

B.7 Application of the monitoring methodology and description of the monitoring plan:
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B.7.1 Data and parameters monitored:

Data / Parameter:	EGy																																																							
Data unit:	MWh (Mega-watt hour)																																																							
Description:	Net electricity supplied to the grid by the Project																																																							
Source of data to be used:	Electricity supplied to the grid as per Joint Meter Readings (Form B) taken at 33 kV metering point for each of the sub project included in the project activity..																																																							
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Annual electricity supplied to the grid by the Project = 30.40 MW (Capacity) x 26.5% (PLF) x 8760 (hours) MWh = 70570.56 MWh																																																							
Description of measurement methods and procedures to be applied:	Monitoring: All the meters are two-way trivector meters capable of recording import and export of electricity and provide output in the form of net electricity supplied to the grid. The procedures for metering and meter reading will be as per the provisions of the power purchase agreement except or otherwise explicitly stated in the monitoring plan. Metering system for the project activity consists of dedicated main and check meters for each of the sub project owner included in the project activity at 33 kV metering location.																																																							
	<p>In addition to this Joint meter readings are also noted at main and check meters (bulk meters) located at the substations. The subprojects included in the project activity are connected to following four substations:</p> <table><tr><th>S. No.</th><th>Name of Customer</th><th>Capacity (MW)</th><th>Enercon Sub-station</th></tr><tr><td>1</td><td>Enercon Wind Farms (Chitradurga) Pvt Ltd</td><td>8.8</td><td>Enercon Sub-station at Imangala</td></tr><tr><td>2</td><td>Steelfab Offshore</td><td>0.8</td><td rowspan="9">GIM-II Sub-station at Gownalli</td></tr><tr><td>3</td><td>Dewanchand Ramsaran</td><td>0.8</td></tr><tr><td>4</td><td>Elpro International</td><td>0.8</td></tr><tr><td>5</td><td>Gautam Ladkat</td><td>0.8</td></tr><tr><td>6</td><td>Sameer Ladkat</td><td>0.8</td></tr><tr><td>7</td><td>Panama Business Centre</td><td>1.6</td></tr><tr><td>8</td><td>Balasaheb Ladkat</td><td>1.6</td></tr><tr><td>9</td><td>Panama Infrastructure</td><td>1.6</td></tr><tr><td>10</td><td>MK Agrotech Private Ltd</td><td>1.6</td></tr><tr><td>11</td><td>Srinivas Sirigeri</td><td>0.8</td><td rowspan="4">EP-II Sub-station at Nandana Hosuru</td></tr><tr><td>12</td><td>Dempo Industries</td><td>0.8</td></tr><tr><td>13</td><td>Power Link Systems Pvt Ltd</td><td>0.8</td></tr><tr><td>14</td><td>Desai Brothers</td><td>0.8</td></tr><tr><td>15</td><td>Siddganga Oil Extraction</td><td>1.6</td><td rowspan="2">Gadag Sub-station at Banikoppa</td></tr><tr><td>16</td><td>Abhilash Garments</td><td>0.8</td></tr></table>	S. No.	Name of Customer	Capacity (MW)	Enercon Sub-station	1	Enercon Wind Farms (Chitradurga) Pvt Ltd	8.8	Enercon Sub-station at Imangala	2	Steelfab Offshore	0.8	GIM-II Sub-station at Gownalli	3	Dewanchand Ramsaran	0.8	4	Elpro International	0.8	5	Gautam Ladkat	0.8	6	Sameer Ladkat	0.8	7	Panama Business Centre	1.6	8	Balasaheb Ladkat	1.6	9	Panama Infrastructure	1.6	10	MK Agrotech Private Ltd	1.6	11	Srinivas Sirigeri	0.8	EP-II Sub-station at Nandana Hosuru	12	Dempo Industries	0.8	13	Power Link Systems Pvt Ltd	0.8	14	Desai Brothers	0.8	15	Siddganga Oil Extraction	1.6	Gadag Sub-station at Banikoppa	16	Abhilash Garments
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	18	Gangadhar Narsingdas Agarwal	4.0	
	<p>The bulk meters are connected to the machines of the project activity and the machines commissioned by the other project developers. Therefore in order to determine the electricity supplied to the grid by the project activity at high voltage side of the substation, the state utility applies the transmission loss between 33 kV metering point and meter reading noted at high voltage side of the receiving substation to the meter reading recorded at the 33 KV metering point. The transmission loss calculated by the state utility is endorsed / confirmed jointly by the representatives of Enercon and the state utility. The transmission loss applied to the project activity by the state utility is reflected in the JMR (Form B) recorded at 33kV metering point.</p> <p>Frequency of recording data: Monthly</p> <p>Recording: The values of electricity supplied to the grid are sourced from JMR for the sub projects at 33 kV metering point.</p> <p>Responsibility: Joint responsibility of Enercon and state utility.</p> <p>Refer Annex – 4 for an illustration of the provisions for measurement methods.</p>			
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by the state utility pursuant to the provisions of the power purchase agreement. Refer Annex – 4 for an illustration of the provisions for QA/QC procedures.			
Any comment:	The data is archived for a period up to 2 years after the finishing of crediting period.			

Data / Parameter:	EGexport
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity Export recorded at meters (main and check meters). All the subprojects included in the project activity have dedicated main and check meters at 33 kV metering point.
Source of data to be used:	Electricity export to the grid as per joint meter reading (FormB) for each of the sub project taken at 33 kV metering point.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This value will be taken from the JMR (Form B) taken at 33kV metering point and will be applied directly.
Description of measurement methods and procedures to be applied:	<p>Monitoring: Electricity export to the grid will be recorded by the meters (main and check meters) at 33kV point. Refer section B.7.2 and Annex – 4 for an illustration of the provisions for measurement methods.</p> <p>Frequency of recording data: Monthly</p> <p>Recording: The values of electricity exports to the grid are sourced from JMR for the sub projects at 33 kV metering point.</p> <p>Responsibility: Joint responsibility of Enercon and state utility</p>
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility and the PP except or otherwise explicitly stated in the PDD. Refer Annex – 4 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data will be archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting

	period.
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Data / Parameter:	EGimport
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity Import recorded at the meters (main and check meters). All the subprojects included in the project activity have dedicated main and check meters at 33 kV metering point.
Source of data to be used:	Electricity import from the grid as per joint meter reading for each of the sub project taken at 33kV metering point.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This value will be taken from the JMR (Form B) taken at 33 kV metering point and will be applied directly.
Description of measurement methods and procedures to be applied:	Monitoring: Electricity import from the grid will be recorded by meters (main and check meters) at 33kV metering point. Refer section B.7.2 and Annex – 4 for an illustration of the provisions for measurement methods. Frequency of recording data: Monthly Recording: The values of electricity import to the grid are sourced from JMR for the sub projects at 33 kV metering point. Responsibility: Joint responsibility of Enercon and state utility
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility and the PP except or otherwise explicitly stated in the PDD. Refer section B.7.2 Annex – 4 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data will be archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period.

Data / Parameter:	T_E
Data unit:	MWh (Mega-Watt hour)
Description:	Transmission loss for export between the metering location at 33 kV metering point and the high voltage side of the substation to which the subproject is connected.
Source of data to be used:	Transmission Loss for export will be sourced from the joint meter reading (Form B) taken at 33kV metering point for all the sub projects included in the project activity.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This value is certified by the State utility in the JMR (Form B). This value will be directly sourced from the JMR (Form B).
Description of measurement methods and procedures to be applied:	Monitoring: Transmission loss between metering location at 33 kV and the metering location at receiving substation is applied to the meter reading taken at meters connected at 33 KV point for the project activity. The Substation is connected to the machines of the project activity and the machines commissioned by the other project owners. Therefore transmission loss is applied by the state utility as reflected in the JMR (Form B) taken at 33kV point for all the sub projects included in the project activity. The JMR is signed by the representatives of Enercon and the state utility. Refer section B.7.2 and Annex – 4 for an illustration of the provisions for measurement methods.

	Frequency of recording data: Monthly Recording: The value of transmission loss is sourced from JMR for all the sub projects at 33 kV metering point. Responsibility: Joint responsibility of Enercon and state utility Refer section B.7.2 and Annex – 4 for an illustration of the provisions for measurement methods.
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility and the PP. Refer section B.7.2 and Annex – 4 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data will be stored in hard format and values will be taken from JMR.

The data will be stored in hard format and soft format by PP (Enercon) at the project site office. Joint meter reading is taken in the presence of the persons representing Enercon [Operation and Maintenance Contractor] and the state utility. The archive will be kept for the period up to two years after the completion of the crediting period.

B.7.2 Description of the monitoring plan:

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Approved monitoring methodology ACM0002 / Version 06 Sectoral Scope: 1, “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”, by CDM - Meth Panel is proposed to be used to monitor the emission reductions.

This approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid, where *ex post* determination of grid emission factor has been chosen

Since the baseline methodology is based on *ex ante* determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required.

There is dedicated main and check meters for each of the sub projects included in the project activity at 33 kV metering point. The feeders of 33 kV metering point are further connected to step up transformer at substation and subsequently to bulk meter at high voltage side of receiving substation. The bulk meters are connected to machines of the project activity and the machines commissioned by the other project developers. The subprojects included in the project activity are connected to following four substations where the bulk meters are located:

S. No.	Name of Customer	Capacity (MW)	Enercon Sub-station	State Utility Sub-station
1	Enercon Wind Farms (Chitradurga) Pvt Ltd	8.8	Enercon Sub-station at Imangala	Aiamangala, 66/11 kV KPTCL sub-station
2	Steelfab Offshore	0.8	GIM-II Sub-station at Gownalli	Hiriyur, 220/66/11 kV KPTCL sub-station
3	Dewanchand Ramsaran	0.8		
4	Elpro International	0.8		
5	Gautam Ladkat	0.8		
6	Sameer Ladkat	0.8		
7	Panama Business Centre	1.6		
8	Balasahab Ladkat	1.6		
9	Panama Infrastructure	1.6		
10	MK Agrotech Private Ltd	1.6		

11	Srinivas Sirigeri	0.8	EP-II Sub-station at Nandana Hosuru	Ramagiri, 66/11 kV KPTCL sub-station
12	Dempo Industries	0.8		
13	Power Link Systems Pvt Ltd	0.8		
14	Desai Brothers	0.8		
15	Siddganga Oil Extraction	1.6	Gadag Sub-station at Banikoppa	Dambal, 110/33/11 kV KPTCL sub-station.
16	Abhilash Garments	0.8		
17	Prasad Global Solution	1.6		
18	Gangadhar Narsingdas Agarwal	40		

Therefore in order to determine the net electricity supplied to the grid by the project at high voltage side of receiving substation, the state utility applies the transmission loss to the meter reading recorded at the 33 KV metering point. The transmission loss calculated by the state utility is endorsed / confirmed jointly by the representatives of Enercon and the state utility. The transmission loss applied to the project activity by the state utility is reflected in the JMR (Form B) for each sub project recorded at 33kV metering point. Net electricity supplied to the grid is calculated by applying transmission loss to the meter readings taken at 33 kV metering location for all the sub projects included in the project activity.

The procedure for calculation of transmission loss as given in the PPA is set-out below:

$$Z = \frac{(X1 + X2 + X3 \dots + Xn) - Y}{(X1 + X2 + X3 \dots + Xn)} \times 100$$

Z = Percentage transmission loss for export incurred in transmission line between the meters located at 33 kV metering point (including the machines of the project activity and other project developers) and the meters located at at high voltage side (bulk meter: main and check) of receiving sub-station.

Summation of meter readings at 33 kV metering points for all the project developers connected to receiving substation (including the machines of the project activity and other project developers)=
 $(X1 + X2 + X3 \dots + Xn)$

X_i = Energy Export Reading (X_i) noted at energy meter installed at 33kV metering point where i vary from 1 to n which represents the meters connected to project activity and other project developers. $X_1, X_2, X_3, \dots, X_n$ are the meters that are installed at 33kV metering point (including the machines of the project activity and other project developers) and further connected to the receiving substation by internally connected lines.

Y = Energy Export Reading at bulk meter installed at high voltage side of transformer of the receiving sub-station

The Export Reading X_i is adjusted for transmission loss that is determined by the state utility and is applied directly to the JMR (Form B) for each sub project included in the project activity taken at 33 kV metering point. This can be checked from the JMR signed jointly by the representatives of Enercon and the state utility.

Transmission Loss in Export (**TE**) = Transmission Loss (Z) * Energy Export at 33kV metering point (EG_{Export})

The transmission loss in export is generally less than 5%. However in case of Energy Import, the state utility conservatively applies adjustment of 15% to the import values noted at 33 kV metering point.

EG_y (Sub project) = EG_{export} – 115%*EG_{import} – Transmission Loss (TE)

The Joint meter reading for each of the sub project noted at 33 KV metering location contains the following data:-

1. Electricity Export (EGexport)
2. Electricity Import (EGimport)
3. Transmission Loss (TE) between 33 kV metering point and high voltage side of receiving substation
4. Net Electricity supplied to the Grid $[EG_{\text{export}} - 115\% * EG_{\text{import}} - TE]$

JMR is signed by the representatives of Enercon and the state utility. The meter readings (both export and import), transmission loss and net electricity supplied to the grid are recorded in the JMR (33 KV metering point). Hence all these values will be reproduced from the JMR for calculation of emission reductions.

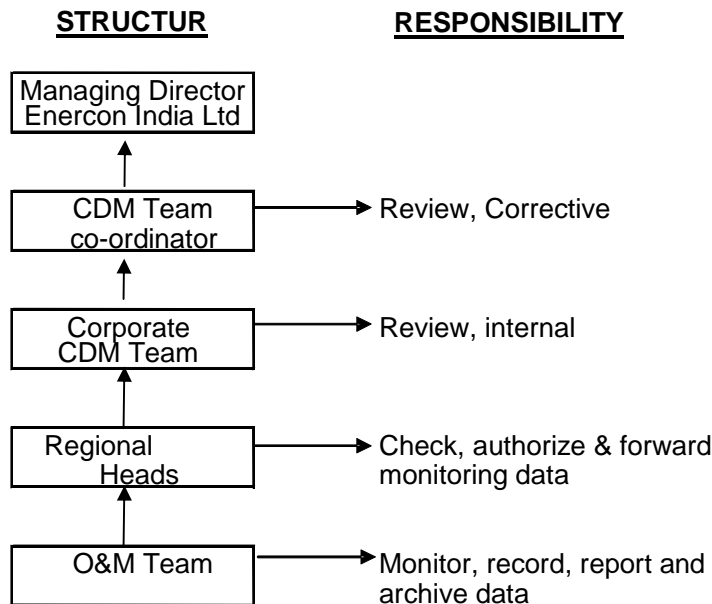
In addition to the JMR (Form B) at 33kV metering location for each of the sub project included in the project activity, the following documents will also be provided to the DoE for verification:

1. JMR (Form B) at high voltage side of receiving sub-station (bulk meters: main and check).
2. Transmission loss calculation endorsed / confirmed jointly by the representatives of Enercon and the state utility.

The net electricity supplied to the grid can be cross checked from the invoices for each of the sub project raised on the state utility for supply of net electricity supplied to the grid.

Net electricity Supplied to Grid for the project activity is summation of Net electricity Supplied to Grid for each of the sub project included in the project activity.

The Project is operated and managed by Enercon (India) Ltd. The operational and management structure implemented by Enercon is as follows:



Training and maintenance:

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the Wind Energy Converters (WECs), it is extremely

essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that Enercon's service staff is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. The Enercon Training Academy provides need-based training to meet the training requirements of Enercon projects. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving.

Annex 4

MONITORING INFORMATION

- **Metering:** Electricity supplied to the grid is metered jointly by state utility and Enercon through dedicated main and check meters at 33 kV metering point for each of the sub project included in the project activity.

In addition to this there are main and check meters (Bulk meters) at high voltage side of receiving sub-station covering sub projects of the project activity and machines of other project developers. There are four receiving stations to which the sub projects included in the project activity are connected. The sub projects and the respective sub stations to which they are connected is provided under section B.7.2.

The schematic diagram shows location of meters for the project activity is attached as Appendix 1.

- **Metering Equipment:** Metering system for the project activity consists of main and check meters at 33kV metering point for each of the sub project included in the project activity and set(s) of main and check meters at high voltage side of receiving substation. all the meters are **two-way trivector meters capable of recording import and export of electricity** The meters installed are capable of recording and storing half hourly readings of the electrical parameters for a minimum period of 35 days with digital output.
- **Meter Readings:** The electricity export and import to the grid is recorded by taking a Joint Meter Reading (JMR) in the presence of Officials from state Utility and Enercon India Limited at 33kV metering point for each of the sub project included in the project activity. The Joint meter reading contains the value of energy imported, exported, transmission loss and the net electricity exported to the grid during the recording period. This Joint meter reading is certified by the Executive engineer of the state utility and by Enercon Officials. These certified readings are then used by the state utility to prepare the tariff invoices. Thus net electricity supplied to the grid for each of the sub project included in the project activity can be crosschecked with the value mentioned in the invoices raised on the state utility by each of the sub project included in the project activity
- **Inspection of Energy Meters:** All the main and check energy meters and all associated instruments, transformers installed at the Project are of 0.2% accuracy class. Each meter is jointly inspected and sealed on behalf of the Parties and is not to be interfered with by either Party except in the presence of the other Party or its accredited representatives.
- **Meter Test Checking:** All the main and check meters are tested (and calibrated if found necessary) for accuracy on annual basis with reference to a portable standard meter. The portable standard meter is owned by KPTCL. The main and check meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. The consumption registered by the main meters alone will hold good for the purpose of metering electricity supplied to the grid as long as the error in the main meters is within the permissible limits. All the meters will be tested / calibrated for accuracy annually.

If during the meter test checking,

- the main meter is found to be within the permissible limit of error and the corresponding check meter is beyond the permissible limits, then the meter reading will be as per the main meter as usual. The check meter shall, however, be calibrated immediately.
- the main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within permissible of error, then the meter reading for the month up to the date and time of such test shall be as per the check meter. There will be a revision in the meter reading for the period from the previous calibration test up to the current test based on the readings of the check meter. The main meter shall be calibrated immediately and meter reading for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.
- both the main meters and the corresponding check meters are found to be beyond the permissible limits of error, both the main meters shall be immediately calibrated and the correction applied to the reading registered by the main meter to arrive the correct reading of energy supplied for metering electricity supplied to the grid for the period from the last month's meter reading up to the current test. Meter reading for the period thereafter till the next monthly reading shall be as per the calibrated main meter.
- If during any of the monthly meter readings, the variation between the main meter and the check meter is more than the permissible limit for meters of 0.2% accuracy class, all the meters shall be re-tested and calibrated immediately.

Appendix 1

