ENERCON
I N D I A

GERMANISCHER LLOYD CERTIFICATION GLC QUALITY MANAGEMENT SYSTEMS ISO 9001 : 2000
MGMT. SYS RvA C 039

APPORTIONING PROCEDURE IMPLEMENTED BY ENERCON AND CERTIFIED BY MSEDCL IS AS FOLLOWS:

STEP 1: MEASURING ELECTRICITY GENERATION FOR EACH WEG

Electricity generation readings of the LCS meters on each WEG are recorded on continuous basis and fed to the central monitoring system. Data on generation for each WEG within the wind farm are accessed and archived electronically in the central monitoring system database.

Electricity generation from the project during a monitoring period connected to feeder 2 ($EG_{f2,gross,\ y}$) and feeder 3 ($EG_{f3,gross,\ y}$) is noted from central monitoring system database by Enercon as:

$$\sum_{y=0}^{N_{f2}} EG_{f2,gross,y}$$

$$\sum_{y=0}^{N_{f3}} EG_{f3,gross,y}$$

Where N_{f2} = *number of WEGs comprising the Project activity connected to the feeder 2*

Where N_{f3} = *number of WEGs comprising the Project activity connected to the feeder 3*

Electricity generation from other WEGs connected to feeder 2 ($EG_{f2,gross,\ y}$) and feeder 3 ($EG_{f3,gross,\ y}$) is noted from central monitoring system database by Enercon as:

$$\sum_{y=0}^{M_{f2}} EG_{f2,gross,x}$$

$$\sum_{y=0}^{M_{f3}} EG_{f3,gross,x}$$

Where M_{f2} = *number of WEGs that are not part of the project activity but are connected to the feeder 2.*

Where M_{f3} = *number of WEGs that are not part of the project activity but are connected to the feeder 3.*

STEP 2: DETERMINING ELECTRICITY EXPORTS FROM THE TURBINES

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2.1 MEASURING AGGREGATE ELECTRICITY EXPORTS FROM THE FEEDER

Aggregate electricity exports, to the grid, from the turbines connected to feeder 2 and feeder 3 is measured through the main and check meters installed at the 33kV side of the Substation. There are one set of main and check meter at each feeder. Joint Meter Reading (JMR) of the main and check meter is carried out on first day of every month in presence of the representatives of the Enercon (the O&M contractor) & the state electricity utility (MSETCL). The JMR gives both the "export" and "import" of the electricity to/ from the grid, which forms the basis on which the utility makes the payment to the project proponent. Electricity export and import for feeder 2 and feeder 3 is denoted as:

Electricity Export from feeder 2: $EG_{f2,JMR,export}$

Electricity Import from feeder 2: $EG_{f2,JMR,import}$

Electricity Export from feeder 3: $EG_{f3,JMR,export}$

Electricity Import from feeder 3: $EG_{f3,JMR,import}$

2.2 DETERMINING ELECTRICITY EXPORTS FROM PROJECT ACTIVITY

Net electricity exported by individual wind turbines is determined by MSEDCL by apportioning electricity export and electricity import to the project and non-project WEGs in proportion to their generated electricity.

This apportioning activity is carried out by Enercon, the O&M contractor. Operation and maintenance personnel from Enercon prepare a monthly report on generation and consumption. This report contains details of power exported/imported to/from the grid by each of the wind turbines connected to the feeder.

$EG_{f2,export}$ the electricity supplied to the grid by the project activity is calculated as follows:

$$EG_{f2,export} = \frac{EG_{f2,JMR,export} \times \sum_{y=0}^{N} EG_{f2,gross,y}}{\left(\sum_{y=0}^{N} EG_{f2,gross,y} + \sum_{y=0}^{M} EG_{f2,gross,y}\right)}$$

$EG_{f3,import}$ the electricity drawn from the grid by the project activity is calculated as follows:

$$EG_{f2,import} = \frac{EG_{f2,JMR,import} \times \sum_{y=0}^{N} EG_{f2,gross,y}}{\left(\sum_{y=0}^{N} EG_{f2,gross,y} + \sum_{y=0}^{M} EG_{f2,gross,y}\right)}$$

$EG_{f2,y}$, the net electricity supplied to the grid by WEGs of the project activity connected to feeder 2, is calculated as follows:

$EG_{f2,y} = EG_{f2,export} - EG_{f2,import}$

Similarly for feeder 3, $EG_{f3,export}$, $EG_{f3,import}$ and $EG_{f3,y}$, is calculated as:

Similarly for feeder 3, $EG_{f3,export}$, $EG_{f3,import}$ and $EG_{f3,y}$, is calculated as:

$EG_{f3,export}$ the electricity supplied to the grid by the project activity is calculated as follows:

$$EG_{f3,export} = \frac{EG_{f3,JMR,export} \times \sum_{y=0}^{N} EG_{f3,gross,y}}{\left(\sum_{y=0}^{N} EG_{f3,gross,y} + \sum_{y=0}^{M} EG_{f3,gross,y}\right)}$$

$EG_{f3,import}$ the electricity drawn from the grid by the project activity is calculated as follows:

$$EG_{f3,import} = \frac{EG_{f3,JMR,\ import} \times \sum_{y=0}^{N} EG_{f3,gross,\ y}}{\left(\sum_{y=0}^{N} EG_{f2,gross,\ y} + \sum_{y=0}^{M} EG_{f3,gross,\ y}\right)}$$

$EG_{f3,}y$, the net electricity supplied to the grid by WEGs of the project activity connected to feeder 3, is calculated as follows:

$EG_{f3,}y = EG_{f3,export} - EG_{f3,import}$

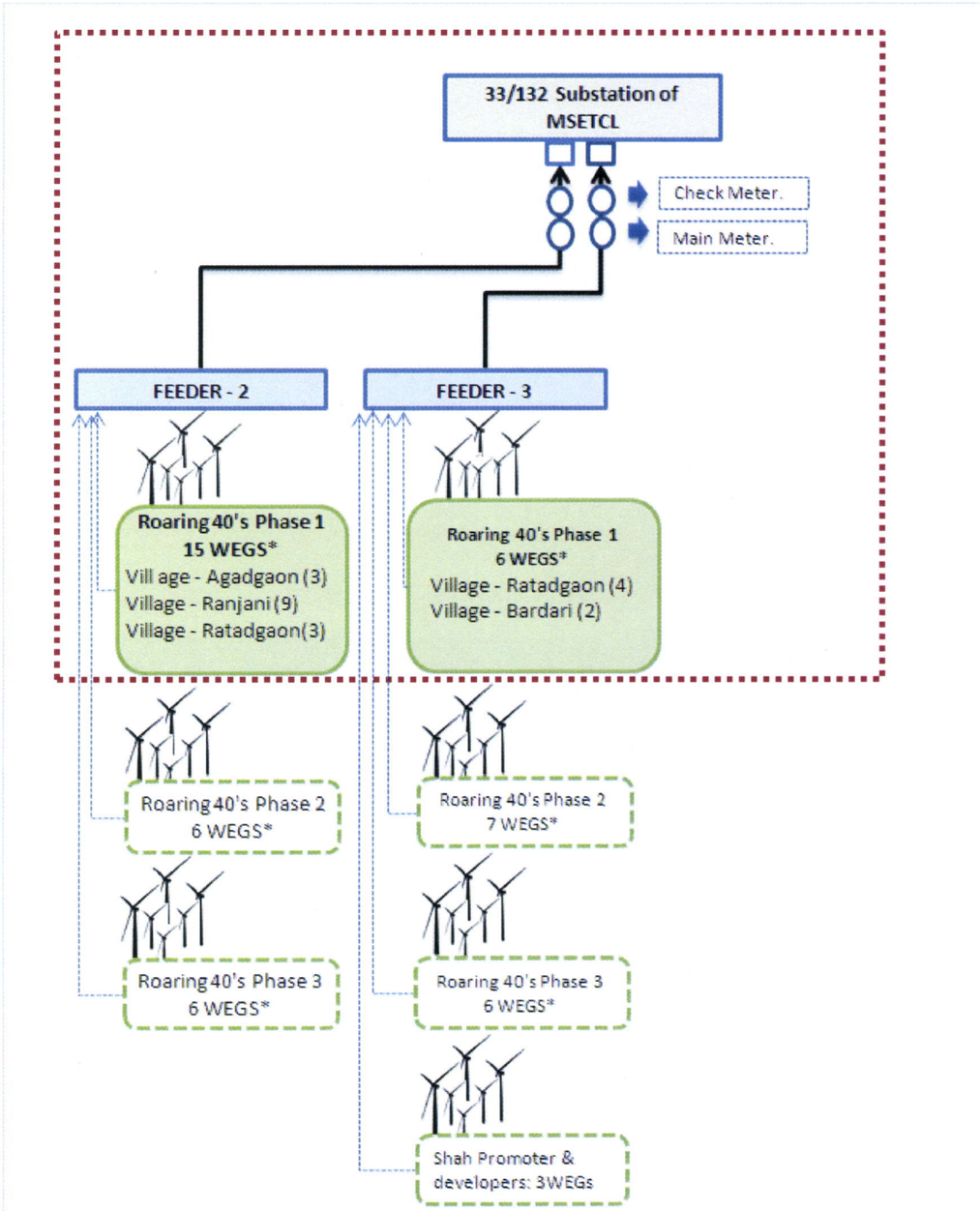
Net electricity exported to the grid by the project activity is calculated as:

$EGy = EG_{f2,}y + EG_{f3,}y$

The meter reading from the LCS of each turbine is noted by the CMS (Central Monitoring Station) directly in the soft format. The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report.

Enercon is an ISO 9001:2000 certified Quality Management system from Germanischer Lloyd. Enercon follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, construction, commissioning and operation of the wind power project. The accuracy of monitoring parameter is ensured by adhering to the calibration and testing procedure. The project will adhere to all the mandatory regulatory and statutory requirements at the state as well as national level. Enercon is Operation and Maintenance contractor for the project activity and provides the daily generation report to the Project proponent. The project proponent also maintains the records of daily generation report and joint meter report.

Layout of the Project Activity



*The Roaring 40s project constitutes of 63 machines which are implemented under three phases and are presented in three PDDs. This PDD is developed for the phase I of the project activity which constitutes 21 machines which are connected to feeder 2 and Feeder 3. The feeder 2 connects 15 machines and Feeder 3 connects 6 machines of the project activity. The villages and the machines of the project activity that are connected to Feeder 2 and Feeder 3 are given in the above diagram. The apportioning procedure for calculating net electricity supplied to the grid will be calculated based upon the procedure as better described under B.7.2.