



Verified Carbon Standard

BUNDLED WIND POWER PROJECT IN GUJARAT AND TAMIL NADU



Document Prepared by EKI Energy Services Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The main purpose of this bundled project activity is to generate clean form of electricity through renewable wind energy sources. The project activity involves installation of combined capacity of 12.8 MW wind power projects in the states of Gujarat and Tamil Nadu India.

Over the first crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 29,987 tCO₂e per year, thereon displacing 32,012 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel based power plant.

The electricity generated from the project activity would be supplied to the national grid of India Though all the WTGs are connected to the grid, usage is for sale to grid (State Utility), third party sale & captive use. Thus for third party sale and captive use tri-party wheeling agreements are executed between PP and State Utility.

The total GHG emission reduction in this monitoring period 30-Mar-2017 to 28-Feb-2019 (inclusive of both days) is 42,054 tCO₂e.

No major breakdowns occurred during the current monitoring period apart from the scheduled maintenance shutdowns.

The details of the project, their investors and their location of installation are mentioned in the table below:-

Name of Investor	Capacity in MW	COD	Connection with Grid	State	Usage
M/s Venus Textile Service	1.50 MW	30/03/2017	Indian Grid	Tamil Nadu	Sale to State Discom
	1.50 MW	30/03/2017			
	1.50 MW	31/03/2017			
	2.0 MW	Not Commissioned			Sale to Third Party ¹

¹ WTG is connected to the state grid and wheeling agreement is signed between PP & State Utility.

M/s JB Ecotex LLP	2.10 MW	17/10/2017	Indian Grid	Gujarat	Captive ²
M/s J. Korin Spinning Private Limited	2.10 MW	02/08/2017			
M/s Orillion India Private Limited	2.10 MW	31/03/2018			

Sectoral Scope: 01 - Energy industries (renewable / non-renewable sources)

Project Type: I - Renewable Energy Projects

Project Category: Grid-connected electricity generation from renewable sources AMS-I.D Version 18.0³

Tools referred with above methodology are:

- Tool to calculate the emission factor for an electricity system⁴ - Version 07.0 (EB 100, Annex 04)

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 paragraph 19 of Section 5.2 of applied methodology is the following:

² All WTG are connected to the state grid and wheeling agreement is signed between PP & State Utility.

³ <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQQOFQQH4SBK>

⁴ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v6.pdf>

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

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

1.2 Sectoral Scope and Project Type

The project activity falls under the following Sectoral scope and Project Type:

Sectoral Scope : 01 - Energy industries (renewable / non-renewable sources)
Project Type : I - Renewable Energy Projects
Project Category : Grid-connected electricity generation from renewable sources AMS-I.D (Version 18.0)

The project is not a grouped project activity.

1.3 Project Eligibility

The project activity involves installation and generation of electricity using renewable energy resources i.e. by using the Wind Energy (renewable sources) replacing electricity supply from a fossil-fuel dominated electricity, thus leads to reductions of anthropogenic GHG emissions from atmosphere. Hence the project activity is eligible Sectoral scope 1 i.e. energy industries (renewable/ non-renewable sources) under the scope of the VCS Program.

1.4 Project Design

The project involves installation of wind power project by different companies. The project is not a grouped project activity.

Eligibility Criteria

The project is not a grouped project.

1.5 Project Proponent

Organization name	M/s Venus Textile Service
Contact person	Mr. Mathew Jose
Title	Proprietor
Address	48/B4, Maniam Kaliappan Street, K. K. Pudur, Coimbatore – 641038, Tamil Nadu, India
Telephone	+91-9873654312
Email	mjvts@gmail.com

Organization name	M/s JB Ecotex LLP
Contact person	Mr. Vishal Kejriwal
Title	Authorized Signatory
Address	Block No. 195, National Highway-8, Near Rose Garden Hotel, Dhamdod, Taluka: Mangrol, District Surat – 394125, Gujarat, India.
Telephone	+91-987365322
Email	Jbdp1@msn.com

Organization name	M/s J. Korin Spinning Private Limited
Contact person	Mr. Vishal Kejriwal
Title	Authorized Signatory
Address	502, 5 th Floor, Union Trade Center, Udhana Dawaraja, Ring Road, Surat – 395002, Gujarat, India
Telephone	+91-987365322
Email	Jbdp1@msn.com

Organization name	M/s Orillion India Private Limited
Contact person	Mr. Vishal Kejriwal
Title	Authorized Signatory
Address	33/1, N.S. Road, Marshal House, 4 th Floor, R. N. 444, Kolkata: - 700001, West Bengal.
Telephone	+91-987365322
Email	Jbdp1@msn.com

1.6 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the project	Project Consultant
Contact person	Manish Dabkara
Title	CEO & MD
Address	EnKing Embassy, Office No 201, Plot 48, Scheme 78, Part 2, Vijay Nagar, Indore- 452010, Madhya Pradesh, India.
Telephone	+91-731-4289086
Email	manish@enkingint.org

1.7 Ownership

As per VCS Program Definitions version 4.0, the project ownership is the legal right to control and operate the project activities.

M/s Venus Textile Service, M/s JB Ecotex LLP, M/s Orillion India Private Limited and M/s J. Korin Spinning Private Limited are the project proponents (PP) of the bundled project activity and they have the legal right to control and operate the project activities.

The project ownership has been demonstrated through below supporting documents:

- *Commissioning certificates – The letter from respective State Nodal Agency to the M/s Venus Textile Service, M/s JB Ecotex LLP, M/s Orillion India Private Limited and M/s J. Korin Spinning Private Limited for registration of commissioning of generation facility indicates that PP have the legal right to control and operate the project activities.*
- *Contract with EPC contractor – The purchase order on the name of M/s Venus Textile Service, M/s JB Ecotex LLP, M/s Orillion India Private Limited and M/s J. Korin Spinning Private Limited indicates that PP have the legal right to control and operate the project activities.*

Based on above evidences, the project ownership is demonstrated and M/s Venus Textile Service, M/s JB Ecotex LLP, M/s Orillion India Private Limited and M/s J. Korin Spinning Private Limited are authorised for the project activity.

1.8 Project Start Date

Start date of the bundled project activity is the earliest date of interconnection with the grid i.e 30-03-2017. This is the date of commissioning of two WTGs of 1.50 MW each by M/s Venus Textile Service in Tamil Nadu.

The details of the commissioning dates of the individual project activity are mentioned in the section 1.1 of this report.

1.9 Project Crediting Period

Crediting Period Start date: 30-March-2017

Crediting Period End date: 29-March-2024

The project activity adopts renewable crediting period of 7 years period which can be renewed for maximum 2 times which is as per VCS Version 4.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

The bundled project involves setting up of a Wind power project of combined capacity of 12.80 MW in the states of Gujarat and Tamil Nadu.

Project Scale	
Project	✓
Large project	

As the estimated annual average GHG emission reductions or removal per year is 29,987 tCO₂e which is less than 300,000 tonnes of CO₂e per year, the project falls in the category of Project. In the table below, the estimated emission reductions have been calculated

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	29,987
Year 2	29,987
Year 3	29,987
Year 4	29,987
Year 5	29,987
Year 6	29,987
Year 7	29,987
Total estimated ERs	209,909
Total number of crediting years	7
Average annual ERs	29,987

1.11 Description of the Project Activity

The bundled project activity involves the installation of Wind project. The total installed capacity of the project is 12.80 MW Wind project located in the states Gujarat and Tamil Nadu in India. The details of the investors is mentioned in Section 1.1.

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

In the Pre- project scenario the entire electricity, delivered to the grid by the project activity, would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

Over the 7 years of first crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 29,987 tCO₂e per year, thereon displacing 32,012 MWh/year amount of electricity.

The basic technical details of the WTGs are as follows: -

Name of Investor	Capacity in MW	Details

M/s Venus Textile Service	3 X1.50 MW	WEC type Vensys make V87-1500 KW
	1 X 2.0 MW	G-114/T106 2.00 MW Siemens Gamesa make
M/s JB Ecotex LLP	1 X2.10 MW	Suzlon make, 2100 kW
M/s J. Korin Spinning Private Limited	1 X2.10 MW	Suzlon make, 2100 kW
M/s Oriillion India Private Limited	1X2.1 MW	Suzlon make, 2100 kW

The detailed technical specifications for the respective WTGs are as follows: -

M/s Venus Textile Service: 3 X1.50 MW, WEC type Vensys make V87-1500 KW

Wind Energy Converter with 1500 kW rating, Upwind, Horizontal Axis with active yawing, three bladed Direct Drive permanent Magnet excited, grid connected.

Main Characteristics: -

Model	ReGen make Vensys 87
Hub Height	85 m
GL Wind Turbine Class	IIIB
Type	Direct drive horizontal axis wind turbine with variable rotor speed
Survival wind speed	52.5 m/s
Power Regulation	Independent Electromechanical pitch system for each blade
Rated Power	1500 kW
Rated Speed	9 to 17.3 rpm

Design Lifetime	20 years
Output Voltage of WEC	620 V, 50 Hz
Output Voltage of Power Transformer	33 kV, 50 Hz

M/s Venus Textile Service: 1 X 2.0 MW G-114/T106 2.00 MW Siemens Gamesa make Wind Turbine Generator⁵

Power:

Rated Power:	2,000.0 kW
Cut-In Wind Speed:	2.5 m/s
Rated Wind Speed:	10.0 m/s
Cut-Out Wind Speed:	25.0 m/s
Survival Wind Speed:	60.0 m/s

Rotor: -

Diameter:	114.0 m
Swept area:	10,207.0 m ²
Number of blades:	3
Rotor speed, max:	16.0 U/min
Tipspeed:	96 m/s
Type:	55.5

⁵ <https://en.wind-turbine-models.com/turbines/428-gamesa-g114-2.0mw>

Material:	GFK
Manufacturer:	Gamesa
Power density 1:	195.9 W/m ²
Power density 2:	5.1 m ² /kW

Gear Box:

Type:	spur/planetary
Stages:	3.0
Ratio:	1:80
Manufacturer:	Echesa (Gamesa Group)/Hansen/Bosch Rexroth/Winergy

Generator:

Type:	Double Fed Asyn
Number:	1
Speed, max:	1,280.0 U/min
Voltage:	690.0 V
Grid connection:	IGBT
Grid frequency:	50/60 Hz
Hersteller:	Cantarey (Gamesa Group)/ABB/Indar

Tower:

Hub height:	93/120/140 m
Type:	Steel tube/ concrete
Shape:	conical
Corrosion protection:	Painted
Manufacturer:	Gamesa

The technical specifications of Suzlon make S111-90m WTG installed by M/s JB Ecotex LLP, M/s J Korin and M/s Oriilion India are as follows: ⁶

OPERATING DATA

Wind class - IEC IIIA / IEC S
 Rated power - 2.1 MW
 Cut-in wind speed - 3.0 m/s
 Rated wind speed - 12.5m/s
 Cut-out wind speed - 30.0m/s (3-second average); 21.0m/s (10-minute average)

ROTOR

Rotor diameter - 111.8m
 Swept area - 9,852m²

GENERATOR

Frequency - 50Hz/60Hz
 Type Asynchronous - 3 phase induction generator with slip rings operated with rotor circuit inverter system (DFIG)

TOWER

Hub heights - 90m
 Type - Steel Tubular

BLADE

Make - Suzlon SB54

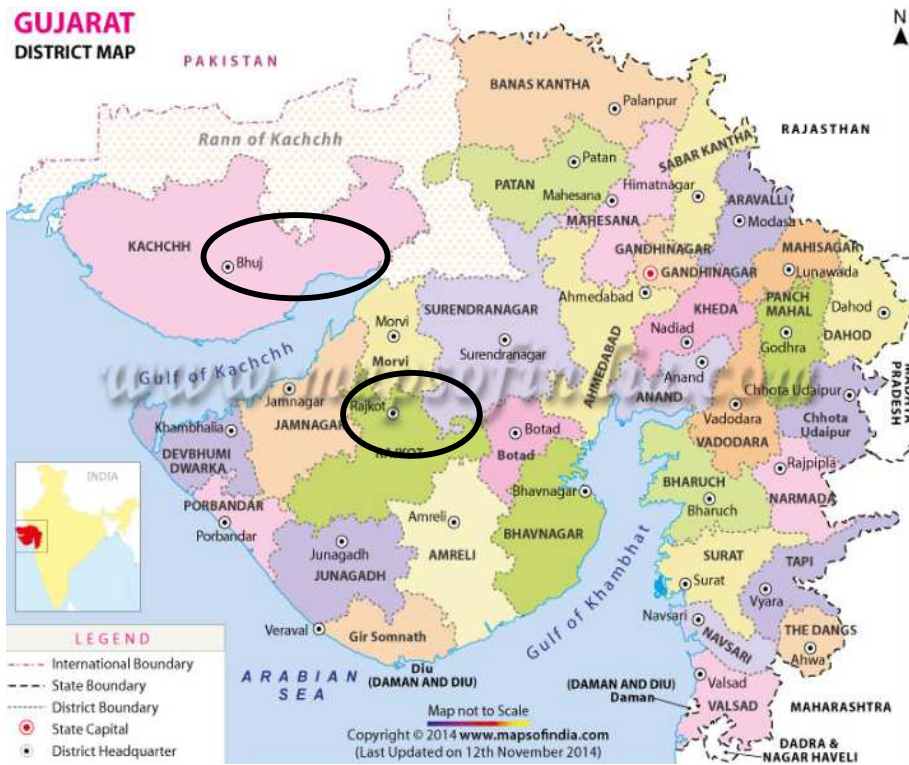
⁶ <https://www.suzlon.com/in-en/energy-solutions/s111-wind-turbine-generator>

1.12 Project Location

The details of the project locations are mentioned in the table below: -

Name of Investor	Capacity (MW)	Village(s)	Tehsil / Mandal	District	State	Latitude (N)	Longitude (E)
M/s Venus Textile Service	1 X1.5 MW	Seepala-kottai;	Uthama-palayam	Theni	Tamil Nadu	9.849219° N	77.460520 ° E
	1 X1.5 MW					9.846994° N	77.465597 ° E
	1 X1.5 MW	Odaipatti	Oddan-chatram	Dindigul		9.838719° N	77.457333° E
	1 X 2.0 MW (Not Commissioned)	Palayam Wind Park		Karur		10.8855° N (Tentative)	78.1564° E (Tentative)
M/s JB Ecotex LLP	1 X 2.10 MW	Hadiyana	Jodiya	Jamnagar	Gujarat	22.601056° N	70.244152° E
M/s J. Korin Spinning Private Limited	1 X 2.10 MW	Karmata	Abdasa	Kutch		23.39665° N	68.629127° E
M/s Oriilion India Private Limited	1 X 2.10 MW	Baradi	Jodiya	Jamnagar		22.560829° N	70.252549° E

The project locations have been shown in the map below: -



1.13 Conditions Prior to Project Initiation

The project is a Greenfield wind power project and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal or destruction. Thus prior to project initiation, there was nothing at site.

In absence of project activity, the continuation of current practise i.e generation of equivalent amount electricity would have been generated from grid connected fossil fuel dominated power plants. Thus for project activity baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Project has received all the necessary approvals for development and commissioning for the proposed bundled project of combined capacity of 12.8 MW wind project from the respective State Nodal Agencies of Gujarat and Tamil Nadu and is in compliance to the local laws and regulations.

As per Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India), final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (February 29, 2016).

The newly introduced White category of industries pertains to those industrial sectors which are practically non-polluting such as Biscuit trays etc. from rolled PVC sheet (using automatic vacuum forming machines), Cotton and woollen hosiers making (Dry process only without any dyeing/washing operation), Electric lamp (bulb) and CFL manufacturing by assembling only, Scientific and mathematical instrument manufacturing, Solar power generation through photovoltaic cell, wind power and mini hydel power (less than 25 MW).

There shall be no necessity of obtaining the Consent to Operate'' for White category of industries. An intimation to concerned SPCB / PCC shall suffice.

Since project activity falls under white category and the non-polluting nature of project fulfils the compliance to the local laws and regulations. The state nodal agency approval is submitted to DOE.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The project has neither been registered nor seeking registration under any other GHG programs. The project is seeking registration only in VCS program.

1.15.2 Projects Rejected by Other GHG Programs

The Project is not rejected by other GHG programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

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

1.16.2 Other Forms of Environmental Credit

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

However it can be crosschecked that PP is not claiming REC benefits, the same can be verified with the REC accreditation body of India⁷.

1.17 Additional Information Relevant to the Project

Leakage Management

Not applicable to the project activity.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Sustainable Development

Contribution to sustainable development:

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

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

⁷ https://recregistryindia.nic.in/index.php/general/publics/accredited_regens_pdf

Economic well-being: The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits the project activity will also help to reduce the demand supply gap in the state.

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

Environmental well-being: Wind energy being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission, the Project activity also helps in avoiding significant amount of GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.

Further Information

Not Applicable.

2 SAFEGUARDS

2.1 No Net Harm

The project activity does not involve any major construction activity. It primarily requires the installation of the wind turbines, interfacing the generators with the State Electricity Board by setting up HT transmission lines and installation of other accessories.

The report on “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013. This report clearly mentioned that wind project activity operations do not result in direct air pollution, noise pollution. Please refer below web link for the same⁸.

Thus there are no any significant impacts due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

2.2 Local Stakeholder Consultation

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

⁸ <http://mnre.gov.in/file-manager/UserFiles/report-on-developmental-impacts-of-RE.pdf>

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

All the stakeholders had been invited through invitation letters (delivered in hand) and public notice to attend the stakeholders meeting. The schedule of events related to local stakeholder consultation is being described below:

1. For 2 x1.5 MW WTGs of M/s Venus Textile Service in village Seepalakottai, Tamil Nadu

Date of invitation - 06/07/2016

Date of Meeting – 12/07/2016

Location of Meeting - Project site, Tamil Nadu

The stakeholders gathered at the venue, as per the scheduled time. The meeting was opened by the site representative with a welcome remark; it was attended by the attendees as per List of Attendees.

The meeting was outlined towards making aware stakeholder & local community people, about the wind project activity & how does it leads to reduction of the GHG gases emission. Details regarding the proposed project cycle & also the role of local stakeholders in the project was outlined.

Explanation about the main purpose of the project activity i.e. 'to generate electrical energy through green energy generation resource & to utilize the generated output for selling it to the state electricity utility' was narrated. Furthermore it was elaborated that the said project also conceives the following:-

- Indian economy is highly dominated by generation of electricity using fossil fuel, & coal is majorly used in thermal power plants to generate energy & for production processes, yet the basic necessity of large section is not being met. Use of renewable form of energy generation will change consumption pattern & will mitigating the immense stress on the environment.
- Spread of the commercialization of the wind projects in the region.
- Contribute to sustainable development of the region, socially, environmentally & economically

After the detailed discussion, some of the stakeholders raised questions on the wind energy based power project to clear their doubts. Following questions were asked which were adequately explained and answered:

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: Will there 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: Will it impact the Rainfall pattern in the nearby area?

A: No, it will not impact the rainfall pattern of the nearby area.

Q: Will the project release any 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.

2. For 1 x1.5 MW WTGs of M/s Venus Textile Service in village Odaipatti in Tamil Nadu

Date of invitation - 06/07/2016

Date of Meeting - 14/07/2016

Location of Meeting - Project site, Tamil Nadu

The stakeholders gathered at the venue, as per the scheduled time. The meeting was opened by the site representative with a welcome remark; it was attended by the attendees as per List of Attendees.

The meeting was outlined towards making aware stakeholder & local community people, about the wind project activity & how does it leads to reduction of the GHG gases emission. Details regarding the proposed project cycle & also the role of local stakeholders in the project was outlined.

Explanation about the main purpose of the project activity i.e. 'to generate electrical energy through green energy generation resource & to utilize the generated output for selling it to the state electricity utility' was narrated. Furthermore it was elaborated that the said project also conceives the following:-

- Indian economy is highly dominated by generation of electricity using fossil fuel, & coal is majorly used in thermal power plants to generate energy & for production processes, yet the basic necessity of large section is not being met. Use of renewable form of energy generation will change consumption pattern & will mitigating the immense stress on the environment.
- Spread of the commercialization of the wind projects in the region.
- Contribute to sustainable development of the region, socially, environmentally & economically

After the detailed discussion, some of the stakeholders raised questions on the wind energy based power project to clear their doubts. Following questions were asked which were adequately explained and answered:

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: Will there 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: Will it impact the Rainfall pattern in the nearby area?

A: No, it will not impact the rainfall pattern of the nearby area.

Q: Will the project release any 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.

3. For 1x2.0 MW WTG of M/s Venus Textile Service (Not commissioned) in Palayam Wind Park, Tamil Nadu

Date of invitation – 16/12/2018

Date of Meeting – 20/12/2018

Location of Meeting - Project site, Tamil Nadu

The stakeholders gathered at the venue, as per the scheduled time. The meeting was opened by the site representative with a welcome remark; it was attended by the attendees as per List of Attendees.

The meeting was outlined towards making aware stakeholder & local community people, about the wind project activity & how does it leads to reduction of the GHG gases emission. Details regarding the proposed project cycle & also the role of local stakeholders in the project was outlined.

Explanation about the main purpose of the project activity i.e. 'to generate electrical energy through green energy generation resource & to utilize the generated output for selling it to Third Party' was narrated. Furthermore it was elaborated that the said project also conceives the following:-

- Indian economy is highly dominated by generation of electricity using fossil fuel, & coal is majorly used in thermal power plants to generate energy & for production processes, yet the basic necessity of large section is not being met. Use of renewable form of energy generation will change consumption pattern & will mitigating the immense stress on the environment.

- Spread of the commercialization of the wind projects in the region.
- Contribute to sustainable development of the region, socially, environmentally & economically

After the detailed discussion, some of the stakeholders raised questions on the wind energy based power project to clear their doubts. Following questions were asked which were adequately explained and answered:

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: Will there 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: Will it impact the Rainfall pattern in the nearby area?

A: No, it will not impact the rainfall pattern of the nearby area.

Q: Will the project release any 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.

4. For 1x2.1 MW WTG of M/s JB Ecotex LLP in Village Hadiyana, Gujarat

Date of invitation – 17/08/2016

Date of Meeting – 23/08/2016

Location of Meeting - Project site, Gujarat

The stakeholders gathered at the venue, as per the scheduled time. The meeting was opened by the site representative with a welcome remark; it was attended by the attendees as per List of Attendees.

The meeting was outlined towards making aware stakeholder & local community people, about the wind project activity & how does it leads to reduction of the GHG gases emission. Details regarding the proposed project cycle & also the role of local stakeholders in the project was outlined.

Explanation about the main purpose of the project activity i.e. 'to generate electrical energy through green energy generation resource & to utilize the generated output for selling it to the state electricity utility' was narrated. Furthermore it was elaborated that the said project also conceives the following:-

- Indian economy is highly dominated by generation of electricity using fossil fuel, & coal is majorly used in thermal power plants to generate energy & for production processes, yet the basic necessity of large section is not being met. Use of renewable form of energy generation will change consumption pattern & will mitigating the immense stress on the environment.
- Spread of the commercialization of the wind projects in the region.
- Contribute to sustainable development of the region, socially, environmentally & economically

After the detailed discussion, some of the stakeholders raised questions on the wind energy based power project to clear their doubts. Following questions were asked which were adequately explained and answered:

Q: Will there 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: Will it impact the Rainfall pattern in the nearby area?

A: No, it will not impact the rainfall pattern of the nearby area.

Q: Will the project release any 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.

5. For 1x2.1 MW WTG of M/s Orillion India Private Limited in Village Baradi, Gujarat

Date of invitation – 18/03/2017

Date of Meeting – 23/03/2017

Location of Meeting - Project site, Gujarat

The stakeholders gathered at the venue, as per the scheduled time. The meeting was opened by the site representative with a welcome remark; it was attended by the attendees as per List of Attendees.

The meeting was outlined towards making aware stakeholder & local community people, about the wind project activity & how does it leads to reduction of the GHG gases emission. Details regarding the proposed project cycle & also the role of local stakeholders in the project was outlined.

Explanation about the main purpose of the project activity i.e. 'to generate electrical energy through green energy generation resource & to utilize the generated output for selling it to the state

electricity utility' was narrated. Furthermore it was elaborated that the said project also conceives the following:-

- Indian economy is highly dominated by generation of electricity using fossil fuel, & coal is majorly used in thermal power plants to generate energy & for production processes, yet the basic necessity of large section is not being met. Use of renewable form of energy generation will change consumption pattern & will mitigating the immense stress on the environment.
- Spread of the commercialization of the wind projects in the region.
- Contribute to sustainable development of the region, socially, environmentally & economically

After the detailed discussion, some of the stakeholders raised questions on the wind energy based power project to clear their doubts. Following questions were asked which were adequately explained and answered:

Q: Will there 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: Will it impact the Rainfall pattern in the nearby area?

A: No, it will not impact the rainfall pattern of the nearby area.

Q: Will the project release any 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.

6. For 1x2.1 MW WTG of M/s J Korin Spinning Mills Private Limited in Village Karmata, Gujarat

Date of invitation – 05/08/2016

Date of Meeting – 12/08/2016

Location of Meeting - Project site, Gujarat

The stakeholders gathered at the venue, as per the scheduled time. The meeting was opened by the site representative with a welcome remark; it was attended by the attendees as per List of Attendees.

The meeting was outlined towards making aware stakeholder & local community people, about the wind project activity & how does it leads to reduction of the GHG gases emission. Details regarding the proposed project cycle & also the role of local stakeholders in the project was outlined.

Explanation about the main purpose of the project activity i.e. 'to generate electrical energy through green energy generation resource & to utilize the generated output for selling it to the state electricity utility' was narrated. Furthermore it was elaborated that the said project also conceives the following:-

- Indian economy is highly dominated by generation of electricity using fossil fuel, & coal is majorly used in thermal power plants to generate energy & for production processes, yet the basic necessity of large section is not being met. Use of renewable form of energy generation will change consumption pattern & will mitigating the immense stress on the environment.
- Spread of the commercialization of the wind projects in the region.
- Contribute to sustainable development of the region, socially, environmentally & economically

After the detailed discussion, some of the stakeholders raised questions on the wind energy based power project to clear their doubts. Following questions were asked which were adequately explained and answered:

Q: Will there 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: Will it impact the Rainfall pattern in the nearby area?

A: No, it will not impact the rainfall pattern of the nearby area.

Q: Will the project release any 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.

2.3 Environmental Impact

The project activity has no significant impact on the environment. Wind projects are not included in the Schedule I of the EIA notification S.O.1533 (E) dated 14th September 2006⁹ and thus an EIA is not required. Ministry of Environment & forests vide their OM J-11013/41/2006 - IA II (I) dated 13th May 2011¹⁰ has re-affirmed this and exempted Wind power plants from EIA and EC requirement.

2.4 Public Comments

⁹ <http://envfor.nic.in/legis/eia/so1533.pdf>

¹⁰ <http://moef.nic.in/downloads/public-information/OM-SolarPV.pdf>

The project was open for public comment from 28 February – 30 March 2019. ¹¹

No comments were received.

2.5 AFOLU-Specific Safeguards

Not Applicable.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Title: Grid-connected electricity generation from renewable sources

Reference: The project activity meets the eligibility criteria of small scale project as it is less than 15 MW

Methodology: Grid-connected electricity generation from renewable sources AMS-I.D (Version 18.0)¹²

Type I: Energy industries (renewable / non-renewable sources)

Category: Approved Consolidated Methodology (AMS-I.D.: Grid connected renewable electricity generation – Version 18.0)

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

- Tool to calculate the emission factor for an electricity system¹³ - Version 07.0 (EB 100, Annex 04)

3.2 Applicability of Methodology

The project activity involves generation of grid connected electricity from renewable wind energy. The project activity has an installed capacity of 12.8 MW which will remain within the maximum 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:

¹¹ https://www.vcsprojectdatabase.org/#/pipeline_details/PL1862

¹² <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQQOFQQH4SBK>

¹³ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v7.0.pdf>

Applicability Criterion					Project Case																														
<p>1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:</p> <p>(a) Supplying electricity to a national or a regional grid.</p> <p>(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.</p>					<p>The project activity is a Renewable Energy Project i.e. Wind Power Project which falls under applicability criteria option 4(a) i.e., "Install a Greenfield plant;". Hence the project activity meets the given applicability criterion.</p>																														
<p>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 below:</p> <table border="1"> <thead> <tr> <th></th> <th>Project type</th> <th>AMS-I.A</th> <th>AMS-I.D</th> <th>AMS-I.F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Project supplies electricity to a national/regional grid</td> <td></td> <td>√</td> <td></td> </tr> <tr> <td>2</td> <td>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)</td> <td></td> <td></td> <td>√</td> </tr> <tr> <td>3</td> <td>Project supplies electricity to an identified consumer facility via national/regional grid (through a contractual arrangement such as wheeling)</td> <td></td> <td>√</td> <td></td> </tr> <tr> <td>4</td> <td>Project supplies electricity to a mini grid system where in the baseline all generators use exclusively fuel oil and/or diesel fuel</td> <td></td> <td></td> <td>√</td> </tr> <tr> <td>5</td> <td>Project supplies electricity to household users (included in the project</td> <td>√</td> <td></td> <td></td> </tr> </tbody> </table>						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 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	√			<p>The 1st and 3rd option of Table of AMS I.D. Version 18, is applicable.</p>
	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 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	√																																	

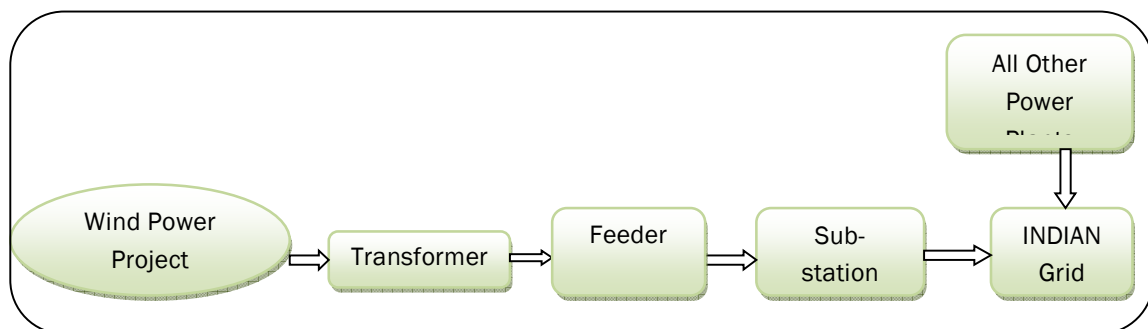
Applicability Criterion					Project Case
	boundary) located in off grid areas				
<p>3. This methodology is applicable to project activities that (a) install a Greenfield plant; (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); (d) involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) involve a replacement of (an) existing plant(s).</p>					<p>The project is installation of new wind based electricity generation plants (not addition to existing system). Option (a) is applicable.</p>
<p>4. Hydro power plants with reservoirs 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 reservoir, 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. 					<p>The project is wind power project and thus the criterion is not applicable to this project activity.</p>
<p>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, the capacity of the entire unit shall not exceed the limit of 15 MW.</p>					<p>The project activity is 12.8 MW wind electricity generation. Unit does not co-fire fossil fuels. Hence the criterion is not applicable to the project activity.</p>
<p>6. Combined heat and power (co-generation) systems are not eligible under this category.</p>					<p>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</p>
<p>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 from the existing units.</p>					<p>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</p>
<p>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.</p>					<p>Not applicable, the wind project is a Green field project activity and this project is not the enhancement or up gradation project.</p>

Applicability Criterion	Project Case
<p>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.</p>	<p>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</p>
<p>10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.</p>	<p>The Project activity is a renewable wind power project and is not a biomass project. Hence the criterion is not applicable to the project activity.</p>

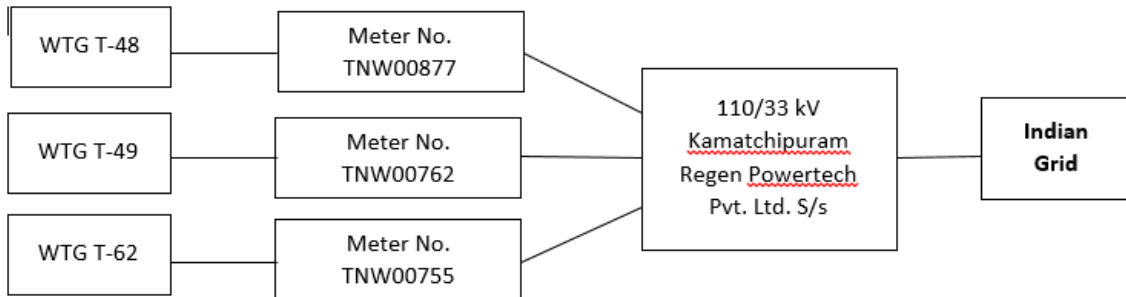
3.3 Project Boundary

As per AMS-I.D Version 18- “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”.

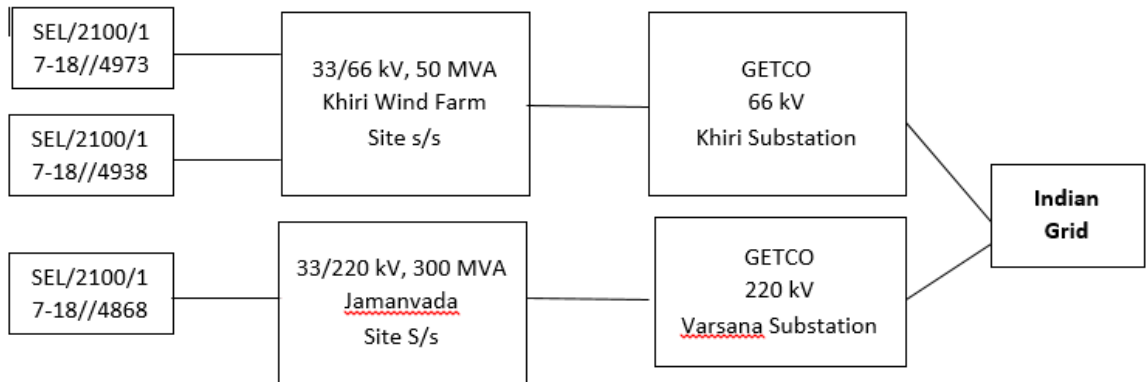
The project boundary includes the wind turbine generator, sub-station, grid and all power plants connected to grid. The proposed project activity will evacuate power to the INDIAN grid. Therefore the entire INDIAN grid and all connected power plants have been considered in the project boundary for the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



The layout 3X1.5 MW WTGs of M/s Venus Textile Service is as follows:



The layout 1X2.1 MW WTGs of M/s J Korin Spinning Mills Private Limited, M/s JB Ecotex LLP and M/s Orillion India Private Limited is as follows: -



	Source	Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation.	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	No CO ₂ emissions are emitted from the project
Project	Greenfield Wind Project Activity.	CO ₂	No	No CO ₂ emissions are emitted from the project
		CH ₄	No	Project activity does not emit CH ₄
		N ₂ O	No	Project activity does not emit N ₂ O
		Other	No	Project activity does not emit other forms of GHG emissions

3.4 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 wind plant 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 Indian grid), which is fed mainly by fossil fuel fired plants.

In the absence of the project activity, the equivalent amount of power would have been drawn from the state grid. Hence, the baseline for the project activity is the equivalent amount of power from the INDIAN 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 is based upon CEA Database for Indian Power System, Version 14.0, dated December 2018. This data base is the latest available data at the time of PD submission to DOE for validation purpose.

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

Parameter	Value	Nomenclature	Source
$EF_{grid,y}$	0.9368 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 14.0 Dated December 2018 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	0.9610 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2014-15, 2015-16 and 2017-18) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 14.0, Dated December 2018 published by Central Electricity Authority (CEA), Government of India.
$EF_{grid,BM,y}$	0.8644 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Calculated from latest year (2017-18) sourced from Baseline CO ₂ Emission Database, Version 14.0, Dated December 2018 published by Central Electricity Authority (CEA), Government

Parameter	Value	Nomenclature	Source
			of India.

3.5 Additionality

The table below is only applicable if the proposed project activity is a type of project activity which is deemed automatically additional, as defined by the applied approved methodology or standardized baseline. As per Methodological Tool for the demonstration of Additionality of Small-scale Project Activities (Ver. 7, EB 70 Annex 08¹⁴), 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;
- 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 participant, 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 project investor 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 35¹⁵ (“Non-binding best practice examples to demonstrate additionality for SSC project activities”), a benchmark analysis is used in the project case under investment barrier.

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

Selection of Financial Indicator

¹⁴ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf>

¹⁵ https://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid15_v01.pdf

According to the “Tool for demonstration and assessment of Additionality (EB 99, Annex 3)”, 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. Therefore in accordance with the guidance, the relevant financial indicator for project activity has been chosen as post tax equity IRR.

Determine appropriate analysis method.

As per Sub-step 2a, Paragraph (1), as the project activity is selling the generated electricity or using it for captive purposes & getting financial benefits other than CDM benefits hence, Option- I (Apply simple cost analysis) is not applicable under this situation. Also as per EB-92, Annex 5, clause no.19 “If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate”. Hence Option-II (Apply investment comparison analysis) is also not applicable under this situation. So the project investor has chosen Option- III or benchmark analysis as an appropriate analysis method to demonstrate the investment barrier.

Appropriateness of using benchmark analysis for additionality demonstration and its conformity to guidance 16 of Annex 5, EB 92 and EB 85 Annex 12 -

Considering the fact that the alternative to the project is the supply of electricity from the grid & the choice of the developer is to invest or not to invest, benchmark analysis has been considered appropriate to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest. Benchmark analysis has been considered appropriate for demonstration of additionality, which is in conformity with guidance 16 of Annex 5 EB 92 and EB 85 Annex 12.

Benchmark Calculation

As per the guidelines of Methodological Tool- Investment Analysis, para 16, “The applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate”. Since in this project activity, equity IRR has been considered as financial indicator, hence as per guidance 16, Required/expected returns on equity are considered as appropriate benchmarks and benchmark supplied by relevant national authorities has been used.

Since the choice of benchmark is based upon parameters that are standard in the market, hence as per Guidance 20 of EB 92 Annex 5 and EB 85 Annex 12, “the cost of equity should be determined either by: (a) selecting the values provided in the Appendix; or by (b) calculating the cost of equity using CAPM”. Hence as per option (a), the default value for India is being considered as per the value provided in Appendix of EB 92 Annex 12. The benchmark thus selected complies as per the relevant guidelines on Investment Analysis.

Further as per guidance 17 of EB 92 Annex 5 and EB 85 Annex 12, “In situations where an investment analysis is carried out in nominal terms and the available IRR benchmarks are in real terms, project participants shall convert the real term values of benchmarks to nominal values by adding the inflation rate. The inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period”. Following the above guidance, the default value is being converted to nominal values by adding inflation rate for 10 years, as per the inflation forecast rate provided by Reserve Bank of India.

Benchmark Calculation

The benchmark has been considered in accordance with Guidance 16 of EB 92 Annex 5 and EB 85 Annex 12, “The values in the table in Appendix A may also be used, as a simple default option”.

As suggested in Appendix A in EB 92 Annex 5 and EB 85 Annex 12, default value benchmark is presented below:

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

Sr No	Investor Name	WTG Capacity	Offer Letter	Decision Date	Default Value	Tool Version	Benchmark Applied
1	Venus Textile Service	3 x 1.5 MW	20/01/2016	25/05/2016	11.10%	Version 06, EB 85 Annex 12	14.77%
2		1 x 2 MW	22/01/2019	25/01/2019	9.79%	Version 09, EB 101 Annex 11	14.62%
3	M/s JB Ecotex LLP	1 x 2.1 MW	02/12/2016	20/12/2016	11.06%	Version 07, EB 92 Annex 5	15.17%
4	M/s Oriilion	1 x 2.1 MW	08/06/2017	25/06/2017	11.06%	Version 07, EB	14.84%

	India Private Limited	MW				92 Annex 5	
5	M/s J Korin Spinning Mills Private Limited	1 x 2.1 MW	12/12/2016	18/12/2016	11.06%	Version 07, EB 92 Annex 5	15.17%

Methodology deployed for arriving at a suitable value of Benchmark using Default Value has been described below:

- As the proposed project activity generates power utilizing wind energy, Group 1 as per para 5 of Appendix of EB 92, Annex 5 has been identified as a suitable category.
- The investment analysis has been carried out in Nominal terms. The investment decision date of the project activity is on 06 December, 2016. Accordingly, Default value as given in Para 6, Appendix of Annex 5, EB 92 has been adjusted by adding suitable forecasted inflation rate taken from RBI (Central Bank, India).
- Project investor has calculated Benchmark based on WPI mean inflation rate. As per Para 17 of EB 92, Annex 5, the inflation forecast should be for the duration of the crediting period. The project investor has calculated benchmark using 10 years forecast and the same is considered as Benchmark for the project activity.

The benchmark has been computed in the following manner:

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

Where,

Real Benchmark = Default Value, i.e., 11.06% (as per Appendix of Annex 5, EB 92)

Inflation rate = Projected Inflation Rate for India

Further a comparison has been done between the above values and the minimum conservative value has been considered for further consideration which is found to be 14.62%.

Addressing Guidance 28 & 29 of EB 92, Annex 5, and Sensitivity Analysis has been carried out. The rationale of sensitivity is, "The ultimate objective of the sensitivity analysis is to determine the likelihood of the occurrence of a scenario other than the scenario presented, in order to provide a cross-check on the suitability of the assumptions used in the development of the investment analysis."

Sensitivity Analysis

As per Guidance 28 and 29 of Annex 5 of EB 92, 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 not firmed up at the time of investment making decision, the cost is variable. The tariff is determined by state electricity board tariff order which is fixed for years mentioned as per the State Electricity Board’s 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 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.

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

Kindly refer Appendix 1 for the Financial calculation of IRR of all investors.

However, this project consist multiple project (ie, Project 1, Project 2, Project 3, Project 4, Project 5) components and each project consist of multiple instances (ie, Wind power project of different capacities). Each project component is having different investment decision time, financial parameters (such as PLF, project cost, tariff etc) are different for each project component. As per the host country requirement, cash flow and tax have been calculated individually for each project. After calculation of post-tax cash flow for each project, all the cash flows are added to obtain the combined cash flow for the project.

The combined equity IRR is calculated considering net cash flow of all 5 projects. The result of combined equity IRR is as below:

Combined Post tax Equity IRR	4.27%
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Benchmark Value	14.62%
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The combined financial analysis sheet is submitted to DOE.

Key Assumptions supporting financial projections are provided in excel spreadsheet to the DOE and the same has also been provided in the appendix-1 of this report.

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

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

Sub-step 2d: Sensitivity Analysis

Addressing Guidance 28 & 29 of EB 101 Annex 11, following factors has been subjected to sensitivity analysis:

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

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

The results of sensitivity analysis are as follows:

Variation %	-10%	Normal	10%	Variation required to reach benchmark
Tariff	2.26%	4.27%	6.32%	45.20%
PLF	2.26%	4.27%	4.27%	45.20%
Project Cost	6.13%	4.27%	2.80%	-34.99%
O&M Cost	4.55%	4.27%	3.98%	-423.41%

The results of sensitivity analysis show that even with a variation of +10% & -10% in project cost, O&M cost, PLF and Tariff Rate, the Equity IRR (4.27%) is significantly lower than the benchmark (14.62%). And it is evident from the results given above; the project remains additional even under the most favorable conditions.

Probability to breach the benchmark:

<p>Sensitivity Parameter 1: PLF</p> <p>PLF considered in financials for is as per Third Party DPR in line with “Guidelines for the reporting and validation of Plant load factors” stated in EB48 Annex11 option 3(b). Hence, variation in PLF of more than 10% is unlikely to happen as the PLF has been reported as per the Third Party Report based on long term data.</p>
<p>Sensitivity Parameter 2: O&M</p> <p>The sensitivity analysis reveals that O&M will breach the benchmark at negative values and is hypothetical case. Since the O&M cost is subject to escalation (as evidence by the O&M agreement) and also subject to inflationary pressure, any reduction in the O&M costs is highly unlikely. Hence, the reduction in the O&M cost is highly unlikely.</p>
<p>Sensitivity Parameter 3: Project Cost</p> <p>Project Cost for financial analysis is considered from DPR of the project activity, being available at the time of investment making decision to go ahead with the project activity. The actual project cost is lower than the DPR cost. Since the Purchase Order cost is firm, there is no possibility of project cost going below this level. However, Sensitivity is carried out for threshold level below which benchmark is not breached.</p>
<p>Sensitivity Parameter 4: Tariff Rate</p> <p>The tariff is determined by PPA which is fixed for entire lifetime of the project activity. Hence, there is no probability to get variation for the same. However, Sensitivity is carried out for +/- 10% even then the benchmark is not breached.</p>

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

3.6 Methodology Deviations

There is no methodology deviation.

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

As per the approved consolidated Methodology AMS - I.D, version 18:

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid- connected power plants. The baseline emissions are to be calculated as follows:

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

Where:

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

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

$EF_{grid,,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO₂/MWh)

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

CO₂ Baseline Database for the Indian Power Sector, Version 14, December 2018¹⁶ published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.

As per Methodological tool: Tool to calculate the emission factor for an electricity system (Version 07.0, EB 100, Annex 4), following six steps have been followed:

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

Step 1: Identify the relevant electricity systems

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

However since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO₂ Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid,

¹⁶ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table: Geographical Scope of Indian Electricity Grid

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

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

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

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

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

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

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

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 and Dispatch data analysis OM is not possible due to lack of availability of data to project developers. The choice of other two options for calculating operating margin emission factor depends on 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)

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)

	2013-14	2014-15	2015-16	2016-17	2017-18
India	18.6%	16.8%	15.1%	14.6%	14.3%

Data Source: Central Electricity Authority (CEA) database Version 14, Dec 2018¹⁷

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

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

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 calculation of Simple OM emission factor using a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PD to the DOE for validation.

¹⁷ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

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 ($EF_{grid, OMSimple,y}$) according to the selected method

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

Net Generation in Operating Margin (GWh) (incl. Imports)			
	2015-16	2016-17	2017-18
INDIAN Grid	871,753	916,278	960,693

Simple Operating Margin (tCO ₂ /MWh) (incl. Imports)			
	2015-16	2016-17	2017-18
INDIAN Grid	0.9655	0.9636	0.9543

Weighted Generation Operating Margin	
INDIAN Grid	0.9610

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

As per Methodological tool: “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4) para 72:

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

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

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

third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Option 1 as described above is chosen by PP 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 PD and is fixed for the entire crediting period.

Build Margin (tCO ₂ /MWh) (not adjusted for imports)	
	2017-18
INDIAN Grid	0.8644

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

As per Methodological tool: “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4) para 81:

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

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

PP has chosen option (a) i.e weighted average CM to calculate the combined margin emission factor for the project activity.

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (t CO₂/MWh)

$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (t CO₂/MWh)

W_{OM} = Weighting of operating margin emissions factor (per cent)

W_{BM} = Weighting of build margin emissions factor (per cent)

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

Wind and solar power generation project activities: $W_{OM} = 0.75$ and $W_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods. Since project activity is of solar power generation, the above weightage has been considered for OM and BM.

Therefore, $EF_{grid,CM,y}$

$$= 0.9610 * 0.75 + 0.8644 * 0.25$$

$$= 0.9368 \text{ t CO}_2/\text{MWh}$$

Baseline emission factor (EF_y):

The baseline emission factor is calculated using the combined margin approach as described in Step 6 above:

Therefore, $EF_y = EF_{grid,CM,y} = 0.9368 \text{ tCO}_2/\text{MWh}$.

$$BE_y = 32,012 \times 0.9368 = 29,987 \text{ tCO}_2 \text{ (rounddown to nearest integer)}$$

4.2 Project Emissions

As per the approved consolidated Methodology AMS I.D (Version 18.0): “For most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

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

Where:

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

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO₂/yr)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (t CO₂e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO₂e/yr)

As the project activity is the installation of a new grid-connected Wind Power plant and does not involve any project emissions from fossil fuel, operation of dry, flash steam or binary geothermal power plants, and from water reservoirs of hydro power plants. Therefore $PE_{FF,y}$, $PE_{GP,y}$, $PE_{HP,y}$ are equal to zero and thus, $PE_y = 0$.

4.3 Leakage

No other leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected.

4.4 Estimated Net GHG Emission Reductions and Removals

Reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER _y	=	Emission reductions in year y (t CO ₂ e/yr)
BE _y	=	Baseline emissions in year y (t CO ₂ /yr)
PE _y	=	Project emissions in year y (t CO ₂ e/yr)

Therefore, Net GHG Emission Reductions and Removals are calculated as follows:

$$ER_y = BE_y - PE_y$$

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 1	29,987	0	0	29,987
Year 2	29,987	0	0	29,987
Year 3	29,987	0	0	29,987
Year 4	29,987	0	0	29,987
Year 5	29,987	0	0	29,987
Year 6	29,987	0	0	29,987
Year 7	29,987	0	0	29,987
Total	2,09,909	0	0	2,09,909

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	EF_{grid,OM,y}
Data unit	tCO ₂ /MWh
Description	Operating Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 14, December 2018 ¹⁸
Value applied:	0.9610
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07” as 3-year generation weighted average using data for the years 2015-16, 2016-17 & 2017-18. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 14, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF_{grid,BM,y}
Data unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 14, December 2018 ¹⁹
Value applied:	0.8644
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07” as per the latest data available for the most recent year 2017-18. The data is obtained from “CO ₂ Baseline Database for Indian Power Sector” version 14, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF_{grid,CM,y}
Data unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 14, December 2018 ²⁰
Value applied:	0.9368
Justification of choice of data or description of measurement methods and procedures applied	<p>The combined margin emissions factor is calculated as follows:</p> $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid, BM,y} * W_{BM}$ <p>Where:</p> <p>EF_{grid,BM,y}= Build margin CO₂ emission factor in year y (tCO₂/MWh)</p> <p>EF_{grid,OM,y}= Operating margin CO₂ emission factor in year y (tCO₂/MWh)</p> <p>W_{OM} = Weighting of operating margin emissions factor (%) = 75%</p>

¹⁸ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

¹⁹ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

²⁰ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

	W_{BM} = Weighting of build margin emissions factor (%) = 25%
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

5.2 Data and Parameters Monitored

Data / Parameter	EG_{PJ, yGujarat}
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Monthly Share Certificate issued by GETCO
Description of measurement methods and procedures applied	The difference of final value of export and import is used for monthly values of net electricity supplied to the grid by the project activity and same value will be considered for ER calculations.
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value applied:	16,554 MWh (estimated)
Monitoring equipment	The electricity exported / supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid.
QA/QC procedures applied	<p>The meters is approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is once in 5 years.²¹ The monthly electricity supplied/exported by the project activity in the Share Certificate is cross checked with the monthly electricity bills being a captive project. In the absence or delay in the meter calibration appropriate Guidelines will be applied appropriately to confirm the conservativeness of metering.</p> <p>The metering arrangement, accuracy class of meters, calibration frequency 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 and the same is considered the monitoring parameter. The billing is raised based on substation meters.</p>
Purpose of data	Calculation of baseline emissions
Calculation method	Thus, Net electricity supplied to the grid by the project plant in a given month = Export, kWh – Import, kWh
Comments	Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of VERs for this project activity, whichever occurs later.

For Tamilnadu Site

²¹ http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

Data / Parameter	EG_{PJ, y} Tamil Nadu
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Monthly joint meter reading reports
Description of measurement methods and procedures applied	The difference of final value of export and import is used for monthly values of net electricity supplied to the grid by the project activity and same value will be considered for ER calculations.
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value applied:	15,458 MWh (estimated)
Monitoring equipment	The electricity exported / supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid.
QA/QC procedures applied	<p>The meters is approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is once in 5 years.²² The monthly electricity supplied/exported by the project activity in the JMR report is cross checked with the monthly invoices of sale. In the absence or delay in the meter calibration appropriate Guidelines will be applied appropriately to confirm the conservativeness of metering.</p> <p>The metering arrangement, accuracy class of meters, calibration frequency 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 and the same is considered the monitoring parameter.</p> <p>The billing is raised based on substation meters.</p>
Purpose of data	Calculation of baseline emissions
Calculation method	Thus, Net electricity supplied to the grid by the project plant in a given month = Export, kWh – Import, kWh
Comments	Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of VERs for this project activity, whichever occurs later.

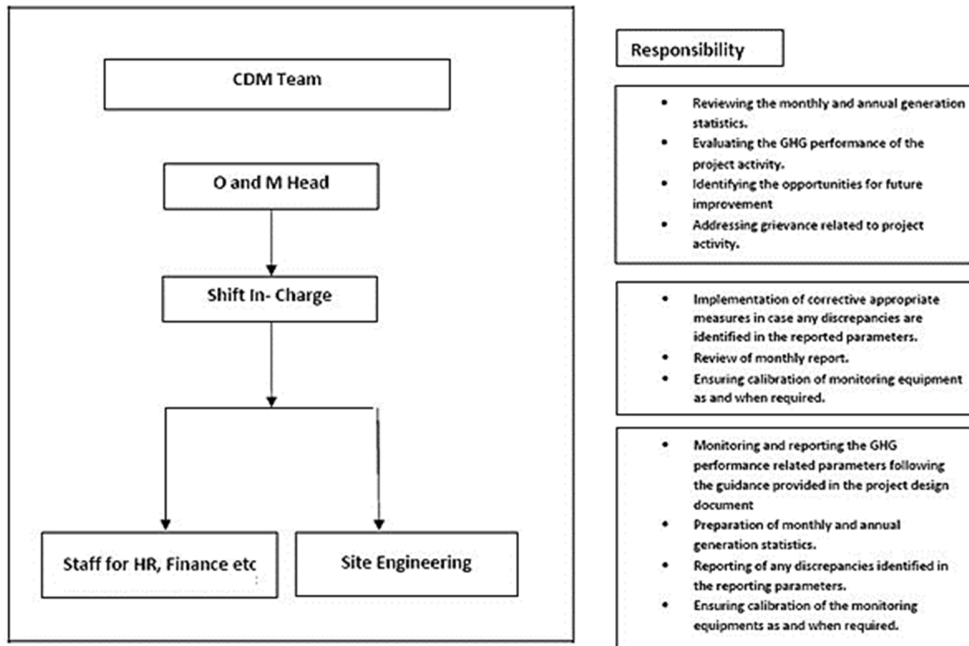
5.3 Monitoring Plan

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. The monitoring plan, which will be implemented by the project participant describes about the

²² http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

monitoring organization, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

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



Data Measurement

The export and import energy will be measured continuously using above mentioned Main and Check meters located at the substations. Readings of meters shall be taken on monthly basis by authorized officer of SEB in the presence of PP or representative of PP. Based on the Meter Reading Statement to PP, invoices will be raised. These invoices can be used for cross checking the meter readings taken for the respective project activity.

QA/QC Procedures for WTG's operational in Tamilnadu State:

Data Archiving: The metering equipments will be maintained in accordance with electricity standards and will have the capability of recording daily and monthly readings. Records of joint meter reading will be maintained at site and a copy will be kept with the project owner. Necessary records of calibration will be maintained by both State Electricity Board and project proponent. The Generation Data and other related documents will be kept for 2 years after the whole crediting period. All monitored data is stored / archived under safe custody of the project executor and controller for a period of crediting period + 2 years.

QA/QC Procedure: - The main & check meters shall be tested for accuracy, with a portable standard meter, by the SEB or authorized Testing Laboratories at the cost of PP. The TGENCO shall carry out the calibration, periodical testing, sealing & maintenance of meters once in 5 years in the presence of authorized representative(s) of PP shall sign on the result thereof. The frequency of meter testing shall be done once in 5 years, as per CEA Guidelines. All meters will be tested only at the metering point. The SEB will provide a copy of the test reports to the PP. If during testing, both the main & check meters are found within the permissible limits of error i.e. 0.2%, the energy computation will be as per the main meter. If during test, any of the main meter is found to be within permissible limits of error but the corresponding check meter is beyond the permissible limit, energy computation will be as per the main meter. The check meter shall be calibrated immediately. If during the tests, the main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within the permissible limits of error, then the energy computation for the month to-date & time of such test check shall be in accordance with check meter. The main meter shall be calibrated immediately & the energy for the period thereafter shall be as per the calibrated main meter. If during any of the monthly meter readings, the variation between the main meter & check meter is more than 0.2%, all the meters shall be retested & calibrated immediately by SEB, at the seller's cost. The correction required as per result of testing will be applied to generation & consumption of energy for the period from last meter reading to the time of such test checks. Energy from the period thereafter shall be in accordance with calibrated main meter. The net electricity supplied to the grid can be cross checked with the invoices raised / sales receipts by project investor to State Electricity Board or Third Party.

QA/QC Procedures for WTG's operational in Gujarat State:

Data Archiving: The metering equipments will be maintained in accordance with electricity standards and will have the capability of recording daily and monthly readings. Records of Monthly Share Certificates will be maintained at site and a copy will be kept with the project owner. Necessary records of calibration will be maintained by both State Electricity Board and project proponent. The Generation Data and other related documents will be kept for 2 years after the whole crediting period. All monitored data is stored / archived under safe custody of the project executor and controller for a period of crediting period + 2 years.

QA/QC Procedure: - The main & check meters shall be tested for accuracy, with a portable standard meter, by the SEB or authorized Testing Laboratories at the cost of PP. The GETCO shall carry out the calibration, periodical testing, sealing & maintenance of meters once in 5 years in the presence of authorized representative(s) of PP shall sign on the result thereof. The frequency of meter testing shall be done once in 5 years, as per CEA Guidelines. All meters will be tested only at the metering point. The SEB will provide a copy of the test reports to the PP. If during testing, both the main & check meters are found within the permissible limits of error i.e. 0.2%, the energy computation will be as per the main meter. If during test, any of the main meter is found to be within permissible limits of error but the corresponding check meter is

beyond the permissible limit, energy computation will be as per the main meter. The check meter shall be calibrated immediately. If during the tests, the main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within the permissible limits of error, then the energy computation for the month to-date & time of such test check shall be in accordance with check meter. The main meter shall be calibrated immediately & the energy for the period thereafter shall be as per the calibrated main meter. If during any of the monthly meter readings, the variation between the main meter & check meter is more than 0.2%, all the meters shall be retested & calibrated immediately by SEB, at the seller's cost. The correction required as per result of testing will be applied to generation & consumption of energy for the period from last meter reading to the time of such test checks. Energy from the period there after shall be in accordance with calibrated main meter. The net electricity supplied to the grid can be cross checked with the monthly electricity bills.

Emergency preparedness

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

Personnel training

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

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	EG_{PJ, yGujarat}
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Value applied:	25,044
Comments	Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of VERs for this project activity, whichever occurs later.

Data / Parameter	EG_{PJ, y Tamil Nadu}
Data unit	MWh

Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Value applied:	19,885
Comments	Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of VERs for this project activity, whichever occurs later.

6.2 Baseline Emissions

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

Where:

BE_y : Baseline emissions in year y (tCO₂e/yr)

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

$EF_{grid, CM, y}$: Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO₂e/MWh)

Parameter	Unit	Value
$EG_{PJ, y}$ (Gujarat + Tamil Nadu)	MWh	44,929.06
$EF_{grid, CM, y}$	tCO ₂ e	0.9368
BE_y	=	44,929.06 x 0.9368
	=	42,054 (Round down value)

6.3 Project Emissions

Not Applicable, since leakage emissions are zero as per AMS I.D methodology.

6.4 Leakage

Not Applicable, since emissions from the project activity is zero as per AMS I.D. methodology.

6.5 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
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	(tCO ₂ e)	(tCO ₂ e)		
2017	10,716	0	0	10,716
2018	26,781	0	0	26,781
2019	4,557	0	0	4,557
Total	42,054	0	0	42,054

It is to be noted here that as per the estimated emission reduction to be achieved from the project activity for the current monitoring period is 39,234 tCO₂e, whereas actual emission reductions achieved are 42,054 tCO₂e, which is approximately 7.19% higher than the estimated emission reductions. The generation of electricity depends upon many other climatic conditions, and not within the control of the project participant. The higher generation during the current verification period is hence due to certain natural conditions and hence acceptable.

APPENDIX 1: INPUT PARAMETERS AND ASSUMPTIONS FOR ADDITIONALITY ASSESSMENT

Assumptions and Values considered for Financial and Sensitivity Analysis for the total 12.8 MW Wind Project.

Particulars	M/s J Korin Spinning Private Limited	M/s JB Ecote x LLP	M/s Orillion India Private Limited	M/s Venus Textile Service	M/s Venus Textile Service	Unit	Source/Remarks
Capacity of the project	2.1	2.1	2.1	2	4.5	MW	As per DPR
Plant Load Factor	30.00%	30.00%	30.00%	27.15%	27.15%	%	As per DPR
Annual Net generation	5.5188	5.5188	5.5188	4.7567	10.7025	GWh	Calculated
Project cost	178.00	178.00	178.00	160.40	315.75	INR Million	As per DPR
Debt	75%	75%	75%	75%	75%	%	As per DPR
Equity	25%	25%	25%	25%	25%	%	
Debt	133.50	133.50	133.50	120.30	236.81	INR Million	Calculated
Equity	44.50	44.50	44.50	40.10	78.94	INR Million	Calculated
Interest rate	13.00%	13.00%	13.00%	13.00%	13.00%	%	As per DPR
Debt Repayment tenure	12	12	12	10	10	years	As per DPR
Moratorium	0	0	0	0	0	year	
Operation and Maintenance Cost	0.65	0.65	0.65	1.6	4.8	INR Million	As per DPR
Operation and Maintenance Cost per MW	0.31	0.31	0.31	0.80	1.07	INR Million	Calculated
Escalation in O & M	5.00%	5.00%	5.00%	6.00%	6.00%	%	As per DPR
GST on O & M fees	18.00%	18.00%	18.00%	18.00%	18.00%	%	As per prevailing tax rates
Insurance & overhead	1.29	1.29	1.29	0.79	1.78	INR Million / Yr	As per quotation received from Insurance companies for this project activity

Tariff	4.15	4.15	4.15	4.16	4.16	Rs/kWh	As per DPR
Escalation in tariff	0.00%	0.00%	0.00%	0.00%	0.00%	%	
Depreciation Rate (Book)	13.00%	13.00%	13.00%	13.00%	13.00%	%	
IT Depreciation Rate	7.69%	7.69%	7.69%	7.69%	7.69%	%	https://www.inco.metaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income tax rate	34.94%	34.94%	34.94%	34.94%	34.94%	%	Calculated
MAT rate	38.44%	38.44%	38.44%	38.44%	38.44%	%	Calculated
Salvage Value	10%	10%	10%	10%	10%	%	

Tax Rates

Financial Year	FY 2017-18	FY 2017-18	FY 2017-18	FY 2017-18	FY 2017-18		
Income tax rate (%)	30.00%	30.00%	30.00%	30.00%	30.00%	%	Indian IT Act for FY 2017-18
Corporate tax/MAT (%)	33.00%	33.00%	33.00%	33.00%	33.00%	%	Indian IT Act for FY 2017-18
Surcharge (%)	12.00%	12.00%	12.00%	12.00%	12.00%	%	Indian IT Act for FY 2017-18
Education cess (%)	4.00%	4.00%	4.00%	4.00%	4.00%	%	Indian IT Act for FY 2017-18

Final Results

Equity IRR	Benchmark
4.27%	14.62%

Sensitivity Analysis

Variation %	-10%	Normal	10%	Variation required to reach benchmark
Tariff	2.26%	4.27%	6.32%	45.20%
PLF	2.26%	4.27%	4.27%	45.20%
Project Cost	6.13%	4.27%	2.80%	-34.99%
O&M Cost	4.55%	4.27%	3.98%	-423.41%

APPENDIX 2: METER AND CALIBRATION DETAILS

1. 3x1.5 MW WTGs in Tamil Nadu of M/s Venus Textile Service

S. No.	WTG No.	Meter No.	Make	Initial Calibration Date	Validity
1.	T-62	TNW00877	Secure Accuracy Class: 0.2 s	30/03/2017	29/03/2022
2.	T-48	TNW00762	Secure Accuracy Class: 0.2 s	30/03/2017	29/03/2022
3.	T-49	TNW00755	Secure Accuracy Class: 0.2 s	30/03/2017	29/03/2022

2. 1x2.1 MW WTG of M/s J B Ecotex LLP

S. No.	WTG No.	Meter No.	Make	Initial Calibration Date	Validity
1.	SEL/2100/17-18/4938	GJ-3897-B	EDMI Accuracy Class: 0.2 s	30/08/2017	29/08/2022

3. 1x2.1 MW WTG of M/s J Korin Spinning Mills Private Limited

S. No.	WTG No.	Meter No.	Make	Initial Calibration Date	Validity
1.	SEL/2100/17-18/4868	GJ-3947-B	EDMI Accuracy Class: 0.2 s	30/07/2017	29/07/2022

4. 1x2.1 MW WTG of M/s Orillion India Private Limited

S. No.	WTG No.	Meter No.	Make	Initial Calibration Date	Validity
1.	SEL/2100/17-18/4973	GJ-3893-B	EDMI Accuracy Class: 0.2 s	26/02/2018	25/02/2023