BUNDLED WIND POWER PROJECT BY SEMBCORP GREEN INFRA LIMITED IN INDIA

Project Title	Bundled Wind Power Project by Sembcorp Green Infra Limited in India
Version	03
Report ID	1856
Date of Issue	25-January-2024
Project ID	1856
Monitoring Period	01-August-2022 to 31-August-2023 (Including both the dates)
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The purpose of the project activity is to generate clean electricity by harnessing the renewable wind energy. The project activity involves the installation of 56 Wind Turbine Generators (WTGs) for generating the electricity having aggregated capacity of 95.5 MW. This is a greenfield bundled project activity consists of 3 individual projects promoted by:

Project	Project Promoter	State	COD[1]	Capacity of each WTG	No of WTGs	MW	Total MW
Project 1	Green Infra Wind Energy Limited	Gujarat	02-March-2017	2 MW	4	8	22
			22-March-2017	2 MW	2	4	
			24-March-2017	2 MW	2	4	
			25-March-2017	2 MW	1	2	
			29-March-2017	2 MW	1	2	
			28-June-2017	2 MW	1	2	
Project 2	Green Infra Wind Energy Limited	Gujarat	31-March-2017	2 MW	7	14	24
			30-May-2017	2 MW	3	6	

[1] Commissioning Certificates

			30-June-2017	2 MW	2	4	
Project 3	Green Infra Wind Energy Limited	Andhra Pradesh	30-March-2017	1.5 MW	33	49.5	49.5
				Total	56		95.5 MW

The project activity leads to an estimated emission reduction of 1,910,060 tCO2 for the chosen crediting period of 10 years. The total GHG emission reductions or removals generated in this monitoring period (01-August- 2022 to 31-August-2023) is 205,831 tCO2e.

Audit type	Period	Program	Validation/verification body name	Number of years
Joint Validation & Verification	02-March-2017 to 31-December-2018	VCS	LGAI Technological Center S.A. (Applus+ Certification)	1.21
Verification	01-January-2019 to 31-July-2020	VCS	Earthood Services Pvt Ltd.	1.6
Verification	01-August-2020 to 31-July-2021	VCS	Earthood Services Pvt Ltd.	1
Verification	01-August-2021 to 31-July-2022	VCS	LGAI Technological Center S.A. (Applus+ Certification)	1
Verification	01-August-2022 to 31-August-2023	VCS	LGAI Technological Center S.A. (Applus+ Certification)	1.1

1.2 Sectoral Scope and Project Type

Sectoral scope[2]	:	01 – Energy Industries (renewable-/non-renewable sources)
Project activity type	:	Renewable-/non-renewable sources

Project is neither an AFOLU project nor a grouped project. it consists of 3 independent wind power projects by 2 project developers with combined capacity of 95.5 MW.

1.3 Project Proponent

Organization name	Green Infra Wind Energy Limited
Contact person	Ms. Shivanjali Anubhuti Mishra
Title	Assistant Manager
Address	5th floor, Tower C, Building No. 8, DLF Cybercity, Gurgaon – 122002 Haryana, India
Telephone	-
Email	netzero@sembcorp.com

1.4 Other Entities Involved in the Project

Organization name	Infinite Solutions
Role in the Project	Project Consultant
Contact person	Mr. Jimmy Sah
Title	Head – Sustainability
Address	214-215 Milinda Manor, Opp. Next Treasure Island, 2 RNT Marchg, Indore 452001
Telephone	+91-9644130430
Email	jimmy@infisolutions.org

[2] *Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes*

1.5 Project Start Date

Project start date : 02-March-2017

Justification : This is the day on which the first WTG was commissioned

1.6 Project Crediting Period

The project chooses a renewable crediting period of 10 years. After 10 years, the crediting period will be renewed twice.

Crediting period : 02-March-2017

Crediting End Date : 01-March-2027

1.7 Project Location

The project activity is located in two states of India. The table provided details of location of each project:

Project	Promoter	Capacity (MW)	Location
Project 1	Green Infra Wind Energy Limited	22	Amreli/Rajkot, Gujarat
Project 2	Green Infra Wind Energy Limited	24	Surendra Nagar, Gujarat
Project 3	Green Infra Wind Solutions Limited	49.5	Kumool, Andhra Pradesh

Project 1: The below table provides details of location of individual WTGs (Latitude and Longitude in Degree Minutes Seconds format) of the project

S.No	WTG No	Location	Latitude	Longitude
1	RJ9-T-094	Kalasar Jasdan Rajkot	N21°56'50.532"	E71°16'0.516"
2	RJ9-T-099	Lilapur Jasdan Rajkot	N21°50' 39.84"	E71° 26'37.068"
3	RJ9-T-076	Godladhar Jasdan Rajkot	N22°3'8.928"	E71°19'7.464"
4	RJ9-T-096	Kalasar Jasdan Rajkot	N21°50'53.088"	E71°25'45.732"
5	RJ9-T-078	Godladhar Jasdan Rajkot	N22°6'47.772"	E71°19'7.464"
6	RJ9-T-095	Kalasar Jasdan Rajkot	N21°53'26.7"	E71°11'18.348"
7	RJ9-T-039	Hirana Lathi Amreli	N22°6'58.212"	E71°19'7.32"

8	RJ9-T-013	Miya Khijadiya Babra Amreli	N22°6'33.696"	E71°19'1.524"
9	RJ8-T-073	Sukavada Babra Amreli	N22°6' 6.408"	E71°17' 8.916"
10	RJ9-T-040	Hirana Lathi Amreli	N22°3'17.82"	E71°20'44.196"
11	RJ-9T-075	Ambaradi Jasdan Rajkot	N22°1' 50.232"	E71°22' 26.04"

Project 2: The below table provides details of location of individual WTGs (Latitude and Longitude in Degree Minutes Seconds format) of the project

S.No	WTG No	Location	Latitude	Longitude
1	SDL-T-30	Jepur (Ranipat) Muli Surendranager	N22°42'57.348"	E71°13'19.668"
2	SDL-T-33	Jepur (Ranipat) Muli Surendranager	N22°43'48.468"	E71°13'38.604"
3	SDL-T-38	Jepur (Ranipat) Muli Surendranager	N22°43'52.788"	E71°12'33.624"
4	SDL-T-168	Vadadhra Muli Surendranager	N22°45'16.74"	E71°18'1.332"
5	SDL-T-169	Vadadhra Muli Surendranager	N22°45'25.092"	E71°17'39.552"
6	SDL-T-170	Vadadhra Muli Surendranager	N22°45'43.38"	E71°17'32.496"
7	SDL-T-171	Vadadhra Muli Surendranager	N22°45'53.352"	E71°16'59.304"
8	SDL-T-172	Vadadhra Muli Surendranager	N22°45'4.824"	E71°17'23.244"
9	SDL-T-98	Asundrali Muli Surendranager	N22°40'27.372"	E71°17'32.028"
10	SDL-T-99	Asundrali Muli Surendranager	N22°40'19.488"	E71°17'40.992"
11	SDL-T-95	Palasa Muli Surendranager	N22°37'53.868"	E71°19'55.02"
12	SDL-T-96	Palasa Muli Surendranager	N22°38'7.836"	E71°19'41.232"

Project 3: The below table provides details of location of individual WTGs (Latitude and Longitude in Degree Minutes Seconds format) of the project

S.No	WTG No	Location	Latitude	Longitude
1	GISKK-01	Gundlakonda Pattikonda Kurnool	N15°30'56.484"	E77°37' 1.02"
2	GISKK-02	Gundlakonda Pattikonda Kurnool	N15°31' 4.908"	E77°37' 2.28"
3	GISKK-03	Gundlakonda Pattikonda Kurnool	N15° 31'15.456"	E77°36' 47.952"
4	GISKK-04	Gundlakonda Pattikonda Kurnool	N15°31'39.396"	E77°35' 41.784"
5	GISKK-05	Kunkanuru Pattikonda Kurnool	N15°31'42.996"	E77°36'18.828"
6	GISKK-06	Kunkanuru Pattikonda Kurnool	N15°32' 57.768"	E77°36'7.668"
7	GISKK-07	Jilledubudakala Pattikonda Kurnool	N15°31' 45.732"	E77°37' 38.964"
8	GISKK-08	Gundlakonda Pattikonda Kurnool	N15°31' 51.492"	E77°36'18.072"
9	GISKK-09	Devanakonda Pattikonda Kurnool	N15°31' 51.564"	E77°35' 40.56"
10	GISKK-10	Jilledubudakala Pattikonda Kurnool	N15°32' 8.412"	E77°38' 59.244"
11	GISKK-11	Jilledubudakala Pattikonda Kurnool	N15°32' 41.676"	E77°37' 44.184"
12	GISKK-12	Kunkanuru Pattikonda Kurnool	N15°31' 59.844"	E77°36' 16.38"
13	GISKK-13	Kunkanuru Pattikonda Kurnool	N15°32' 9.528"	E77°36' 10.476"
14	GISKK-14	Jilledubudakala Pattikonda Kurnool	N15°32' 23.172"	E77°38' 53.52"
15	GISKK-15	Jilledubudakala Pattikonda Kurnool	N15°32' 51.144"	E77°37' 43.608"
16	GISKK-16	Jilledubudakala Pattikonda Kurnool	N15°31' 55.128"	E77°37' 37.848"
17	GISKK-17	Kunkanuru Pattikonda Kurnool	N15°32' 19.536"	E77°36' 7.272"
18	GISKK-18	Jilledubudakala Pattikonda Kurnool	N15°32' 33.756"	E77°38' 53.448"
19	GISKK-19	Jilledubudakala Pattikonda Kurnool	N15°32' 6.936"	E77°37'32.592"

20	GISKK-20	Kunkanuru Pattikonda Kurnool	N15° 32' 28.284"	E77°36'5.364"
21	GISKK-21	Jilledubudakala Pattikonda Kurnool	N15°32' 32.856"	E77°37'21.36"
22	GISKK-22	Kunkanuru Pattikonda Kurnool	N15°32' 35.052"	E77°35' 59.964"
23	GISKK-23	Kunkanuru Pattikonda Kurnool	N15°37'35.364"	E77°35' 53.052"
24	GISKK-24	Jilledubudakala Pattikonda Kurnool	N15°32' 24.324"	E77°37' 21.468"
25	GISKK-25	Jilledubudakala Pattikonda Kurnool	N15°33' 21.996"	E77°39'3.636"
26	GISKK-26	Jilledubudakala Pattikonda Kurnool	N15°32' 24.36"	E77°37' 56.28"
27	GISKK-27	Jilledubudakala Pattikonda Kurnool	N15°32' 58.344"	E77°37' 42.816"
28	GISKK-28	Jilledubudakala Pattikonda Kurnool	N15°32' 56.112"	E77°38' 20.58"
29	GISKK-29	Kappatralla Pattikonda Kurnool	N15°34'26.688"	E77°37' 43.032"
30	GISKK-30	Kappatralla Pattikonda Kurnool	N15°34'38.244"	E77°37'37.848"
31	GISKK-31	Jilledubudakala Pattikonda Kurnool	N15°33'37.404"	E77°38'48.012"
32	GISKK-32	Jilledubudakala Pattikonda Kurnool	N15°34' 8.292"	E77°37' 56.064"
33	GISKK-33	Kappatralla Pattikonda Kurnool	N15°34'19.092"	E77°37' 53.688"

1.8 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
ACM002	https://cdm.unfccc.int/methodologies/DB/VJI9AX539D9ML0PXN2AY9UR1N4IYGD	Grid-connected electricity generation from renewable sources	19.0

Tool-01	https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf	Tool for the demonstration and assessment of additionality	07.0.0
Tool-7	https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf	Tool to calculate the emission factor for an electricity system	07.0

1.9 Participation under other GHG Programs

PP has submitted the undertaking confirming that project has not participated in any other binding and/or non-binding GHG program and any national REC scheme to the DOE.

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

Emission Trading Programs and Other Binding Limits: The project proponent is not part of any other emission trading program. PP also does not have any binding GHG emission limits. The net GHG emission reductions from the project will not be used for compliance with emission trading programs or to meet binding limits on GHG emissions. A letter of this effect from the project proponent shall be submitted to the VVB. The project activity has not participated under any other GHG programs. A letter of this effect from the project proponent shall be submitted to the validator during verification.

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.

Following activities has been implemented during the current monitoring period that result in SDG contributions:

For SDG 7: About 217,236 MWh renewable electricity has been supplied to Indian grid during the reported monitoring period i.e., 01-August-2022 to 31-August-2023, that helps to increase the renewable energy share in the energy mix.

For SDG 13: By supplying 217,236 MWh clean electricity to Indian grid, the project avoided release of 205,831 tCO_2e into the atmosphere during the reporting period i.e., 01-August-2022 to 31-August-2023.

For SDG 8: Project proponent ensures safe working environment for all the employees. There have been no fatal and non-fatal occupational injuries during the current monitoring period i.e., 01-August-2022 to 31-August-2023.

Table 1: Sustainable Development Contributions

<table>
<tr><th>Row number</th><th>SDG target</th><th>SDG indicator</th><th>Net impact on SDG indicator</th><th>Current project contributions</th><th>Contributions over project lifetime</th></tr>
<tr><td>1)</td><td>7.2</td><td>7.2.1: Renewable energy share in the total final energy consumption</td><td>Implemented activities to increase</td><td>About 217,236 MWh, renewable electricity has supplied to Indian grid during the current monitoring period that helps to increase the renewable energy share in the energy mix.</td><td>Project has generated about 1,142,694 MWh renewable electricity has supplied to Indian grid from 02-March-2017 to 31-August-2023, that helped to increase the renewable energy share in the energy mix the electricity generated as follows:
<table>
<tr><th>S. No</th><th>Monitoring Period</th><th>Contribution (MWH)</th></tr>
<tr><td>1</td><td>02-March-2017 to 31-December-2018</td><td>223,284</td></tr>
<tr><td>2</td><td>01-January-2019 to 31-July-2020</td><td>310,474.799</td></tr>
<tr><td>3</td><td>01-August-2020 to 31-July-2021</td><td>192,344</td></tr>
<tr><td>4</td><td>01-August-2021 to 31-July-2022</td><td>199,355</td></tr>
</table></td></tr>
</table>

					5 | 01-August-2022 to 31-August-2023 | 217,236
2)	8.6	8.6.1 Proportion of youth (aged 15- 24) not in education, employment or training	Implemented activities to increase	46 peoples are employed for the project and 130 training was provided during the current monitoring period.	Currently 46 peoples are working in the project activity. Total number of trainings provided up to current project activity is 221.

S. No	Monitoring Period	Contribution	
		Job	Number of trainings
1	01-August-2021 to 31-July-2022	3	91
2	01-August-2022 to 31-August-2023	0	130

<table>
<tr>
<td>3)</td>
<td>13.0</td>
<td>Tones of greenhouse gas emissions avoided or removed</td>
<td>Implemented activities to increase</td>
<td>The project avoided release of 205,831 tCO2 into the atmosphere during this current monitoring period.</td>
<td>Prevented the release of 1,092,161 tCO_2 in the atmosphere from 02-March-2017 up to 31-August-2023.
<table>
<tr><th>S. No</th><th>Monitoring Period</th><th>Contribution (tCO_2)</th></tr>
<tr><td>1</td><td>02-March-2017 to 31-December-2018</td><td>221,026</td></tr>
<tr><td>2</td><td>01-January-2019 to 31-July-2020</td><td>294,174</td></tr>
<tr><td>3</td><td>01-August-2020 to 31-July-2021</td><td>182,244</td></tr>
<tr><td>4</td><td>01-August-2021 to 31-July-2022</td><td>188,886</td></tr>
<tr><td>5</td><td>01-August-2022 to 31-August-2023</td><td>205,831</td></tr>
</table>
.</td>
</tr>
</table>

2 SAFEGUARDS

2.1 No Net Harm

There is no net harm from the project activity as the wind project does not have any negative environmental and socio-economic impacts.

Further, as per the prevailing Ministry of Environment and Forest laws, the Schedule 1 of MoEF&CC (Government of India) notification dated 14-September-2006, 38 activities are required to undertake environmental impact assessment studies. Environmental Impact Assessment study is not required for windmill project as there is no negative environmental impact due to the project activity and wind energy is one of the cleanest sources of energy.

2.2 Local Stakeholder Consultation

Local stakeholder consultation has already done during registration of project activity. The stakeholder consultation meeting was conducted during the social survey as a part of the ESIA study. The dates for consulting stakeholders are as follows

Project 1 22 MW	Project 2 24 MW	Project 3 49.5 MW
18-December-2016	20-December-2016	23-December-2016

The consultations were done by identifying the right stakeholders, including, local farmers, villagers, school teachers, government officials, panchayat officials, local NGOs. The purpose of the consultation was to account for the views of the people impacted either directly or indirectly due to the project activity. The objective of the SHC meetings was to inform the stakeholders on the environmental and social impact of the project activity and to discuss their concerns regarding it. Notices were put up in the local panchayats at least a week in advance of the consultations.

Also, as a part of continual improvement process, feedback from the associated stakeholders is vital, therefore a dedicated Visitor register cum grievance register has been placed at the project site which is accessible to stakeholders to provide their feedback on the project. It is appropriate publicly accessible location at which local stakeholders can provide their feedback on the project. This location is also conducive to continuous and regular checks for stakeholder comments. During the current monitoring period, positive feedbacks had been received regarding site operation. No any grievances received during the current monitoring period; therefore, no any mitigation measures were required. During previous monitoring periods also continuous on-going communication with the local stakeholders was done by maintaining on-site grievance register.

There was no negative feedback received during previous monitoring periods, However, grievance register goes nil during this monitoring period.

2.3 AFOLU-Specific Safeguards

As this is wind power project which is a non-AFOLU project. So, this is not applicable to the project activity as for non-AFOLU projects, this section is not required.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity has been successfully commissioned by project promoters and was registered by VCS Board subsequently (Project ID: Ref No 1856).

The project is a bundled Wind Power project, consists of 3 individual projects which involves installation of total 56 numbers of WTGs (11 WTGs x 2MW = 22MW, 12 WTGs X 2MW = 24MW, 33 WTGs X 1.5MW = 49.5MW) aggregated capacity of project is 95.5 MW. The generated electricity is delivered to grid i.e., Sale to Grid.

The detailed specifications of the WTGs are as below:

Project	Project Promoter	Capacity in MW	No of WTGs	Capacity & make
Project 1	Green Infra Wind Energy Limited	22	11	2MW, INOX make (DF100-92 M)[3]
Project 2	Green Infra Wind Energy Limited	24	12	2MW, INOX make (DF113 - 92M)[4]
Project 3	GreenInfra Wind Solutions Limited	49.5	13	1.5 MW each of ReGen make(V87)[5]

As described above Project 1 and Project 2 are promoted by the SPV 'Green Infra Wind Energy Limited" and Project 3 is promoted by the SPV "Green Infra Wind Solutions Limited" of which **"Green Infra Wind Energy Limited"** is the representative of promoters of this bundled project.

[3] https://en.wind-turbine-models.com/turbines/1098-inox-df-100

[4] https://en.wind-turbine-models.com/turbines/1846-inox-df-113

[5] https://www.thewindpower.net/turbine_en_927_regen-powertech_vensys-v87.php

The electricity generated by the project is exported to the Indian electricity grid. The project activity will therefore displacing an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The project activity has been in operation continuously since its commissioning. There have been no emergencies happened to the monitoring system. There are no events or situation that occurred during the monitoring period which may impact the applicability of the methodology. Also, there were no major breakdowns occurred during current monitoring period.

3.2 Deviations

3.2.1 Methodology Deviations

There has been no methodology deviation applied during this monitoring period of the project activity.

3.2.2 Project Description Deviations

Deviation during current monitoring period

No Deviation is sought during this current monitoring period.

Deviation during previous monitoring period:

Deviation 1:

1.Typo Error Correction in Reporting the Make of Energy Meters for project 1.

Reason: The Make of Energy Meters for the project 1 is “EDMI” but inadvertently reported as Secure. Hence, PP is correcting the typo error in reporting the “Make” of Energy meters. Please refer Appendix-1 for details of Energy Meters. The above deviations do not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology. This deviation was approved in monitoring period of 01-January-2019 to 31-Juyl-2020.

Deviation 2:

Data Adjustment in case of monitoring period different from billing period.

As the billing cycle differs from monitoring period, therefore in case the dates of a particular monitoring period do not match with the dates of the billing period, the net electricity exported to the grid would be calculated as follows:

$D = (A/B) \times C$

Where:

A = Difference of number of days which are not matching of billing period and monitoring period.
B = Number of days of the billing period/ month which was not matched with the monitoring period.

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

The calculated value after apportioning would be used for calculation of emission reductions during that period. Based on the above procedure, the Monthly Certificate for Share of Electricity Generated shall be provided to the project participant. This is to be noted that the detail procedure of monitoring is illustrated here for the sake of understanding; for the preparation of monitoring report during periodic verifications, only the net electricity generation value mentioned in monthly wind energy certificates shall be directly used for emission reduction calculation. No other parameters as explained above shall be used and presented in the monitoring report.

3.3 Grouped Projects

The project is not a grouped project hence this section is not applicable.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2/MWh
Description	Operating margin CO_2 emission factor of Indian grid
Source of data	Central Electricity Authority: CO_2 Emission Database
Value applied	CEA CO_2 Baseline database Version 13
Justification of choice of data or description of measurement methods and procedures applied	0.9726 Calculated using "Tool to calculate the emission factor for an electricity system" using data from Central Electricity Authority of India's (CEA) "Baseline Carbon Dioxide Emission Database Version 13".
Purpose of data	Calculation of baseline emissions
Comments	The operating margin emission factor is a 3-year generation weighted average (2014-17). The operating Margin is calculated ex ante and fixed during the crediting period

Data / Parameter	$EF_{grIBOM,y}$
Data unit	tCO_2/MWh
Description	Build margin CO_2 emission factor of Indian grid

Source of data	Central Electricity Authority: CO_2 Emission Database
Value applied	CEA CO_2 Baseline database Version 13
Justification of choice of data or description of measurement methods and procedures applied	0.8723 Calculated using "Tool to calculate the emission factor for an electricity system" using data from Central Electricity Authority of India's (CEA) "Baseline Carbon Dioxide Emission Database Version 13".
Purpose of Data	Calculation of baseline emissions
Comments	The operating margin emission factor is a 3-year generation weighted average (2014-17). The operating Margin is calculated ex ante and fixed during the crediting period

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor of Indian grid.
Source of data	Central Electricity Authority: CO2 Emission Database
Value applied	CEA CO2 Baseline database Version 13
Justification of choice of data or description of measurement methods and procedures applied	0.9475 The data has been considered in accordance to the Tool to calculate emission factor of an electricity system. The tool guides to take 75% weightage of EF_{gridOM} simple, & 25% weightage of $EF_{grid,BM,y.}$
Purpose of data	Calculation of baseline emissions
Comments	The operating margin emission factor is a 3-year generation weighted average (2014-17). The operating Margin is calculated ex ante and fixed during the crediting period

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh/year
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y. Calculated (based on the measured values of electricity exported and imported)
Source of data	Project 1 & Project 2: Monthly "Certificate for Share of Electricity Generated by Wind Farm" issued by GETCO. Project 3: JMR (Joint Meter Reading).
Description of measurement methods	Project 1 & Project 2: Data Type: Measured & Calculated.

and procedures to be applied	Monitoring equipment: a) At WTG yard: Secure make Meters of accuracy class 0.2s. b) At substation: Secure make Meters accuracy class 0.2s. Archiving Policy: Paper & Electronic. The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from Monthly Meter reading reports provided by GETCO/ SLDC as per below equation: Calculation of $EG_{facility,y}$: Net-Electricity = Export – Import The net electricity exported by the project activity is taken directly from the share certificate issued by GETCO on monthly basis. The apportioning procedure is performed by GEDA personnel on monthly basis and the PP has no role in it. Net electricity supplied to the grid by the project activity will be cross checked with invoices raised by PP. Responsibility: a) At WTG yard: The O&M shift-in-charge shall be responsible for the regular recording of data. b) At substation: The representatives of the PP/GETCO/GEDA are responsible for taking monthly joint meter reading at the substation. Project 3: Data Type: Measured & Calculated. Monitoring equipment: Substation: All Secure Make Meters accuracy class 0.2s. Archiving Policy: Paper & Electronic. Net electricity supplied will be calculated based on the difference between calculated values of “export” and “import” and transmission losses on the EB energy meter at the “evacuation point”. (Net Electricity = Export – Import – Transmission loss) The Export and import are referred from JMR. Currently, DISCOM has considered the Transmission Losses while preparing the Joint Meter Reading. Hence same has been considered and deducted from the Export value to arrive at the Net Electricity delivered to the grid. Calibration Frequency: Once in five years
Frequency of monitoring/recording	Continuous monitoring with monthly recording
Value monitored	217,236

<table>
<tr><td>Monitoring equipment</td><td>Energy Meter
<table>
<tr><th>Meter Location</th><th>Meter Number</th><th>Meter Make</th><th>Accuracy class</th></tr>
<tr><td rowspan="2">Project-1</td><td>GJ-3057-A</td><td>EDMI</td><td>0.2s</td></tr>
<tr><td>GJ-3058-A</td><td>EDMI</td><td>0.2s</td></tr>
<tr><td rowspan="2">Project-2</td><td>GJ3819A</td><td>Secure</td><td>0.2s</td></tr>
<tr><td>GJ3820A</td><td>Secure</td><td>0.2s</td></tr>
<tr><td rowspan="2">Project-3</td><td>APX01475</td><td>Secure</td><td>0.2s</td></tr>
<tr><td>APX01476</td><td>Secure</td><td>0.2s</td></tr>
</table></td></tr>
<tr><td>QA/QC procedures to be applied</td><td>Net electricity supplied to the grid by the project activity will be cross checked with invoices raised by PP. The meter(s) shall be calibrated and maintained by the state utility as per their own schedule, and this frequency of meter calibration is not within the control of the Project Proponent.

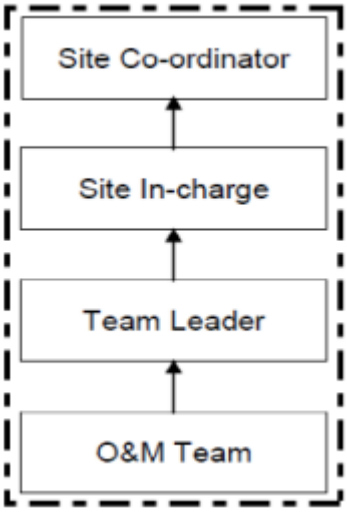
Calibration of electricity meters is carried out in-line with the Nation standard which recommends at least once in 5-year calibration or whenever abnormal difference/inconsistency is observed between main meter and check meter. Meter Details has been provided under Appendix-1 of the MR.</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of Baseline Emissions</td></tr>
<tr><td>Calculation method</td><td>NA</td></tr>
<tr><td>Comments</td><td>NA</td></tr>
</table>

4.3 Monitoring Plan

All the three projects in the bundle have entered into agreement with the WTG Suppliers for the operation and maintenance of WTGs. The WTG supplier has dedicated and technically well-equipped O&M team for day-to-day Operation and maintenance of each WTG. O&M contractor will provide a monthly report, which includes generation data, major breakdown events and machine availability. Project manager is responsible for recording of monthly meter readings of export and import. Monthly power export and import data will be sent regularly to site in charge of each project separately.

Monitoring roles and responsibilities:

The data for the project is compiled by the O&M Contractor and subsequently stored by the PP, the reporting and data flows as per the below mentioned flow chart starting from Site O&M team which monitors day to day operational data and monthly recording. The reporting responsibilities for the project are described as below;



The Site In-charge will be responsible for carrying out internal auditing and QA/QC. All the values from generation record will be checked with JMR and invoices for consistency. In case there are any non-conformances identified. The Site In-charge will investigate the error and revise the record to correct it. In any case where values have slightest of variation in different records the most conservative value will be taken in the project monitoring report.

Personal Training:

The training for operating and maintaining the plant will be provided to the O&M team whenever there would be necessity or any technological up gradation. The trainings provided for O and M are mentioned below:

For Karikonda site-

SR No	Date	Topic
1	12-August-2022	Stop work policy and HSE infraction.
2	12-August-2022	Drop objects & Suspension load safety.
3	13-August-2022	Stop work policy, HSE infraction & Violation.
4	13-August-2022	Covid 19 Precaution.
5	13-August-2022	PPE usage and maintenance.
6	16-August-2022	Covid 19 Precaution drop prevention and handling of hand and power tools.
7	10-September-2022	Chemical handling storage.
8	15-September-2022	Unsafe Act/condition and NM reporting.
9	22-September-2022	Seed balls usage.

10	22-September-2022	Single use plastic awareness.
11	20-October-2022	Snake bite and wild animal attack.
12	25-October-2022	Drive home safety.
13	15-November-2022	Electrical Safety and LOTO training.
14	24-November-2022	Basic Electrical Training.
15	25-November-2022	Basic safety while work on 33 KV & 220 KV EHV line and feeder.
16	25-November-2022	Ladder and climbing safety
17	10-December-2022	Basic safety while work on 33 KV
18	16-December-2022	Work at height
19	21-December-2022	Electrical safety training
20	27-December-2022	Usage of PPE
25	25-January-2023	Road Safety defensive driving
26	24-February-2023	Micro Management under BBS
27	27-February-2023	Code of Conduct
28	09-March-2023	Chemical Handling and Hazard communication.
29	11-March-2023	Lifesaving rules
30	16-March-2023 To 20-March-2023	BBS Training from Batch-1 to Batch-5
31	20-March-2023	Dropped object
32	21-April-2023	Fire Safety awareness and portable fire extinguisher.
33	25-April-2023	Emergency preparedness and response
34	20-May-2023	Usage of PPE and Maintenance
35	23-May-2023	Online permit to work
36	25-May-2023	Heat stroke
37	22-May-2023	Waste Management Training
38	27-May-2023	Environmental Pollution Control

39	05-July-2023	Healthy Heart and Nutrition diet.
40	05-August-2023	Awareness session for Eye conjunctivitis.

For Rojmal Site:

SR No	Date	Topic
1	13-August-2022	PPEs usage Maintenance.
2	16-August-2022	Drop object preventors and handling of hand and power tools.
3	17-August-2022	Inspection, Troubleshooting, maintenance of lightning arrestor.
4	17-August-2022	SOP- procedure for confined space.
5	01-September-2022	SOC radiator replacement.
6	10-September-2022	Chemical handling, storage and spillage
7	15-September-2022	SOP- Requirements for contractor working.
8	15-September-2022	HSE- Communication on used gloves on work.
9	15-September-2022	Mock drill.
10	15-September-2022	Unsafe act/condition & near miss reporting.
11	22-September-2022	Safety committee training.
12	22-October-2022	HSE communication- drive home safely.
13	22-October-2022	Risk assessment & risk control training.
14	22-October-2022	Safety committee meeting.
15	22-October-2022	SOP Electrical safety.
16	22-October-2022	Electrical Panel maintenance.
17	25-October-2022	Mock-drill- snake bite/attack
18	10-November-2022	Procedure for HSE infraction and violation.
19	15-November-2022	Electrical safety and LOTO training.
20	24-November-2022	Basic electrical safety training, electrical shock and rescue of a person due to shock.

21	25-November-2022	Safety committee meeting.
22	25-November-2022	Inspection, troubleshooting & maintenance of battery charger system.
23	10-December-2022	Procedure for HSE infraction and violation
24	10-December-2022	Basic safety while work on 33 KV & 220 KV EHV line.
25	16-December-2022	Work at height
26	19-December-2022	HSE communication
27	24-December-2022	Electrical height safety training.
28	24-December-2022	Rescue drill from nacelle
29	27-December-2022	Oil change in turbine gear box, yaw drive and pitch drive.
30	27-December-2022	Usage of PPE
31	12-January-2023	Approaching WTG throughout highway/site road to wind turbine entrance door.
32	24-January-2023	HSE-Communication: Near miss, First aid Report discussion.
33	24-January-2023	HSE Communication: Coach the driver on vehicle inspection checks.
34	24-January-2023	Observation analysis.
35	24-January-2023	Mock-drill – vehicle incident & Rescue of injured person.
36	24-January-2023	Defensive driving awareness.
37	24-January-2023	Covid 19 awareness
38	16-February-2023	Risk Assessment & Risk Control
39	21-February-2023	Feeder 33 Kv lines and 220 Kv EHV lines inspection trouble shooting maintenance.
40	23-February-2023	Micro-Management under BBS (HSE Campaign).
41	09-March-2023	Chemical handling and hazard communication.
42	10-March-2023	Awareness session on cyber security.
43	16-March-2023	RA-Material storage & Handling at site storage area.

44	16-March-2023	Work instruction for storage and handling at material storage area.
45	16-March-2023, 17-March-2022, 18-March-2023, 22-March-2023, 25-march-2023	BBS training (External).
46	21-March-2023	HSE campaign and drop object.
47	21-March-2023	HSE communication pan India, near-miss and bulletin.
48	25-March-2023	Unconscious person rescue from nacelle.
49	19-April-2023	Inspection troubleshooting maintenance of fire system.
50	19-April-2023	Management procedure for emergency preparedness.
51	19-April-2023	Fire safety awareness and portable fire extinguisher.
52	12-May-2023	RA/SGIL-21-Climbing/Descending, WTG-Manual Climbing through ladder, using club Assist & Accessing up to Nacelle hub.
53	17-May-2023	Heat Stroke and chocking prevention.
54	18-May-2023	Summer Beat the Heat (HSE campaign).
55	18-May-2023	Fire in substation and transformer
56	20-May-2023	PPEs usage and Maintenance awareness
57	23-May-2023	Online PTW training.
58	22-June-2023	Waste Management
59	06-June-2023	World Environment Day (HSE Communication)
60	23-June-2023	Oil Spillage at Work area & Chemical Splash on the Worker Eyes
61	27-June-2023	Environmental Pollution Control (Air water, HW, EW) & Water & Energy Conservation.
62	05-July-2023	Healthy heart and nutritious diet.
63	06-July-2023	First aid & CPR training.
64	07-July-2023	Importance of ear plug& noise induce hearing loss.

65	19-July-2023	Stress Management
66	19-July-2023 To 21-July-2023	Group security standard/frame-work.
67	03 August 2023	Awareness session on Eye conjunctivitis
68	17 August 2023	Insects & Snake Bite & Wild animals attack awareness
69	26 August 2023	Unsafe Act / Condition & Near miss reporting Awareness
70	31 August 2023	Bird Collusion
71	31 August 2023	Catastrophic Turbine Failure & Collapse turbine run away

For Sadla Site:

SR No	Date	Topic
1	05-June-2023	HSE Communication on Environment Day Campaign & Health Campaign
2	05-June-2023	HSE Induction Refreshment Training
3	14-June-2023	HSE Communication on Cyclone & its Preparedness
4	14-June-2023	Mock drill on Oil Spill in the Work Area & Chemical Splash on the Worker Eyes
5	22-June-2023	Waste Management
6	23-June-2023	Environment Pollution Control (Air Water, HW, EW) & Water & Energy Conservation.
7	05-July-23	Talk session on Healthy Heart & Nutritious Diet
8	06-July-23	First Aid & CPR
9	07-July-23	Awareness Session on Importance of Ear Plugs & Noise Induced Hearing Loss (NIHL)
10	11-July-23	Fire Safety Training Awareness (Theoretical & Practical session)
11	12-July-23	Confined Space Entry Permit & Hot work Permit Program
12	19-July-2023 to	Group Security Standard/Framework

	21-July-2023	
13	19-July-23	Training session on Stress Management
14	20-July-23	Training session on IT Awareness
15	26-July-23	Awareness Session on Waste Reduction and 3R (Reduce, Reuse, Recycle)
16	29-July-23	Awareness Session on Group Environmental Standard
17	31-July-23	Excise session on Review of the Chemical/Hazardous Waste Storage Shed
18	11-Jul-23	Fire Drill-Fire in Unit substation Transformer/ICR
19	17-Jul-23	Mock drill on Natural Disaster Severe Storm, Cyclone, Torrential Rain & Flooding Employees Stocked at Site Locations

Emergency preparedness:

In case Main meter or Check meter is found to be outside the acceptable limits of accuracy or faulty or not functioning properly, it will be repaired, recalibrated or replaced as soon as possible. In the event that the Main meter is not in service as a result of maintenance, repairs or testing, the Check meter will be used for readings.

Data recording & archiving: The project proponent shall maintain data both in electronic form and hard copies. The monitored data shall be archived till 2 years after the completion of crediting period.

Monitoring Process at project site

Project 1 & Project 2 (Same Procedure):

•Joint monthly meter reading shall be taken from pooling substation (PSS) meter by representative of GEDA/GETCO and O&M team/service provider (on behalf of individual wind mill owners). Let the total generation recorded for particular month is 'X' units in sub-station meter.

•Joint daily meter reading shall be taken at Local Meter (transformer yard meter of each WTG) by representative of GEDA/GETCO on a monthly basis. Let us assume total approved generation recorded for particular month is 'Y1' units.

•Similarly, joint meter reading for other wind farm owners connected to the sub-station shall also be taken. Let the generation of individual owner recorded for particular month are 'Y2, Y3, ….Yn' units.

•The GEDA/GETCO apportions 'X' to individual wind farm owners using following formula and issues monthly certificates. Net units calculated for billing = (X × Yi) / ΣYn

• For PP, net units calculated for billing = X × Y1 / ΣYn

The net electricity generated by the project owners is being provided by GETCO in the share certificate of electricity generated. The value of the net electricity generated by the project activity has been taken directly by the project proponent from the share certificate provided by GETCO for calculation of emission reductions. The share certificate provides the value of export and import by the project.

Calculation of $EG_{facility,y}$:

Net Electricity = Export – Import

Hence, the net electricity supplied to the grid by the project activity is taken directly from the share certificate issued by GETCO on monthly basis by simply taking export & import. The apportioning g procedure is performed by GEDA personnel on monthly basis and the PP has no role in it. Hence the PP does not have any apportioning data available.

Data Adjustment in case of monitoring period different from billing period.

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

D = (A/B) × C

Where:

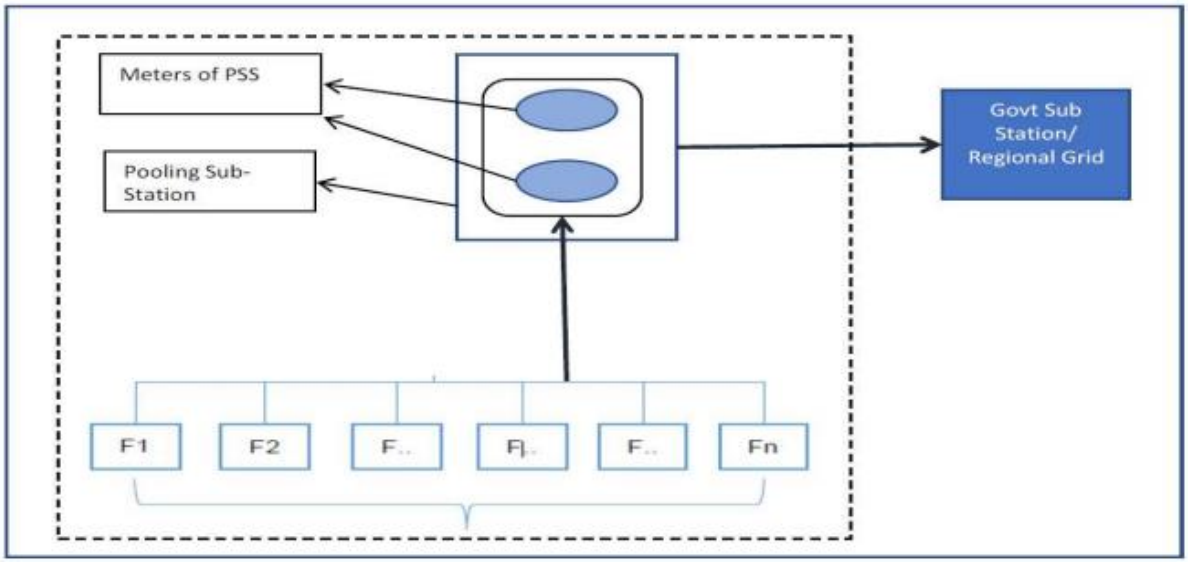
A = Difference of number of days which are not matching of billing period and monitoring period.
B = Number of days of the billing period/ month which was not matched with the monitoring period.

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

The calculated value after apportioning would be used for calculation of emission reductions during that period. Based on the above procedure, the Monthly Certificate for Share of Electricity Generated shall be provided to the project participant. This is to be noted that the detail procedure of monitoring is illustrated here for the sake of understanding; for the preparation of monitoring report during periodic verifications, only the net electricity generation value mentioned in monthly wind energy certificates shall be directly used for emission reduction calculation. No other parameters as explained above shall be used and presented in the monitoring report.

A schematic diagram indicating the metering system is provided below:

Metering



Project 3:

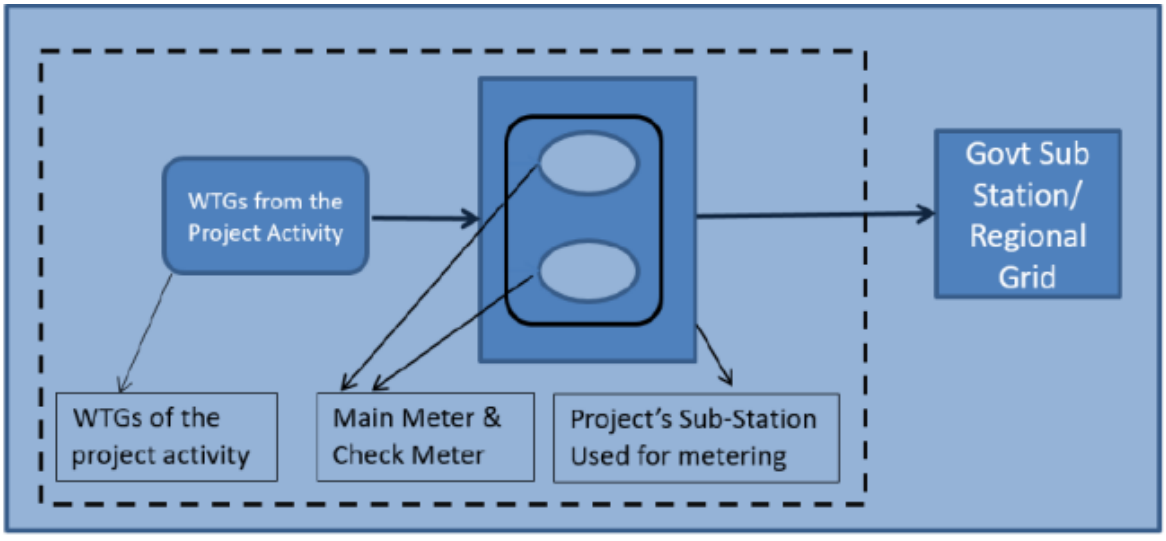
Joint monthly meter reading is taken at the Pooling substation (PSS) meters by representative of DISCOM and O&M team/service provider (on behalf of the project proponent). It must be noted here that the meter readings as mentioned above shall be calculated as the product of meter multiplication factor and the difference of the current and previous meter readings and transmission losses are also deducted to prepare the JMR.

(i. e.Net Electricity = Export – Import -Transmission Losses)

Based on the above procedure, the monthly JMRs shall be provided to the project proponent.

A schematic diagram indicating the metering system is provided below:

Metering System



For all the projects in the bundle this is to be noted that the detail procedure of monitoring is illustrated here for the sake of understanding; for the preparation of subsequent monitoring report during periodic verifications, only the net electricity generation value shall be directly used for emission reduction calculation. No other parameters as explained above shall be used and presented in the monitoring.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

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

$EF_{grid,CM,y}$ is Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO2/MWh) (i.e., 0.9475 tCO2/MWh).
and; $EG_{PJ,y} = EG_{facility,\ y}$
Here, BE_Y = 217,236 MWh × 0.9475 tCO2/MWh
= 205,831 tCO2e (Round down values)

5.2 Project Emissions

The project activity involves in harnessing wind power. So, the emissions from the project are zero as per methodology ACM0002 of version 19.0.

5.3 Leakage

No leakage emissions have been considered and hence the leakage emission is zero as per methodology ACM0002 of version 19.0.

5.4 Net GHG Emission Reductions and Removals

As per the applied methodology, emission reductions are calculated as follows:
$ERy = BE_y - PE_y$
Where, ERy = Emission Reduction in tCO_{2e}/year
BE_y = Baseline emission in tCO_2e/year

PE_y = Project emissions in tCO_2e/year:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)

01-August-2022 to 31-December-2022	59,835	0	0	59,835
01-January-2023 to 31-August-2023	145,996	0	0	145,996
Total	205,831	0	0	205,831

Ex-ante emissions reductions /removals	Achieved emissions reductions /removals	Percent difference	Justification for the difference
207,228	2,05,831	0.679 (lower)	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 207,228 tCO2e for 396 days (for 365 days estimated reduction is 191,006 tCO_{2e}), whereas actual emission reductions achieved are 205,831 tCO2e, which is approximately 0.679% lower than the estimated emission reductions. The lower generation in the current verification period is due to certain natural conditions and hence acceptable.

APPENDIX 1: CALIBRATION DETAILS

Project 1:		
Meter & Calibration Details		
Details	Line 1	Line 2
Meter Number	GJ-3057-A	GJ-3058-A
Make	EDMI	EDMI
Accuracy	0.2s	0.2s
Previous Calibration	22-November-2021	22-November-2021
Validity Date	21-November-2026	21-November-2026

Project 2:		
Meter & Calibration Details		
Details	Line 1	Line 2
Meter Number	GJ3819A	GJ3820A
Make	Secure	Secure
Accuracy	0.2s	0.2s
Previous Calibration	22-April -2022	22-April -2022
Validity Date	21- April -2027	21- April -2027

Project 3:		
Meter & Calibration Details		
Details	Line 1	Line 2
Meter Number	APX01475	APX01476
Make	Secure	Secure
Location	33 kV/220 kV Karidikonda Pooling Substation	33 kV/220 kV Karidikonda Pooling Substation
Accuracy	0.2s	0.2s
Previous Calibration	16-November-2021	16-November-2021
Validity Date	15-November-2026	15-November-2026