Project design document form for small-scale CDM project activities

(Version 08.0)

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

PROJECT DESIGN DOCUMENT (PDD)	
Title of the project activity	9.5 MW wind energy based power generation by Interocean Group
Version number of the PDD	3.1
Completion date of the PDD	30/03/2017
Project participant(s)	Interocean Shipping (I) Pvt. Ltd.
Host Party	India (host)
Applied methodology(ies) and, where applicable, applied standardized baseline(s)	**Methodology**: AMS.I.D: "Grid connected renewable electricity generation" Reference: Version-18, EB-81, valid from–28/11/2014
Sectoral scope(s) linked to the applied methodology(ies)	**Sectoral Scope-I**: Energy industries (renewable/non-renewable sources)
Estimated amount of annual average GHG emission reductions	18045 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The proposed project activity is a bundle project activity involves installation and operation of 5 number of Wind Turbine Generators (WTGs) having individual capacity 3*2000kW (G97) manufactured and supplied by Gamesa Wind Turbines Pvt. Ltd, 1*2000kW manufactured and supplied by Inox Wind, 1*1500kW manufactured and supplied by Regen with aggregated installed capacity of 9.5MW in Madhya Pradesh state of India. The proposed project activity is promoted by Interocean Shipping India Pvt. Ltd., Interocean Shipping Company and Interocean Projects Pvt. Ltd. with a view to align itself with sustainable development policies of India has undertaken this project to produce green power using wind as an energy source.

Description of Project Activity:

The project activity has been undertaken to harness the available wind power potential to generate clean power in Madhya Pradesh. The project activity will install and operate 5 number of sophisticated, state-of art Wind Turbine Generators (WTG) consisting of 4*2000kW and 1*1500kW with aggregated installed capacity of 9.5 MW. The project will generate approximately 18470 MWh of electricity per annum, which will be sold to state electricity board of Madhya Pradesh states of India. All the WTGs of proposed project activity are connected to NEWNE regional grid of India. The project activity will help in green house gas (GHG) emission reduction by using renewable resources (wind energy) for generating power which otherwise would have been generated using grid mix power plants, which is dominated by fossil fuel based thermal power plants. The project activity is a green field project aimed at utilising wind to produce power. The technological details have been provided in Section A.4.3.

The project activity doesn't involve any GHG emission sources. The estimated annual average and the total CO_2e emission reduction by the project activity over the first renewable crediting period of 7 years are expected to be 18045 tCO_2e and **126315** tCO_2e respectively.

The spatial extent of project boundary is the NEWNE grid (NEWNE notation taken based on CO2 Baseline Database version available at the time of PDD published for global stakeholder comments, which is currently merged into one grid as Indian Grid). The project activity will supply electricity to NEWNE grid through transmission lines connected through sub-stations. Since the project activity will generate electricity through wind energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

Unique ID	Village	District	State	Owner
Gch119N	Bardu	Dewas	Madhya Pradesh	Interocean Shipping (I) Pvt. Ltd.
Gch235N	Jamoniya	Dewas	Madhya Pradesh	Interocean Shipping Company
Rh06	Kheda Dhamnar	Mandsaur	Madhya Pradesh	Interocean Shipping Company
R22	Guradiyadas	Dewas	Madhya Pradesh	Interocean Shipping Company
NPY-P-74	Nipaniya	Mandsaur	Madhya Pradesh	Interocean Projects Pvt. Ltd.

Pre-project Scenario/Baseline Scenario:

In the pre project scenario, the equivalent amount of electricity would have been generated by grid connected fossil fuel based power plants.

The project activity is a Greenfield project activity with no power generation facility existing at the project site in the pre-project scenario. In the pre-project scenario equivalent amount of electricity

that would be generated by the project activity and sold to NEWNE grid, would have been generated by grid mix power plants, which is dominated by fossil fuel based thermal power plan.

As established in section B.4, the baseline scenario for the project activity is same as continuation of the pre-project scenario wherein equivalent amount of electricity shall be generated from carbon intensive NEWNE grid. The project activity will thus reduce the anthropogenic emissions of Green House Gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation from the fossil fuel based grid connected power plant.
The PP hereby confirms inline with PDD completion guidelines that the proposed CDM project activity is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs.

Project's Contribution to Sustainable Development
Indian economy is highly dependent on "Coal" as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met.

This results in excessive demands for electricity and places immense stress on the environment. Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of renewable energy (RE) sources.

Government of India has stipulated following indicators for sustainable development in the interim approval guidelines[1] for CDM projects.

1. Social well-being
The proposed CDM project activity leads to direct and indirect employment benefits accruing out of ancillary units for manufacturing towers for erecting the WTG and for maintenance during operation of the project activity; It will lead to development of infrastructure around the project area in terms of improved road network etc. and will also improve in availability of electricity to the region.

2. Economical well-being
Being a renewable resource, using wind energy to generate electricity contributes to conservation precious natural resources. The project contributes to the economic sustainability through promotion of decentralization of economic power, leading to diversification of the national energy supply, which is dominated by conventional fuel based generating units. Locally, improvement in infrastructure will provide new opportunities for industries and economic activities to be setup in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

3. Environmental well-being
The project utilizes wind energy for generating electricity which is a clean source of energy. The project activity will not generate any air pollution, water pollution or solid waste to the environment which otherwise would have been generated through fossil fuels. Also it will contribute to reduction GHG emissions. Thus the project causes no negative impact on the surrounding environment contributing to environmental well-being.

4. Technological well-being
The project activity employs state of art technology i.e. 2MW WTGs which has high power generation potential with optimised utilization of land. Hence, the project leads to technological well-being.
In view of the above, the project participant considers that the project activity profoundly contributes to the sustainable development.

[1] Designated National Authority (CDM India) web site: http://www.cdmindia.gov.in/approval_process.php

A.2. Location of project activity

A.2.1. Host Party

>>
India

A.2.2. Region/State/Province etc.

>>
Madhya Pradesh

A.2.3. City/Town/Community etc.

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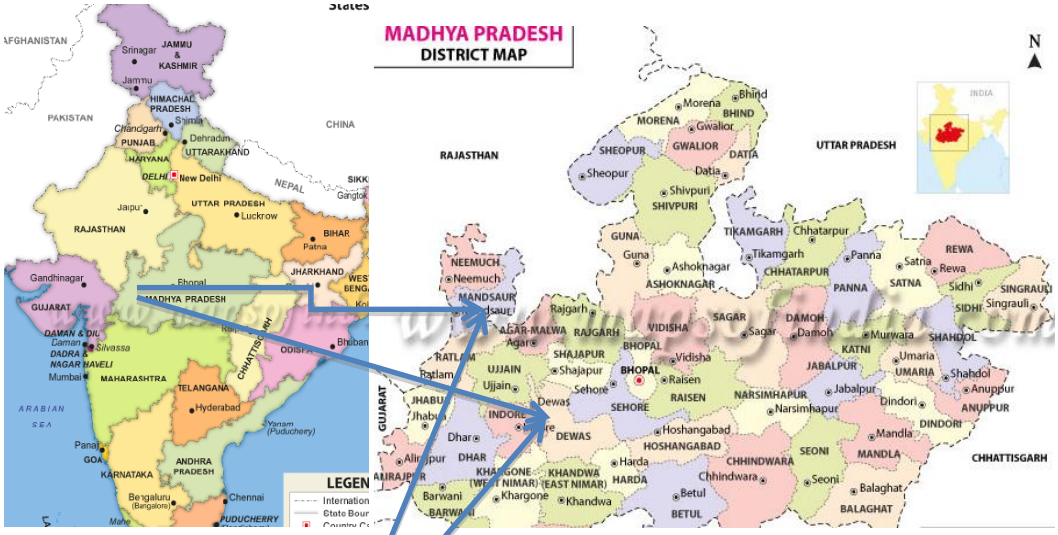
Village-Bardu, District-Dewas, Maddhya Pradesh
Village-Jamoniya, District-Dewas, Maddhya Pradesh
Village- Guradiyadas, District-Dewas, Maddhya Pradesh
Village- Kheda Dhamnar, District-Mandsaur, Maddhya Pradesh
Village- Nipaniya, District-Mandsaur, Maddhya Pradesh

A.2.4. Physical/Geographical location

>>Bardu, Jamoniya, Guradiyadas, Kheda Dhamnar and Nipaniya villages are located in Dewas and Mandsaur district of Madhya Pradesh state about 50-80 km from Indore, nearest airport is at Indore and nearest railway station is Dewas.



The physical address and geographic co-ordinate of WTGs under the project is provided below.

Unique ID	Longitude	Latitude	Address
Gch119N	76^0 16’ 37.16”E	23^0 11’ 0.29”N	Bardu, Dewas, Madhya Pradesh
Gch235N	76^0 18’ 40.64”E	23^0 10’ 55.36”N	Jamoniya, Dewas, Madhya Pradesh
Rh06	75^0 09’ 37.9”E	23^0 53’ 59.66”N	Kheda Dhamnar, Mandsaur, Madhya Pradesh
R22	76^0 18’ 49.48”E	23^0 09’ 5.04”N	Guradiyadas, Dewas, Madhya Pradesh
NPY P-74	75^0 38’ 2.84”E	24^0 17’ 50.44”N	Nipaniya, Mandsaur, Madhya Pradesh

A.3. Technologies and/or measures

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According to Appendix B of the Simplified Modalities and Procedures (M&P) for small-scale CDM project activities, the project activity falls under:

Type: I-Renewable Energy Projects

Category: AMS I. D. - Grid connected renewable electricity generation

Technology/Measure

Wind power technology details – The technology employed, converts wind energy to electrical energy. In wind power generation, energy of wind is converted into mechanical energy and subsequently into electrical energy. The project activity is the installation of an environmentally safe and sound technology since there are no GHG emissions associated with the electricity generation.

The technical specifications of the WTGs have been provided as below.

Unique ID	NPY P-74	Rh06	Gch119N, Gch235N and R22
Turbine model	DF 2000 Inox	V87 Regen	G97 Gamesa
Rated power	2000 kW	1500 kW	2000 kW
Rotor diameter	93.3 m	87 m	97m
Hub height	80 m	85 m	90 m
Turbine Type	TC III B	GL III B	Horizontal axis wind turbine with variable rotor speed
Rated rotational speed	15.9	9-17.3 rpm	9.6-17.8 rpm
No of Blades	3	3	3
Wind cut in speed	3	3 m/s	3 m/s
Rated wind speed	11.5	12 m/s	12 m/s
Cut out wind speed	20	22 m/s	22 m/s
Gear box type	2 planetary & 1 parallel shaft	---	3 stages (1 planetary & 2 parallel)
Generator type	Double fed induction generator	Variable Speed, Multipole Synchronous with Permanent Magnet Excitation	Doubly-fed machine
Braking	Aerodynamic Brake, Full span independent blade pitching, mechanical disc brakes	Aerodynamic Brake, Single Pitch Control/triple redundant	Aerodynamic and emergency mechanical
Output Voltage	690V	690V	690V

The average lifetime of the WTGs under project activity is around 25 years as per the equipment supplier specifications. The plant load factor estimated as Gch119-22.24%, Gch235-22.1%, R22-22.40% (Gamesa) for Dewas, 20.7% (NPYP74 Inox) for Nipaniya, Mandsaur and 24%(Rh06-Regen) for Kheda Dhamnar, Mandsaur assessed by third party.

In the absence of the project activity the equivalent amount of electricity would have been generated by NEWNE grid, which is predominantly based on fossil fuels[2], hence baseline scenario of the project activity is the grid based electricity system, which is also the pre-project scenario. Apart from the above technical specification of WTGs, the connectivity of all the WTGs is to a central Monitoring Station (CMS) through high speed WLAN modem or fibre optic cable, which helps in providing real time status of the turbine at CMS with easy GUI (Graphical User Interface) and ability to monitor the functioning of the turbine from CMS.

A Supervisory Control & Data Acquisition System (SCADA) provides a graphical representation of data providing ease to understand the behaviour of WTG, long time data storage facility, access to daily generation report and power curve related information & helps to analyze the problem with graphical tools offline as well as online. The other specifications include a safety system with instrumentation for tracking individual functions of the wind electric generator.

A.4. Parties and project participants

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

A.5. Public funding of project activity

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The project is not utilizing any public funding form Annex I countries and not creating any diversion of Official Development Assistance (ODA).

A.6. Debundling for project activity

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The project activity is not a debundled component of a larger project activity as explained below.
As per clause 12(c) of the Simplified Modalities and Procedures for small scale clean development mechanism project activities (decision 4/CMP.1, Annex II), "*To use simplified modalities and procedures for small-scale CDM project activities, a proposed project activity shall: Not be a debundled component of a larger project activity, as determined through appendix C to this annex.*"

As per para 9 of the tool "Assessment of de-bundling for SSC project activities, Version 4, EB83, Annex-13), "*A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:*

(a) With the same project participants;

(b) In the same project category and technology/measure; and

(c) Registered within the previous 2 years; and

(d) Whose project boundary is within 1 km of the project boundary of the proposed small- scale activity at the closest point."

[2] http://www.cea.nic.in/executive_summary.html

There is no other project activity by same project proponents applied or registered within previous 2 years with UNFCCC under CDM, whose boundary is within 1km of the boundary of the proposed project activity. Hence, the project activity is not a de-bundled component of a large-scale project activity.

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

B.1. Reference of methodology and standardized baseline

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Following approved baseline & monitoring methodology is applied;
Title: Type-I, Renewable Energy Project
Methodology: I.D. Grid Connected renewable electricity generation
Version: 18, valid from 28/11/2014. Scope: 01, EB 81
Reference: The approved baseline methodology has been referred from the "Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories." http://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

The tools referenced in this methodology used for the proposed project includes:

- Tool to calculate the emission factor for an electricity system Version 05.0.0, Annex 09 of EB 87 Report
- Demonstration of additionality of small-scale Project activities" Version 10 EB 83 Annex 14
- Investment Analysis Version-07, EB92 Annex-5

Guidelines:
General guidelines for SSC CDM methodologies, Version 22.1, EB 86, Annex 13.

B.2. Project activity eligibility

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As per the Para 12 of Simplified M & P for small-scale CDM project activities (FCCC/CP/2002/7/Add.3, Page 21) – "to use simplified modalities and procedures for small-scale CDM project activities, a proposed project activity shall meet eligibility criteria for a small scale CDM project activity[3]" . AMS-I.D. Version 18 has been used and justifications for the eligibility conditions are provided below.

Applicability Conditions	Position of the project activity vis-à-vis applicability conditions
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass a) a) Supplying electricity to a national or a regional grid b) b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity is wind based power generation project with aggregated installed capacity 9.5MW that will sale the generated renewable electricity to NEWNE regional grids.
2. Illustration of respective situations under which each of the methodology (i.e. "AMS-I.D.: Grid connected renewable electricity generation", "AMS-I.F.: Renewable	As per Table No 2 of AMS – I. D. / Version 18, the AMS I.D is applicable to the project activity.

[3] http://cdm.unfccc.int/Reference/Documents/AnnexII/English/annexII.pdf

Applicability Conditions	Position of the project activity vis-à-vis applicability conditions
electricity generation for captive use and mini-grid" and "AMS-I.A.: Electricity generation by the user) applies is included in the appendix.	
3. This methodology is applicable to project activities that (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	The project activity is installation of a Greenfield project activity. PPs doesn't have any WTG at the project site prior to the implementation of the project activity.
4. Hydro power plants with reservoirs [4] that satisfy at least one of the following conditions are eligible to apply this methodology: • a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • b) The project activity is implemented in an existing reservoir [5], where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m2; • c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m2.	The project activity is a wind power plant. Hence, not applicable
5. If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co fires fossil fuel[6], the capacity of the entire unit shall not exceed the limit of 15MW.	The project activity is only 9.5MW Wind based renewable electricity generation project. It does not include any non-renewable unit and co-firing system.
6. Combined heat and power (co-generation) systems are not eligible under this category.	The project activity does not involve combined heat and power generation system as it is only a wind power project.
7. In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the	It is a Greenfield project and not the extension of an existing renewable energy facility.

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

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

[6] Co-fired system uses both fossil and renewable fuels.

Applicability Conditions	Position of the project activity vis-à-vis applicability conditions
units added by the project should be lower than 15 MW and should be physically distinct[7] from the existing units.	
8. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	The project activity is not the retrofitting or replacement of an existing facility for renewable energy generation. Hence this criteria in not applicable.
9.In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	The proposed project activity is a wind power project, hence criterion not applicable.
10.In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	The proposed project activity is a wind power project, hence criterion not applicable.

Table 2: Applicability of AMS-I.D, AMS-I.F and AMS-I.A based on project types

	Project type	AMS-I.A	AMS-I.D	AMS-I.F
1	Project supplies electricity to a national/regional grid		√	
2	Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)			√
3	Project supplies electricity to an identified consumer facility via national/regional grid (through a contractual arrangement such as wheeling)		√	
4	Project supplies electricity to a mini grid[8] system where in the baseline all generators use exclusively fuel oil and/or diesel fuel			√
5	Project supplies electricity to household users (included in the project boundary) located in off grid areas	√		

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

[8] The sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW.

The project activity is installation of 9.5MW of wind power and there would not be any change in the capacity of the project during its crediting period. Since the project will sale the generated renewable electricity to Madhya Pradesh State Electricity Boards, which is part of NEWNE regional grid system and the capacity of the project activity is well below the qualifying limit of 15 MW. Hence the choice of project Type I and category is justified.

B.3. Project boundary

As per Para 18 of applied baseline and monitoring methodology AMS I.D, Version-18 / EB 81 the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to. This includes the wind turbine installation, pooling and sub-stations.

The proposed project activity evacuates the power to the NEWNE regional grid. Therefore, all the power plants contributing electricity to the Integrated NEWNE regional grids have been considered in the project boundary for the purpose of baseline estimation. The project activity targets reduction of CO_2e as main GHG greenhouse gas in baseline, there are no GHG emission associated with project activity.

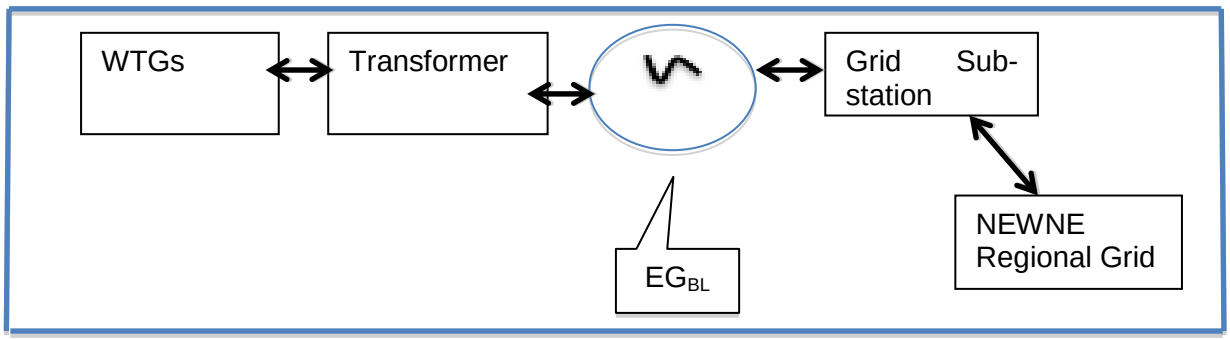

Fig: Project Boundary

B.4. Establishment and description of baseline scenario

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The project activity involves installation of wind turbine generators for the generation of electrical energy. This project activity comprises 5 WTGs in which the generated power will be sold to the NEWNE regional grid, possesses a mix of generation types with fossil fuel fired power plants.

As per para 19 of AMS-I.D. (Version 18) "The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid. Project activity supplies electricity to NEWNE regional grid of India. In the absence of the project activity same amount electricity would have been generated from NEWNE regional grid, in which the electricity is generated by the fossil fuel intensive power plant (Coal based). Thus baseline is in line with para 19 of AMS-I.D. (Version 18).

Para 22 of AMS-I.D. (Version 18) calculates baseline emissions as:

$BE_y = EG_{PJ,y} \times EF_{grid,.y}$. .....(A)

Where,

BE_y = Baseline Emissions in year y; t CO2

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{grid,.y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

Accordingly, the emission factor of the grid will be used to estimate emission reductions. As per para 23 of AMS-I.D. (Version 18), PP has chosen option (a) and used the combined margin (CM) approach to calculate emission factor, as official data is available for operating margin (OM) and build margin (BM) values, whereas no such data exists in the public domain to support choice of option (b). Hence,

$EF_{grid,.y} = EF_{grid,CM,y}$ .....(B)

DATA USED

Parameters	**Description**	**Source**
$EF_{OM,y}$	Operating margin CO_2 emission factor for the project electricity system in year *y*	**Calculated as per "*Tool to calculate the emission factor for an electricity system (Version 05.0.0)*" using data from Central Electricity Authority of India's (CEA) "*Baseline Carbon Dioxide Emission Database Version 10.0*"** [9]
$EF_{BM,y}$	Build margin CO_2 emission factor for the project electricity system in year *y*	
$EF_{grid,y}$	Combined margin CO_2 emission factor for the project electricity system in year *y*	
$EG_{PJ,y}$	Quantity of net electricity supplied by the candidate project activity to the grid in year *y (18470MWh)*	Estimated generation based on rated capacity of the project activity and the applicable PLF. During the crediting period, records of actual net electricity supply to the grid will be used.
PLF	NPYP74-20.7%, Gch235-22.1%, Gch119-22.24%, R22-22.4%	Third party assessment report for 2MW WTG for respective location
PLF	Rh06-24%	Third party assessment report for 1.5 MW

This data is published by Central Electricity Authority (CEA) (a statutory body constituted under Electricity Act and having its office attached to Ministry of Power, Government of India) on their website (www.cea.nic.in). "Baseline Carbon Dioxide Emission Database Version 10.0" is the latest available data at the time of publication of the PDD for global stakeholder consultation and is, therefore, being used in calculation of the baseline emissions.

B.5. Demonstration of additionality

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In accordance with "demonstration of additionality of small scale project activity" Version-10.0, PP shall provide an explanation to show that the project activity would not have occurred due to at least one of the following barrier

-Investment barrier
-Technological barrier
-Barrier due to prevailing practice
-Other barriers

[9] http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver10.pdf

The project proponent identified “investment barrier” as the most relevant barrier faced by the project activity. The investment barrier faced by the project activity consists of barrier due to high capital cost and consequent impact on return.

Investment analysis:

The purpose of investment analysis is to determine whether the project activity is economically or financially less attractive than other alternatives without additional funding that may be derived from the CDM project activity. The investment analysis was conducted in accordance with guidelines on investment analysis.

As per tool Investment Analysis, " *If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate."*

Also the guideline says that *"The purpose of an investment analysis in the context of the CDM is to determine whether the project is less financially attractive than at least one alternative in which the project participants could have invested. In cases where the alternative requires investment anyhow and baseline emissions are based on that alternative, the only means of determining that the project activity is less financially attractive than at least one alternative is to conduct an investment comparison analysis. The benchmark approach is therefore suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest*".

In the proposed project activity, the baseline scenario is the generation of equivalent amount of electricity from the grid-connected power plants, owing to which, it is outside the direct control of the project proponent. Hence, the benchmark analysis approach has been adopted.

The project proponent proposes to use benchmark analysis approach to prove additionality. IRR is the most suitable and commonly used financial indicator. Hence, PP has used post tax-equity IRR as financial indicator.

Selection of financial indicator:

In order to analyse the financial viability of the project activity, the prime financial indicator that has been used is the equity IRR of the project activity. The equity IRR is one of the most commonly used tools to assess the feasibility and viability of the projects. Since the project developer is demonstrating the financial unattractiveness of the project, equity IRR is appropriate as it is often used by the project developers to make a decision on investing in the project. Hence, post tax-equity IRR is considered the financial indicator for demonstrating the additionality of the project.

Selection of benchmark:

As per tool Investment Analysis, *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; or by (b) calculating the cost of equity using CAPM.*

PP has considered the value of 11.06% provided as the default Return on Equity (ROE) value in *Appendix Defualt value for expected return on equity of the tool*.

Further as per tool PP has chosen option a) selecting the values provided in Appendix; Project participant has considered the benchmark based on equity indices. Cost of equity has been estimated based on the values provided in Appendix. As per the values, Cost of Equity can be estimated as below using fisher formula–

Return on equityNominal = (1+ Return on equityReal)*(1+Inflation rateHost country) – 1

Apart from the default values of ROE provided in Appendix, para 1 of Appendix is also used to finally arrive at the value of the benchmark. As per the same, “i*n 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. The inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period. If this information is not available, the target inflation rate of the central bank shall be used."

The Reserve bank of India (RBI) provides the bi-monthly forecast (for the next 5 years and 10 years) for the inflation. For the first bimonthly report of 2015 (published dated 03/02/2015), RBI forecasted values for the next ten years for WPI inflation has been used to adjust the default value of ROE, which is given in real terms as per below for respective WTGs.

Long term WPI for 10 years forecast applicable to WTGs under project activities are as below 4%[10] applicable for WTGs under proposed project activity as the same was available to PP at the time of investment decision date i.e. 06/02/2015 and 16/02/2015.

WTGs	Investment Decision Date	WPI value (10 years forecast)	Source
NPY P-74	06/02/2015	4.0	https://rbi.org.in/Scripts/PublicationsView.aspx?id=16202
R-22, GCH 235N, GCH 119N, RH-06	16/02/2015	4.0	https://rbi.org.in/Scripts/PublicationsView.aspx?id=16202

Therefore,
Return on equity$_{Nominal}$ = (1+ 11.06%)*(1+4%) – 1=15.50%

Hence, the return on equity 15.50% for the project activity is considered as benchmark value.

Post Tax Equity Calculation:
As per the tool Investment Analysis version 07, "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 period considered for Post Tax Equity IRR calculations is 25 years, which corresponds to the operational lifetime of the project activity.

Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, is added back to net profits for the purpose of calculating the financial indicator.

The following table illustrates the assumptions used for the calculation of the financial indicator i.e. Post Tax Equity IRR for the given project activity. The use of these parameters indicating if they are assumed or based on actual figures is explained in the table. All the relevant costs and revenues for the project activity have been considered for calculation of Post Tax Equity IRR.

Key Assumption for Financial Analysis
In line with investment analysis guideline of EB, the assumptions used for the determination of *post-tax* Equity IRR for the proposed project activity at the time of project decision are given below

2MW WTG (Gamesa)-Guradiyadas

[10]https://rbi.org.in/Scripts/PublicationsView.aspx?id=16202

Capacity of Machines in kW	2000	Offer Letter from Gamesa dated 02/02/2015
Number of Machines	1	Offer Letter from Gamesa dated 02/02/2015
Project Capacity in MW	2	Offer Letter from Gamesa dated 02/02/2015
Project Cost (INR. In Millions)	160	Offer Letter from Gamesa dated 02/02/2015
Plant Load Factor Base Case	22.4%	Third party PLF report dated 06/02/2015
Net Electricity Generation per year(MWh)	3924	Calculated
Operation & Maintenance Cost (INR Million)	1.9	Offer Letter from Gamesa dated 02/02/2015
% of escalation per annum on O & M Charges every year after 2nd Year	5.0%	Offer Letter from Gamesa dated 02/02/2015
Tariff Rate of Electricity(INR/kWh)	5.92	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Equity	30%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Debt	70%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Interest Rate	14.55%	Calculated as average of BPLR of five major bank
Loan Tenure (years)	10	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Rate of Depreciation (As per Books) on Plant and Machinery	4.75%	Company's act, Shcedule XIV, http://asa-india.com/Depreciation%20Rates%20Companies%20Act.pdf
Book depreciation	90%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Residual Value (%)	10%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Rate of Depreciation (As per Income Tax)	80%	Income tax Act http://www.incometaxindia.gov.in/communications/notification/notification43_2014.pdf
MAT Rate	20.01%	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Corporate Tax	32.45%	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Lifetime of the project activity (years)	25	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf

2MW WTG (Gamesa)-Bardu		
Capacity of Machines in kW	2000	Offer Letter from Gamesa dated 02/02/2015
Number of Machines	1	Offer Letter from Gamesa dated 02/02/2015
Project Capacity in MW	2	Offer Letter from Gamesa dated 02/02/2015
Project Cost (INR. In Millions)	160	Offer Letter from Gamesa dated 02/02/2015
Plant Load Factor Base Case	22.24%	Third party PLF report dated 06/02/2015
Net Electricity Generation per year(MWh)	3896	Calculated
Operation & Maintenance Cost (INR Million)	1.9	Offer Letter from Gamesa dated 02/02/2015

% of escalation per annum on O & M Charges every year after 2nd Yea	5.0%	Offer Letter from Gamesa dated 02/02/2015
Tariff Rate of Electricity(INR/kWh)	5.92	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Equity	30%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Debt	70%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Interest Rate	14.55%	Calculated as average of BPLR of five major bank
Loan Tenure (years)	10	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Rate of Depreciation (As per Books) on Plant and Machinery	4.75%	Company's act, Shcedule XIV, http://asa-india.com/Depreciation%20Rates%20Companies%20Act.pdf
Book depreciation	90%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Residual Value (%)	10%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Rate of Depreciation (As per Income Tax)	80%	Income tax Act http://www.incometaxindia.gov.in/communications/notification/notification43_2014.pdf
MAT Rate	20.01%	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Corporate Tax	32.45%	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Lifetime of the project activity (years)	25	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf

2MW WTG (Gamesa)-Jamonia		
Capacity of Machines in kW	2000	Offer Letter from Gamesa dated 02/02/2015
Number of Machines	1	Offer Letter from Gamesa dated 02/02/2015
Project Capacity in MW	2	Offer Letter from Gamesa dated 02/02/2015
Project Cost (INR. In Millions)	160	Offer Letter from Gamesa dated 02/02/2015
Plant Load Factor Base Case	22.1%	Third party PLF report 06/02/2015
Net Electricity Generation per year(MWh)	3871	Calculated
Operation & Maintenance Cost (INR Million)	1.9	Offer Letter from Gamesa dated 02/02/2015
% of escalation per annum on O & M Charges every year after 2nd Year	5.0%	Offer Letter from Gamesa dated 02/02/2015
Tariff Rate of Electricity(INR/kWh)	5.92	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Equity	30%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Debt	70%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Interest Rate	14.55%	Calculated as average of BPLR of five major bank

Loan Tenure (years)	10	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Rate of Depreciation (As per Books) on Plant and Machinery	4.75%	Company's act, Shcedule XIV, http://asa-india.com/Depreciation%20Rates%20Companies%20Act.pdf
Book depreciation	90%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Residual Value (%)	10%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Rate of Depreciation (As per Income Tax)	80%	Income tax Act http://www.incometaxindia.gov.in/communications/notification/notification43_2014.pdf
MAT Rate	20.01%	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Corporate Tax	32.45%	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Lifetime of the project activity (years)	25	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf

1*2MW WT (Inox)_Nipaniya		
Capacity of Machines in kW	2000	Offer Letter from Inox dated 04/02/2015
Number of Machines	1	Offer Letter from Inox dated 04/02/2015
Project Capacity in MW	2	Offer Letter from Inox dated 04/02/2015
Project Cost (INR. In Millions)	140	Offer Letter from Inox dated 04/02/2015
Plant Load Factor Base Case	20.7%	Third party PLF report dated 15/03/2016
Net Electricity Generation per year(MWh)	3626	Calculated
Operation & Maintenance Cost (INR Million)	2	Offer Letter from Inox dated 04/02/2015
% of escalation per annum on O & M Charges every year after 2nd Year	5.0%	Offer Letter from Inox dated 04/02/2015
Tariff Rate of Electricity(INR/kWh)	5.92	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Equity	30%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Debt	70%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Interest Rate	14.55%	Calculated as average of BPLR of five major bank
Loan Tenure (years)	10	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Rate of Depreciation (As per Books) on Plant and Machinery	4.75%	Company's act, Shcedule XIV, http://asa-india.com/Depreciation%20Rates%20Companies%20Act.pdf
Book depreciation	90%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Residual Value (%)	10%	CERC order dated 26/04/2010

		http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Rate of Depreciation (As per Income Tax)	80%	Income tax Act http://www.incometaxindia.gov.in/communications/notification/notification43_2014.pdf
MAT Rate	20.01%	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Corporate Tax	32.45%	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Lifetime of the project activity (years)	25	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf

1*1.5MW WTG MP (Regen)		
Capacity of Machines in kW	1500	Offer letter from Regen dated 10/02/2015
Number of Machines	1	Offer letter from Regen dated 10/02/2015
Project Capacity in MW	1.5	Offer letter from Regen dated 10/02/2015
Project Cost (INR. In Millions)	110	Offer letter from Regen dated 10/02/2015
Plant Load Factor Base Case	24%	Third party PLF report dated 16/02/2015
Net Electricity Generation per year (MWh)	3153	Calculated
Operation & Maintenance Cost (INR Million)	1.7	Offer letter from Regen dated 10/02/2015
% of escalation per annum on O & M Charges every year after 2nd Year	5.0%	Offer letter from Regen dated 10/02/2015
Tariff Rate of Electricity(INR/kWh)	5.92	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Equity	30%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Debt	70%	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Interest Rate	14.55 %	Calculated as average of BPLR of five major bank
Loan Tenure (years)	10	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf
Rate of Depreciation (As per Books) on Plant and Machinery	4.75%	Company's act, Shcedule XIV, http://asa-india.com/Depreciation%20Rates%20Companies%20Act.pdf
Book depreciation	90%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Residual Value (%)	10%	CERC order dated 26/04/2010 http://www.cercind.gov.in/2010/ORDER/April10/Final_RE_Tariff_Order_FY2010-11(53-2010_Suo-motu).pdf
Rate of Depreciation (As per Income Tax)	80%	Income tax Act http://www.incometaxindia.gov.in/communications/notification/notification43_2014.pdf
MAT Rate	20.01 %	http://www.incometaxindia.gov.in/booklets%20%20pamphlets/12.pdf
Corporate Tax	32.45	http://www.incometaxindia.gov.in/booklets%20%20p

	%	amphlets/12.pdf
Lifetime of the project activity (years)	25	http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf

Post Tax Equity IRR for the WTGs and Solar PV based power project under proposed project activity is given in table below against the benchmark values. Thus, it is evident that the project is not financially attractive.

WTGs	Investment Decision Date	IRR	Benchmark
Gch119N_Bardu_Gamesa	16/02/2015	9.66%	15.50%
Gch235N_Jamoniya_Gamesa	16/02/2015	9.50%	15.50%
Rh06_(Regen)	16/02/2015	13.50%	15.50%
R22 _Gamesa	16/02/2015	9.85%	15.50%
NPY P-74_Inox	06/02/2015	11.08%	15.50%

Sensitivity Analysis

To check the robustness of the project's financial return calculation subjecting critical parameters to reasonable variation has tested it. The robustness of the conclusion drawn above, namely that the project is not financially attractive, has been tested by subjecting critical assumptions to reasonable variation. The 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. PPs have identified the total revenue from the project activity is dependent on the Plant Load Factor and Project Cost, O&M Costs constitute more than 20% of the project costs. These factors have been subjected to a 10% variation on either side and the results of the sensitivity analysis so conducted are given in the following tables.

1*2MW (Gamesa)_Bardu

FACTOR	VARIATION			Breaching value
	-10%	0%	+10%	
Project Cost	12.26%	9.66%	7.43%	-19.59%
O&M Cost	9.86%	9.66%	9.37%	-217.6%
PLF	6.81%	9.66%	12.28%	21.82%
Tariff	6.81%	9.66%	12.28%	21.82%
Benchmark	**15.50%**			

1*2MW (Gamesa)_Jamoniya

FACTOR	VARIATION			Breaching value
	-10%	0%	+10%	
Project Cost	12.07%	9.50%	7.25%	-20.15%
O&M Cost	9.79%	9.50%	9.19%	-224.0%
PLF	6.63%	9.50%	12.10%	22.60%
Tariff	6.63%	9.50%	12.10%	22.60%
Benchmark	**15.50%**			

1*1.5MW (Regen)

FACTOR	VARIATION			Breaching value
	-10%	0%	+10%	
Project Cost	16.73%	13.50%	10.96%	-6.5%
O&M Cost	13.87%	13.50%	13.13%	-54.7%
PLF	10.32%	13.50%	16.77%	6.17%
Tariff	10.32%	13.50%	16.77%	6.17%
Benchmark	**15.50%**			

1*2MW (Gamesa)_Guradiyadas

FACTOR	VARIATION			Breaching value
	-10%	0%	+10%	
Project Cost	12.47%	9.85%	7.63%	-18.94%
O&M Cost	10.07%	9.85%	9.56%	-210.3%
PLF	7.02%	9.85%	12.49%	20.98%
Tariff	7.02%	9.85%	12.49%	20.98%
Benchmark	**15.50%**			

1*2MW (Inox)_Nipaniya

FACTOR	VARIATION			Breaching value
	-10%	0%	+10%	
Project Cost	12.21%	11.08%	10.55%	-31.45%
O&M Cost	11.39%	11.08%	10.77%	-150.0%
PLF	8.13%	11.08%	13.93%	15.34%
Tariff	8.13%	11.08%	13.93%	15.34%
Benchmark	**15.50%**			

An analysis has been done to identify the percentage variation at which the financial indicators will equal/breach the benchmark and the probability of its occurrence. Based on sensitivity analysis it can be consluded that the proposed project activity is additional with reasonable variation in values and is not likely to reach the benchmark value.
An analysis has been done to identify the percentage variation at which the financial indicator wills equal/breach the benchmark and the probability of its occurrence. The occurrence of these events is unlikely for the following reasons:

a) PLF: The PLF value considered is based on Third Party PLF report i.e. 22.4%, 22.24%, 22.1%, and 20.7% for 1*2MW Gamesa (Guradiyadas), 2MW Gamesa (Bardu), 2MW Gamesa (Jamoniya), and 2MW Inox (Nipaniya), the PLF will breach the benchmark value at an increase in PLF value by more than 15.34%. Further for 1.5MW Regen the PLF is considered as 24%, wherein an increase in PLF by 6.17% will breach the benchmark. The increase in PLF value to breach the benchmark is highly unlikely as the normative PLF for the state of Madhya Pradesh is published by state electricity regulatory commission as 20%, given the analysis above its highly unlikely that PLF will increase above breaching value.

b) Project Cost: The project cost considered for investment analysis for 1*2MW Gamesa (Guradiyadas), 2MW Gamesa (Bardu), 2MW Gamesa (Jamoniya), and 2MW Inox (Nipaniya) are sourced from offer letter, the actual project cost incurred by the PP is well within 10% sensitivity range of the investment cost considered at the time of investment analysis. As the project cost has already been incurred by the PP, further reduction in the same is not possible. Moreover it is observed that the breaching value for 1.5MW Regen is 6.5%, however the actual project cost is 5.2% lower than considered in investment analysis, hence breach in benchmark value is not possible.

c) O&M Costs: The sensitivity analysis reveals that O&M will breach the benchmark at negative values and is hypotheical case. Since the O&M cost is subject to escalation (as evidence by the O&M agreement) and also subject to inflationary pressure, any reduction in the O&M costs is highly unlikely. Hence, the reduction in the O&M cost is highly unlikely.

d) Tariff: The Tariff rate of electricity used for investment analysis i.e. 5.92 INR/kWh are sourced from the offer letters, the same has been also confirmed from tariff orders of respective states applicable to project activity at the time of investment decision. Furthermore, these tariffs will be fixed for lifetime of the project activity, hence this is not a likely scenario.

The above analysis proves that varying the parameters does not lead to a Post Tax Equity IRR without CDM revenue, which will cross the benchmark value.

The carbon revenue from the project activity would provide significant amount of returns from the sale of the Emission Reductions accrued from the project activity and in turn increase the financial attractiveness of the project activity and hence make the project activity more financially viable.

Prior CDM consideration:

As per the "Guidelines on the demonstration and assessment of prior consideration of the CDM", Version 04, EB 62, "*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. Such notification must be made within six months of the project activity start date*"

The start date for the project activity is 27/02/2015 (Date of Purchase Order of first WTG i.e. R22). The project proponent intimated the UNFCCC and DNA of their intention to seek CDM status on 29/04/2015, which is within six months of the project start date. Further as other WTGs purchase order released later the same has been also notified to UNFCCC and DNA on 05/12/2015, wherein first WTG i.e. R22 is also included as re-notification. This is in line with the guidance quoted above.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

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As per para 22 of AMS-I.D. (Version 18), baseline emission are calculated as follows:

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

Where,

BE_y = Baseline Emissions in year y; t CO2

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{grid,.y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

Calculation of $EG_{PJ,y}$

As proposed project activity is a greenfield project, in accordance with para 26 of applied methodology

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

Where,

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

Calculation of BEy

Calculation of baseline emissions i.e. BEy, requires calculation of grid emission factor ($EF_{grid,y}$), which is being presented below.

As per para 23 of the applied methodology, the emission factor can be calculated in a transparent and conservative manner as follows:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the Emission Factor for an electricity system"; or

(b) The weighted average emissions (in t CO_2/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

The PP has chosen option a i.e. combined margin (CM) consisting of combination OM and BM. Tool to calculate the emission factor for an electricity system (Version 05.0.0), has been used to determine the CO_2 emission factor for displacement of electricity generated by power plants in an electricity system, by calculating the combined margin emission factor (CM) of that electricity system. As per the tool, PP has applied the following six steps:

Step 1: Identify the relevant electricity systems.
Indian electricity system comprises of two regional electricity grids i.e. NEWNE regional grid.

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

Notably, regional grid represents the largest electricity system where power plants can be dispatched without significant constraints and, thus, forms the project electricity system for a project activity delivering electricity into it. The proposed project activity is located in Madhya Pradesh state of India, which is connected to the NEWNE regional grid of India, it, therefore, can be identified as the project electricity system.

Additionally, some amount of power exchange invariably takes place between these regional grids, while a small exchange also occurs with few neighbouring countries like Bhutan & Nepal. All these grids, therefore, form a connected electricity system.

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.

Project Participant has chosen Option I i.e. only including grid power plants in the calculation of operating margin and build margin emission factor, since data for the same is available from Central Electricity Authority which is an official source. No official data is available publicly for off grid power plants.

Step 3: Select a method to determine the operating margin (OM), $EF_{grid,OM,y}$

According to the tool the calculation of the operating margin emission factor 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.

PP has chosen Option (a) i.e. simple OM, to determine the operating margin. Other available options in the tool were ruled out considering the fact that data required to calculate simple adjusted OM or dispatch data analysis is not available publically. As per the tool, low cost/must run resources typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. Data for the same, as published by Central Electricity Authority, has been presented below which illustrates that low cost/must run resources constitute less than 50% of total NEWNE regional grid generation, hence, the average OM method could not have been used.

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

The above data clearly shows that the percentage of total grid generation by low cost/must run plants (on the basis of average of five most recent years) for the NEWNE regional grid is less than 50 % of the total generation.

As per tool to calculate emission factor for an electricity system (Version 05.0.0), 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. Since the low cost/must run resources constitute less than 50% of total grid generation as seen from the average of five most recent years, the Simple OM method can be used to calculate the Operating Margin Emission factor.

PP has chosen ex ante option, thus, no monitoring and recalculation of the emissions factor during the crediting period is required. PP has considered a data vintage of 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.

Step 4: Calculate the operating margin emission factor according to the selected method
The simple OM emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units.

The simple OM may be calculated:

Option A: Based on the net electricity generation and a CO2 emission factor of each power unit; or
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

The Central Electricity Authority, Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. The CO2 Baseline Database provides information about the Combined Margin Emission Factors of all the regional electricity grids in India. The Combined Margin in the CEA database is calculated ex ante using the guidelines provided by the UNFCCC in the “Tool to calculate the emission factor for an electricity system, Version 05.0.0”. We have, therefore, used the Combined Margin data published in the CEA database, for calculating the Baseline Emission Factor.

As per „Tool to calculate the emission factor for an electricity system", Option A ("Based on the net electricity generation and a CO2 emission factor of each power unit") is used to calculate simple OM emission factor. Where Option A is used, the simple OM emission factor is calculated based on the electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \Sigma (EG_{m,y} \times EF_{EL,m,y}) / \Sigma EG_{m,y}$$

Where:

$EF_{grid,OMsimple,y}$ Simple operating margin CO2 emission factor in year y (tCO2/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 (tCO2/MWh)

m All power units serving the grid in year y except low-cost / must-run power units y the relevant year as per the data vintage chosen in STEP 3

The CO_2 emission factor ($EF_{EL,m,y}$) data for simple OM, available under the CEA database (Version 10.0) for the last three years is as follows.

Net generation in operating margin GWh including import			
	2011-2012	2012-13	2013-14
NEWNE	508004	546941	569216

Simple operating margin(tCO_2/MWh) (Incl Import)			
	2011-2012	2012-13	2013-14
NEWNE	0.9699	0.9919	0.9952

Weighted Avg. Operating Margin is

= (508004*0.9699+546941*0.9919+569216*0.9952)/ (508004+546941+569216)
= 0.98620

Step 5: Calculate the build margin (BM) emission factor, $EF'_{grid',BM,y}$

The project participants have chosen Option I, i.e. fixing 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.

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

$$\mathbf{EFgrid_{BM,y} = \Sigma(EG_{m,y} X EF_{EL,m,y}) / \Sigma EG_{m,y}}$$

Where:
$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (t CO_2 e/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* (t CO_2 e/MWh)
m = Power units included in the build margin
y = Most recent historical year for which power generation data is available

The CO2 emission factor of each power unit m (EFEL,m,y) is determined as per the procedures given in step 4 (a) for the simple OM, using options A1B1 using for y the most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

The build margin emission factor ($EF_{grid,BM,y}$) for the year 2013-14 (most recent year) for NEWNE grid is 0.94954 tCO_2/MWh.

CEA's "CO2 Baseline Database for the Indian Power Sector" Version 10.0,.

Build Margin (tCO2/MWh) (not adjusted for imports)	
	2013-2014
NEWNE	0.94954

Step 6: Calculate the combined margin (CM) emissions factor
The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for wind energy based power generation types such as, the 'Tool to calculate the emission factor for an electricity system (Version 05.0.0)', allows to weigh the operating margin and Build margin at 75% and 25%, respectively

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

$= (EF_{OM,y} \times 75\%) + (EF_{BM,y} \times 25\%)$

Electronic spreadsheet showing calculation of all these parameters is being submitted separately and the final values are presented below:

Parameter	Value	Units
Operating Margin : $EF_{OM,y}$	0.98620	tCO2e/MWh
Build Margin : $EF_{BM,y}$	0.94954	
Combined Margin : $EF_{CM,y}$	=0.98620*75%+0.94954*25%	
Combined Margin : $EF_{grid,y}$	0.97704	

B.6.2. Data and parameters fixed ex ante

Data / Parameter	**$EF_{OM, y}$**
Unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor for the NEWNE Grid in year y
Source of data	CEA's "*Baseline Carbon Dioxide Emission Database Version 10.0* "
Value(s) applied	0.98620
Choice of data or Measurement methods and procedures	Calculated in line with "*Tool to calculate the emission factor for an electricity system (Version 05.0.0)*" using data from Central Electricity Authority of India's (CEA) "*Baseline Carbon Dioxide Emission Database Version 10.0*". The value used is calculated ex-ante as generation based weighted average of last three years of the operating margin provided in the CEA database. Weighted average = $\sum_{i=1 \text{ to } n}$ (Net generation in operating margin in year i * Simple operating margin in year i)/$\sum_{i= 1 \text{ to } n}$ (Net generation in operating margin of year i)
Purpose of data	Calculation of baseline emissions
Additional comment	The value is fixed ex-ante

Data / Parameter	**$EF_{BM, y}$**
Unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor for the NEWNE Grid in year y
Source of data	CEA's "*Baseline Carbon Dioxide Emission Database Version 10.0* " http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver10.pdf
Value(s) applied	0.94954
Choice of data or Measurement methods and procedures	Calculated in line with "*Tool to calculate the emission factor for an electricity system (Version 05.0.0)*" using data from Central Electricity Authority of India's (CEA) "*Baseline Carbon Dioxide Emission Database Version 10.0*". The value is calculated ex-ante as most recent build margin provided by the CEA.
Purpose of data	Calculation of baseline emissions
Additional comment	The value is fixed ex-ante

Data / Parameter	**$EF_{grid, y}$**
Unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor for the NEWNE Grid in year y
Source of data	Central Electricity Authority(CEA) of India Database *Version 10.0* http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver10.pdf
Value(s) applied	0.97704
Choice of data or Measurement methods and procedures	This has been calculated based on Operating Margin (OM) and Build Margin (BM) published by Central Electricity Authority (CEA) of India. Please refer section B.6.1 for details.
Purpose of data	Calculation of baseline emissions
Additional comment	The value is fixed ex-ante

B.6.3. Ex ante calculation of emission reductions

>>

This is a renewable power generation project, the entire power generated from the project activity will be supplied to NEWNE grid. This form of energy generation has no associated GHG

emissions. So, the emission reductions will just depend on the quantity of electricity being supplied to the regional grids, which would have been otherwise generated in grid.

Baseline emissions:
Baseline emission is calculated as per equation (1) in section B.6.1

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

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

$EG_{PJ,y}$ = (2MW*20.7%+2MW*22.1%+2MW*22.4%+ 2MW*22.24% + 1.5MW*24%)* 365days * 24 hours = 18470 MWh (rounded down)

PLF has been taken from the third party Report.
Here,
$EF_{grid,y}$ =*0.97704 tCO_2/MWh*

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

BEy = 18470*0.97704

BEy =18045 tCO_2/year (rounded down)

Project emissions:
Not applicable as this is a wind energy based power generation project.
PE y = 0

Leakage emissions:
No leakage emissions occur due to this project activity.
LE y = 0

Emission reductions:

ER y = BE y – PE y – LE y
or
ERy = BEy as PEy = 0 and LEy = 0
ER y = 18045 tCO_2/annum

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

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
2017-18	18045	0	0	18045
2018-19	18045	0	0	18045
2019-20	18045	0	0	18045
2020-21	18045	0	0	18045
2021-22	18045	0	0	18045
2022-23	18045	0	0	18045
2023-24	18045	0	0	18045
Total	126315	0	0	126315
Total number of crediting years	7			

Annual average over the crediting period	18045	0	0	18045

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter	$EG_{PJ, y}$
Unit	MWh / year
Description	Net electricity supplied to the NEWNE grid facility by the project activity
Source of data	Share certificate issued by Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Ltd. (MPPKVVCL)
Value(s) applied	18470
Measurement methods and procedures	The net electricity exported to the grid by project activity WTG will be ascertained by government agency Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Ltd. (MPPKVVCL) on the basis of energy meter reading at substation (includes generation from project and non-project WTGs) and meter readings at transformer. On the basis of the meter reading and gross generation at controller installed at individual WTGs, apportioning is carried out in order to estimate the net electricity generated by the project activity. Apportioning is discussed in detail in the subsequent sections. The net electricity generated by the project activity will be calculated from net electricity supplied to grid from the share certificate issued by state utility (currently MPPKVVCL) on monthly basis for respective WTGs. The amount of energy supplied by the WTGs are continuously monitored and recorded once a month. Continuous monitoring and monthly recording is carried out.
Monitoring frequency	Continuous monitoring, monthly recording
QA/QC procedures	The energy meter will be calibrated as per standard practice adopted by State Nodal agency responsible for calibration of meter. The energy meters at the substation is of 0.2S accuracy class Calibration of the TVM/ABT meter will be done at least once in 3 year. The net electrity supplied to grid used for emission reduction calculation will also be checked from monthly bills raised by PP to DISCOM.
Purpose of data	Calculation of baseline emissions
Additional comment	. All the data will be archived till a period of two years from the end of the crediting period.

B.7.2. Sampling plan

>>

This project includes 5 WTGs under proposed project activity; the energy generated will be monitored and recorded for all WTGs for the CDM Project activity without any sampling procedure.

B.7.3. Other elements of monitoring plan

>>

The project activity is operated and managed by the project proponent with the help of site in charge (personal from the project proponent) and site O & M contractor (respective personal from the wind turbine manufacturer). The project proponent has entered into comprehensive Operation & Maintenance contract with each of his supplier of Wind Electric Generators (INOX, Regen Powertech and Gamesa).

There are two meters installed at substation i.e. main meter and check meter of accuracy class 0.2s, where in case of failure of main meter reading from check meter shall be used for determination of net electricity exported to grid. The meters are tri-vector/ABT meters and are capable of recording export as well as import. The electricity exported and imported by all the WEG's (project activity as well as non-project activity) are recorded on a monthly basis by the representatives of the PP and state utility. Main meter and Check meters are calibrated at least once in every three years by state utility officials in the presence of PP, however the calibration is not in control of PP and state agency has full control on calibration and replacement.

Net Electricity Exported to the Grid by the project activity as per apportioning procedure followed by state utility for each state is given below:

Madhya Pradesh

- A Joint Meter Reading shall be taken by the representatives of WTG operator and Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Ltd. (MPPKVVCL) at the high voltage side of the step up transformer installed at the substation at a particular date.
- In case the main metering system is not in service, then the check metering system shall be used until the main system is back to service.
- Meter reading would be jointly signed by both the representatives.
- The main and the check metering systems shall be sealed in presence of representatives of Power producers, WTG operator and MPPKVVCL.
- When any of these metering systems is found to be outside acceptable limits of accuracy or otherwise not functioning properly, it shall be repaired, recalibrated or replaced.
- PP will raise a monthly energy bill/statement based on the JMR/share certificates at the end of each calendar month and the payment by State Electricity Board is done on this basis. The billing and payment records will be maintained by the PP.
- Calibration and Testing of Meters will be done annually.

Calculation of data

$$EG_{export} = \frac{EG_{controller\ per\ WEG}}{\sum_{i=1}^{total} EG_{controller,\ windfarm}} \times EG_{gross\ export,\ SS}$$

$$EG_{import} = \frac{EG_{controller\ per\ WEG}}{\sum_{i=1}^{total} EG_{controller,\ windfarm}} \times EG_{gross\ import,\ SS}$$

Where:

Electricity generated by one WEG as per controller report	$EG_{controller\ per\ WEG}$
Sum of panel readings of all WEGs connected to the wind farm, as per controller report	$EG_{controller,\ windfarm}$
Total energy exported to the substation by the project activity	$EG_{gross\ export,\ SS}$
Total energy imported from the substation by the project activity	$EG_{gross\ import,\ SS}$
Electricity exported to the grid by the project activity	EG_{export}
Electricity imported from the grid by the project activity	EG_{import}
Net electricity supplied to the grid ($EG_{export} – Eg_{import}$)	$EG_{PJ,\ facility,\ y,\ MP}$

Procedure for apportioning for the WTG of the project activity located in Madhya Pradesh:

Assuming,

X = Gross electricity generation at controller of the WTG of the project activity in Maharashtra during the partial period of the corresponding period of main meter reading (kWh)

Y = Gross electricity generation at controller of the WTG of the project activity in Maharashtra during the corresponding full period of main meter reading (kWh)

Therefore, ratio of the gross electricity generation during the partial period (Z) = X/Y
If G = Net electricity supplied by the WTG of the project activity to the grid during the corresponding full period of main meter reading as per credit notes (kWh)
Then net electricity supplied by the WTG of the project activity in Maharashtra to the grid during the partial period (for calculating emission reduction for partial period) = G*Z

QA/QC Procedures

There are one ABT meter and two trivector meters (one main meter and one check meter) of 0.2s accuracy class at substation. If some defect occurs to ABT meters, these trivector meters can be used to obtain the reading. All meters (ABT, main and check) and yard meters are calibrated at least once in a three year by utility officials or its representatives.
The measurement results will be cross checked with records of sole electricity such as invoices.

Data Management and Data Archiving

Copies of the break-up sheet, invoices raised on discom and sales receipts will be retained and archived for the entire crediting period plus two years by the project proponent.

Emergency preparedness plan

Operation and Maintenance team is trained for emergency situations.

Training

Operation and maintenance team will train the staff on operation and maintenance aspects of the plant. The training will ensure preventive maintenance and better operational control for the plant.

Data adjustments/uncertainties

- In case Main meter is found to be faulty/ damaged, during the monthly recording then the reading for that month would be taken from the back up meter for the purpose of billing. The defective main meter would be replaced and the subsequent readings would be taken from the new main meter.
- In case Backup meter is found to be faulty/ damaged, the defective backup meter would be replaced.
- During annual calibration / accuracy testing of the main and backup meter if an error is observed to be outside the permissible limits of accuracy then both the Main & backup meter will be replaced immediately and the measured error from the recording meter would be applied to all the recorded readings conservatively since the date of last calibration/ accuracy test of that meter.

For the accurate execution of the Project activity a project team has been constructed.The project team is delegated with the responsibility of monitor and document the electricity generated and also safe keeping of the recorded data. The project team is also responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner.The CDM monitoring team will composed the following staff:

Position	**Report to:**
Operators (WTG Operator)	Site Engineer
Site Engineer (WTG Operator)	Site Incharge
Site Incharge (WTG Operator)	Project Owner
CDM monitoring project manager	Project Owner

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

>>
05/01/2016
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This entity is not a project participant.

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

>>
27/02/2015

C.1.2. Expected operational lifetime of project activity

>>
25 years 00 months

C.2. Crediting period of project activity

C.2.1. Type of crediting period

>>
Renewable crediting period

C.2.2. Start date of crediting period

>>
05/05/2017 or the date of registration whichever is later

C.2.3. Length of crediting period

>>
7 years 00 months

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
As per the of Ministry of Environment and Forests (MoEF), Government of India, under the Environment Impact Assessment Notification vide S.O. 1533 dated 14/09/2006 has listed a set of activities in Schedule I of the notification which for setting up new projects or modernization/expansion will require environmental clearance & will have to conduct an Environmental Impact Assessment (EIA) studies. As per the notification EIA need not to be conducted for the projects of capacity less than 25 MW. Since the capacity of the project is 9.5 MW, the project activity doesn't falls under preview to conduct EIA study.

No significant environmental impacts considered due to implementation of project activity by the host party.

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

>>

The project proponent has identified relevant stakeholders e.g. nearby villagers, employee, nodal agencies and has sent personal invitation letters well in advance dated 20/01/2015 with details of venue, date and agenda of meeting. Public notice is also pasted on village panchayat office.
The local stakeholder consultation meeting for the WTGs under project activity has been conducted as detailed below

3*2MW	27/01/2015	Bardu, Jamoniya, Guradiyadas	Dewas	Madhya Pradesh
1*1.5MW & 1*2MW	27/01/2015	Kheda Dhaman & Nipaniya	Mandsaur	Madhya Pradesh

The stakeholder meeting process is followed in the following sequence

- Welcome Speech by the organizers.
- Introduction to 'Clean Development Mechanism'
- Interactive Sessions with the stakeholders.
- Vote of Thanks

E.2. Summary of comments received

>>

Will these projects enable the village to get an increased supply of power? (query by Mr. Sumer Singh Balai)	We cannot guarantee the same. Once the electricity is generated, it is fed in to the state grid and then it becomes the decision of the state government as to where they have to give supply with respect to the amount of power at their disposal. But yes we do expect the same. (answer by Mr. M Rajni)
Is there any problem for any other activity that the villagers were carrying out in past at the site? (Query by Mr. Ajay Singh)	No there is no such problem faced by the villagers. (answer by Mr. Dhanasekar)
Why the power generated from the project isn't being supplied directly to the village? (Query by Mr. Toofan Singh)	It was explained to Mr. Toofan Singh, the power generated from the project activity is evacuated to the nearby substation and developer is not authorized to supply electricity directly to the villagers.
What are the other employment opportunities apart from Security personnel staff? (query by Mr. Balu Singh)	The consultant explained to Mr. Balu Singh, trained persons can be employed in skilled manpower jobs.
We have heard that apart from wind, power can be generated from other sources of nature – such as water, sun, etc. Why does the government not invest entirely in renewable energy projects to source all the power that it needs? (query by Mr. Rajram Gurakhe)	The government has invested in renewable energy projects in technologies apart from wind. The Bhakra Nangal Dam, the Hirakud Dam over the Mahanadi River – these are all prime examples of government investment to harness power from renewable energy (hydro power). The government has also made a long term plan to use renewable sources of energy for generating power, wherein the Prime Minister himself is involved (National Action Plan on Climate Change). This has a lot of focus on

	solar energy (energy generated from the sun). But these technologies also have a few areas of concern. These have to be harnessed only from the source where these gifts of nature are available. This brings up certain logistical and regulatory problems. This is apart from the problems of wheeling and storage of energy over long distances and long periods of time The amount of investment required for these technologies too is very high. Also, as against the power generated from fossil fuels, the reliability in these renewable energy technologies is a little uncertain as this depends entirely on the forces of nature. This can be in the case of hydro power where the input depends upon the amount of rainfall in the monsoons – most of you being farmers understand this much better than others. There is a similar case while generating energy by wind and solar.
Could you please elaborate in what manner have these projects been useful to the villagers? (query by Mr.Krushna Hari Patil)	The Projects have brought employment opportunity at the village level. Lot of villagers have got employment - either as security guards, drivers, etc. This has made ii possible for them to earn a living at a place closer to their home rather than going far away into the cities. Apart from this, contracts for civil work have also been given to local villagers. Other work pertaining to these projects have helped the local villagers also such as hiring of transport services, civil contracts, couriers, office automation facilities such as photocopying/printing/fax services etc. (answer by Mr. Nishant Mudhale)
The project will use solar light for energy generation, would there be pollution from the plant? (Query by Mr. Sridhara)	For the project, the solar energy is renewable source of energy for pollution free electricity generation. Without the use of solar energy for electricity generation, that equal amount of electricity would have been generated by the fossil fuel based power plants in the regional grid. (Answer by Mr. Suraj)

E.3. Report on consideration of comments received

>>

There were no negative comments raised by stakeholders in local stakeholder consultation meetings and due to the associated benefits stakeholders have appreciated the proposed project activity.

SECTION F. Approval and authorization

>>

Letter of approval from the Host Party is achieved dated 08/02/2017 with reference number 4/7/2016-CC.

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

Project participant and/or responsible person/ entity	☒ Project participant ☐ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	Interocean Shipping India Private Limited
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State/Region	Delhi
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Country	India
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E-mail	power@interocean.in
Website	www.interocean.in
Contact person	Mr Shashikant Verma
Title	Head-Power Division
Salutation	Mr
Last name	Verma
Middle name	--
First name	Shashikant
Department	Power
Mobile	--
Direct fax	--
Direct tel.	--
Personal e-mail	power@interocean.in

Project participant and/or responsible person/ entity	☐ Project participant ☒ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	PA Research & Consultants Pvt. Ltd.
Street/P.O. Box	Vardhman Star Mall, Mathura Road
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City	Faridabad
State/Region	Haryana
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E-mail	info@pars-consultants.com
Website	http://www.pars-cosultants.com
Contact person	Mr Phool Chand

Title	Director
Salutation	Mr.
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Department	-
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Personal e-mail	pchand@pars-consultants.com

Appendix 2. Affirmation regarding public funding

No public funding involved in the project activity.

Appendix 3. Applicability of methodology and standardized baseline

Please refer section B.4

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

Please refer section B.6.3

Appendix 5. Further background information on monitoring plan

Please refer section B.7.3

Appendix 6. Summary of post registration changes

Not applicable

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Document information

Version	*Date*	*Description*
08.0	22 July 2016	EB 90, Annex 2 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).

Version	*Date*	*Description*
06.0	9 March 2015	Revisions to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Editorial improvement.
05.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the project design document form for small-scale CDM project activities (these instructions supersede the "Guidelines for completing the project design document form for small-scale CDM project activities" (Version 01.1)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1; • Change the reference number from *F-CDM-SSC-PDD* to *CDM-SSC-PDD-FORM*; • Editorial improvement.
04.1	11 April 2012	Editorial revision to change history box by adding EB meeting and annex numbers in the Date column.
04.0	13 March 2012	EB 66, Annex 9 Revision required to ensure consistency with the “Guidelines for completing the project design document form for small-scale CDM project activities”
03.0	15 December 2006	EB 28, Annex 34 • The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.
02.0	08 July 2005	EB 20, Annex 14 • The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
01.0	21 January 2003	EB 07, Annex 05 Initial adoption.

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