



**Project design document form for
small-scale CDM project activities
(Version 08.0)**

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	Wind Power Project by Wires & Fabriks (EKIESL-CDM.February-15-03)
Version number of the PDD	03
Completion date of the PDD	23/08/2016
Project participant(s)	Wires and Fabriks (S.A.) Ltd. ReXchange Global Solutions (P88)
Host Party	India
Applied methodology(ies) and, where applicable, applied standardized baseline(s)	Methodology: - AMS-I.D "Grid connected renewable electricity generation" (EB 81, Version 18)
Sectoral scope(s) linked to the applied methodology(es)	Sectoral Scope 1: Energy Industries (renewable - /non renewable sources)
Estimated amount of annual average GHG emission reductions	5,745 tCO ₂ e / annum

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The main purpose of this project activity is to generate clean form of electricity through renewable wind energy source. Wires and Fabriks (S.A.) Ltd. is the promoter of the proposed project activity. The project activity involves installations of 3 wind turbine of 0.6 MW each and 1 wind turbine of 1.25 MW at Jaisalmer, Rajasthan. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 5,745 tCO₂e per year, thereon displacing 5,881 MWh/year amount of electricity from the generation-mix of power plants connected to the NEWNE regional grid, which is mainly dominated by thermal/fossil fuel based power plant.

The power generated from the project activity will be sold to the State Electricity Board.

The details of the WTGs and the state of installation are mentioned in the table:-

Project Promoters' Name	Capacity in MW	Connection with Grid	Usage	State
Wires and Fabriks (S.A.) Ltd.	0.6x3 MW	NEWNE	Sale to EB	Rajasthan
	1.25x1 MW			

Sectoral Scope: 01 : "Grid connected renewable electricity generation", AMS I.D. (Version 18)

Project Type: (i) : Renewable energy projects

Project Category : I.D. - Grid connected renewable electricity generation (Version 18, EB 81, Annex 24¹)

The approved methodology also refers to latest approved versions of

- Tool to calculate the emission factor for an electricity system – Version 5.0.0, EB 87 Annex 9²

Scenario existing prior to the implementation of project activity:

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

Baseline Scenario:

As per the applicable methodology, a Greenfield power plant is defined as "*a new renewable energy power plant that is constructed and operated at a site where no renewable energy power plant was operated prior to the implementation of the project activity*".

As the project activity falls under the definition of a Greenfield power plant, the baseline scenario as per applied methodology is the following:

The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

¹ http://cdm.unfccc.int/methodologies/documentation/meth_booklet.pdf#AMS_I_D

² <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf>

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

Sustainable development indicators

The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GOI) under the Ministry of Environment and Forests (MoEF), has mentioned four indicators for the sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India³. Thus the project's contribution towards sustainable development has been addressed based on the following sustainable development aspects:

Social well being

The project activity provided / provides job opportunity to local people during erection, commissioning and maintenance of the wind machines. Frequency of visiting villages and nearby areas by skilled, technical and industrialist increase due to installation /site visit/operation and maintenance work related to WTGs. This directly and indirectly positively effects the economy of villages and nearby area.

Environmental well being

The 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 CDM 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.

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 of WTGs and demonstrates the success of wind turbines in the region which further motivate more investors to invest in wind power projects. Hence, the project activity leads to technological well-being.

The Host County Approval issued by Indian DNA declaring acceptability of the Sustainable Indicators by the project activity is submitted to DOE.

A.2. Location of project activity

A.2.1. Host Party

India

A.2.2. Region/State/Province etc.

Rajasthan

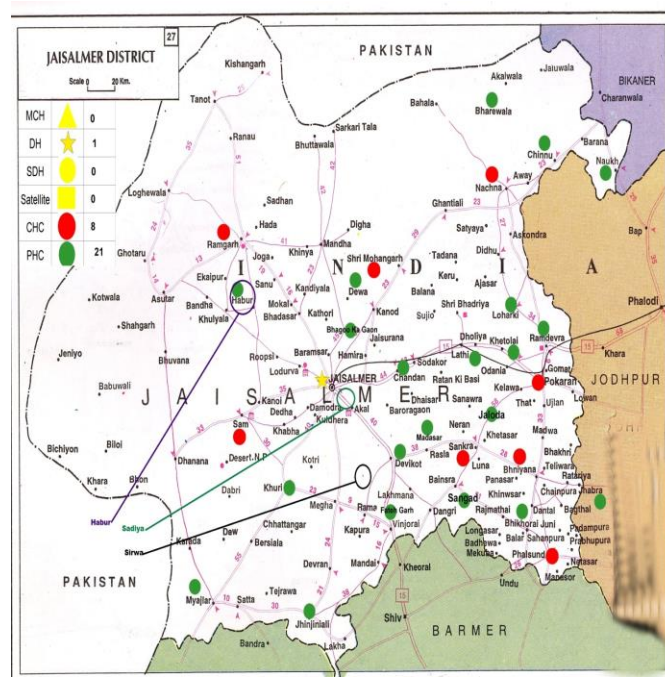
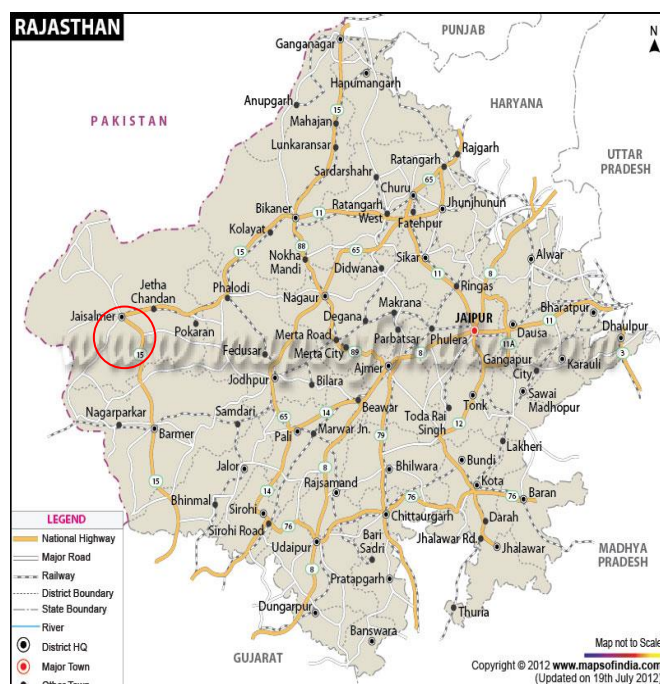
A.2.3. City/Town/Community etc.

³ http://www.cdmindia.gov.in/approval_process.php

Village : Sadiya, Habur, Sirawa
District : Jaisalmer

A.2.4. Physical/Geographical location

Project Promoters' Name	UID	Capacity	Latitude	Longitude	Date of Commissioning
Wires and Fabriks (S.A.) Ltd.	TEJ-25	0.6 MW	N 27° 03' 06.3"	E 70° 43' 23.3"	15/02/2011
	J-426	0.6 MW	N 26° 53' 26.4"	E 71° 00' 35.3"	31/08/2008
	J-411	0.6 MW	N 26° 54' 17.4"	E 70° 59' 08.6"	30/09/2007
	AK-28	1.25 MW	N 26° 41' 40.0"	E 71° 05' 43.9"	25/09/2010



A.3. Technologies and/or measures

Sectoral Scope : 01 - Energy industries (renewable / non renewable sources)
Project Type : I - Renewable Energy Projects
Project Category : I.D. - Grid connected renewable electricity generation (Version 18, EB 81)

Wind power technology details - The technology employed, converts wind energy to electrical energy. In wind power generation, energy of wind is converted into mechanical energy and subsequently into electrical energy. The project activity is the installation of an environmentally safe and sound technology since there are no GHG emissions associated with the electricity generation. The design lifetime of all the WTGs in the project activity is 25 years. The Net electricity generated from the project activity is 5,881 MWh/year. The annual GHG emission reduction through this project activity is estimated to be 5,745 tCO₂e whereas the GHG emission reductions for the chosen crediting period of seven years are 40,215 tCO₂e.

Technical details for S52-0.60 MW⁴

Particulars	Details
Rated power	600 kW

⁴ <http://www.suzlon.com/pdf/Suzlon-S52-product-brochure.pdf>

Cut-in wind speed	4 m/s
Cut-out wind speed	25 m/s
Rated wind speed	13 m/s
Rotor Speed	24.19 rpm
Diameter	52 m
Swept area	2,124 m ²
Design Lifetime	25 years

Technical details for S66-1.25 MW⁵

Particulars	Details
Rated power	1250 kW
Cut-in wind speed	4 m/s
Cut-out wind speed	20 m/s
Rated wind speed	12 m/s
Rotor Speed	20.62 rpm
Diameter	66 m
Swept area	3,421 m ²
Design Lifetime	25 years

For monitoring equipment, their location and technical specifications, refer Section B.7.3. For Plant Load Factor, please refer Section B.6.3.

Baseline Scenario:

As the project activity is the installation of a Greenfield power plant, the baseline scenario is the following as per applied methodology:

The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

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

A.4. Parties and project participants

Party involved (host) indicates host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	Wires and Fabriks (S.A.) Ltd. (Private Entity) ReXchange Global Solutions (P88) (Private Entity)	No

A.5. Public funding of project activity

There is no public funding from Annex 1 countries and no diversion of Official Development Assistance (ODA) involved in the project activity.

A.6. Debundling for project activity

⁵ <http://www.suzlon.com/pdf/Suzlon-S66-Mark-II-product-brochure.pdf>

As per the provisions prescribed in “Clean development mechanism project standard” and further referring to “Methodological Tool- “Assessment of debundling for small scale Project Activities” EB 83, Annex 13, Para 5⁶, “A small project activity shall be deemed to be a de-bundled component of large scale project activity, if there is a registered small scale CDM project activity or an application to register another small scale CDM project activity.

- With the same project participants
- In the same project category and technology
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small scale activity”

The project participant hereby confirms that they have not registered any small scale CDM activity or applied to register another small scale CDM project activity within 1 km of the project boundary, in the same project category and technology/measure in previous 2 years.

This means that the project activity does not fall under the de-bundled category and qualifies for small scale CDM Project.

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

B.1. Reference of methodology and standardized baseline

Title: Grid connected renewable electricity generation⁷

Reference: The project activity meets the eligibility criteria to use the simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7. Details of methodology for baseline calculations for CDM projects of capacity less than 15 MW are available in the “Appendix B of the simplified modalities and procedure for small scale CDM project activities”.

Methodology : AMS-I.D Grid Connected Renewable Electricity Generation (Version 18)⁸

Type I : Renewable Energy Project (Small Scale)

Category : I. “D”, Grid Connected Renewable Electricity Generation

Reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

Tools referred with above methodology are:

Tool to calculate the emission factor for an electricity system⁹ - Version 05.0 (EB 87, Annex 9)

Guidelines on the Methodological tool- Demonstration of additionality of small-scale project activities Version 10.0.0¹⁰

B.2. Project activity eligibility

The project activity involves generation of grid connected electricity from renewable wind energy. The project activity has an installed capacity of 3.05 MW which will remain less than the maximum

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

⁷ <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>

⁸ <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQQOFQQH4SBK>

⁹ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf>

¹⁰ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v1.pdf>

qualifying capacity of 15 MW for a small scale CDM project activity under Type-I of the small scale methodologies. The installed capacity will not increase throughout and even after the crediting period therefore the project activity will remain within the limit of small scale in each year of the crediting period. The project status is corresponding to the methodology AMS-I.D and applicability of methodology AMS-I.D are discussed below:

Applicability Criterion	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid. (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity is a Renewable Energy Project i.e. Wind Power Project which falls under applicability criteria option 1 (a) i.e., "Supplying electricity to a national or a regional grid". Hence the project activity meets the given applicability criterion.
2. Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table 2 ¹¹	The 1 st option of Table 2 of AMS I.D. Version 18, EB 61 is applicable (please refer footnote) as project supplies electricity to a national/regional grid.
3. This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition ¹² ; (c) involve a retrofit ¹³ of (an) existing	The project is installation of new wind based electricity generation plants (not addition to existing system). Option a is applicable.

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	Project type	AMS-I.A	AMS-I.D	AMS-I.F
1	Project supplies electricity to a national/regional grid		√	
2	Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)			√
3	Project supplies electricity to an identified consumer facility via national/regional grid (through a contractual arrangement such as wheeling)		√	
4	Project supplies electricity to a mini grid ¹¹ system where in the baseline all generators use exclusively fuel oil and/or diesel fuel			√
5	Project supplies electricity to household users (included in the project boundary) located in off grid areas	√		

¹² A capacity addition is an increase in the installed power generation capacity of an existing power plant through: (i) The installation of a new power plant besides the existing power plant/units; or (ii) The installation of new power units, additional to the existing power plant/units. The existing power plant/units continue to operate after the implementation of the project activity.

¹³ Retrofit (or rehabilitation or refurbishment). It involves an investment to repair or modify an existing power plant/unit, with the purpose to increase the efficiency, performance or power generation capacity of the plant, without adding new power plants or units, or to resume the operation of closed (mothballed) power plants. A retrofit restores the installed power generation capacity to or above its original level. Retrofits shall only include measures that involve capital investments and not regular maintenance or housekeeping measures.

plant(s); or (d) involve a replacement ¹⁴ of (an) existing plant(s).	
<p>4. Hydro power plants with reservoirs¹⁵ that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <ul style="list-style-type: none"> • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir¹⁶, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m². 	The project is wind power project and thus the criterion is not applicable to this project activity.
5. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel ¹⁷ , the capacity of the entire unit shall not exceed the limit of 15 MW.	The project activity is a 3.05 MW wind electricity generation. Unit does not co-fire fossil fuels. Hence the criterion is not applicable to the project activity.
6. Combined heat and power (co-generation) systems are not eligible under this category.	The Project activity is a renewable wind energy project and is not a combined heat and power system. Hence the criteria is not applicable to the project activity
7. In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct ¹⁸ from the existing units.	The project activity is Greenfield and there is no existing power generation facility at the site. Hence the criteria is not applicable to the project activity
8. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	Not applicable, the wind project is a Green field project activity and this project is not the enhancement or up gradation project.

¹⁴ Replacement. It involves investment in a new power plant or unit that replaces one or several existing unit(s) at the existing power plant. The installed capacity of the new plant or unit is equal to or higher than the plant or unit that was replaced.

¹⁵ A reservoir is a water body created in valleys to store water generally made by the construction of a dam.

¹⁶ A reservoir is to be considered as an "existing reservoir" if it has been in operation for at least three years before the implementation of the project activity.

¹⁷ A co-fired system uses both fossil and renewable fuels, for example the simultaneous combustion of both biomass residues and fossil fuels in a single boiler. Fossil fuel may be used during a period of time when the biomass is not available and due justifications are provided.

¹⁸ Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct".

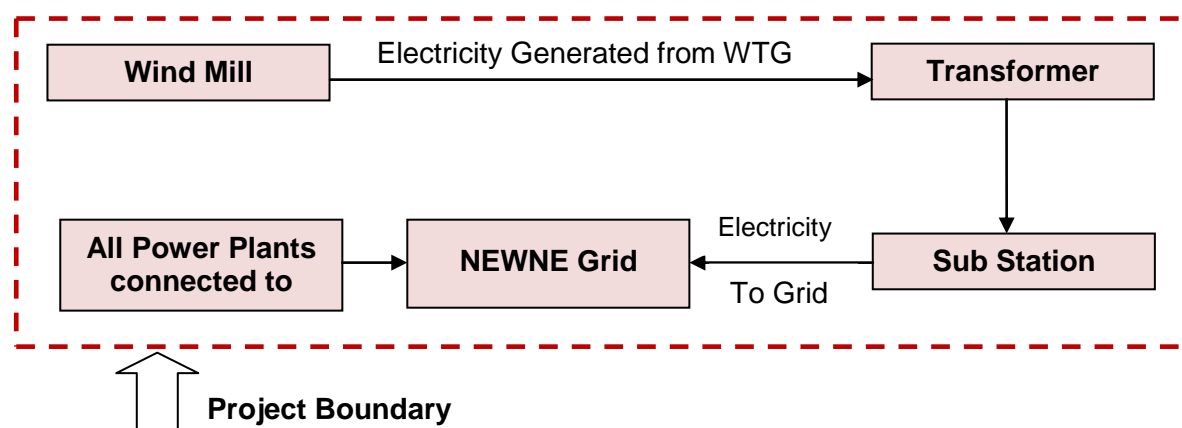
9. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as “AMS-I.C.: Thermal energy production with or without electricity” shall be explored.	The Project activity is a renewable wind power project and is not a landfill gas, waste gas, waste water treatment and agro-industries projects or recovered methane emissions project. Hence the criteria is not applicable to the project activity
10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.	The Project activity is a renewable wind power project and is not a biomass project. Hence the criteria is not applicable to the project activity.

The project activity qualifies as Type I during every year of the crediting period in accordance with applicable provisions for project activity eligibility as discussed above. Also the total installed capacity of project activity is 3.05 MW which is less than 15 MW threshold limit for small scale project activities as per **AMS-I.D: Grid connected renewable electricity generation, version 18**. The project capacity will be always remain the same and hence the project activity will always be under the threshold limit of small scale project activities throughout the crediting period and thereafter.

B.3. Project boundary

As per AMS-I.D Version 18, EB 81 - “The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to”.

The project boundary includes the wind turbine generator, sub-stations, grid and all power plants connected to grid. The proposed project activity will evacuate power to the NEWNE grid. Therefore the entire NEWNE grid and all connected power plants have been considered in the project boundary for the proposed CDM project activity.



B.4. Establishment and description of baseline scenario

As the project activity is the installation of a Greenfield power plant, the baseline scenario is the following as per applied methodology:

The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

The project activity involved setting up of a WTG to harness the power of wind 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 state grid (part of NEWNE grid), which is fed mainly by fossil fuel fired plants.

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

The combined margin ($EF_{grid,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM). Calculations for this combined margin must be based on data from an official source¹⁹ (where available) and made publically available.

The combined margin of the NEWNE grid (now a part of unified Indian Grid) used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
$EF_{grid,y}$	0.9770 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 10.0 Dec 2014, published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	0.9862 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2011-12, 2012-13, 2013-14) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 10.0, Dec 2014, published by Central Electricity Authority (CEA), Government of India
$EF_{grid,BM,y}$	0.9495 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 10.0, Dec 2014 published by Central Electricity Authority (CEA), Government of India

B.5. Demonstration of additionality

As per the Guidelines on the demonstration of additionality of small-scale project activities (ver. 10 EB 83 Annex 14)²⁰ of the simplified modalities and procedures for small scale CDM project activities, to establish the project additionality, it has to be shown that the project activity would not have occurred anyway due to at least one of the following barriers:

- **Investment barrier:** a financially more viable alternative to the project activity would have led to higher emissions;

¹⁹ http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver10.pdf

²⁰ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v1.pdf>

- **Technological barrier:** a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
- **Barrier due to prevailing practice:** prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
- **Other barriers:** Without the project activity, for another specific reason identified by the project participants, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

The PP has selected Investment barrier to demonstrate in a conservative and transparent manner that the proposed CDM project activity is financially unattractive. In line with the guidelines stipulated under Annex 34 of EB 35²¹ ("Non-binding best practice examples to demonstrate additionality for SSC project activities"), a benchmark analysis is used in the project case under investment barrier.

Additionality demonstration for J-411 and J-426

As per Guidance on assessment of investment analysis, for project activity Equity IRR has been chosen as the financial indicator, Required Return on Equity is suitable benchmark.

Para 12 of guidance also indicates that in cases where project can be developed by an entity other than PP benchmark should be based on publically available data available at the time of decision making. It further indicates that benchmarks should may include local lending rates or equity indices or benchmarks determined by relevant national authorities.

Considering the above PP has chosen benchmark based on equity indices required return on equity has been estimated based on Capital Asset Pricing Model (CAPM), which is an industry accepted norm. As per the model, Required Return on Equity can be estimated below:

$$R_e = R_f + \text{Beta} \times (\text{Market Return} - \text{Risk Free Return})$$

Estimation of Benchmark:

As discussed above, Capital Asset Pricing Model (CAPM) is used which is well accepted methodology for estimating the expected return on equity. As per CAPM, the required return on equity investment is the return of risk free security plus beta times the difference between market return and risk free return. CAPM can highlight the relationship between the overall market scenario and its effect on individual or group of companies.

Risk Free Return

The risk free rate of return is a benchmark figure against which all the investments in an economy should be measured. Reserve Bank of India provides information on Weighted Average Yield on market Loans which is actually a risk free return. The value for the year 2006-07²² for WTG No. J-411 was 7.90% and 2007-08²³ for WTG No. J-426 was 8.31%.

Cost of Equity:

The cost of equity has been determined using the Capital Asset Pricing Model (CAPM) considering Beta values of all power generating companies in India that were listed at the time of this investment making decision.

²¹ https://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid15_v01.pdf

²² <https://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/77804.pdf>

²³ <https://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/83924.pdf>

Risk Premium:

The market risk premium, as measured and applied in practice is the premium above the risk free rate of return that investors expect to earn on a portfolio of equities. Equity indices are indicators of expected market returns. Market Return has been assumed to be the minimum of all the values of listed Sensex operating in India during the time of Investment making decision. For this purpose the Index values from the start date of the Sensex till the date of Invest making decision has been considered. After the analysis BSE 100 has been taken into consideration as the most suitable and accordingly historical price index of power companies listed into that platform on that particular date have been considered. It is to be noted here that only power companies listed under BSE 100 at the time of Investment making decision has been considered and as there was only one wind energy generation company (i.e. Suzlon Energy Ltd) listed under BSE 100 during that period, hence beta values has been considered based upon historical indexes of leading power producer companies in India. Selection of BSE 100 represent a more robust and efficient face of market. Based on this market return is estimated as detailed out in the excel sheet.

Beta:

PP has estimated equity beta values for a number of power companies in India. Equity beta measures the risk that cannot be eliminated in a systematic well balanced and diversified portfolio. The beta of an equity is calculated as co variance between its return and return on a well diversified portfolio.

$$\text{Equity Beta} = \text{Covariance}(r, r_m) / \text{Variance}(r_m)$$

Where: r is return from equity investment in a single stock

r_m is return from equity investment in well diversified market portfolio

However the measured equity beta values for a particular company relates to the unique capital structure of that firm and that a change in capital structure will change the degree of financial risk borne by the equity holders and hence the equity beta. A common practice to allow equity beta to be compared across firms with different capital structures is to adjust the estimated equity beta into equivalent asset beta. Please refer financial excel spreadsheet for the same

Key assumptions for financial analysis

All the values taken for the various parameters in the analysis are assumptions made by PP during the project evaluation at the time of investment decision. The key assumptions used for calculating the post tax project IRR are set out below:

Key financial assumptions and values for J-411

Investor Name	Wires & Fabriks (S.A.) Limited- J 411		
Project Location	Jaisalmer, Rajasthan		
Machine Details	1 x 0.6 MW		
Expected Date of Commissioning	30-Sep-2007		
Life of Plant in years	25		
<div>Offer Letter</div> <div>15-Jul-07</div>			
in INR MN			
Items	Cost	Tax	Cost + Tax

Supply of WTG Comprehensive cost	36.24	-	36.24
Total Cost of Project	36.24	-	36.24

O&M Expenses	N.M.	N.M.	N.M.
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Key assumptions for the project activity are as follows:

Details of the project		Source
State where the project is situated	Rajasthan	
No. of machines	1	
Capacity /machine (MW)	0.60	
Total Capacity (MW)	0.60	Calculated Value
Expected Date of Commissioning	30-Sep-07	Assumption
Life of the plant (Yrs.)	25	As per WTG manufacturer specifications
Generation of electricity		
PLF (%)	23.44%	As per Third Party Report dated 20th March 2007 being available at the time of investment making decision as on 18 th July 2007
Annual generation (kWh)	12,32,006	Calculated Value
Tariff rate at the decision making (INR/kWh) ²⁴	3.60	As per RERC order dt. 09.03.2007, Pg 20
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	0.45	As per RERC order dt. 09.03.2007, Pg 18 ²⁵
Escalation in the operational expenses (%)	5.00%	
O & M free for (Yr.)	-	
Administrative expenses	0.30	Administration and Miscellaneous expenses were worked out by PP during investment decision
Escalation in Administrative expenses	10.00%	Escalation for Admin Expenses
Insurance (INR Mn.) ²⁶	0.05	As per TAC order 2001, Sheet No. 31
Financial parameters		
TOTAL COST (INR Mn.)	36.24	As Per Offer Letter
Loan Amount (INR Mn.)	-	
Equity Investment (INR Mn.)	36.24	
Book Depreciation (SLM Method)		

²⁴ [http://www.erc.rajabthan.gov.in/TariffOrders/JS_\(PO\)_Order_RE_Tariff_15.03.07.pdf](http://www.erc.rajabthan.gov.in/TariffOrders/JS_(PO)_Order_RE_Tariff_15.03.07.pdf)

²⁵ [http://www.erc.rajabthan.gov.in/TariffOrders/JS_\(PO\)_Order_RE_Tariff_15.03.07.pdf](http://www.erc.rajabthan.gov.in/TariffOrders/JS_(PO)_Order_RE_Tariff_15.03.07.pdf)

²⁶ <https://iib.gov.in/IIB/tac/tariffs/AIFT2001.pdf>

Land	-	As Per Offer Letter
Gross Depreciable Value (INR Mn.)	36.24	Calculated Value
Salvage Value (%) ²⁷	10.00%	As per RERC order dt. 29.09.2006, Pg 19
Salvage value (INR Mn.)	3.62	Calculated Value
Net Depreciable Value (INR Mn.)	32.62	Calculated Value
Residual Value (INR Mn.)	3.62	Calculated Value
IT Depreciation		
IT Depreciation (WDV Method) (%) ²⁸	80.00%	As Per Income Tax Act
Income Tax		
Financial Year	FY 2007-08	
Income tax rate (%)	30.00%	As Per IT rule Pg 53 Para E(I)
MAT (%)	10.00%	As Per IT rule
Service Tax (%)	12.00%	As Per Income Tax Rule
Surcharge (%)	10.00%	As Per Income Tax Rule, Pg 37 Para E(I)
Education cess (%)	3.00%	As Per IT rule Pg 4, Points 2.(11) and 2.(12)
Final Tax rates		
Income tax rate (%)	33.99%	Calculated Value
MAT (%)	11.33%	Calculated Value
Service Tax (%)	12.36%	Calculated Value

Key financial assumptions and values for J-426

Investor Name	Wires & Fabriks (S.A.) Limited- J 426
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Project Location	Jaisalmer, Rajasthan
Machine Details	1 x 0.6 MW
Expected Date of Commissioning	30-Sep-2008
Life of Plant in years	25

Offer Letter

16-May-08

in INR MN

Items	Cost	Tax	Cost + Tax
Supply of WTG Comprehensive cost	26.91	-	26.91

²⁷ http://www.erc.rajasthan.gov.in/Orders/Final%20order_NES_Chairman.pdf

²⁸ <http://www.incometaxindia.gov.in/incometaxindia/contents/ITRules2010/appendix264.htm>

Erection & Commissioning	1.29	0.05	1.34
Transformer	0.94	-	0.94
Civil Works	2.82	0.12	2.94
Electrical Works	1.84	0.08	1.92
Power Evacuation	1.80	0.22	2.02
Land	0.90	-	0.90
Total Cost of Project	36.50	0.47	36.97

O&M Expenses	N.M.	N.M.	N.M.
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Key assumptions for the project activity are as follows:

Details of the project		Source
State where the project is situated	Rajasthan	
No. of machines	1	
Capacity /machine (MW)	0.60	
Total Capacity (MW)	0.60	Calculated Value
Expected Date of Commissioning	30-Sep-08	Assumption
Life of the plant (Yrs.)	25	As per WTG manufacturer specifications
Generation of electricity		
PLF (%)	23.41%	As per Third Party Report dated 15th April 2008 available at time of investment decision as on 20 th May 2008
Annual generation (kWh)	12,30,430	Calculated Value
Tariff rate at the decision making (INR/kWh) ²⁹	3.60	As per RERC order dt. 09.03.2007, Pg 20
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	0.46	As per RERC order dt. 09.03.2007, Pg 18 ³⁰
Escalation in the operational expenses (%)	5.00%	
O & M free for (Yr.)	-	
Administrative expenses	0.30	Administration and Miscellaneous expenses were worked out by PP during investment decision
Escalation in Administrative expenses	10.00%	Escalation for Admin Expenses
Insurance (INR Mn.) ³¹	0.06	As per TAC order 2001, Sheet No. 31

²⁹ [http://www.erc.rajabthan.gov.in/TariffOrders/JS_\(PO\)_Order_RE_Tariff_15.03.07.pdf](http://www.erc.rajabthan.gov.in/TariffOrders/JS_(PO)_Order_RE_Tariff_15.03.07.pdf)

³⁰ [http://www.erc.rajabthan.gov.in/TariffOrders/JS_\(PO\)_Order_RE_Tariff_15.03.07.pdf](http://www.erc.rajabthan.gov.in/TariffOrders/JS_(PO)_Order_RE_Tariff_15.03.07.pdf)

³¹ <https://iib.gov.in/IIB/tac/tariffs/AIFT2001.pdf>

Financial parameters		
TOTAL COST (INR Mn.)	36.97	As Per Offer Letter
Loan Amount (INR Mn.)	-	
Equity Investment (INR Mn.)	36.97	
Book Depreciation (SLM Method)		
Land	0.90	As Per Offer Letter
Gross Depreciable Value (INR Mn.)	36.07	Calculated Value
Salvage Value (%) ³²	10.00%	As per RERC order dt. 29.09.2006, Pg 19
Salvage value (INR Mn.)	3.61	Calculated Value
Net Depreciable Value (INR Mn.)	32.46	Calculated Value
Residual Value (INR Mn.)	4.51	Calculated Value
IT Depreciation		
IT Depreciation (WDV Method) (%) ³³	80.00%	As Per Income Tax Act
Income Tax		
Financial Year	FY 2008-09	
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 37 Para E(I)
MAT (%)	10.00%	As Per IT rule
Service Tax (%)	12.00%	As Per Income Tax Rule
Surcharge (%) ³⁴	10.00%	As Per Income Tax Rule, Pg 37 Para E(I)
Education cess (%) ³⁵	3.00%	As Per IT rule Pg 4, Points 2.(11) and 2.(12)
Final Tax rates		
Income tax rate (%)	33.99%	Calculated Value
MAT (%)	11.33%	Calculated Value
Service Tax (%)	12.36%	Calculated Value

Additionality demonstration for AK-28 and TEJ-25 having Investment Decision on 29/04/2010

Selection of Benchmark & Financial Indicator:

According to the “Tool for demonstration and assessment of Additionality³⁶”, the financial indicator can be based either on (1) project IRR or (2) equity IRR. There is no general preference between the approaches (1) or (2). The benchmark chosen for analysis shall be fully consistent with the choice of approach.

³² http://www.rerc.rajasthan.gov.in/Orders/Final%20order_NES_Chairman.pdf

³³ <http://www.incometaxindiapr.gov.in/incometaxindiapr/contents/ITRules2010/appendix264.htm>

³⁴ <http://indiabudget.nic.in/ub2007-08/fb/bill81.pdf>

³⁵ <http://indiabudget.nic.in/ub2007-08/fb/bill81.pdf>

³⁶ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.1.0.pdf>

As per Guidance on assessment of investment analysis the required or expected return on equity are appropriate benchmark for equity IRR. Project participants have considered Equity IRR for investment analysis at the time of decision-making. As Project participants are only interested in the returns project is generating on the portion of investment costs, which is financed by them in the form of equity.

Hence, Project participants have considered Equity IRR for investment analysis at the time of decision-making. As Project participants are 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 12 of the “GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS³⁷” states that required returns on equity is appropriate benchmark for Equity IRR. Therefore, the Expected return on equity is considered appropriate benchmark.

As in equity IRR has been chosen as the financial indicator, Required Return on Equity is suitable benchmark.

The para 12 of guidance also suggests that in cases where the project can be developed by an entity other than project participant, the benchmark should be based on publically available sources which can be validated by DoE. It further states that such benchmarks may include local lending and borrowing rates, equity indices or benchmarks determined by relevant national authorities.

Considering the above Project Participant has considered the benchmark based on equity indices. Required return on equity has been based on Capital Asset Pricing Model (CAPM) which is an industry accepted norm. As per the model, Required Return on Equity can be estimated as below:

$$R_e = R_f + \text{Beta} \times (\text{Market Return} - \text{Risk Free Return})$$

Estimation of benchmark:

As discussed above, Capital Asset Pricing Model (CAPM) is used which is well accepted methodology for estimating the expected return on equity. As per CAPM, the required return on equity investment is the return of risk free security plus beta times the difference between market return and risk free return. CAPM can highlight the relationship between the overall market scenario and its effect on individual or group of companies.

PP has used Capital Asset Pricing Model (CAPM) to calculate the benchmark for this project activity.

Risk Free Return

The risk free rate of return is a benchmark figure against which all the investments in an economy should be measured. Reserve Bank of India provides information on Weighted Average Yield on market Loans which is actually a risk free return. The value for the year 2009-10³⁸ for WTG No. TEJ-25 and AK-28 was 8.27%.

Cost of Equity:

The cost of equity has been determined using the Capital Asset Pricing Model (CAPM) considering Beta values of all power generating companies in India that were listed at the time of this investment making decision.

Risk Premium:

The market risk premium, as measured and applied in practice is the premium above the risk free rate if return that investors expect to earn on a portfolio of equities. Equity indices are indicators of

³⁷ https://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf

³⁸ https://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/26CT_CSM080310.pdf

expected market returns. Market Return has been assumed to be the minimum of all the values of listed Sensex operating in India during the time of Investment making decision. For this purpose the Index values from the start date of the Sensex till the date of Invest making decision has been considered. After the analysis BSE 200 has been taken into consideration as the most suitable and accordingly historical price index of power companies listed into that platform on that particular date have been considered. It is to be noted here that only power companies listed under BSE 200 at the time of Investment making decision has been considered and as there was only one wind energy generation company (i.e. Suzlon Energy Ltd) and NHPC Ltd listed under BSE 200 during that period, hence beta values has been considered based upon historical price indexes of leading power producer companies in India. Selection of BSE 200 represent a more robust and efficient face of market. Based on this market return is estimated as detailed out in the excel sheet.

Beta:

PP has estimated equity beta values for a number of power companies in India. Equity beta measures the risk that cannot be eliminated in a systematic well balanced and diversified portfolio. The beta of an equity is calculated as co variance between its return and return on a well diversified portfolio.

$$\text{Equity Beta} = \text{Covariance}(r, r_m) / \text{Variance}(r_m)$$

Where: r is return from equity investment in a single stock

r_m is return from equity investment in well diversified market portfolio

However the measured equity beta values for a particular company relates to the unique capital structure of that firm and that a change in capital structure will change the degree of financial risk borne by the equity holders and hence the equity beta. A common practice to allow equity beta to be compared across firms with different capital structures is to adjust the estimated equity beta into equivalent asset beta. Please refer financial excel spreadsheet for the same

The benchmark Cost of equity for the project is detailed out in Financial Calculations sheet for both the WTGs (AK28 and TEJ25).

Parameter	Applicable Beta	Risk Free Rate	Market Return	Market Risk Premium	Cost of Equity
Values	0.68	8.27%	15.82%	7.55%	13.42%

Key assumptions for financial analysis

All the values taken for the various parameters in the analysis are assumptions made by PP during the project evaluation at the time of investment decision. The key assumptions used for calculating the post tax equity IRR are set out below:

Key assumptions used for calculating post-tax Equity IRR for WTG AK-28 are set out below:

Investor Name	Wires & Fabriks (S.A.) Limited (AK 28)
Project Location	Jaisalmer, Rajasthan
Machine Details	1 x 1.25 MW
Expected Date of Commissioning	30-Sep-2010

Life of Plant in years	25
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Offer Letter

26-Apr-10

in INR MN

Items	Cost	Tax	Cost + Tax
Supply of WTG Comprehensive cost	63.80	-	63.80
Total Cost of Project	63.80	-	63.80

O&M Expenses	1.30	0.13	1.43
	Free for 1 Yr		
	5% Escalation, starting from 3rd Yr.		

Key financial assumptions and calculations are as follows:

Details of the project		Source
State where the project is situated	Rajasthan	
No. of machines	1	
Capacity /machine (MW)	1.25	
Total Capacity (MW)	1.25	Calculated Value
Expected Date of Commissioning	30-Sep-10	Assumption
Life of the plant (Yrs.)	25	As per WTG manufacturer specifications
Generation of electricity		
PLF (%)	20.32%	As per Third Party Report dated 10th Jan 2010, available at the time of investment making decision as on 29 th April 2010.
Annual generation (kWh)	22,25,040	Calculated Value
Tariff rate at the decision making (INR/kWh) ³⁹	3.83	As per RERC order dt. 31.03.2010
O & M Expenses (INR Mn.)	1.43	As Per Offer Letter
Escalation in the operational expenses (%)	5.00%	As Per Offer Letter
O & M free for (Yr.)	1	As Per Offer Letter
Administrative expenses	0.50	Administration and Miscellaneous expenses were worked out by PP during investment decision

³⁹ http://www.erc.rajabtan.gov.in/TariffOrders/Order_WIND.pdf

Escalation in Administrative expenses	10.00%	Escalation for Admin Expenses
Insurance (INR Mn.)	0.10	As per TAC order 2001 ⁴⁰ , Sheet No. 31
Financial parameters		
TOTAL COST (INR Mn.)	63.80	As Per Offer Letter
Loan Amount (INR Mn.)	-	
Equity Investment (INR Mn.)	63.80	
Book Depreciation (SLM Method)		
Land	-	As Per Offer Letter
Gross Depreciable Value (INR Mn.)	63.80	Calculated Value
Salvage Value (%) ⁴¹	10.00%	As per RERC order dt. 23.01.2009, Pg 20
Salvage value (INR Mn.)	6.38	Calculated Value
Net Depreciable Value (INR Mn.)	57.42	Calculated Value
Residual Value (INR Mn.)	6.38	Calculated Value
IT Depreciation		
IT Depreciation (WDV Method) (%) ⁴²	80.00%	As Per Income Tax Act
Income Tax		
Financial Year	FY 2010-11	
Income tax rate (%) ⁴³	30.00%	As Per Income Tax Rule, Pg 29 Para E(I)
MAT (%) ⁴⁴	18.00%	As Per IT rule Pg 9
Service Tax (%) ⁴⁵	10.00%	As Per Income Tax Rule, Pg 14
Surcharge (%) ⁴⁶	7.50%	As Per Income Tax Rule, Pg 29 Para E(I)
Education cess (%) ⁴⁷	3.00%	As Per IT rule Pg 3, Points 2.(11) and 2.(12)
Final Tax rates		
Income tax rate (%)	33.22%	Calculated Value
MAT (%)	19.93%	Calculated Value

⁴⁰ <https://iib.gov.in/IIB/tac/tariffs/AIFT2001.pdf>

⁴¹ <http://www.erc.rajasthan.gov.in/Regulations/Reg%2076.pdf>

⁴² <http://www.incometaxindiapr.gov.in/incometaxindiapr/contents/ITRules2010/appendix264.htm>

⁴³ <http://indiabudget.nic.in/ub2010-11/fb/bill91.pdf>

⁴⁴ <http://indiabudget.nic.in/ub2010-11/bh/bh1.pdf>

⁴⁵ <http://indiabudget.nic.in/ub2010-11/bh/bh1.pdf>

⁴⁶ <http://indiabudget.nic.in/ub2010-11/fb/bill91.pdf>

⁴⁷ <http://indiabudget.nic.in/ub2010-11/fb/bill2.pdf>

Service Tax (%)	10.30%	Calculated Value
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Key assumptions used for calculating post-tax Equity IRR for WTG TEJ-25 are set out below:

Cost of the Project Activity

Investor Name	Wires & Fabriks (S.A.) Limited (TEJ 25)
Project Location	Jaisalmer, Rajasthan
Machine Details	1 x 0.6 MW
Expected Date of Commissioning	31-Mar-2011
Life of Plant in years	25

Offer Letter

2-Apr-10

in INR MN

Items	Cost	Tax	Cost + Tax
Supply of WTG	39.00	-	39.00
Erection & Commissioning	-	-	-
Transformer	-	-	-
Civil Works	-	-	-
Electrical Works	-	-	-
Power Evacuation	-	-	-
Land	-	-	-
Total Cost of Project	39.00	-	39.00

O&M Expenses	0.70	0.07	0.77
	Free for 1 Yr		
	5% Escalation, starting from 3rd Yr.		

Key Financial Values and assumptions for TEJ- 25 are as follows:

Details of the project		Source
State where the project is situated	Rajasthan	
No. of machines	1	
Capacity /machine (MW)	0.60	
Total Capacity (MW)	0.60	Calculated Value
Expected Date of Commissioning	31-Mar-11	Assumption
Life of the plant (Yrs.)	25	As per WTG manufacturer specifications
Generation of electricity		
PLF (%)	22.71%	As per Third Party Report dated 15th April 2010, available at the time of investment making decision as on 29 th April 2010

Annual generation (kWh)	11,93,638	Calculated Value
Tariff rate at the decision making (INR/kWh) ⁴⁸	3.87	As per RERC order dt. 06.08.2010
O & M Expenses (INR Mn.)	0.77	As Per Offer Letter
Escalation in the operational expenses (%)	5.00%	As Per Offer Letter
O & M free for (Yr.)	1	As Per Offer Letter
Administrative expenses	0.25	Administration and Miscellaneous expenses were worked out by PP during investment decision
Escalation in Administrative expenses	10.00%	Escalation for Admin Expenses
Insurance (INR Mn.)	0.06	As per TAC order 2001, ⁴⁹ Sheet No. 31
Financial parameters		
TOTAL COST (INR Mn.)	39.00	As Per Offer Letter
Loan Amount (INR Mn.)	-	
Equity Investment (INR Mn.)	39.00	
Book Depreciation (SLM Method)		
Land	-	As Per Offer Letter
Gross Depreciable Value (INR Mn.)	39.00	Calculated Value
Salvage Value (%)	10.00%	As per RERC order ⁵⁰ dt. 23.01.2009, Pg 20
Salvage value (INR Mn.)	3.90	Calculated Value
Net Depreciable Value (INR Mn.)	35.10	Calculated Value
Residual Value (INR Mn.)	3.90	Calculated Value
IT Depreciation		
IT Depreciation (WDV Method) (%) ⁵¹	80.00%	As Per Income Tax Act
Income Tax		
Financial Year	FY 2010-11	
Income tax rate (%)	30.00%	As Per Income Tax Rule ⁵² , Pg 29 Para E(I)
MAT (%)	18.00%	As Per IT rule ⁵³ Pg 9
Service Tax (%)	10.00%	As Per Income Tax Rule ⁵⁴ , Pg 14
Surcharge (%)	7.50%	As Per Income Tax Rule ⁵⁵ , Pg 29 Para E(I)

⁴⁸ http://www.erc.rajasthan.gov.in/TariffOrders/Order_WIND.pdf

⁴⁹ <https://iib.gov.in/IIB/tac/tariffs/AIFT2001.pdf>

⁵⁰ <http://www.erc.rajasthan.gov.in/Regulations/Reg%2076.pdf>

⁵¹ <http://www.incometaxindiapr.gov.in/incometaxindiapr/contents/ITRules2010/appendix264.htm>

⁵² <http://indiabudget.nic.in/ub2010-11/fb/bill91.pdf>

⁵³ <http://indiabudget.nic.in/ub2010-11/bh/bh1.pdf>

⁵⁴ <http://indiabudget.nic.in/ub2010-11/bh/bh1.pdf>

⁵⁵ <http://indiabudget.nic.in/ub2010-11/fb/bill91.pdf>

Education cess (%)	3.00%	As Per IT rule ⁵⁶ Pg 3, Points 2.(11) and 2.(12)
Final Tax rates		
Income tax rate (%)	33.22%	Calculated Value
MAT (%)	19.93%	Calculated Value
Service Tax (%)	10.30%	Calculated Value

Considering the input values, Equity IRRs for all the WTGs are given below:

Project Investor	Capacity	Equity IRR without CDM	Benchmark (Cost of Equity)
Wires and Fabriks (S.A.) Ltd.	TEJ-25	3.31%	13.42%
	J-426	4.46%	17.49%
	J-411	5.12%	18.64%
	AK-28	4.93%	13.42%

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

Sensitivity Analysis:

As per Guidance 20 and 21 of Annex 5 of EB 62, only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets. Guidance also states, "All parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude". The Annex also states, as a general point of departure, variations in the sensitivity analysis should at least cover a range of +10% and -10%, unless this is not deemed appropriate in the context of the specific project circumstances.

Since the project cost is already firmed up, the cost is not variable. The tariff is determined by PPA which is fixed for years mentioned as per the tariff order and hence it need not be subjected to variation. All other expenses are much less than 20% of the total cost. Hence, only PLF needs to be subjected to reasonable variation. Nevertheless, following factors have been subjected to sensitivity analysis:

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

The results of sensitivity analysis are as follows:

Equity IRR	Wires and Fabriks (S.A.) Ltd. (TEJ-25)			
Variation %	-10%	Normal	10%	Breaching Value
PLF	0.64%	3.31%	5.55%	55.94%
O&M Cost	3.86%	3.31%	2.69%	-280.09%
Project Cost	4.86%	3.31%	1.88%	-45.58%
Tariff Rate	0.64%	3.31%	5.55%	55.94%

Equity IRR	Wires and Fabriks (S.A.) Ltd. (J-426)			
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⁵⁶ <http://indiabudget.nic.in/ub2010-11/fb/bill2.pdf>

Variation %	-10%	Normal	10%	Breaching Value
PLF	1.39%	4.46%	6.83%	73.58%
O&M Cost	4.86%	4.46%	4.05%	-550.49%
Project Cost	6.11%	4.46%	3.04%	-50.58%
Tariff Rate	1.39%	4.46%	6.83%	73.58%

Equity IRR	Wires and Fabriks (S.A.) Ltd. (J-411)			
Variation %	-10%	Normal	10%	Breaching Value
PLF	2.51%	5.12%	7.32%	77.82%
O&M Cost	5.49%	5.12%	4.74%	-595.06%
Project Cost	6.82%	5.12%	3.62%	-51.09%
Tariff Rate	2.51%	5.12%	7.32%	77.82%

Equity IRR	Wires and Fabriks (S.A.) Ltd. (AK-28)			
Variation %	-10%	Normal	10%	Breaching Value
PLF	2.01%	4.93%	7.23%	43.41%
O&M Cost	5.45%	4.93%	4.29%	-212.38%
Project Cost	6.52%	4.93%	3.43%	-38.78%
Tariff Rate	2.01%	4.93%	7.23%	43.41%

From the above analysis, it can be seen that the equity IRR of the project activity remains well below the benchmark even under the sensitivity analysis. Therefore, it can be concluded that the proposed CDM project activity is unlikely to be the most financially/economically attractive and hence, additional.

	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 5% inflation on an average, the question of O&M coming down is ruled out. Moreover, the purchase order provides for a 5% escalation in the cost every year. Even the tariff order of Rajasthan provides for a 5% escalation in the O&M cost.
Project Cost	The Purchase Order cost for none of the WTGs is 10% less than the Offer letter cost 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 equity IRR does not breach the Benchmark.
Tariff Rate	The tariff is determined as per State Electricity Board Tariff Order and further compared with PPA which is fixed for years mentioned as per the State Electricity Board's tariff order. Hence, there is no probability to get variation for the same.

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.

Demonstration of Parallel and continuing actions as per the 'Guidelines on the demonstration and assessment of prior consideration of the CDM' annex 13 to EB 62⁵⁷ and also as per para 29 of Project Standard Version 09.

Parameter	Date
WTG No. : J411 (0.6 MW)	
Board Resolution for Investment making decision	18/07/2007
Purchase Order from Wires and Fabriks (S.A.) Ltd	23/07/2007
Email Communication with CDM Consultant Asia Carbon Emission Management India Pvt Ltd expressing interest to get CDM Project Registration	24/07/2007
Confirmation from Consultant about offer acceptance	01/08/2007
Appointment of CDM consultant	17/03/2008
Follow up for project execution from PP to Consultant	18/12/2008
Follow up for project execution from PP to Consultant	29/05/2009
Termination of earlier appointed CDM Consultant due to no project movement	16/09/2009
Appointment of new CDM Consultant "Ennavoir Consulting"	10/09/2011
Follow up with Consultant for non-performance	18/12/2012
Termination of appointed CDM Consultant "Ennavoir Consulting"	11/02/2013
Appointment of CDM Consultant EKI Energy Services Ltd	15/07/2013
Appointment of DoE	22/04/2015
Webhosting of PDD at UNFCCC	24/04/2015
WTG No. : J426 (0.6 MW)	
Board Resolution for Investment making decision	24/05/2008
Purchase Order from Wires and Fabriks (S.A.) Ltd	05/06/2008
Appointment of CDM Consultant "Asia Carbon Emission Management Pvt Ltd"	15/07/2008
Termination of appointed CDM Consultant due to no project movement	18/05/2010
Appointment of new CDM Consultant "Ennavoir Consulting"	10/09/2011
Follow up with Consultant for non-performance	18/12/2012
Termination of appointed CDM Consultant "Ennavoir Consulting"	11/02/2013
Appointment of CDM Consultant EKI Energy Services Ltd	15/07/2013
Appointment of DoE	22/04/2015
Webhosting of PDD at UNFCCC	24/04/2015

⁵⁷ http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid04.pdf

The above chronology of events indicates that PP had awareness of CDM prior to start date and benefits of CDM were decisive factor in decision to proceed with the project. PP has taken continuing and real actions for project activity in parallel with it's implementation. The supporting evidences are submitted to DOE for validation purpose.

The project investor had intimated the NCDMA and the UNFCCC of the commencement of the project activity and of their intention to seek CDM status within six months of the below project activity WTGs start date. Hence, the proposed project activity is in compliance with Para 2 of Annex 13, EB 62.

WTG ID	Board Resolution	Purchase Order Date	Date of intimation to UNFCCC and MoEF
TEJ-25	29/04/2010	03/12/2010	24/01/2011
AK-28		03/05/2010	26/07/2010
J-411	18/07/2007	23/07/2007	Not Applicable
J-426	24/05/2008	05/06/2008	

B.6. Emission reductions

B.6.1. Explanation of methodological choices

Applied Methodology: AMS - I.D, version 18, EB 81

Baseline emissions:

The baseline emission calculation for the project activity is attributable to the CO₂ Emission that could have been produced by the fossil fuel based power plants in absence of the proposed project activity. Therefore the amount electricity supplied to the NEWNE grid will be multiplied by the grid emission factor to calculate the baseline emissions reduced by the proposed project activity.

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

Where,

BE_y	=	Baseline emissions in year y (t CO ₂)
EG_{PJ,y}	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)
EF_{grid,y}	=	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO ₂ /MWh)

The methodology provides following approaches for emission factor calculations:

(a) *Combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology "Tool to calculate the emission factor for an electricity system".*

OR

(b) *The weighted average emissions (in t CO₂/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.*

Option (a) has been considered to calculate the grid emission factor as per the 'Tool to calculate the emission factor for an electricity system' since data is available from an official source.

CO₂ Baseline Database for the Indian Power Sector, Version 10.0, December 2014⁵⁸, published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.

As per the "Tool to calculate the emission factor for an electricity system" Version 05.0, EB 87, Annex 9, the following steps have been followed.

- STEP 1: Identify the relevant electricity systems;
 STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional);
 STEP 3: Select a method to determine the operating margin (OM);
 STEP 4: Calculate the operating margin emission factor according to the selected method;
 STEP 5: Calculate the build margin (BM) emission factor;
 STEP 6: Calculate the combined margin (CM) emission factor.

STEP 1: Identify the relevant electricity power systems

The tool defines that “for determining the electricity emission factors, identify the relevant electricity system. Similarly, identify any connected electricity systems”. It also states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used”. Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern.

However since 2007-08 as the four regional grids except the Southern grid has been synchronized, they are now being considered as one and named as NEWNE grid. Since the project supplies electricity to the NEWNE grid, emissions generated due to the electricity generated by the NEWNE grid as per CM calculations will serve as the baseline for this project.

Table: Grid Classification

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

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

⁵⁸ http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver10.pdf

Project participants have the option of choosing between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation.

The Project Participant has chosen only grid power plants in the calculation.

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

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4:

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

The data required to calculate simple adjusted OM or Dispatch data analysis is not possible due to lack of availability of this activity data to the project developers. The choice of other two options for calculating the operating margin emission factor depends on the generation of electricity from low cost/must run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.

	Share of Must-Run (Hydro/Nuclear) (% of Net Generation)				
	2009-10	2010-11	2011-12	2012-13	2013-14
NEWNE	15.9%	17.6%	19.0%	17.2%	18.0%
India	17.1%	18.4%	19.6%	16.9%	18.6%

Data Source: Central Electricity Authority (CEA) database Version 10, Dec'2014

The above data clearly shows that the percentage of total grid generation by low cost/must run plants (on the basis of average of three most recent years) for the NEWNE grid is less than 50% of the total generation. Thus the average emission rate method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

The "Simple operating margin" has been calculated as per the weighted average emissions (in tCO_2/MWh) of all generating sources serving the system, excluding hydro, geo-thermal, wind, low-cost biomass, nuclear and solar generation;

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

- **Ex ante option:** If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required.

Or

- **Ex post option:** If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

PP has chosen ex ante option for the calculation of OM with 3 years generation weighted average of the most recent years available at the time of submission of CDM-PDD to the DOE for validation.

OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the crediting period.

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

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

Net Generation in Operating Margin (MWh) (incl. Imports)			
	2011-12	2012-13	2013-14
NEWNE	508,004,381	546,941,372	569,215,756

Simple Operating Margin (tCO₂/MWh) (incl. Imports)			
	2011-12	2012-13	2013-14
NEWNE	0.9699	0.9919	0.9953

Weighted Generation Operating Margin	
NEWNE	0.9862

STEP 5: Calculate the build margin emission factor (EF_{BM,y})

Option 1 as described above is chosen to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PDD and is fixed for the entire crediting period.

Build Margin (tCO₂/MWh) (not adjusted for imports)	
	2013-14
NEWNE	0.9495

(With sample group constituting most recent capacity additions to the grid comprising 20% of the system generation)

STEP 6: Calculate the combined margin (CM) emissions factor

Combined Margin – The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Tool to calculate the emission factor for an electricity system, Version 05.0.0, EB 87, Annex 9, allows to weigh the operating margin and Build margin at 75% and 25%, respectively.

The baseline emission factor is calculated using the combined margin approach as described in the following steps:

Calculation of Baseline Emission Factor EF_y

The baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

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

Where,

w_{OM}	75% weight for wind energy projects
w_{BM}	25% weight for wind energy projects
$EF_{OM,y}$	calculated as described in Steps 3 & 4 above (tCO ₂ /MWh)
$EF_{BM,y}$	calculated as described in Steps 5 above (tCO ₂ /MWh)

$$\text{Baseline Emission factor (NEWNE Grid)} = 0.75 * 0.9862 + 0.25 * 0.9495 \\ = 0.9770 \text{ tCO}_2/\text{MWh}$$

Project Emissions: For most renewable power generation projects activities $PE_y = 0$. As per applied methodology only emission associated with the fossil fuel combustion, emission from operation of geo-thermal power plants due to release of non-condensable gases, emission from water reservoir of Hydro should be accounted for the project emission. Since the project activity is a wind power project,

Hence $PE_y = 0$

Leakage Emissions: No Leakage emissions are considered. The main emission potentially giving rise to leakage in the context of electrical sector projects is emission arising due to activities arising such as power plant construction and upstream emission from fossil fuel use (e.g. extraction, processing, and transport). These emission sources are neglected.

Hence, $LE_y = 0$

Emission reduction (ER_y): The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plant by renewable electricity. The emission reduction ER_y by the project activity during a given year y is the difference between Baseline emission and Project emission & Leakage emission.

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = Emission Reduction in tCO₂/year
 BE_y = Baseline emission in tCO₂/year
 PE_y = Project emissions in tCO₂/year
 LE_y = Leakage Emissions in tCO₂/year

B.6.2. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,OM,y}$
Unit	tCO ₂ /MWh
Description	Operating Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014 ⁵⁹
Value(s) applied	0.9862

⁵⁹ http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver10.pdf

Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0" as 3-year generation weighted average using data for the years 2011-2012, 2012-2013, & 2013-2014. The data are obtained from "CO ₂ Baseline Database for Indian Power Sector" version 10.0, dated Dec 2014 published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Data/Parameter	EF _{grid,BM,y}
Unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014
Value(s) applied	0.9495
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0" for the year 2013-2014. The data is obtained from "CO ₂ Baseline Database for Indian Power Sector" version 10.0, dated Dec 2014 published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Data/Parameter	EF _{grid,y}
Unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014
Value(s) applied	0.9770
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0". The data is obtained from "CO ₂ Baseline Database for Indian Power Sector" version 10.0, dated Dec 2014 published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

B.6.3. Ex ante calculation of emission reductions

Formula used to calculate the net emission reduction for the project activity is

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = Emission Reduction in tCO₂/year

BE_y = Baseline emission in tCO₂/year

PE_y = Project emissions in tCO₂/year

LE_y = Leakage Emissions in tCO₂/year

Baseline Emission (BE_y)

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

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

Where,

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

Project Investors' Name	Capacity	PLF (%)	Grid	Generated Power (MWh) p.a	Baseline Emission Factor (tCO ₂ /MWh)	Baseline emissions (tCO ₂ / year)
Wires and Fabriks (S.A.) Ltd.	TEJ-25	22.71%	NEWNE	1,194	0.9770	1,166
	J-426	23.41%		1,230		1,202
	J-411	23.44%		1,232		1,204
	AK-28	20.32%		2,225		2,174

$EF_{grid,y}$ = Baseline emission factor
= 0.9770 tCO₂/MWh

BE_y = 5,881 * 0.9770
= 5,745 (Round down value)

As per Section B.6.1:

$PE_y = LE_y = 0$

Thus,

$ER_y = BE_y - PE_y - LE_y$

$ER_y = BE_y - 0 - 0$

$ER_y = BE_y$

Therefore,

$ER_y = BE_y = 5,745 \text{ tCO}_2 \text{ e}$

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

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	5,745	0	0	5,745
Year 2	5,745	0	0	5,745
Year 3	5,745	0	0	5,745
Year 4	5,745	0	0	5,745
Year 5	5,745	0	0	5,745
Year 6	5,745	0	0	5,745
Year 7	5,745	0	0	5,745
Total	40,215	0	0	40,215
Total number of crediting years	7			
Annual average over the crediting period	5,745	0	0	5,745

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{PJ,y}$
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Unit	MWh
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
Source of data	Monthly electricity share certificates/note or Credit Note or Joint Meter Reading Report
Value(s) applied	5,881 (Estimated Value)
Measurement methods and procedures	<p>Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Calibration frequency: Once in 5 years</p> <p>The monthly electricity share certificates or Credit Note or Joint Meter Reading Report are prepared by the state electricity board based on the monthly joint energy meter readings taken from common meter at the substation end and monthly electricity readings recorded from the individual WEG controller. Since energy generated from the all the WTGs in the entire wind farm is fed into a common substation, the electricity (import/export/transmission losses) by each individual WTGs/investor is determined based on pro-rata approach.</p> <p>The electricity readings are measured on continuous basis & accumulated at both the end of measurement, i.e. the individual WEG controller panel and substation common meter. The hourly readings from the WEG controller panel are recorded (manual/ automatic at the respective energy meter) and consolidated monthly values are used for the calculation. Similarly, at the substation, the readings are recorded hourly (automatic at the energy meter) and monthly joint meter readings taken by the State Electricity Board in presence of the representative of the PP is used for the calculation and preparation of monthly share of electricity certificates/notes.</p> <p>The meters used at the pooling substation and main substation are two way energy meters which measure import and export reading of electricity separately. The net electricity export to grid is the value of electricity after deducting the transmission losses, thus the same value of electricity at delivery point is used for calculations of emission reductions.</p>
Monitoring frequency	Monthly
QA/QC procedures	<p>The energy meters used are trivector meters which are of accuracy class 0.2. The meters are monitored continuously & cumulative readings are taken at the end of the month by joint meter reading procedure. These are sealed by RRVPNL to avoid malfunctioning with meter readings. The officials frequently check the meters for tampering and malfunctioning with the meters. Meter is calibrated once in 5 years⁶⁰ by the authority in the presence of O&M Contractor / investors representatives and RRVPNL officials to ensure the working of meter within permissible limits. The calculation of net electricity supplied to grid is under purview of state electricity board and PP do not have any control on it. The value of net electricity supplied to grid after deducting the transmission losses i.e electricity at delivery point (main substation) is considered for emission reduction calculation and only this value is available to PP, hence single parameter is mentioned in monitoring plan. Also accuracy class of meters, calibration interval is under control of state electricity board and PP do not have any control on it.</p>
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.

B.7.2. Sampling plan

Sampling is not required for the given project activity.

⁶⁰http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf, page 12

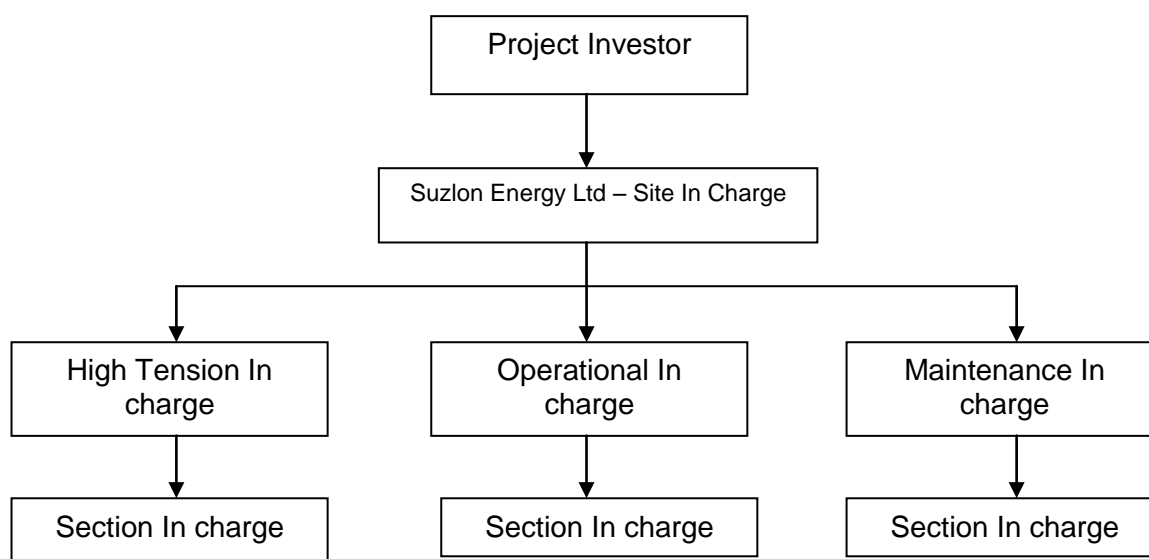
B.7.3. Other elements of monitoring plan

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 being implemented in Rajasthan, 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.

Organisational Structure for data recording and monitoring

A detailed description of metering measurements methods procedures to be applied to the project activity has been well incorporated in section B.7.1, favouring Rajasthan-sites.

The organizational hierarchy of PP & Project management entity is as follows:



PP has assigned the responsibility of operation and maintenance of WTGs to Suzlon. The Plant In-charge and Shift In-Charge would be deployed by Suzlon.

Monitoring Plan:

QA/QC Procedures:

The main and backup meter installed at connected substations for monitoring of the project activity are electronic tri-vector energy meters of 0.2 accuracy class. Each meter is jointly inspected and sealed on behalf of PP and RRVPNL, in the presence of its authorised representatives. All main and backup meter are calibrated once in 5 years by RRVPNL or its representatives.

Description of calibration of WTG Controller

The controller used for the WTGs which is an SCS Controller is a micro-processor based intelligent controller which has been specially designed for control of wind turbines. It uses a Woodward Multi function Relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current / voltage is converted into digital signal internally using A/D Converters at very high sampling rate. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVAh and kWh. These instantaneous values are then time integrated and displayed / stored. Woodward relay is having no display and needs special protocol to view energy readings as this relay is communicating digital signal through special communication protocol. Moreover, turbine cannot run without this relay hence it cannot be removed for calibration, hence, it is not possible to calibrate.

Data Management and Data Archiving:

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

Procedures for Data Adjustments/Uncertainties:

Data uncertainty in the project activity monitoring could occur under the following circumstances:

1. During the monthly joint meter reading at connected substations, the reading of the main meter and backup meter are cross checked to insure that the meters are working within the permissible limit. If during the cross checking the reading is found to be outside the permissible limit of accuracy, then calibration is done to identify the meter with the error and the faulty meter is replaced immediately. The meter reading for that month is to be taken from the correct meter.
2. During the monthly joint meter reading at the connected substations, if the display defect is in the main meter than in that case the backup meter reading are considered for the purpose of preparation of the break-up sheet and billing purpose. Defective main meter will be replaced immediately.
3. During the monthly joint meter reading at the connected substation, if the display defect is in the check meter than in that case the main meter reading are considered for the purpose of preparation of the break-up sheet and billing purpose. Defective check meter will be replaced immediately.
4. If during the calibration of the meters at the connected substations, the main meter is found to be outside the permissible limit of accuracy and if the main meter reading have been used to prepare the break-up sheet, then the identified error would be applied to all the measured value since the date of last calibration. Further the main meter would be replaced immediate.
5. If during the calibration of the meters the connected substations, the check meter is found to be outside the permissible limit of accuracy and if the check meter reading have been used to prepare the break-up sheet, then the identified error would be applied to all the measured value since the date of last calibration. Further the check meter would be replaced immediate.

Procedure for data apportioning:

The sample Apportioning of net electricity generation from each WTG located at Rajasthan determined by SEB is as follows:

The apportioning of the electricity is the responsibility of the State Utility. The sample apportioning procedure adopted for any given WTG for any given month is given below:

Generation Ratio at metering point (33 kV/220 kV level GSS): The generation ratio is the ratio of electricity generated by installed WTG of PP to the total generation by all the connected WTGs to the applicable metering point.

$$G_{R, \text{ metering point}} = EG_{\text{ Controller, WTG}} / EG_{\text{ Controller, metering point}} \quad (a)$$

Where,

$G_{R, \text{ metering point}}$: Generation Ratio at metering point

$EG_{\text{ Controller, WTG}}$: Electricity generated by installed WTG of PP connected to the applicable metering point

$EG_{\text{ Controller, metering point}}$: Total generation by all the connected WTGs to the applicable metering point

Calculation of net electricity exported at applicable metering point:

The Main and Check meters at the applicable metering point measure a number of parameters including export and import for all the connected WTGs.

The import, kWh by the WTG at the metering point is calculated in the following manner:

$$EG_{\text{Import, metering point}} = G_{R, \text{ metering point}} \times EG_{\text{Total Import, metering point}} \quad (b)$$

Where,

$EG_{\text{Import, metering point}}$: Import, kWh by the WTG at the metering point

$G_{R, \text{ metering point}}$: Generation Ratio at metering point

$EG_{\text{Total Import, metering point}}$: Total Import, kWh by all the WTGs at the metering point

The export, kWh by the WTG at the metering point is calculated in the following manner:

$$EG_{\text{Export, metering point}} = G_{R, \text{ metering point}} \times EG_{\text{Total Export, metering point}} \quad (c)$$

Where,

$EG_{\text{Export, metering point}}$: Export, kWh by the WTG at the metering point

$G_{R, \text{ metering point}}$: Generation Ratio at metering point

$EG_{\text{Total Export, metering point}}$: Total Export, kWh by all the WTGs at the metering point

The net electricity exported by the WTG at the 33 kV/220 kV level metering point is calculated by subtracting equation (b) from (c).

Thus, the net electricity exported at 33 kV/220 kV level metering point:

$$= EG_{\text{Export, metering point}} - EG_{\text{Import, metering point}} \quad (d)$$

The above calculations are done at pooling substation, however transmission loss has been deducted from the above value. The transmission loss is calculated as below

Transmission Loss Calculation:

The total transmission loss occurred during export of the electricity between the 33/220 kV level pooling station & 220 kV level common delivery point is calculated as the difference between total aggregated reading of export for all metering points at 33/220 kV level and the total reading of export for same metering points recorded at the 220 kV level. Similarly transmission loss occurred during import of the electricity is also calculated.

The PP/WTG wise transmission loss during export & import is calculated by multiplying the values of arrived transmission loss for export & import for wind farm with the Generation Ratio at common delivery point.

Generation Ratio at common delivery point:

It is the ratio of electricity generated by installed WTG to the total generation by all the connected WTGs/ or connected metering points under common delivery point.

$$G_{R, \text{ Common Delivery Point}} = EG_{\text{Controller, WTG}} / EG_{\text{Controller, Common Delivery Point}} \quad (e)$$

Where,

$G_{R, \text{ Common Delivery Point}}$: $EG_{\text{Controller, Common Delivery Point}}$

$EG_{\text{Controller, WTG}}$: Electricity generated by installed WTG

$EG_{\text{Controller, Common Delivery Point}}$: Total generation by all the connected WTGs/ or connected metering points under common delivery point

Calculation of net electricity delivered to the Grid:

The values of transmission loss during export & import for the given WTG are subtracting from EG Export, metering point & EG Import, metering point respectively to get the values of export and import respectively for the given month.

The net electricity delivered to the Grid by the given WTG for the given month (net export kWh) is then obtained by subtracting import from export.

Thus,

$$= \text{Export} - \text{Import} \quad (f)$$

These apportioned values viz., import, export and net export kWh can be referred from the Monthly Break up of net export units report. The value of net electricity delivered to grid is with consideration of transmission losses, thus minimum and conservative. Thus the value of net electricity supplied to grid at delivery point (i.e after deducting the transmission loss) is considered for emission reduction calculations.

The above sample process of apportioning is under control of state electricity board and PP do not have any control on it. PP is getting value of net electricity supplied to grid through JMR, hence single parameter is mentioned in section 7.1 of monitoring plan.

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

10/04/2015 is the date of completion of study on application of the selected methodology (AMS-I.D - version 18). Further, the standardized baseline is not applicable for this project activity.

Wires and Fabriks (S.A.) Ltd. and ReXchange Global Solutions (P88) are the entities responsible for the application of the selected methodology and are also the project participants for this project activity as indicated in Appendix 1 below.

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

Start date of the project activity is the date of earliest purchase order for J-411 WTG, i.e., 23/07/2007.

C.1.2. Expected operational lifetime of project activity

25 Years 00 Months

C.2. Crediting period of project activity

C.2.1. Type of crediting period

Renewable crediting period of 7 years 00 Months have been opted for the project activity. This is the first crediting period of the project activity.

C.2.2. Start date of crediting period

31/10/2016 or Date of submission of complete request for registration by the DOE whichever is later.

C.2.3. Length of crediting period

07 Years 00 Months

SECTION D. Environmental impacts**D.1. Analysis of environmental impacts**

The project activity has no significant impact on the environment. Wind power projects are not included in the Schedule I of the EIA notification S.O.1533 (E) dated 14th September 2006⁶¹ and thus an EIA is not required. Also as per notification dated 01/12/2009⁶², The Ministry of Environment & forests has re-affirmed this and exempted Wind power plants from EIA and EC requirement.

SECTION E. Local stakeholder consultation**E.1. Solicitation of comments from local stakeholders**

The Local Stakeholder Meetings were organized for local stakeholder consultation by the Project Investor in the respective villages of Dist- Jaisalmer, Rajasthan. The stakeholders had been identified, and informed local stakeholder regarding the meeting via the personal invitation, such as an announcement at the local area, and personal communication through telephonic calls. In addition, a public invitation letter was also sent to Gram Panchayat head to invite the local stakeholders for the meeting. The followings are the local stakeholders for the project activity:

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

The list of Meeting dates and Public Invitation dates for the corresponding WTG's are as follows:

WTG Number	Location	Venue	Meeting Date	Invitation	Meeting Date
J-411		Project Site, Sadiya Village	10/02/2015		27/02/2015
J-426		Project Site, Sadiya Village			
AK-28		Project Site, Sirawa Village	10/05/2010		17/05/2010
TEJ-25		Project Site, Habur Village	28/12/2010		07/01/2011

The lists of LSM Participants for the LSHM dated 27/02/2015 are provided below:

Participants:

1. Mr Sumeet Singhvi – ReXchange Global Solutions (P88)
2. Mr Gopal Lal Agrawal – Client Representative (Wires and Fabriks (S.A.) Ltd)

List of Villagers at Stakeholder Meeting organised for J-411 and J-426 at Sadiya Village on 27/02/2015:

1. Mr Bishnudev Pratap - Villager
3. Mr Bhanu Dev Pratap Singh- Villager
4. Urmila Devi – Villager

⁶¹ <http://envfor.nic.in/legis/eia/so1533.pdf>

⁶² <http://www.moef.nic.in/downloads/rules-and-regulations/3067.pdf>

5. Mr Bishnudev Singh – Villager
6. Mr Rakesh – Villager
7. Mr Rampravesh – Villager
8. Mrs Reshma – Villager
9. Mr Motilal - Villager

List of Villagers at Stakeholder Meeting organised for AK-28 at Sirawa Village on 17/05/2010:

1. Mr Biren Kumar - Farmer
1. Mr Mohan Lal Singh- Villager
2. Ramesh Pratap – Villager
3. Mr Mukesh Rathore – Villager
4. Mr Mahendra Kumar – Villager
5. Mr Rajesh Singh – Shopkeeper
6. Mrs Rohan Patel – Shopkeeper
7. Mr Hareesh Kumar – Student

List of Villagers at Stakeholder Meeting organised for TEJ-25 at Habur Village on 07/01/2011:

1. Mr Mohan Singh - Villager
1. Mr Viju Rathore- Villager
2. Ram Singh – Villager
3. Mr Shivam Rathore – Villager
4. Mr Shivanshu Singh – Villager
5. Mr Ranjan Kumar – Villager
6. Mr Saroj Kumar – School Teacher
7. Mr Ravindra Singh – Shopkeeper

For the meeting dated 17/05/2010 and 07/01/2011, local stakeholders gathered at the venue, as per the scheduled time. Both these meetings were organised by the PP i.e. Wires and Fabriks (S.A.) Limited at the project site itself. The meeting was opened by Mr. Yogesh Kumar Sharma from Wires and Fabriks (S.A) Limited with welcome remark; it was attended by the attendees depicted above.

Subsequent to the introductory speech, stakeholders were explained about the electricity generation from wind project is an environmental friendly power generation technology contributing to reduction in GHG emissions. They were also explained about the benefits of the wind power projects like, increasing energy availability and improving quality of power and its assistance to the local population by providing employment opportunities to both skilled & unskilled labours.

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

E.2. Summary of comments received

Meeting started with opening speech by representative of project participant. He introduced all guests on dais. The representative of project participant explained Technical aspects of project to stakeholders. He also explained about social, environmental & economical benefits of the project. He also elaborated about CDM & its requirement for the current project. After the presentation, the session was open for questions/feedback from stakeholders.

The villagers raised various queries as summarised below:

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

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

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

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

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

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

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

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

Q: Will the project cause any noise & vibration or release of light, heat energy or harmful radiations?

A: No, not from what we know. It is harmless to human health.

Q: Will the project cause any effect on rainfall?

A: No, not from what we know. It will not have any adverse impact on rainfall in the local area.

All the above queries have been suitably and satisfactorily replied / clarified by project participant's representatives. Local stakeholders welcomed and expressed their support to the project. The meeting was concluded by vote of thanks to all the participants.

E.3. Report on consideration of comments received

There were no comments raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region.

SECTION F. Approval and authorization

The project obtained Host Country Approval from Ministry of Environment, Forest and Climate Change vide Ref No: 4/3/2015-CCC dated 16th November 2015.

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

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input type="checkbox"/> Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	Wires and Fabriks (S.A.) Ltd.
Street/P.O. Box	63, Industrial Area, Jhotwara
Building	
City	Jaipur
State/Region	Rajasthan
Postcode	302 012
Country	India
Telephone	+91-141-2341722
Fax	NA
E-mail	rajesh.patni@wirefabrik.com
Website	
Contact person	Mr. Rajesh Patni
Title	Joint Vice President
Salutation	Mr.
Last name	Patni
Middle name	
First name	Rajesh
Department	NA
Mobile	+91-93513-89091
Direct fax	NA
Direct tel.	NA
Personal e-mail	rajesh.patni@wirefabrik.com

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input checked="" type="checkbox"/> Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	ReXchange Global Solutions (P88)
Street/P.O. Box	Office No 201, Plot No 48, Scheme 78, Part II, Vijay Nagar
Building	Enking Embassy
City	Indore
State/Region	Madhya Pradesh
Postcode	452010
Country	India
Telephone	NA
Fax	NA
E-mail	manish@enkingint.org
Website	

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Contact person	Manish Dabkara
Title	Proprietor
Salutation	Mr.
Last name	Dabkara
Middle name	-
First name	Manish
Department	
Mobile	+91-9907534900
Direct fax	NA
Direct tel.	NA
Personal e-mail	manish@enkingint.org

Appendix 2. Affirmation regarding public funding

No public funding for this project activity was received from annex 1 parties.

Appendix 3. Applicability of methodology and standardized baseline

Please refer section B of the PDD for the same.

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

Please refer Section B.6.1 of the PDD.

Appendix 5. Further background information on monitoring plan

Please refer section B.7.1 and B.7.2 for information on monitoring.

Appendix 6. Summary of post registration changes

Not Applicable.

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Document information

Version	Date	Description
08.0	22 July 2016	EB 90, Annex 2 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Editorial improvement.
05.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the project design document form for small-scale CDM project activities (these instructions supersede the "Guidelines for completing the project design document form for small-scale CDM project activities" (Version 01.1)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and ¡Error! No se encuentra el origen de la referencia.; • Change the reference number from <i>F-CDM-SSC-PDD</i> to <i>CDM-SSC-PDD-FORM</i>; • Editorial improvement.
04.1	11 April 2012	Editorial revision to change history box by adding EB meeting and annex numbers in the Date column.
04.0	13 March 2012	EB 66, Annex 9 Revision required to ensure consistency with the “Guidelines for completing the project design document form for small-scale CDM project activities”
03.0	15 December 2006	EB 28, Annex 34 <ul style="list-style-type: none"> • The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.
02.0	08 July 2005	EB 20, Annex 14 <ul style="list-style-type: none"> • The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at http://cdm.unfccc.int/Reference/Documents.

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	21 January 2003	EB 07, Annex 05 Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: project design document, SSC project activities		