

Gold Standard for the Global Goals
Key Project Information & Project Design Document (PDD)



Version 1.1 – August 2017

KEY PROJECT INFORMATION

Title of Project:	200 MW Wind Power Project in Tamil Nadu by Orange Sironj
Brief description of Project:	The project activity is a 200 MW wind power project, promoted by Orange Sironj Wind Power Pvt Ltd. The purpose of the project activity is to generate clean electricity with utilization of wind energy. The Project comprises of 100 WTGs of Gamesa G114 max 2 MW turbines.
Expected Implemetation Date:	30/11/2018
Expected duration of Project:	20 years
Project Developer:	Orange Sironj Wind Power Pvt Ltd.
Project Representative:	Infinite Solutions
Project Participants and any communities involved:	Orange Sironj Wind Power Pvt Ltd.
Version of PDD:	1
Date of Version:	29/01/2018
Host Country / Location:	India
Certification Pathway (Project Certificatin/Impact Statements & Products	Project Certification
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG
Methodologies applied:	ACM0002: Grid-connected electricity generation from renewable sources - Version 17.0
Product Requirements applied:	
Regular/Retroactive:	Retroactive
SDG Impacts:	1 - SDG 3 Good Health and Well-Being 2 - SDG 4 Quality Education 3 - SDG 6 Clean Water and Sanitation 4 - SDG 7 Affordable and Clean Energy 5 - SDG 8 Decent Work and Economic Growth 6 - SDG 13 Climate Action
Estimated amount of SDG Impact Certified	613,844 tCO2e per annum

SECTION A. Description of project

A.1. Purpose and general description of project

>> (Provide a brief description of the project including the description of scenario existing prior to the implementation of the project.)

The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources, the generated green electricity will contribute to climate change mitigation efforts. This project activity is a large scale wind project. Orange Sironj Wind Power Pvt Ltd is the project investor for this project activity. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 613,844 tCO₂e per annum, thereon displacing 635,976 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian electricity grid, which is mainly dominated by thermal/ fossil fuel based power plant.

The project activity is the installation of a new grid-connected renewable power plant/unit and this is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs.

The details of the project are mentioned in the table:

Project Investors' Name	Capacity in MW	State
Orange Sironj Wind Power Pvt Ltd	200	Tamil Nadu

Scenario existing prior to the implementation of the project activity

As the project activity is the installation of a new grid-connected renewable power plant/unit. The scenario existing prior to the implementation of project activity is Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system" (Version 06.0, EB 97 Annex 7).

Baseline Scenario

Baseline scenario and Scenario existing prior to the implementation of the project activity are both same.

Sustainable Development

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

- *Social well being*
The project activity will provide job opportunity to local people during erection, commissioning and maintenance of the Wind power project. Frequency of visiting to villages and nearby areas by skilled, technical and industrialist has increased due to installation /site visit/operation and maintenance work related to WTGs at plant site. This directly and indirectly positively effects the economy of nearby populace.
- *Environmental well being*
Wind power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions. The impact on land, water, air and soil is negligible. Thus the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.
- *Economic well being*
The project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.

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- *Technological well being*

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

A.2. Eligibility of the project under Gold Standard

>> (Describe how the project meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document and the relevant activity requirements document)

The project activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document as described below.

- The project applies methodology ACM0002, which is an approved methodology under Gold Standard.
- The project type is wind which is an eligible project type as it is in accordance with 1.1.1 a) and 1.1.1 b) of the Eligible Project Types & Scope under Renewable Energy Activity Requirements.
- The project activity results in displacement of electricity from thermal power stations while contributing to sustainable development of India. Hence, the project contributes to the Gold Standard Vision and Mission.
- Wind projects are an approved project type and do not require further approval from Gold Standard.
- This project activity is not associated with geo-engineering or energy generated from fossil fuel or nuclear, fossil fuel switch, nor does it enhances or prolongs such energy generation.

General Eligibility Criteria under Renewable Energy Activity Requirements

Project Type : As discussed above, the project type is eligible.

Project Location : The project is located in India.

Project scale : The project activity is a 200 MW wind project and thus qualifies under large scale projects.

A.3. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

>> (Justify that project owner has full and uncontested legal ownership of the products that are generated under Gold Standard Certification and has legal rights concerning changes in use of resources required to service the Project for e.g water rights, where applicable.)

The project participant Orange Sironj Wind Power Pvt Ltd. is the legal owner of the project and has the legal rights for the credits that shall be generated by this project activity.

A.4. Location of project

A.4.1. Host Country

>>

India

A.4.2. Region/State/Province etc.

>>

Tamil Nadu

A.4.3. City/Town/Community etc.

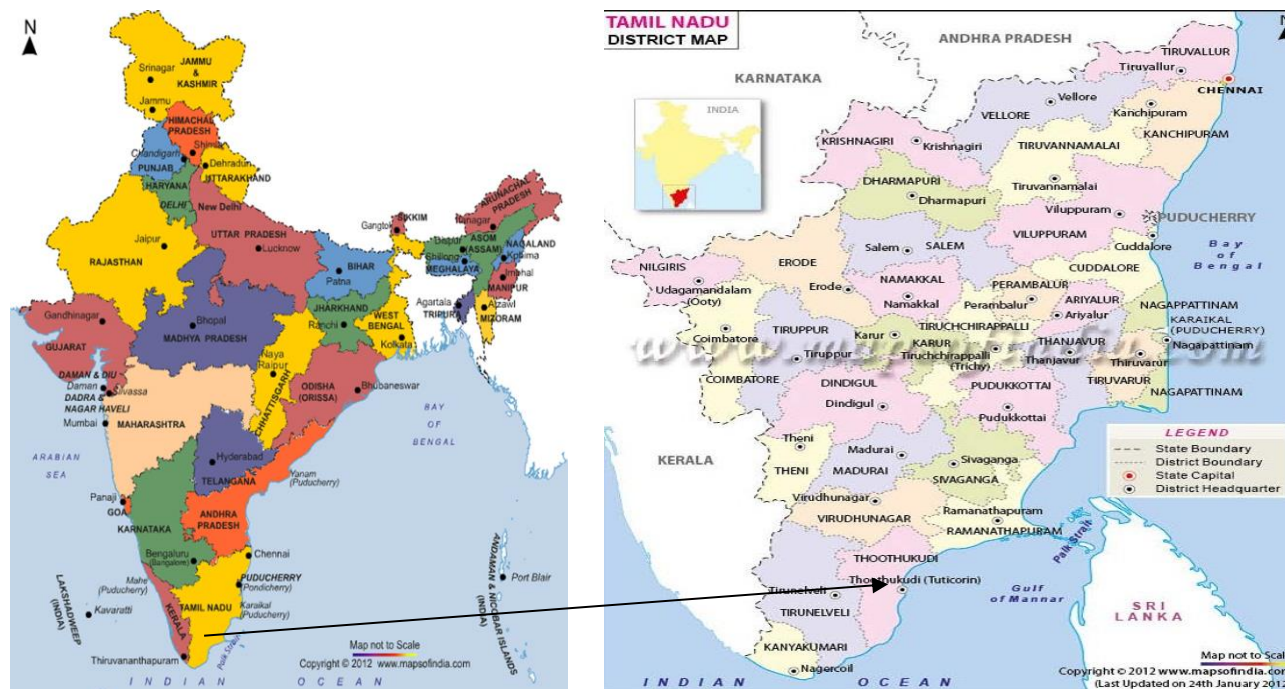
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Village : Poovani

District : Thoothukudi

A.4.4. Physical/Geographical location

>> (Include information allowing the unique identification of this project.)



The Project will be located at Village Poovani, Dist. Thoothukudi, Tamilnadu. The site is about 15 kms from Thoothukudi District Headquarter. The Project site is well connected through NH7 & NH45. Nearest railway station from the Project site is Maniyachichi Railway station and Kailasapuram Railway station. Tuticorin airport is nearest airport. The project coordinates are 8° 49' 30.71" N and 77° 53' 0.73" E.

A.5. Technologies and/or measures

>> (Describe the technologies and measures to be employed and/or implemented by the project, including a list of the facilities, systems and equipment that will be installed and/or modified by the project. Include information essential to understand the purpose of the project and how it will contribute positively to three SDGs.)

The project activity aims to harness Wind energy through installation of 100 nos. of 2 MW WTGs of Gamesa make (model - G114/2000kW IEC Class S model year version with 106m height of tower) with total installed capacity of 200 MW.

A description is given below of the main components of the G114-2.0 MW wind turbines:

PARAMETER	VALUE
Model : G114-2.0 MW CS Max Power	
General Data	
Make of WTG	Gamesa
Type	Three-bladed wind-facing rotor type
Number of Blades	3
Design Conditions of WTGs	
Rated power	2 MW
Average annual wind speed (m/s)	6.5
Turbulence intensity 15 (%)	18
Reference 10-minute wind speed in 50 years (m/s).	40
Extreme wind speed in 50 years over a 3-second average (m/s)	56

Hub Height	106m
Rotor	
Pitch control hydraulic system	Independent hydraulic actuators for each blade that provide a rotation capacity of between -5° and 87° and a system of accumulators which ensure feathering in the event of an emergency.
Diameter	114m
Swept Area	10,207 m ²
Wind speed in operation (rpm)	13.07
Blades	
Length	56m
Weight (t)	11.5 t
Blade cord (maximum/ minimum) (m)	3.865 m
Torsion ($^{\circ}$)	Max 25 , min -1.5
Gearbox	
Type	1 stage planetary / 2 parallel
Generator	
Type	Asynchronous double-feed unit with 4 poles, coil rotor and slip rings.
Nominal power (kW)	2,170 (stator + rotor)
Voltage (Vac)	690
Frequency (Hz)	50 / 60
Transformer	
Type	Three-phase, dry-type encapsulated
Frequency (Hz)	50 / 60
Insulation class	F or H

The WTGs have a useful life of 20 years. For monitoring equipment, their location and technical specifications, refer Section B.7.3. For Plant Load Factor (PLF), please refer Section B.6.4.

Baseline Scenario

As the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following as per applied methodology: *"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".*

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

A.6. Scale of the project

>> (Define whether project is micro scale, small scale or others. Justify the scale referring to relevant activity requirement.)

Large Scale

A.7. Funding sources of project

>> (Provide the public and private funding sources for the project. Confidential information need not be provided.)

Private funding and funding from bank. The PP hereby confirms that there is no ODA received for the project activity.

A.8. Assessment that project complies with 'gender sensitive' requirements

>> (Answer the four mandatory questions included under Step 1 to 3 in "Gold Standard Gender Equality Guidelines and Requirements" available [here](#).)

Question 1: Does the project reflect the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy? Explain how.

Response: As per Gold Standard Gender Policy, para 13(i) "Foundational gender-sensitive requirement - This strengthens Gold Standard's 'do no harm' approach and addresses safeguards to prevent or mitigate adverse impacts on women or men and girls and boys. Such action is mandatory for all projects seeking Gold Standard certification and includes compliance with the gender 'do no harm' safeguards, gender gap analysis and gender sensitive stakeholder consultations." The project being a renewable energy project is not gender sensitive project. The project does not adversely impact women or men.

Question 2: Does the project align with existing country policies, strategies and best practices? Explain how.

Response: India is party to "Convention on the Elimination of All Forms of Discrimination against Women"¹ and the project has aligned its policies which does not discriminate on gender.

Question 3: Does the project address the questions raised in the Gold Standard Safeguarding Principles & Requirements document? Explain how.

Response: Please refer to the responses provided under "Principle 2 - Gender Equality and Women's Rights" under section D.1 - Analysis of social, economic and environmental impacts.

Question 4: Does the project apply the Gold Standard Stakeholder Consultation & Engagement Procedure Requirements? Explain how.

Response: Since the project is applying retroactively for GS registration, a Stakeholder Feedback round would be carried out accordingly.

SECTION B. Application of selected approved Gold Standard methodology

B.1. Reference of approved methodology

>>

Title : Grid-connected electricity generation from renewable sources.

References : Approved Large Scale Consolidated Methodology: ACM0002 "Grid-connected electricity generation from renewable sources" (Version 17.0, EB 89 Annex 1)²

ACM0002 draws upon the following tools which have been used in the PDD:

- Methodological Tool: Tool to calculate the emission factor for an electricity system - Version 06.0, EB 97 Annex 7³
- Methodological Tool: Tool for the demonstration and assessment of additionality - Version 07.0.0, EB 70 Annex 8⁴

B.2. Applicability of methodology

>> (Justify the choice of the selected methodology(ies) by demonstrating that the project meets each applicability condition of the applied methodology(ies))

As per para 2 of ACM0002 (Version 17.0, EB 89, Annex 1), "This methodology applies to project activities that include retrofitting, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant or construction and operation of a Greenfield power plant". The project activity meets the applicability

1 <http://hrlibrary.umn.edu/research/ratification-india.html>

2 <https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN>

3 <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf>

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

conditions of the approved consolidated baseline and monitoring methodology ACM0002, Version 17.0, Sectoral Scope 1, EB 8g for Greenfield projects as described below:

Applicability	Project activity vis-à-vis applicability Conditions
This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (a) Involve a capacity addition to (an) existing plant(s); (b) Involve a retrofit of (an) existing operating plants/units; (c) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (d) Involve a replacement of (an) existing plant(s)/unit(s).	The project activity is installation of a new grid connected Wind power plant/ unit at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant) and hence this criterion is applicable.
The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	The proposed project activity is an installation of a new grid connected wind power plant/ unit and hence criteria under point (a) is met. The project does not involve any capacity additions, retrofits or replacements and therefore this criteria under point (b) is not applicable.
In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m^2 ; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m^2 ; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m^2 , all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m^2 ; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	The proposed project activity is an installation of a new grid connected wind power plant/ unit and not Hydro power plant, therefore this criteria is not applicable for this project activity.
In the case of integrated hydro power projects, project proponent shall:	The proposed project activity is an installation of a new grid

• Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or • Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	connected wind power plant/ unit and not Hydro power plant, therefore this criteria is not applicable for this project activity.
The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	The project activity is installation of a new grid connected wind power project/ unit and does not involve switching from fossil fuel to renewable energy, therefore criterion described in point (a) is not relevant to the project activity. This is a wind power plant/ unit and not a biomass fired plant, therefore criterion described in point (b) is not applicable to the project activity.
In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	The project activity is a new grid connected wind power plant/ unit and not a retrofits, replacement or capacity additions and therefore this criterion is not applicable to the project activity.
Applicability conditions of "Tool to calculate the emission factor for an electricity system", - Version 06.0	
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	This condition is applicable. OM, BM and CM are estimated using the tool under section B.6.3 for calculating baseline emissions.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 2: be met. Namely, the total capacity of off-grid Procedures related to off-grid power generation" should power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity	Since the project activity is grid connected, this condition is applicable and the emission factor has been calculated accordingly.

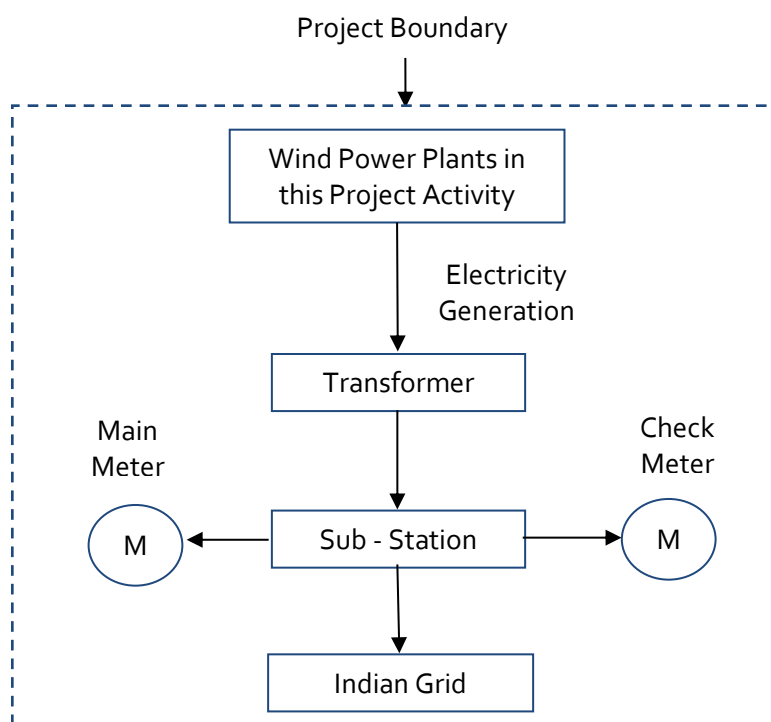
generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The project activity is located in India, a non-Annex I country. Therefore, this criterion is not applicable for the project activity.
Under this tool, the value applied to the CO ₂ emission factor of biofuels is zero.	The project activity is a grid connected wind power project/unit and does not involve emission from biofuels. Therefore, this criterion is not applicable.

B.3. Project boundary

>> (Present a flow diagram of the project boundary, physically delineating the project, based on the description provided in section A.5 above.)

Project boundary has ascertained using para 22 of ACM0002 (Version 17.0, EB EB 89, Annex 1) - *"The spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to."*

Hence the project boundary includes the Wind Project activity, sub-station, grid and all power plants connected to grid. The proposed project activity will evacuate power to the Indian grid.



Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Grid connected electricity generation	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
Project scenario	Greenfield Wind Power Project Activity	CO ₂	No	No CO ₂ emissions are emitted from the project activity
		CH ₄	No	No, Project Activity does not emit CH ₄
		N ₂ O	No	No, Project Activity does not emit N ₂ O

B.4. Establishment and description of baseline scenario

>> (Explain how the baseline scenario is established in accordance with guidelines provided in GS4GG Principles & Requirements and the selected methodology(ies). In case suppressed demand baseline is used then same should be explained and justified.)

As per the approved consolidated Methodology ACM0002 (Version 17.0, EB 89, Annex 1) para 24 "If the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The project activity involves setting up of WTGs to harness the power generation from Wind source to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants.

The combined margin ($EF_{grid,CM,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM), in accordance with the Tool to calculate the emission factor for an electricity system - Version 06.0, (EB 97 Annex 7). Calculations for this combined margin must be based on data from an official source⁵ (where available) and made publically available. In India, Central Electricity Authority (CEA), Government of India provides this data, and accordingly the same has been used.

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

Parameter	Value	Nomenclature	Source
$EF_{grid,CM,y}$	0.9652 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated ⁶ as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 12 published by Central Electricity Authority (CEA), Government of India.
$EF_{grid,OM,y}$	0.9843 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2013-14, 2014-15, and 2015-16) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 12, published by Central Electricity Authority (CEA), Government of India.
$EF_{grid,BM,y}$	0.9083 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 12, published by Central Electricity Authority (CEA), Government of India.

⁵ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver12.pdf

⁶ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/database_12.zip

B.5. Demonstration of additionality

>> (If the proposed project is not a type of project that is deemed additional, as stated below, then follow guidelines in section 3.5.1 of GS4GG Principles & Requirements to demonstrate additionality.)

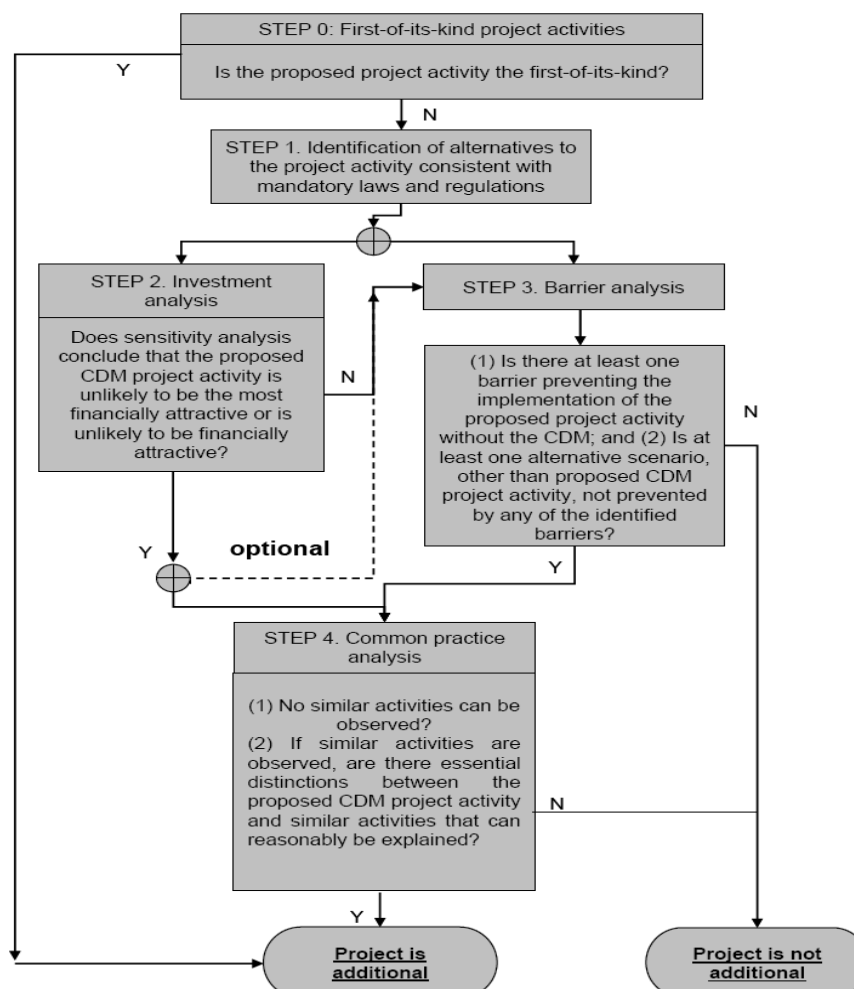
The table below is only applicable if the proposed project is deemed additional, as defined by the applied approved methodology or activity requirement or product requirement.

Specify the methodology or activity requirement or product requirement that establish deemed additionality for the proposed project (including the version number and the specific paragraph, if applicable).	Not Applicable
Describe how the proposed project meets the criteria for deemed additionality.	Not Applicable

The proposed CDM project generates power using wind energy which is a renewable, zero emission source of energy. Baseline considerations for the project are based on approved consolidated baseline methodology ACM0002 (Version 17.0).

Thus the project follows section 5.3.2 of the applied methodology which requires the project proponent to determine the additionality based on "Tool for the demonstration and assessment of additionality", Version 07.0.0.

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



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

The proposed project activity is not the first of its kind. Hence, this step is not applicable.

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

As per the applied methodology ACM0002 version 17.0; Para 24, *"If the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid connected power plant and by the addition of new generation sources"*. As the baseline scenario is prescribed by applied methodology, hence no further analysis is carried out to identify alternatives.

Step 2: Investment Analysis

As per para 29 of "Tool for the demonstration and assessment of additionality" v7.0.0, it is determined that the proposed project activity is not an economically or financially feasible option.

To conduct the investment analysis, Methodological tool: Investment analysis, version 8.0 (EB 97 annex 8) has been referred.

Sub-step 2a: Determine appropriate analysis method

As per "Tool for the demonstration and assessment of additionality" (version 07.0.0), for financial analysis of the project, the following three options are available:

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

The project will generate revenues from sale of electricity, therefore Option I is not applicable in line with para 32 of the Methodological tool: Investment analysis, version 8.0 (EB 97 annex 8).

The most appropriate financial analysis method is therefore option III: the benchmark analysis, where the returns on investment in the project activity are compared to benchmark returns that are available to any investors in the country.

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

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

As per Para 16 of EB97, Annex 8 states that Required/expected returns on equity are appropriate benchmarks for an equity IRR. Therefore, the Expected return on equity is considered appropriate benchmark. Accordingly, the post-tax Equity IRR has been considered as the relevant financial indicator for Investment Analysis.

Default Value Benchmark

The cost of equity is determined by selecting the values provided in the Appendix, i.e. Default values for cost of equity (expected return on equity) in the 'Methodological tool: Investment analysis'

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

$$\text{Nominal Benchmark}^7 = \{(1 + \text{Real Benchmark}) * (1 + \text{Inflation rate})\} - 1$$

Where:

⁷ As per Pg. 320 of Corporate Finance, Second Edition of Aswath Damodaran

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- Default value for Real Benchmark = 10.73% (as per Appendix of EB97, Annex 8)
- Inflation Rate forecast for by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India.

Benchmark estimation

The Cost of Equity has been considered using the "Methodological tool: Investment analysis" available at the time of decision making as well as the latest available value. As a conservative approach, the minimum value of benchmark has been considered as calculated using these 2 approaches.

Table under Appendix in EB97, Annex 8 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = 10.73%⁸

Thus, minimum cost of equity considered for calculation of Benchmark = 10.73%

Inflation Forecast for India as per RBI website⁹ and corresponding benchmark values:

Project Promoters' Name	Inflation Forecast		Benchmark	
	5 Years	10 Years	5 Years	10 Years
Orange Sironj Wind Power Pvt. Ltd.	4.30%	4.20%	15.49%	15.38%

As a conservative approach, benchmark of 15.38% has been selected for this project activity.

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

Kindly refer the financial spread sheets for the key assumptions (web links & sources of input parameters) supporting the financial projections.

Considering the input values, Equity IRR is given below:

Project Promoters' Name	Equity IRR without CDM	Benchmark (Equity IRR)
Orange Sironj Wind Power Pvt Ltd	10.44%	15.38%

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

Sub-step 2d: Sensitivity Analysis

Addressing Guidance 28 & 29 of EB97, Annex 8, following factors has been subjected to sensitivity analysis:

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

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

The results of sensitivity analysis are as follows:

Variation %	-10%	Normal	10%	Breaching Value
PLF	7.21%	10.44%	13.87%	13.99%
O&M	10.79%	10.44%	10.08%	-177.58%
Project Cost	13.93%	10.44%	7.75%	-13.07%
Tariff Rate	7.21%	10.44%	13.87%	13.99%

⁸ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v8.pdf>

⁹ <https://rbi.org.in/Scripts/PublicationsView.aspx?id=17759>

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

	Probability to breach the benchmark
PLF	Not possible as the PLF has been reported as per the Third Party Report based on long term data and hence a PLF fluctuation of more than 10% is unlikely to happen.
O&M	With the country experiencing more than 5% inflation on an average, the question of O&M coming down is ruled out. Moreover, the O&M agreement provides for a 5% escalation in the cost every year. Even the tariff order of Tamil Nadu provides for a 5% escalation in the O&M cost.
Project Cost	The Purchase Order cost is same as that mentioned in the DPR, which was considered during decision making. Since the Purchase Order cost is firm, there is no possibility of project cost going below this level. However, we have conducted sensitivity analysis for project cost being 10% less than that considered during decision making. Still, the IRR does not breach the Benchmark.
Tariff Rate	The tariff is determined by PPA which is fixed for 25 years mentioned. Hence, there is no probability to get variation for the same.

Outcome of Step 2:

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

Step 3: Barrier analysis

Barrier analysis has not been used.

Step 4: Common practice analysis

Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB84, Annex 7:

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

Range	Capacity	Unit
+50%	300	MW
Capacity of the proposed project activity	200	MW
-50%	100	MW

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

- The projects are located in the applicable geographical area;
- The projects apply the same measure as the proposed project activity;
- The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
- The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
- The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
- The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

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

- a) As the project is located in India, therefore, the applicable geographical area is India and projects in the host country India have been chosen for analysis.
- b) The project activity is a green-field wind power project and uses measure (b) "*Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies*". Therefore, all projects applying same measure (b) as the proposed project activity are candidates for similar projects.
- c) The energy source used by the project activity is wind. Hence, only wind energy projects have been considered for analysis.
 - a. The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.
- d) The capacity range of the projects is within the applicable capacity range from 100 MW to 300 MW.

The start date of the project activity is 22-Nov-17. As Kyoto Protocol was ratified by India on 26-Aug-2002¹⁰, therefore projects which had started commercial operation between 26-Aug-2002 to 22-Nov-17, have been identified.

Numbers of Similar projects identified, which fulfil above-mentioned conditioned are

$$N_{\text{wind}} = 1$$

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

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

$$N_{\text{all}} = 0$$

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

From the projects identified above, those projects which employ "different technologies" have been excluded and the number of such projects has been identified as N_{diff} .

Since $N_{\text{all}} = 0$ and N_{diff} can not be more than N_{all} , thus:

$$N_{\text{diff}} = 0$$

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

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

Outcome of Step 5:

As,

- i. $N_{\text{all}} - N_{\text{diff}} = 0$; is less than 3, thus:

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

¹⁰ http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php

B.6. Sustainable Development Goals (SDG) outcomes

B.6.1. Relevant target for each of the three SDGs

>> (Specify the relevant SDG target for each of three SDGs addressed by the project. Refer most recent version of targets [here](#).)

Item	Goals and Targets	Indicators
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SDG 3: Good Health and Well-Being	3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all	3.8.1: Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)
	Target: 1 health camp annually	
SDG 4: Quality Education	4.a: Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, nonviolent, inclusive and effective learning environments for all	4.a.1: Proportion of schools with access to (a) electricity; (b) the Internet for pedagogical purposes; (c) computers for pedagogical purposes; (d) adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic handwashing facilities (as per the WASH indicator definitions)
	Target: 100 students to be benefitted annually	
SDG 6: Clean Water and Sanitation	6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to needs of women & girls and those in vulnerable situations	6.1.1: Proportion of population using safely managed drinking water services 6.2.1: Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water
	Target: 100 persons to be benefitted annually	
SDG 7: Affordable and Clean Energy	7.2: By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1: Renewable energy share in the total final energy consumption
	Target: 635,976 MWh per annum	
SDG 8: Decent Work and Economic Growth	8.6: By 2020, substantially reduce the proportion of youth not in employment, education or training	8.6.1: Proportion of youth (aged 15–24 years) not in education, employment or training
	Target: • Training: 1 nos annually • Employment of 30 staff	
SDG 13: Climate Action	13.2: Integrate climate change measures into national policies, strategies and planning	13.2.1: Number of countries that have communicated establishment or operationalization of an integrated policy/ strategy/ plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)
	Target: 613,844 tCO ₂ per annum	

B.6.2. Explanation of methodological choices/approaches for estimating the SDG outcome

>> (Explain how the methodological steps in the selected methodology(ies) or proposed approach for calculating baseline and project outcomes are applied. Clearly state which equations will be used in calculating net benefit.)

The company has a Corporate Social Responsibility Policy¹¹ in place. In sync with the overall policy, the company conducts regular surveys during construction as well as O&M phases in the villages near project locations to check the requirement of facilities by the villages. Based on the surveys, PP identifies and works on several scope(s) of developmental activities such as health camps, distribution of furniture & sports kits in schools, toilet requirements in government schools, drinking water requirements etc. For this project activity, following SDGs are expected to be impacted:

SDG 3: Good Health and Well-Being

A minimum of 1 health camp annually shall be carried out.

SDG 4: Quality Education

It is expected that a minimum of 100 students would be benefitted annually.

SDG 6: Clean Water and Sanitation

It is expected that a minimum of 100 persons would be benefitted annually.

SDG 7 : Affordable and Clean Energy

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel. The clean energy generated by the project is calculated based on the amount of electricity generated by the project per annum. The project is expected to generate 635,976 MWh of clean energy per annum.

SDG 8: Decent Work and Economic Growth

The project leads to Trainings & workshops which are conducted for the O&M staff of Gamesa as well as for the O&M staff of the PP, by their respective companies. Apart from other trainings/workshops that may be organized, the following are also carried out;

- HSE Training Record
- Regular Drill Record
- Handling of Equipment Training
- Soft Skill Training

It is expected that a minimum of 1 training (either of the above) would be carried out annually.

The project will also provide employment to approximately 30 persons including O&M staff, management, outsourced jobs as well as security guards during the O&M phase.

SDG13 : Climate Action :

The project leads to mitigation of 613,844 tCO₂ per annum.

As per the approved consolidated Methodology ACM0002 (Version 17.0, EB 89, Annex 1), Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year y (t CO₂e/yr)

BE_y = Baseline emissions in year y (t CO₂/yr)

PE_y = Project emissions in year y (t CO₂e/yr)

¹¹ <http://orangerenewable.net/download/OrangeRenewable-CSR-Policy.pdf>

Baseline Emissions:

Baseline Emissions for the amount of electricity supplied by project activity, BE_y is calculated as

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

Where:

- BE_y = Baseline emissions in year y (t CO₂/yr)
- $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
- $EF_{grid,CM,y}$ = Combined margin CO₂ 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 CO₂/MWh)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for

- a) Greenfield plants,
- b) Retrofits and replacements, and
- c) Capacity additions

The project activity is the installation of windmills and it is a green field project. So the formula in option (a) i.e., greenfield plants is used to calculate the value of $EG_{PJ,y}$. In accordance with para 46 of the applied methodology:

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

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

The proposed project activity falls under Indian grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation. Emission reductions due to the project activity are considered to be equivalent to the baseline emissions, since the wind project would not lead to any project emission and leakage emissions. Emission reductions are related to the electricity exported by the project and the emission coefficient of the grid system.

Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin and build margin factors according to the procedures prescribed in the latest tool for calculating the emission factor for an electricity system. The steps of calculation are as follows:

Step 1: Identify the relevant electricity systems

As described in tool "For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems". It also states that "If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used". Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern. However, all the 5 zones have been synchronized and called as Indian Grid.

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

Option I is opted for the project activity i.e. only grid connected power plants are included in the calculation.

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

According to the tool, the calculation of the operating margin emission factor is based on one of the following methods:

- Simple OM; or
- Simple adjusted OM; or
- Dispatch data analysis OM; or
- Average OM.

Any of the four methods can be used for calculating OM. However, the simple adjusted OM and dispatch data analysis OM cannot be currently applied in India due to lack of necessary data 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:

- average of the five most recent years, or
- based on long-term averages for hydroelectricity production.

The Share of Low Cost / Must-Run (% of Net Generation) in the generation profile of the different grids in India in the last five years is as follows:

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)					
	2011-12	2012-13	2013-14	2014-15	2015-16
Indian Grid	19.6%	16.9%	18.6%	16.8%	15.1%

Source: CO₂ Baseline Database for the Indian Power Sector - Central Electricity Authority (CEA)

The above data clearly shows that the percentage of total grid generation by low cost/must run plants (on the basis of average of five most recent years) for the Indian regional grid is less than 50% of the total generation. Hence the Simple OM method can be used to calculate the Operating Margin Emission factor. The average operating margin method cannot be applied, as low cost/ must run resources constitute less than 50% of total grid generation.

The project proponent has chosen an ex ante option for calculation of the OM with a 3-year generation weighted average, based on the most recent data available, without requirement to monitor and recalculate the emissions factor during the crediting period.

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. It may be calculated:

- Based on the net electricity generation, and a CO₂ emission factor of each power unit. (Option A), or
- 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 (option B)

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 the Indian grid. 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". We have, therefore, used the Combined Margin data published in the CEA database, for calculating the Baseline Emission Factor.

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The CEA database uses the option A i.e. data on net electricity generation and CO₂ emission factor for each power unit, the average efficiency of each power unit and the fuel type(s) used in each power unit, to calculate the OM of the different regional grids.

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

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)
 $EF_{EL,m,y}$: CO₂ 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

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.

Following tables shows the simple OM and Net generation¹² respectively for the recent three years:

Simple Operating Margin Emission Factors (t CO ₂ /MWh) (incl. Imports)			
	2013-14	2014-15	2015-16
Indian Grid	1.0002	0.9903	0.9655

Net Generation in Operating Margin (GWh) (incl. imports)			
	2013-14	2014-15	2015-16
Indian Grid	721,632	808,417	871,740

Therefore the 3 years net generation weighted OM average for Indian grid comes out to be 0.9843 tCO₂/MWh

The emission factor of each power unit m has been determined as follows:

$$EF_{EL,m,y} = (\sum FC_{i,m,y} \times NCV_{i,y} \times EF_{CO_2,i,y}) / EG_{m,y}$$

Where:

- $EF_{EL,m,y}$: CO₂ emission factor of power unit m in year y (tCO₂/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)
 $EF_{CO_2,i,y}$: CO₂ emission factor of fossil fuel type i in year y (tCO₂/GJ)
 $EG_{m,y}$: Net quantity of 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 unit m in year y
 y : The relevant year as per the data vintage chosen in step 3

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

The sample group of power units m used to calculate the build margin consists of either:

- The set of five power units that have been built most recently, or
- The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

¹² CO₂ Baseline Database for the Indian Power Sector, Version 12, May 2017

Project participants should use the set of power units that comprises the larger annual generation. Accordingly, the CEA database calculates the build margin as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. The build margin emission factor has been calculated ex-ante based on the most recent information available on units already built for sample group m at the time of PDD submission to the DOE for validation. This option does not require monitoring the emission factor during the crediting period.

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:

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

Where:

$EF_{grid,BM,y}$	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

The CO₂ emission factor of each power unit m ($EF_{EL,m,y}$) is determined as per the procedures given in step 4 (a) for the simple OM, using option A1 for y most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

Build margin emission factor is calculated, ex-ante as per the most recent data available¹². So, build margin emission factor for Indian grid for 2015-2016 is 0.9083 tCO₂/MWh

Step 6: Calculate the combined margin (CM) emission factor ($EF_{grid,CM,y}$)

The emission factor EF_y of the grid is represented as a combination of the Operating Margin (OM) and the Build Margin (BM). Considering the emission factors for these two margins as $EF_{OM,y}$ and $EF_{BM,y}$ then the EF_y is given by:

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

Where:

$EF_{grid,BM,y}$	= Build margin CO ₂ emission factor in year y (t CO ₂ /MWh)
$EF_{grid,OM,y}$	= Operating margin CO ₂ emission factor in year y (t CO ₂ /MWh)
w_{OM}	= Weighting of operating margin emissions factor (per cent)
w_{BM}	= Weighting of build margin emissions factor (per cent)

According to "Tool to calculate the emission factor for an electricity system" the weights for OM and BM are 0.75 and 0.25 respectively.

Using the values for operating and build margin emission factor provided in the CEA database and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 0.9652 tCO_{2e}/MWh.

Project Emission

As per the ACM0002 ver-17.0, Project Emission for most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

- PE_y = Project emissions in year y (tCO₂e/yr)
 $PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO₂/yr)
 $PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non condensable gases in year y (tCO₂e/yr)
 $PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (tCO₂e/yr).

The project activity involves the generation of electricity from the installation of wind turbines. Hence, as per ACM0002, Version 17, there is no project emission for windmill projects. Therefore, project emissions are zero.

Leakage Emissions

No leakage emissions are considered in the project activity. 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). Since the emissions sources are small, it is neglected.

B.6.3. Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs

(Include a compilation of information on the data and parameters that are not monitored during the crediting period but are determined before the design certification and remain fixed throughout the crediting period like IPCC defaults and other methodology defaults. Copy this table for each piece of data and parameter.)

Relevant SDG Indicator	SDG13 : Climate Action
Data/parameter	EF _{OM,y}
Unit	tCO ₂ e/MWh
Description	Operating Margin Emission Factor of Indian Grid
Source of data	Calculated from CEA database, Version 12, May 2017 ¹²
Value(s) applied	0.9843
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 06.0.0" as 3-year generation weighted average using data for the years 2013-2014, 2014-2015 & 2015-16. The data are obtained from "CO ₂ Baseline Database for Indian Power Sector" version 12.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	The data is used to calculate baseline emission reductions.
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Relevant SDG Indicator	SDG13 : Climate Action
Data/parameter	EF _{BM,y}
Unit	tCO ₂ e/MWh
Description	Build Margin Emission Factor of Indian Grid
Source of data	Calculated from CEA database, Version 12, May 2017 ¹²
Value(s) applied	0.9083
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 06.0.0". The data are obtained from "CO ₂ Baseline Database for Indian Power Sector" version 12.0, published by the Central Electricity Authority, Ministry of Power, Government of India.

Purpose of data	The data is used to calculate baseline emission reductions.
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Relevant SDG Indicator	SDG13 : Climate Action
Data/parameter	EF _{CM,y}
Unit	tCO ₂ e/MWh
Description	Combined Margin Emission Factor of Indian Grid
Source of data	Calculated from CEA database, Version 12, May 2017 ¹²
Value(s) applied	0.9652
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 06.0.0". The data is obtained from "CO ₂ Baseline Database for Indian Power Sector" version 12.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	The data is used to calculate baseline emission reductions.
Additional comment	-

B.6.4. Ex ante estimation of outcomes linked to each of the three SDGs

>> (Provide a transparent ex ante calculation of baseline and project outcomes (or, where applicable, direct calculation of net benefit) during the crediting period, applying all relevant equations provided in the selected methodology(ies) or as per proposed approach. For data or parameters available before design certification, use values contained in the table in section B.6.3 above. For data/parameters not available before design certification and monitored during the crediting period, use estimates contained in the table in section B.7.1 below)

SDG 3: Good Health and Well-Being - A minimum of 1 health camp annually shall be carried out
SDG 4: Quality Education - A minimum of 100 students would be benefitted annually
SDG 6: Clean Water and Sanitation - A minimum of 100 persons would be benefitted annually
SDG 7: Affordable and Clean Energy - Project expected to generate 635,976MWh clean energy every year
SDG 8: Decent Work and Economic Growth - Minimum 1 training to be carried out for O&M staff annually.
The project will also provide employment to approximately 30 persons.
SDG13 : Climate Action - The project leads to mitigation of 613,844 tCO₂ per annum.

Calculation of Outcome for SDG13 : Climate Action

Baseline emissions

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

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

Where,

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

EF_{grid,CM,y} = Combined margin CO₂ emission factor for grid connected power generation in year y
= 0.9652 t CO₂/MWh.

Project Participant	Capacity	PLF (%)	Generated Power (MWh/year)	Baseline Emission Factor (tCO ₂ /MWh)	Baseline emissions (tCO ₂ / year)
Orange Sironj Wind Power Pvt. Ltd.	200 MW	36.3%	635,976	0.9652	613,844

$$BE_y = 665,760 * 0.9652 \text{ t CO}_2/\text{year} = 613,844 \text{ tCO}_2/\text{year}$$

Project emissions

$$PE_y = 0$$

Leakage

No leakage emissions are applicable.

Emission reductions

$$ER_y = BE_y - PE_y = 613,844 - 0 = 613,844 \text{ tCO}_2/\text{year}$$

B.6.5. Summary of ex ante estimates of each SDG outcome

SDG 3: Good Health and Well-Being

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0 Health Camps	1 Health Camp	1 Health Camp
Year 2	0 Health Camps	1 Health Camp	1 Health Camp
Year 3	0 Health Camps	1 Health Camp	1 Health Camp
Year 4	0 Health Camps	1 Health Camp	1 Health Camp
Year 5	0 Health Camps	1 Health Camp	1 Health Camp
Total	0 Health Camps	5 Health Camp	5 Health Camp
Total number of crediting years			
Annual average over the crediting period	0 Health Camps	1 Health Camp	1 Health Camp

SDG 4: Quality Education

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Year 2	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Year 3	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Year 4	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Year 5	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Total	0 Beneficiaries	500 Beneficiaries	500 Beneficiaries
Total number of crediting years			
Annual average over the crediting period	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries

SDG 6: Clean Water and Sanitation

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Year 2	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Year 3	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Year 4	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries
Year 5	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries

Total	0 Beneficiaries	500 Beneficiaries	500 Beneficiaries
Total number of crediting years			
Annual average over the crediting period	0 Beneficiaries	100 Beneficiaries	100 Beneficiaries

SDG 7: Affordable and Clean Energy

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0 MWh	635,976 MWh	635,976 MWh
Year 2	0 MWh	635,976 MWh	635,976 MWh
Year 3	0 MWh	635,976 MWh	635,976 MWh
Year 4	0 MWh	635,976 MWh	635,976 MWh
Year 5	0 MWh	635,976 MWh	635,976 MWh
Total	0 MWh	3,179,880 MWh	3,179,880 MWh
Total number of crediting years			
Annual average over the crediting period	0 MWh	635,976 MWh	635,976 MWh

SDG 8: Decent Work and Economic Growth

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0 Training, 0 Jobs	1 Training, 30 Jobs	1 Training, 30 Jobs
Year 2	0 Training, 0 Jobs	1 Training, 30 Jobs	1 Training, 30 Jobs
Year 3	0 Training, 0 Jobs	1 Training, 30 Jobs	1 Training, 30 Jobs
Year 4	0 Training, 0 Jobs	1 Training, 30 Jobs	1 Training, 30 Jobs
Year 5	0 Training, 0 Jobs	1 Training, 30 Jobs	1 Training, 30 Jobs
Total	0 Training, 0 Jobs	5 Trainings, 150 Jobs	5 Trainings, 150 Jobs
Total number of crediting years			
Annual average over the crediting period	0 Training, 0 Jobs	1 Training, 30 Jobs	1 Training, 30 Jobs

SDG13 : Climate Action

Year	Baseline estimate	Project estimate	Net benefit
Year 1	613,844 tCO ₂	0 tCO ₂	613,844 tCO ₂
Year 2	613,844 tCO ₂	0 tCO ₂	613,844 tCO ₂
Year 3	613,844 tCO ₂	0 tCO ₂	613,844 tCO ₂
Year 4	613,844 tCO ₂	0 tCO ₂	613,844 tCO ₂
Year 5	613,844 tCO ₂	0 tCO ₂	613,844 tCO ₂
Total	3,069,220 tCO ₂	0 tCO ₂	3,069,220 tCO ₂
Total number of crediting years			

Annual average over the crediting period	613,844 tCO ₂	0 tCO ₂	613,844 tCO ₂
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B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

(Include specific information on how the data and parameters that need to be monitored in the selected methodology(ies) or proposed approaches or as per mitigation measures from safeguarding principles assessment or as per feedback from stakeholder consultations would actually be collected during monitoring. Copy this table for each piece of data and parameter.)

Relevant SDG Indicator	SDG 3: Good Health and Well-Being SDG 4: Quality Education SDG 6: Clean Water and Sanitation
Data / Parameter	Livelihood of the poor
Unit	Number
Description	Health Camps, distribution of furniture to schools, distribution of water purifiers, etc.
Source of data	CSR records and photographic evidence.
Value(s) applied	The company has a Corporate Social Responsibility Policy¹¹ in place. In sync with the overall policy, the company conducts regular surveys during construction as well as O&M phases in the villages near project locations to check the requirement of facilities by the villages. Based on the surveys, PP identifies and works on several scope(s) of developmental activities such as: • Establishment of library cum computer centre • Construction of Toilets at schools • Establishment of water purifier with cooler • Organization of Health camps • Laying of water pipe lines • Training on agricultural, irrigation and fertilizers techniques by agricultural professionals The project has positive impact on this parameter as there were no socially oriented CSR activities before the project activity. Thus, the project has positive impact on the indicator.
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	-
Additional comment	-

Relevant SDG Indicator	SDG 7 : Affordable and Clean Energy
Data / Parameter	EG _{PJ,y}
Unit	MWh
Description	Quantity of net electricity supplied to the grid

Source of data	Generation statement provided by SECI every month.
Value(s) applied	635,976 MWh
Measurement methods and procedures	Data Type: Measured Monitoring equipment: Energy Meters of accuracy class 0.2s Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually. Archiving Policy: Paper &/or Electronic Calibration frequency: Once in 5 years as per CEA guidelines¹³ Electricity exported/imported to the grid is in kWh. However for the calculation purpose electricity exported is converted in MWh. The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from Monthly Meter reading reports provided by SECI as per below equation: $EG_{PJ,y} = EG_{Export} - EG_{Import}$ Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the Invoices/ Monthly Bill raised by the Project Participant to SECI.
Monitoring frequency	Monthly
QA/QC procedures	Calibration of all the meters will be undertaken once every year and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.2s.
Purpose of data	The Data/Parameter is required to calculate the baseline emission
Additional comment	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

Relevant SDG Indicator	SDG 8: Decent Work and Economic Growth
Data / Parameter	Quality of employment
Unit	Number
Description	Number of Trainings provided to employees & O&M staff
Source of data	Training Records (HSE & HR) & Employee feedback forms
Value(s) applied	Some of the trainings & workshops that are given to the respective O&M staffs by Gamesa or PP. • HSE Training Record • Regular Drill Record • Handling of Equipment Training • Soft Skill Training The training programmes help in making the workforce efficient and skilled at their job. This not only helps the company but adds to growth of individual employees. Thus, the project has a positive impact on the parameter.
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	-

¹³ http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf , page 12

Purpose of data	Continuation of regular trainings/workshops for employees & O&M staffs
Additional comment	-

Relevant SDG Indicator	SDG 8: Decent Work and Economic Growth
Data / Parameter	Quantitative employment and income generation
Unit	1. Cost spent for O&M 2. Number of O&M staffs involved in the project
Description	-
Source of data	Plant employment records
Value(s) applied	The total number of staff (including O&M staff, management, outsourced jobs as well as security guards) employed by Gamesa and Orange during O&M phase of the project activity will be 30. The cost of O&M is over INR 1.4 million per WTG which works at INR 140 million for the project for the 4th year. From the next year onwards, there is an escalation of 5% per annum in the cost of O&M. This helps in creating service based jobs in the project region. However, it is to be noted that the O&M cost for the first 3 years from commissioning is zero. The parameter has a positive impact as the project results in direct employment and income generation.
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	-
Additional comment	-

Relevant SDG Indicator	SDG13 : Climate Action
Data / Parameter	Air quality
Unit	tCO ₂
Description	Reduction in CO ₂ emission reduction due to implementation of project activity
Source of data	Calculated as per "Tool to calculate the emission factor for an electricity system, version 06.0.0". The data are obtained from "CO ₂ Baseline Database for Indian Power Sector" version 12.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) applied	613,844 tCO ₂ emission reductions estimated per annum
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.7.2. Sampling plan

>> (If data and parameters monitored in section B.7.1 above are to be determined by a sampling approach, provide a description of the sampling plan.)

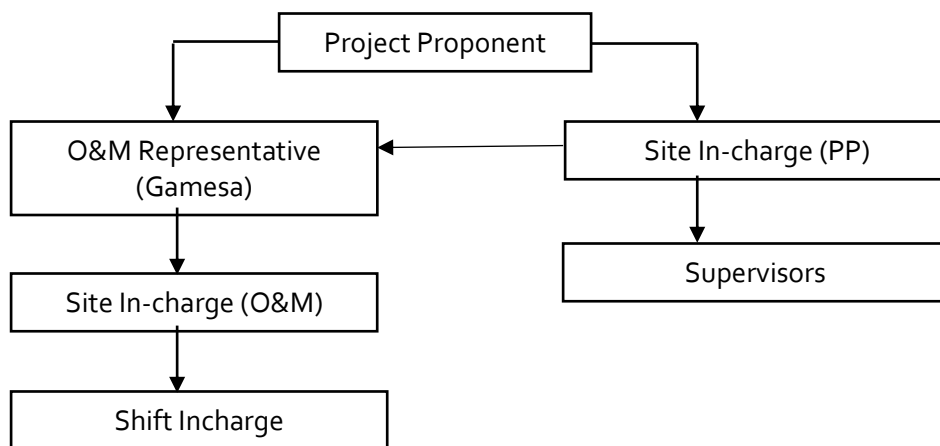
Sampling is not required for the given project activity.

B.7.3. Other elements of monitoring plan

>>

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

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



Responsibilities of Site Incharge (PP): Overall functioning and maintenance of the project activity, the Site incharge shall coordinate with the O&M operator as well as the site supervisors.

Responsibilities of O&M Representative: Co-ordination between Site incharge of the O&M operator as well as the project participant and further report to PP head office.

Responsibilities of Site In-charge (O&M Operator): Responsibility for maintaining the data records, ensures completeness of data, and reliability of data (calibration of equipment) as well as data recording for all the parameters.

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

Data Measurement

Projects activity comprises of installation of 3 Energy meters (1 main meter, 1 check meter and 1 standby meter) at a Pooling Substation prior to the Delivery point.

The export and import energy will be measured continuously using above mentioned Main, Check & Standby meters installed at Substation. Export & Import readings of Main, Check & Standby meters shall be taken on monthly basis by authorized officer of SECI in the presence of representative(s) of PP. The meter reading will be taken jointly and signed by the representatives of the SECI and representative(s) of PP. Based on the readings, invoices/ monthly bills will be raised by PP. These invoices/ monthly bills can be used for cross checking the meter readings taken for the respective project activity.

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In case of pooling of multiple Projects at the same Substation, power from multiple Projects will be pooled at a Pooling Substation prior to the Delivery point and the combined power will be fed at Delivery point through a common transmission line from the Pooling Substation. In such cases, 3 sub-meters (main, check & standby) are also to be set up at pooling substation for individual projects in addition to the meters at Delivery Point.

It is to be noted that though the PP or their representatives are available during meter reading, the calculations of net electricity supplied to grid is completely under purview of SECI and PP does not have any control on it. Also accuracy class of meters and calibration frequency is under purview of SECI/Discom officer and PP does not have any control on it. PP gets the monthly credit report from where net electricity supplied to grid is obtained and used for emission reduction calculations.

Data collection and archiving

Export & Import readings from main, check & standby meters will be collected under the supervision of the O&M Team or authorized representatives of PP. The net electricity supplied to grid would be calculated based on export & import readings. Export and Import data would be recorded and stored in electronic &/or Paper format. The records are checked periodically by the Head (Operations) and discussed thoroughly with the O&M Team. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of GS CERs for the project activity whichever occurs later.

Mismatch in Monitoring Period and the Billing Period

In case the dates of a particular monitoring period do not match with the dates of the billing period, the net electricity exported to the grid would be calculated from:

$$D = (A/B) * C$$

Where,

A = Difference of number of days which are not matching of billing period and monitoring period.

B = Number of days of the billing period/ month which was not matched with the monitoring period.

C = Net Electricity supplied to the grid for that given billing period/ month.

The calculated value after apportioning would be used for calculation of emission reductions during that period.

Emergency preparedness

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

In the unlikely event of failure of all Main, Check as well as Standby meter installed at Substation, where all the faulty meters are required to be repaired or replaced simultaneously, the export & import readings from Main, Check & Standby Meters installed at the inter-connection point at the project site will be used for monitoring of net electricity exported to the grid.

Personnel training

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

SECTION C. Duration and crediting period

C.1. Duration of project

C.1.1. Start date of project

>> (Specify start date of the project, in the format of DD/MM/YYYY. Describe how this date has been determined as per the definition of start date provided in section 3.4.3 of GS4GG Principles & Requirements document and provide evidence to support this date.)

22-Nov-2017

C.1.2. Expected operational lifetime of project

>> (Specify in years)

20 years

C.2. Crediting period of project

C.2.1. Start date of crediting period

>> (Specify in dd/mm/yyyy. This can be start of project operation or two years prior to the date of Project Design Certification, whichever is later.)

30-Nov-2018, or two years prior to the date of Project Design Certification, whichever is later.

C.2.2. Total length of crediting period

>> (Specify the total length of crediting period sought in line with GS4GG Principles & Requirements or relevant activity requirements.)

5 years

SECTION D. Safeguarding principles assessment

D.1. Analysis of social, economic and environmental impacts

>> (Refer the GS4GG Safeguarding Principles and Requirements document for detailed guidance on carrying out this assessment.)

Safeguarding principles	Assessment questions	Assessment of relevance to the project (Yes/potentially/no)	Justification	Mitigation measure (if required)
3.2 Gender Equality and Women's Rights	The Project shall complete the following gender assessment questions in order to inform Requirements, below: 1. Is there a possibility that the Project might reduce or put at risk women's access to or control	No	1. The project does not decrease women's access to or control of resources.	Not Required

	of resources, entitlements and benefits? 2. Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)? 3. Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)? 4. Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)? 5. Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities? 6. Would the Project potentially		2. No, there is no possibility of adverse effect. 3. No, the Project does not consider gender roles and in fact actively engages both women and men. Community meetings are scheduled considering participation by both Men and Women. 4. The project does not discriminate on basis of gender, caste or religion. 5. No the Project was not designed to increase women's workload nor add care responsibilities. 6. There is no place for discrimination against	
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	reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits? 7. Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services? 8. Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards? The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women. 1. Sexual harassment and/or any forms of violence against women - address the multiple risks of gender-based violence, including sexual exploitation or human trafficking. 2. Slavery, imprisonment, physical and mental drudgery, punishment or		women in this Project. The project does not discriminate on basis of gender, caste or religion. 7. The Project will not limit women's ability regarding natural resources. The project being wind power project thus does not have any major impact on natural resources of the region. 8. No the Project will not expose women and girls to further risks or hazards. The project proponent has a grievance cell which would look into complaints. 1. There is no such risk for the project. Participation in the project is 100% voluntary. The project proponent has a grievance cell which would look into complaints. 2. The project does not involve in slavery, imprisonment or coercion of women and girls.	
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	coercion of women and girls. 3. Restriction of women's rights or access to resources (natural or economic). 4. Recognise women's ownership rights regardless of marital status - adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources. Projects shall apply the principles of nondiscrimination, equal treatment, and equal pay for equal work, specifically: 1. Where appropriate for the implementation of a Project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities. 2. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status. 3. Ensure that these conditions do not		3. The Project will not restrict women's rights or access regarding natural resources. The project proponent does not discriminate on gender, caste, religion etc. 4. Marital status is completely irrelevant to the Project. The project proponent does not discriminate on gender, caste, religion etc. Yes, the Project has equal opportunity for women and men to contribute both in volunteer and working positions 1. The project proponent has a stipulated HR policy that takes into account participation by both men and women. Further, the CSR projects designed are implemented for equal participation of both men and women. 2. There is no limit on the access to Project participation and benefits from either of these conditions. 3. There are no such conditions that limit the	
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	limit the access of women or men, as the case may be, to Project participation and benefits. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.		access of women or men for participation. The project is aligned to India's strategy for elimination of all discrimination. India ratified the International Convention on the Elimination of All Forms of Racial Discrimination on 03/12/1968 with certain reservation¹⁴.	
3.4.3 Land Tenure and Other Rights	1. The Project Developer shall identify all such sites/matters potentially affected by the Project. For all such sites/matters identified the Project shall respect and safeguard: (a) Legal rights, or (b) Customary rights, or (c) Special cultural, ecological, economic, religious or spiritual significance of people shall be demonstrably promoted/protected. 2. Changes in legal arrangements must be in line with relevant law and regulation and must be carried out in strict adherence with such laws. All legal disputes must be resolved prior to Project being carried out in such areas. All such changes must be demonstrated as having been agreed with free, prior and informed consent. 3. The Project Developer must hold uncontested land title for the entire Project	No	1. The proponent obtained necessary clearances from nodal agencies and NOC from all the Gram Panchayets for establishing the plant. The project does not involve and is not complicit in involuntary resettlement in any way. 2. The project has all the legal, customary rights on the land. 3. The project developers holds the land title for the all the land covered in the project activity.	

¹⁴ http://nhrc.nic.in/documents/india_ratification_status.pdf

	Boundary to complete Project Design Certification.			
3.6.2 Negative Economic Consequences	1. The Project Developer shall demonstrate the financial sustainability of the Projects implemented, also including those that will occur beyond the Project Certification period. 2. The Projects shall consider economic impacts and demonstrate a consideration of potential risks to the local economy and how these have been taken into account in Project design, implementation, operation and after the Project. Particular focus shall be given to vulnerable and marginalised social groups in targeted communities and that benefits are socially-inclusive and sustainable.	No	1. Financial Sustainability of the project has been discussed under Section B.5 above. The calculations are for the entire life of the project. 2. There are no negative economic impacts or potential risks to the local economy due to the project activity.	
4.1.1 Emissions	Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	The project is a wind power project and does not lead to any greenhouse gas emissions in project scenario.	
4.1.2 Energy Supply	Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	The project is connected to the grid, as well as being a wind power project it will be a net provider of power to the local grid.	
4.2.1 Impact on natural water patterns and flow	Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as	No	The project being a wind power project will not have any such impacts.	

	high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?			
4.2.1 Erosion and/or water body stability	1. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? If 'Yes' or 'Potentially' proceed to question 2. 2. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?	No	1. The project activity has developed activities for prevention of soil erosion by various landscaping measures. 2. The project area is not susceptible to excessive erosion or water body instability.	
4.2.3 Landscape modification and soil	Does the Project involve the use of land and soil for production of crops or other products?	No	The project does not involve the use of land and soil for production of crops or other products.	
4.3.2 Vulnerability to Natural Disaster	Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	The Project will not be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions.	
4.3.3 Genetic Resources	Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?	No	The project does not have any impact by used of GMOs.	
4.3.4 Release of pollutants	Could the Project potentially result in the release of pollutants to the environment?	No	The project being a wind power project does not lead to release of any pollutants.	
4.3.5 Hazardous and Non-hazardous Waste	Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The project during operational phase uses various type of oil/lubricants, grease which are classified as hazardous. These waste are handled in line with hazardous waste	

			management rules and are disposed off accordingly.	
4.3.6 Pesticides and fertilizers	Will the Project involve the application of pesticides and/or fertilisers?	No	The Project will not involve the application of pesticides and/or fertilisers.	
4.3.7 Harvesting of forests	Will the Project involve the harvesting of forests?	No	The Project does not involve the harvesting of forests.	
4.3.8 Food	Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The Project does not have any impact on the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives.	
4.3.9 Animal Husbandry	Will the Project involve animal husbandry?	No	The Project will not involve animal husbandry.	

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from stakeholders

>> *(Describe how stakeholder consultation was conducted in accordance with GS4GG Stakeholder Procedure Requirements and Guidelines.)*

Since the project is applying for retroactive registration, comments from the stakeholder feedback round would be incorporated at a later stage.

E.2. Summary of comments received

>> *(Provide a summary of key comments received during the consultation process.)*

Since the project is applying for retroactive registration, comments from the stakeholder feedback round would be incorporated at a later stage.

E.3. Report on consideration of comments received

>> *(Describe how the comments have been addressed by providing a clarification to the stakeholder or by altering the design of the project or by proposing to monitor any anticipated negative impacts etc.)*

Since the project is applying for retroactive registration, comments from the stakeholder feedback round would be incorporated at a later stage.

Appendix 1. Contact information of project participants

Organization name	Orange Sironj Wind Power Pvt Ltd.
Registration number with relevant authority	U40300DL2011PTC274906
Street/P.O. Box	Sector-21 Dwarka,
Building	#301B,3rd Floor, D21 Corporate Park,
City	New Delhi
State/Region	Delhi
Postcode	110075
Country	India
Telephone	+91-011-30501110
Fax	+91-011-30501114
E-mail	pavangupta@orangerenewable.net
Website	www.orangerenewable.net
Contact person	Mr. Pavan Gupta
Title	Assistant Manager
Salutation	Mr.
Last name	Gupta
Middle name	
First name	Pavan
Department	Business Development
Mobile	+ 91-956054065
Direct fax	+91-011-30501114
Direct tel.	+91-011-30501110
Personal e-mail	pavangupta@orangerenewable.net

Appendix 2. Summary of post registration design changes

Revision History

Version	Date	Remarks
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1	10 July 2017	Initial adoption