



# Verified Carbon Standard

## RENEWABLE WIND POWER PROJECT BY AXIS WIND FARMS (RAYALASEEMA) PVT. LTD.



Document Prepared by EKI Energy Services Limited.

<b>Project Title</b>	Renewable Wind Power Project by Axis Wind Farms (Rayalaseema) Pvt. Ltd.
<b>Version</b>	02
<b>Report ID</b>	2052 <sup>1</sup>
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<b>Project ID</b>	2052
<b>Monitoring Period</b>	01-April-2022 to 30-September-2022 (inclusive of both start and end dates)
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<sup>1</sup> <https://registry.verra.org/app/projectDetail/VCS/2052>

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# 1 PROJECT DETAILS

## 1.1 Summary Description of the Implementation Status of the Project

The main purpose of this project activity is to generate clean form of electricity through renewable wind energy source. The project involves installation of 105 MW wind project in Anantapur district of Andhra Pradesh.

The project activity utilizes 50 Suzlon made S 88 WTGs each with capacity of 2.1 MW. The WTG wise commissioning dates are described in the table below –

Capacity (MW)	Village	WTG Location No	Commissioning Date
10.5	Kalagalla and Ipperu	KDR-033, KDR-035, KDR-036, KDR-037, KDR-038	02-March-2018
25.2	Ipperu, Padmati Yaleru & Atmakur	KDR-039, PTN-003, PT-030, PT-033, PT-018, PT-017, PT-016, PT-019, PT-020, PT-021, PT-024, PT-025	30-March-2018
16.8	Ipperu, Kuderu & Atmakur	PTN-010, KDR-046, KDR-047, KDR-048, KDR-049, PT-022, PT-023, PT-034	15-June-2018
10.5	Ipperu & Kuderu	PTN-09, PTN-05, PTN-04, KDR-45, KDR-34	19-July-2018
21	Kalagalla, Kuredu, Padamati Yaleru & Atmakur	KDR-032, KDR-040, KDR-041, KDR-044, PT-032, PT-031, PT-029, PT-015, PT-026, PT-039	04-September-2018
21	Kammuru, Kuredu & Thimmapurumu	KDR-050, KDR-051, KDR-052, KDRN-001, KDRN-002, KDRN-003, KDR-042, KDR-043, PT-027, PT-028	27-September-2018

All the WTGs mentioned above are in continued operation since the respective dates of commissioning. 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 fossil-fuel dominated grid connected power plants and by the addition of new generation sources.

The total actual GHG Emission reductions achieved in current monitoring period of 01-April-2022 to 30-September-2022 are 166,444 tCO<sub>2</sub>e through displacing 177,673.37 MWh of electricity from fossil-fuel dominated electricity grid with electricity generation using wind energy resources.

The table below shows the description of the previous validation and periodic verifications for the project activity along with this monitoring period. It also includes the information of the respective applicable VCS program, VVB Name and the Number of years for each periodic verification.

Audit Type	Period	Program	VVB Name	Number of years
Joint Validation and Verification	02-March-2018 to 30-November-2019	VCS program guide version 3.7	Earthood Services Private Limited (ESPL)	1 year 8 months
Verification	01-December-2019 to 31-December-2020	VCS program guide version 3.7	LGAI Technological Center S.A. (Applus+ Certification)	1 year 1 month
Verification	01-January-2021 to 30-June-2021	VCS program guide version 3.7	LGAI Technological Center S.A. (Applus+ Certification)	0 Year 6 months
Verification	01-July-2021 to 31-December-2021	VCS program guide version 3.7	LGAI Technological Center S.A. (Applus+ Certification)	0 year 6 months
Verification	01-January-2022 to 31-March-2022	VCS program guide version 3.7	LGAI Technological Center S.A. (Applus+ Certification)	0 year 3 months
Verification	01-April-2022 to 30-September-2022	VCS program guide version 3.7	LGAI Technological Center S.A. (Applus+ Certification)	0 year 6 months
<b>Total</b>	02-March-2018 to 30-			4 years 6 months

September-2022			
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## 1.2 Sectoral Scope and Project Type

Sectoral scope 1: Energy Industries (renewable / non-renewable sources).

Project type: Renewable energy project

The project activity is not a grouped project.

## 1.3 Project Proponent

Organization name	Axis Wind Farms (Rayalaseema) Pvt. Ltd
Contact person	Mr. Murugan Subbiah
Title	Project Representative
Address	Plot No. 47, 48, 49, Street No. 1, 2nd Avenue, Patrika Nagar, Madhapur, Seri Lingampalli (M), Rangareddi, Hyderabad, TG-500081, IN
Telephone	+91- 72089 44360
Email	<a href="mailto:msubbiah@brookfieldrenewable.in">msubbiah@brookfieldrenewable.in</a>

## 1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Mr. Manish Dabkara
Title	MD & CEO
Address	NRK Business Park, 903, B-1 9th Floor, Mangal City Service Rd, Scheme 54 PU4, Indore, Madhya Pradesh 452010
Telephone	+91 99 07 53 4900
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## 1.5 Project Start Date

Start date of the project activity is the earliest date of commissioning of the WEGs i.e., 02-March-2018 and hence it is considered as the project start date.

Project Start Date: 02-March-2018

## 1.6 Project Crediting Period

Crediting Period Start date: 02-March-2018

Crediting Period End date: 01-March -2028

The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times.

## 1.7 Project Location

The project is located in the state of Andhra Pradesh, India.

The location wise respective co-ordinates are mentioned below-

Location	Latitude	Longitude
Kalagalla	14.8138° N	77.4178° E
Ipperu	14.7770° N	77.4250° E
Padmati	13°40'59"N	79°20'49"E
Yaleru	14.6298° N	77.5082° E
Atmakur	15.87791°N	78.58842°E
Kuderu	14.7212° N	77.4128° E
Thimmapurumu	17.0286° N	82.2461° E

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



Project Investor	Capacity (MW)	Village	State	Commissioning Date
Axis Wind Farms	10.5	Kalagalla and Ipperu	Andhra Pradesh	02-March-2018
	25.2	Ipperu, Padmati Yaleru & Atmakur		30-March-2018
	16.8	Ipperu, Kuderu & Atmakur		15-June-2018

(Rayalaseema) Pvt. Ltd	10.5	Ipperu & Kuderu	Andhra Pradesh	19-July-2018
	21	Kalagalla, Kuredu, Padamati Yaleru & Atmakur		04-September-2018
	21	Kammuru, Kuredu & Thimmapurumu		27-September-2018

## 1.8 Title and Reference of Methodology

Methodology: ACM0002 ver. 19.0

Methodology Title: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC CDM<sup>2</sup>.

The methodology also refers to the latest approved versions of:

- Tool to calculate the emission factor for an electricity system, Version 07.0 (EB 100, Annex 4)<sup>3</sup>
- Tool for the demonstration and assessment of additionality - Version 07.0.0 (EB 70, Annex 08)<sup>4</sup>

## 1.9 Participation under other GHG Programs

The project activity has not been registered and is not seeking registration at moment under any other GHG programs. The project also proponent has provided undertaking that it will not claim any GHG credits under any GHG program other than that under VERRA during the current monitoring period.

## 1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

VCUs used for voluntary carbon market purposes do not require Paris Agreement Article 6 mechanism and other Paris-related program VCU labels, though labeled VCUs may be used for voluntary market transactions if desired. Since for this project activity the VCUs for this monitoring period are only to be used for the voluntary carbon market purposes, so project proponent is not required to demonstrate adherence to any of such requirements.

India is Non-annex1 country and there is no compliance with an emission trading program or to meet binding limits on GHG emissions for this project activity.

<sup>2</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/approved>

<sup>3</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

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

The emission reductions or removals generated during this monitoring period have not been used for compliance under an emissions trading program or any other mechanism that includes GHG allowance trading (as identified in the project description, or where such programs or mechanisms have subsequently emerged). The Project is not used for compliance with an emission trading program or to meet binding limits on GHG emissions.

PP has submitted undertaking that it would not use net GHG emission reductions by the projects for compliance with emission trading program to meet binding limits on GHG emissions. PP has also submitted undertaking for not availing any other forms of environmental credits e.g. REC for the monitoring period under consideration.

Also, the project is not claiming any benefits from the REC mechanism of India which can be confirmed from the link below –

[https://www.recregistryindia.nic.in/index.php/publics/accredited\\_regens](https://www.recregistryindia.nic.in/index.php/publics/accredited_regens)

The Project Activity is a wind power project and does not involve any supply chain involved in the project such as manufacturers, wholesalers, distributors and retailers. So, no indirect upstream and downstream GHG emissions are not involved in the project activity. Thus, the Scope 3 emissions are not applicable in this project activity.

## 1.11 Sustainable Development Contributions

Ministry of Environment, Forest and Climate Change (MoEFCC), India's Designated National Authority (DNA) for CDM projects has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. During the current monitoring period, the project has contributed to sustainable development through the following ways.

### **Social well-being:**

- The project activity has resulted in creating job opportunities for the local population on temporary and permanent basis. Manpower is required both during erection and operation of the renewable energy projects. This would result in the improvement in living standards of the local community
- The installation of the renewable energy projects also led to development of basic infrastructure like roads, communication with the nearby cities etc. which also improved in living standards of the local population.

### **Economic well-being:**

- The project activity has created direct and indirect job opportunities to the local community during installation and operation of the renewable energy projects.
- The investment for the project activity instances under grouped project activity has led to the improvement in the economic activity in the local area.

### **Environmental well-being:**

The project activity utilizes renewable energy for generating electricity which otherwise would have been generated through alternate fuel (most likely - fossil fuel) based power

plants, contributing to reduction in specific emissions (emissions of pollutant/unit of energy generated) including GHG emissions. As renewable energy projects produce no end products in the form of solid waste (ash etc.), they address the problem of solid waste disposal encountered by most other sources of power. Being a renewable resource, to generate electricity contributes to resource conservation. Thus, the project causes no negative impact on the surrounding environment.

**Technological well-being:**

The successful operation of project activity has led to promotion of wind power generation and also encourages other entrepreneurs to participate in similar projects.

**Sustainable Development Contributions:**

According to 2- the VCS Standard Version 4.4 (latest version), it is clearly mentioned that Project Proponent is required to demonstrate contributions to a minimum of three SDGs, effective immediately for all projects registered on or after 20 January 2023. Since this is the 6<sup>th</sup> Verification of this project and it is registered before 20 January 2023, SDG reporting for 3 SDGs is demonstrated in the table below.

The SDG's considered for the present monitoring period are –

SDG 7: 7.2.1 Renewable energy share in the total final energy consumption

SDG 8: 8.6.1: Proportion youth (aged 15- 24) not in education, employment, or training

SDG 13: Tonnes of greenhouse gas emissions avoided or removed

The project proponent will only use the VCUs for voluntary carbon market purposes, thus the same is not applicable in the context of the Paris agreement. VCUs used for voluntary carbon market purposes do not require Paris Agreement Article 6 mechanism and other Paris-related program VCU labels, though labeled VCUs may be used for voluntary market transactions if desired.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
<i>Sequential row number</i>	<i>SDG Target number</i>	<i>Number and text of SDG indicator or, if no official SDG indicator is applicable, user-defined indicator</i>	<i>Indicate the project's contribution to the SDG Indicator (implemented activities to increase or decrease)</i>	<i>Brief description of the quantifiable impact of the project's activities related to the SDG indicator, during the monitoring period.</i>	<i>Brief description of the cumulative quantifiable impact of the project's activities related to the SDG indicator, over the project lifetime.</i>
1)	7.2	7.2.1 Renewable energy share in the total final energy consumption	Implemented activities to increase	About 177,673.37 MWh renewable electricity has supplied to Indian electricity grid during the reported period that helps to increase the renewable energy share in the energy mix.	About 958,962.33 MWh renewable electricity has supplied to Indian electricity grid throughout the project lifetime that helps to increase the renewable energy share in the energy mix
2	8.5	8.5.2 Unemployment rate, by sex, age and persons with disabilities	Implemented activities to decrease unemployment rate	Total - 14 people were employed during this monitoring period. Thus, the project activity is contributing. in the reduction of unemployment rate.	Average of 14 people were employed annually for this project activity for the current as well as the previous monitoring period. Thus, the project activity is contributing. in the reduction of unemployment rate.

3)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	By supplying 177,673.37 MWh clean electricity (generated through Wind Power) to Indian electricity grid, the project avoided release of 166,444 tCO <sub>2e</sub> in to the atmosphere during the reporting period.	Overall Prevented the release of 923,672 tCO <sub>2e</sub> into the atmosphere since project commissioning.
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## 2 SAFEGUARDS

### 2.1 No Net Harm

The project activity does not involve any major construction activity. It primarily requires the installation of the WTGs, 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 energy project activity operations do not result in direct air pollution, noise pollution. Please refer below web link for the same-

[https://www.odishainnovationcell.nic.in/Content/SIC/Articles/RE\\_Development\\_Impacts\\_in\\_India.pdf](https://www.odishainnovationcell.nic.in/Content/SIC/Articles/RE_Development_Impacts_in_India.pdf)

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

The project will only bring positive impacts on environmental and socio-economic aspects as elaborated in Section 1.11. Since the project activity is a renewable wind power project so no potential negative environmental or socio-economic impacts have been identified for the project, thus the same is not applicable.

### 2.2 Local Stakeholder Consultation

Before implementation of the project activity, the project proponent did thorough consultation with stakeholders – identifying the stakeholders, consultation with the stakeholders in number of phases and through number of media – focus group discussion, detailed social mapping and fieldwork, inclusion of local stakeholders from all sections of community , explanation of project activity – purpose and details to them and resolving the comments/ grievances along with seeking suggestions from them.

The details of the Stakeholder Meetings are as follows:

Name of Investor	Capacity	Project Location			Date of Invitation	Date of Meeting
		Village	District	State		
Axis Wind Farms (Rayalseema) Pvt. Ltd	10.5	Kalagalla and Ipperu	Anathapur	Andhra Pradesh	09-January-2018	16-January-2018
	25.2	Ipperu, Padmatiyaleru & Atmakur			08-January-2018	15-January-2018
	16.8	Ipperu, Kuderu & Atmakur			20-July-2018	28-July-2018

	10.5	Ipperu & Kuderu			08-January-2018	15-January-2018
	21	Kalagalla, Kuredu, Padamatiyaleru & Atmakur			20-January-2018	31-January-2018
	21	Kammuru, Kuredu & Thimmapurumu			20-July-2018	27-July-2018

The PP has engaged a number of local NGOs for local stakeholder consultations by applying various strategies to engage them in project and for taking care of their complaints/grievances/suggestions. The process is ongoing and continuous; this process is undertaken throughout the year.

**Ongoing Stakeholder Consultation:** During the current monitoring period, the PP has kept grievance register in plant site office seeking complaints/grievances from local community.

**Outcome:** During the current monitoring period, no negative comments are received from the local stakeholders. Thus, no mitigations have been applied.

### 2.3 AFOLU-Specific Safeguards

Not applicable to this as this is not an AFOLU project activity.

## 3 IMPLEMENTATION STATUS

### 3.1 Implementation Status of the Project Activity

The project has been completed and the monitoring equipment are installed to monitor the parameters as described in the registered Project Description (PD). All the WTGs involved in the project activity are already commissioned and operational.

#### Technical specifications of Suzlon S 88 WTG

Operating data	
Rated power	2.1 MW
Cut-out speed	25 m/s
Cut-in speed	4 m/s
Rated speed	14 m/s
Hub height	80m
Rotor diameter	11.8 m

Rotor speed	15.47 rpm
Rotor	
Pitch system	Electric drive with electric brake, gearbox, frequency converter & batteries.
Diameter	88 m
Swept area	6082 m <sup>2</sup>
Blade material	The rotor blades are made of high grade GRP and manufactured by using Resin Infusing Moldings (RIM) technology
Generator Type	Single fed Induction Generator with slip-rings, variable rotor resistance with SUZLON-FLEXI-SLIP control system.
Yaw System	
Type	Electric motors with brake, gearbox & pinion
Bearings	High tensile double-row ball-bearing
Braking System	3 independent Aero Brakes with power back up supply.

The details of commissioning schedule of the WTGs in this project activity have been provided below:

Project Proponent	Capacity (MW)	Date of Commissioning
Axis Wind Farms (Rayalaseema) Pvt. Ltd	10.5	02-March-2018
	25.2	30-March-2018
	16.8	15-June-2018
	10.5	19-July-2018
	21	04-September-2018
	21	27-September-2018

The WTGs are under operation including scheduled shutdowns during the current monitoring period and no such event has been identified in the current monitoring period which may impact GHG emissions reductions. The details of plant breakdowns in the current monitoring period are provided in APPENDIX 2.

## 3.2 Deviations

### 3.2.1 Methodology Deviations

No methodology deviation is applied during the monitoring period.

### 3.2.2 Project Description Deviations

#### Deviation 1:

As per the VCS Joint PD and MR section 4.2<sup>55</sup>, the monthly electricity supplied/exported by the project activity in the JMR report is cross checked with the monthly invoices of sale (of electricity). Also, it is clearly stated in the section 4.2 of the current monitoring report that, Net electricity supplied to the grid by the project plant in a given month = Export (MWh)– Import (MWh). However, as per the project site practice, there are two types of invoices - one for electricity export while the other (HT bill) is electricity import.

The calculation approach for arriving to the Export and the Import values are mentioned below one by one.

**For Export (MWh):** The values of electricity export are adjusted with line loss percentage (provided in monthly JMRs) in accordance with the formula Electricity Delivered (export) = Meter reading – (meter reading\* line loss %). The values of electricity export thus obtain are compared with the values of electricity export as per invoices and for each month, smaller of them is considered for Emissions Reductions calculations as per conservative approach for all the months covered in current monitoring period.

The values of electricity export thus obtained (for months April 2022 to September 2022) are compared with values of export in invoices (Export Invoice) and smaller of the values are considered for Emissions Reductions calculations as per conservative approach. Also, since the values are mentioned in KWh in the JMR and Invoices the final Export values are converted into MWh for calculation of net electricity.

**For Import (MWh):** In case electricity import, for the months April 2022 to September 2022, the values of electricity import (as in JMR) are adjusted with transmission and distribution losses according to the formula as per project site practice:

Electricity Import = Import (as per JMR) \*103%

The values of electricity import thus obtained (for months April 2022 to September 2022) are compared with values of import in invoices (HT bills) and greater of the values are considered for Emissions Reductions calculations as per conservative approach. Also, since the values are mentioned in KWh in the JMR and Invoices the final Import values are converted into MWh for calculation of net electricity.

Thus, the calculation approach for the Export (MWh) and Import (MWh) values has been clearly mentioned above. In order to obtain the values of “Quantity of net electricity generation supplied by the project plant/unit to the grid”, the monthly values of electricity import (obtained by the method described here) are subtracted from the values of electricity export (obtained by the method described above). This is conservative approach for

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<sup>55</sup> <https://registry.verra.org/app/projectDetail/VCS/2052>

Emissions Reductions calculations and is being followed in the present verification and future issuances as well.

The deviation 1 was taken in 2<sup>nd</sup> periodic verification for the monitoring period 01-December-2019 to 31-December-2020

**Deviation 2:**

The contact details of the Project Proponent have been updated in the Section 1.3 in the 5<sup>th</sup> periodic verification. The contact details of the other entities involved were also updated in Section 1.4.

Deviation 2 was taken in the 5<sup>th</sup> periodic verification for the monitoring period 01-January-2022 to 31-March-2022.

The above-mentioned deviations are of permanent nature and does not have any impact on the project applicability, baseline scenario, and additionality.

### 3.3 Grouped Projects

The project is not a grouped project - thus this is not applicable.

## 4 DATA AND PARAMETERS

### 4.1 Data and Parameters Available at Validation

<b>Data / Parameter</b>	EF <sub>grid, OM,y</sub>
<b>Data unit</b>	tCO <sub>2</sub> /MWh
<b>Description</b>	Operating Margin CO <sub>2</sub> emission factor in year y
<b>Source of data</b>	Calculated from CEA database, Version 14, Dec 2018 <sup>6</sup>
<b>Value applied</b>	0.9610
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	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 and 2017-18. The data are obtained from “CO <sub>2</sub> Baseline Database for Indian Power Sector” version 14, published by the Central Electricity Authority, Ministry of Power, Government of India.
<b>Purpose of Data</b>	Calculation of baseline emissions
<b>Comments</b>	The value is fixed and it is same for the entire crediting period

<sup>6</sup> [http://www.cea.nic.in/reports/others/thermal/tpece/cdm\\_co2/user\\_guide\\_ver14.pdf](http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf)

Data / Parameter	$EF_{grid, BM, y}$
Data unit	tCO <sub>2</sub> /MWh
Description	Build margin CO <sub>2</sub> emission factor in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018 <sup>7</sup>
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 are obtained from “CO <sub>2</sub> Baseline Database for Indian Power Sector” version 14 published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed and it is same for the entire crediting period

Data / Parameter	$EF_{grid, y}$
Data unit	tCO <sub>2</sub> /MWh
Description	Combined Margin CO <sub>2</sub> emission factor in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018 <sup>8</sup>
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> $EF_{grid, y} = EF_{grid, OM, y} * W_{OM} + EF_{grid, BM, y} * W_{BM}$ <p>Where:</p> <p><math>EF_{grid, BM, y}</math> = Build margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)</p> <p><math>EF_{grid, OM, y}</math> = Operating margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)</p> <p><math>W_{OM}</math> = Weighting of operating margin emissions factor (%) = 75%</p> <p><math>W_{BM}</math> = Weighting of build margin emissions factor (%) = 25%</p>
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

<sup>7</sup> [http://www.cea.nic.in/reports/others/thermal/tpece/cdm\\_co2/user\\_guide\\_ver14.pdf](http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf)

<sup>8</sup> [http://www.cea.nic.in/reports/others/thermal/tpece/cdm\\_co2/user\\_guide\\_ver14.pdf](http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf)

## 4.2 Data and Parameters Monitored

<b>Data / Parameter</b>	EG <sub>PJ, y</sub>																										
<b>Data unit</b>	MWh																										
<b>Description</b>	Quantity of net electricity supplied by the project plant/unit to the grid in year y in MWh																										
<b>Source of data</b>	Monthly JMRs from SLDC																										
<b>Description of measurement methods and procedures to be applied</b>	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 is being considered for ER calculations.																										
<b>Frequency of monitoring/recording</b>	Continuous measurement & monthly recording																										
<b>Value monitored</b>	<table border="1"> <thead> <tr> <th>Year</th> <th>Net Electricity Supplied</th> </tr> </thead> <tbody> <tr> <td>01-April-2022 to 30-September-2022</td> <td>177,673.37</td> </tr> <tr> <td><b>Total</b></td> <td><b>177,673.37</b></td> </tr> </tbody> </table>		Year	Net Electricity Supplied	01-April-2022 to 30-September-2022	177,673.37	<b>Total</b>	<b>177,673.37</b>																			
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01-April-2022 to 30-September-2022	177,673.37																										
<b>Total</b>	<b>177,673.37</b>																										
<b>Monitoring equipment</b>	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. The details of meters are given in APPENDIX 1.																										
	<table border="1"> <thead> <tr> <th>Meter Type</th> <th>Main Meter</th> <th>Check Meter</th> <th>Standby Meter</th> </tr> </thead> <tbody> <tr> <td>Make</td> <td>L&amp;T</td> <td>L&amp;T</td> <td>L&amp;T</td> </tr> <tr> <td>Serial No.</td> <td>0020006260</td> <td>0020008138</td> <td>0020006261</td> </tr> <tr> <td>Accuracy class</td> <td>0.2s</td> <td>0.2s</td> <td>0.2s</td> </tr> <tr> <td>Date of calibration</td> <td>29-March-2022</td> <td>29-March-2022</td> <td>29-March-2022</td> </tr> <tr> <td>Valid till</td> <td>28-March-2027</td> <td>28-March-2027</td> <td>28-March-2027</td> </tr> </tbody> </table>	Meter Type	Main Meter	Check Meter	Standby Meter	Make	L&T	L&T	L&T	Serial No.	0020006260	0020008138	0020006261	Accuracy class	0.2s	0.2s	0.2s	Date of calibration	29-March-2022	29-March-2022	29-March-2022	Valid till	28-March-2027	28-March-2027	28-March-2027		
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<b>QA/QC procedures to be applied</b>	The meters are 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.																										

	<p>The monthly net 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 are being 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 as the monitoring parameter.</p> <p>The monthly billing is raised based on substation meters.</p>
Purpose of the data	Calculation of baseline emissions
Calculation method	Thus, Net electricity supplied to the grid by the project plant in a given month = Export <sup>9</sup> <sup>10</sup> (MWh)– Import <sup>11</sup> (MWh)
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.

### 4.3 Monitoring Plan

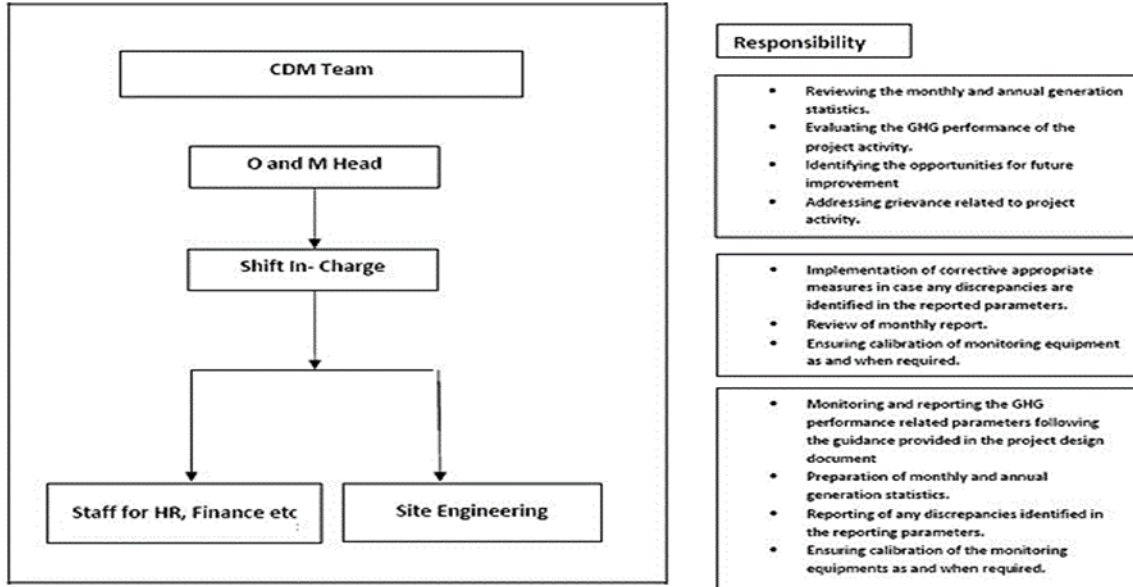
The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected wind energy project being implemented. The monitoring plan, which will be implemented by the project participant describes about the monitoring organization, 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 equipment for this project activity. The team comprises of the following members:

<sup>9</sup> Electricity export value is obtained by adjusting the line loss % according to the formula (given in JMR, page no. 11) i.e. electricity export = meter reading for export - (meter reading for export\*line loss %)

<sup>10</sup> Electricity export value thus obtained adjusting line loss % compared to electricity delivered(export) invoices and smaller value of the two has been considered for ER calculations as per conservative approach

<sup>11</sup> 3% has been added to the import values to adjust T&D losses for the entire monitoring period and the values thus obtained compared with values in invoices(HT bill) and then greater of the two values have been considered for ER calculations



### 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.

### Data collection and archiving

Readings from meters will be collected in the presence of the plant in-charge. Export and Import data would be recorded and stored in logs as well as in electronic form on a daily basis. The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of VCUs for the project activity whichever occurs later.

### Emergency preparedness

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

In the event that the main meter, which is used to record the net electricity exported by the project, is found to be faulty it will be repaired or replaced and the data from the check meter will be used in its place. In the unlikely event that the check meter fails it will also be repaired or replaced.

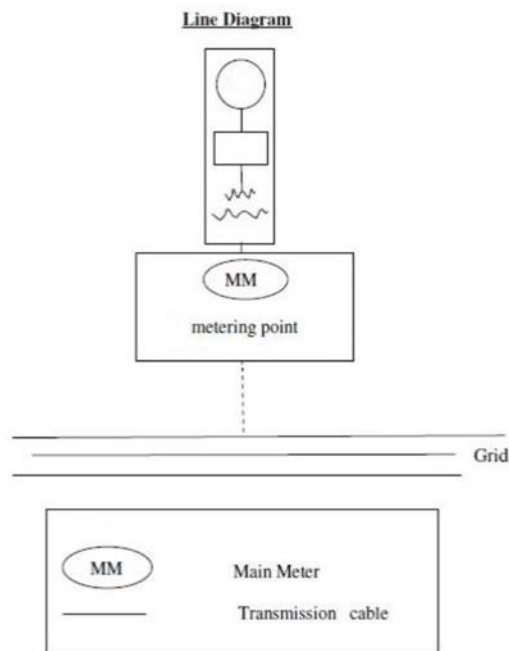
### Personnel training

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.

Also, as described in the diagram above the Site In-charge is responsible for the internal periodic inspection of the project for at least once in a year. Also, corrective action for any non-conformities or discrepancies identified during the audit are to be resolved by the site In-charge.

**Metering Arrangement**

Line diagram with metering arrangement for the wind project activity is shown below



**QA/QC procedures**

The energy meters at the feeders are maintained and owned by state electricity board. Neither the project proponent nor the site personnel have any control over it. The records will be crosschecked with the records of sold electricity to state electricity board. The meters are calibrated by state electricity board at-least once in five years.

**Apportioning**

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

- Apportioning the net electricity exported to grid, as recorded in the consolidated Share Certificate / JMR Report / Credit Notes certified by the respective state DISCOM, based

on the number of days in the monitoring period and the number of days for which Share Certificate / JMR Report / Credit Notes was prepared.

## 5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

### 5.1 Baseline Emissions

As per the approved consolidated Methodology ACM0002 (Version 19.0) para 42:

Baseline emissions include only CO<sub>2</sub> 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:

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

Where:

$BE_y$  = Baseline emissions in year y (t CO<sub>2</sub>/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/year)

$EF_{grid,y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (t CO<sub>2</sub>/MWh)

Total net electricity exported  $EG_{PJ,y} = 177,673.37$  MWh

$EF_{grid, CM, y} = 0.9368$  tCO<sub>2</sub>/MWh

Year-wise calculation of Baseline Emissions

$$\begin{aligned} BE_y &= EG_{PJ,y} \times EF_{grid,y} \\ &= 177,673.37 \text{ MWh} \times 0.9368 \text{ tCO}_2/\text{MWh} \\ &= 166,444 \text{ tCO}_2 \text{ (Round-down value)} \end{aligned}$$

Year	Net Electricity Supplied (MWh)	Baseline Grid Emission Factor (tCO <sub>2</sub> /MWh)	Baseline Emissions(tCO <sub>2</sub> )
01-April-2022 to 30-September-2022	177,673.37	0.9368	166,444

Year	177,673.37		166,444
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Therefore, Baseline Emissions  $BE_y = 166,444$  tCO<sub>2</sub>e (round-down value)

## 5.2 Project Emissions

Not Applicable, since emissions from the project activity is zero as per applied methodology ACM0002 (version 19.0).

Hence, project emissions  $PE_y = 0$  tCO<sub>2</sub>e

## 5.3 Leakage

Not Applicable, since leakage emissions are not to be considered as per the applied methodology ACM0002 (Version 19.0).

Hence leakage  $LE_y = 0$  tCO<sub>2</sub>e.

## 5.4 Net GHG Emission Reductions and Removals

The net emission reductions achieved during the current monitoring period are being calculated as per below equation:

$$\begin{aligned} \text{Net Emission Reductions} &= BE_y - PE_y \\ &= 166,444 - 0 = 166,444 \text{ tCO}_2\text{e (Round down)} \end{aligned}$$

The vintage breakup has been tabulated below.

Year	Baseline emissions or removals (tCO <sub>2</sub> e)	Project emissions or removals (tCO <sub>2</sub> e)	Leakage emissions (tCO <sub>2</sub> e)	Net GHG emission reductions or removals (tCO <sub>2</sub> e)
<b>01-April-2022 to 30-September-2022</b>	166,444	0	0	166,444
<b>Total</b>	166,444	0	0	166,444

It is to be noted here that the estimated emission reduction to be achieved from the project activity for the current monitoring period is 101,523 tCO<sub>2</sub>e, whereas actual emission reductions achieved are 166,444 tCO<sub>2</sub>e, which is 63.9 % higher than the estimated emission reductions which is due to the change in the wind potential and high velocity of wind caused due to the seasonal variation in this monitoring period. The months considered for the monitoring period are April 2022 to September 2022. Also, the beaching value of PLF is

28.25% for a calendar year (365 days) and if the actual PLF for 365 days is greater than 28.25% the project will not qualify to be additional. If we observe the actual PLF for the previous calendar year we can clearly see that there PLF went up to 34.14 % for the period April 2021 to September 2021, but the Actual PLF for the entire calendar year 2021 was 23.16% which is well below the beaching value of PLF. Similarly, for the calendar year 2022, the actual PLF for the months April 2022 to September 2022 38.39 % because as observed for the year 2021 also, this is the high wind flow season. Hence the same is expected to be below the benchmark value of 28.25 % for the 365 days of the calendar year 2022.

The table below describes the justification for the percentage difference between the Ex-ante emissions and the achieved emission reductions for the monitoring period 01-April-2022 to 30-September-2022.

<u>Ex-ante emissions reductions /removals</u>	<u>Achieved emissions reductions /removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
<u>101,523</u>	166,444	63.9%	This is due to the change in the wind potentiel and high velocity of wind caused due to the seasonal variation in this monitoring period.

# APPENDIX 1: CALIBRATION DETAILS

## Calibration Details

Meter Type	Main Meter	Check Meter	Standby Meter
Make	L&T	L&T	L&T
Serial No.	0020006260	0020008138	0020006261
Accuracy class	0.2s	0.2s	0.2s
Date of calibration	29-March-2022	29-March-2022	29-March-2022
Valid till	28-March-2027	28-March-2027	28-March-2027

# APPENDIX 2: BREAK-DOWN DETAILS

Date	Feeder No.	Shutdown or Trip	From	To	Duration (Hours)	Reason
16 April 2022	220 KV	EHV Trip	06:05:00 PM	09:45:00 PM	03:40	Pitch ResolverEncoderDiff3Stop
15 May 2022	220 KV	EHV Trip	06:05:00 PM	10:00:00 PM	03:55	Elec VibControllerErrStop
28 May 2022	220 KV	Internal S/D	06:05:00 PM	11:35:00 PM	05:30	Modification
12 June 2022	220 KV	Internal S/D	06:05:00 PM	11:50:00 PM	05:45	Shut Down Taken By OMS Team
21 June 2022	220 KV	Internal S/D	10:00:00 AM	05:00:00 PM	07:00	Ex Ex Low voltage
15 July 2022	220 KV	EHV Trip	06:05:00 PM	10:00:00 PM	03:55	Elec VibControllerErrStop

04 August 2022	220 KV	Internal S/D	10:00:00 AM	05:00:00 PM	07:00	Ex Ex Low voltage
14 Septemb er 2022	220 KV	Internal S/D	10:00:00 AM	05:00:00 PM	07:00	Low oil level Hydraulic

## APPENDIX 3: WTG LATITUDE AND LONGITUDE DETAILS

Sr no	Location No.	WTG OWNER	Capacity	WTG Co-ordinates (Degree Minutes Seconds)	
				Latitude	Longitude
1	KDR-032	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°47'43.8" N	77°24'08.3" E
2	KDR-033	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°47'30.1" N	77°24'13.0" E
3	KDR-034	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°47'15.7" N	77°24'14.0" E
4	KDR-035	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°47'12.1" N	77°25'07.3" E
5	KDR-036	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°46'53.4" N	77°24'19.4" E
6	KDR-037	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°46'17.0" N	77°24'02.0" E
7	KDR-038	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°46'18.1" N	77°25'35.4" E
8	KDR-039	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°45'15.5" N	77°24'27.4" E
9	KDR-040	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°45'01.1" N	77°24'38.9" E
10	KDR-041	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'36.2" N	77°24'43.2" E
11	KDR-042	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°43'03.6" N	77°25'50.5" E
12	KDR-043	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°42'46.1" N	77°26'01.3" E
13	KDR-044	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°43'33.2" N	77°26'42.0" E
14	KDR-045	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'14.6" N	77°26'40.2" E
15	KDR-046	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'25.1" N	77°26'34.8" E
16	KDR-047	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'36.2" N	77°26'56.4" E

17	KDR-048	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'46.7" N	77°26'40.6" E
18	KDR-049	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'57.5" N	77°26'39.5" E
19	KDR-050	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°45'04.3" N	77°28'02.3" E
20	KDR-051	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°45'15.1" N	77°27'57.6" E
21	KDR-052	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°45'26.84" N	77°27'57.4" E
22	KDRN-001	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°46'12.5" N	77°29'12.1" E
23	KDRN-002	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°43'40.2" N	77°23'17.8" E
24	KDRN-003	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°45'52.9" N	77°29'15.5" E
25	PT -020	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°39'08.3" N	77°23'43.7" E
35	PT-025	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°38'12.6" N	77°24'13.3" E
34	PT-024	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°38'23.6" N	77°24'06.8" E
28	PT -023	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°38'36.1" N	77°24'01.7" E
29	PT-015	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°41'09.2" N	77°23'33.3" E
30	PT-016	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°40'21.4" N	77°22'48.0" E
31	PT-017	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°40'01.3" N	77°23'08.1" E
32	PT-018	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°39'38.8" N	77°23'18.4" E
33	PT-019	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°39'18.0" N	77°23'37.0" E
27	PT -022	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°38'46.8" N	77°23'56.5" E
45	PT-039	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°38'53.5" N	77°24'59.0" E
36	PT-026	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°37'53.6" N	77°23'52.8" E
37	PT-027	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°43'40.2" N	77°23'17.8" E
38	PT-028	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°43'20.9" N	77°23'28.3" E
39	PT-029	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°40'57.1" N	77°23'32.3" E
40	PT-030	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°40'43.4" N	77°23'57.2" E
41	PT-031	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°40'28.2" N	77°23'55.0" E
42	PT-032	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°40'03.7" N	77°24'10.3" E

43	PT-033	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°39'45.6" N	77°24'10.9" E
44	PT-034	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°39'04.5" N	77°24'48.0" E
26	PT -021	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°38'56.6" N	77°23'48.7" E
46	PTN-003	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°40'01.4" N	77°21'57.2" E
47	PTN-004	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'18.6" N	77°23'18.4" E
48	PTN-005	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'37.7" N	77°23'10.9" E
49	PTN-009	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°44'52.5" N	77°23'08.8" E
50	PTN-010	AXIS Wind Farms (Rayalaseema) PVT.Ltd	2.1MW	14°45'03.5" N	77°23'04.2" E