



**Monitoring report form for CDM project activity**  
(Version 07.0)

**MONITORING REPORT**

|   |   |  |
|---|---|--|
| <b>Title of the project activity</b>  | 21 MW Wind energy farm at Palladam, TamilNadu by HZL  |  |
| <b>UNFCCC reference number of the project activity</b>  | 8198 <sup>1</sup>   |  |
| <b>Version number of the PDD applicable to this monitoring report</b>   | 03.1  |  |
| <b>Version number of this monitoring report</b>   | 01  |  |
| <b>Completion date of this monitoring report</b>  | 29/10/2020  |  |
| <b>Monitoring period number</b>   | 03  |  |
| <b>Duration of this monitoring period</b>   | 09/03/2019 to 30/09/2020 (inclusive of both days)   |  |
| <b>Monitoring report number for this monitoring report</b>  | NA  |  |
| <b>Project participants</b>   | M/s Hindustan Zinc Limited (India)<br>EKI Energy Services Limited (Australia)   |  |
| <b>Host Party</b>   | INDIA   |  |
| <b>Applied methodologies and standardized baselines</b>   | Methodologies: ACM0002 ver. 12.3.0 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources<br>Standard Baselines: Not applicable |  |
| <b>Sectoral scopes</b>  | 1 : Energy industries (renewable - / non-renewable sources)   |  |
| <b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b> | <b>Amount achieved before 1 January 2013</b>  | <b>Amount achieved from 1 January 2013</b> |
|   | 0 tCO <sub>2</sub> e  | 56,207 tCO <sub>2</sub> e                  |
| <b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>    | 66,024 tCO <sub>2</sub> e   |  |

<sup>1</sup> <http://cdm.unfccc.int/Projects/DB/DNV-CUK1352807242.64/view>

## SECTION A. Description of project activity

### A.1. General description of project activity

Hindustan Zinc Ltd. (HZL), a vertically integrated natural resources enterprise, headquartered at Udaipur, Rajasthan having broad operations ranging from exploration, mining, ore processing to smelting of nonferrous metals is the owner and project proponent of the project activity.

#### Purpose of the Project Activity

The project activity primarily aims at reducing Green House Gas (GHG) emissions through utilization of renewable energy technology for generation of electrical energy. The electricity generated from the project site displaces equivalent electricity generation in grid-connected power plants. The project activity reduces the anthropogenic GHG emissions associated with the equivalent amount of electricity generation from the fossil fuel based grid connected power plants.

#### Measures Implemented within the Proposed Project Activity

The cumulative capacity of the project activity is 21 MW comprising of fourteen Suzlon make 1.5 MW Wind Turbine Generators (WTGs) by Hindustan Zinc Limited (HZL) in the state of Tamil Nadu. The electricity generated from the wind farm is exported to regional Grid.

#### Baseline Scenario

The project activity is a Greenfield wind power project, supplying electricity to the fossil fuel dominated Southern Grid of India. In the absence of the project activity equivalent amount of electricity would have been generated in the Southern Grid (now Indian Grid). Since the wind power project is a Greenfield project, there is no difference between the pre-project scenario and the baseline scenario.

The total GHG emission reduction in this monitoring period 9<sup>th</sup> March 2019 to 30<sup>th</sup> September 2020 (inclusive of both dates) is 56,207 tCO<sub>2e</sub>.

No major breakdown was experienced during the said monitoring period apart from the scheduled shutdown for maintenance.

### A.2. Location of project activity

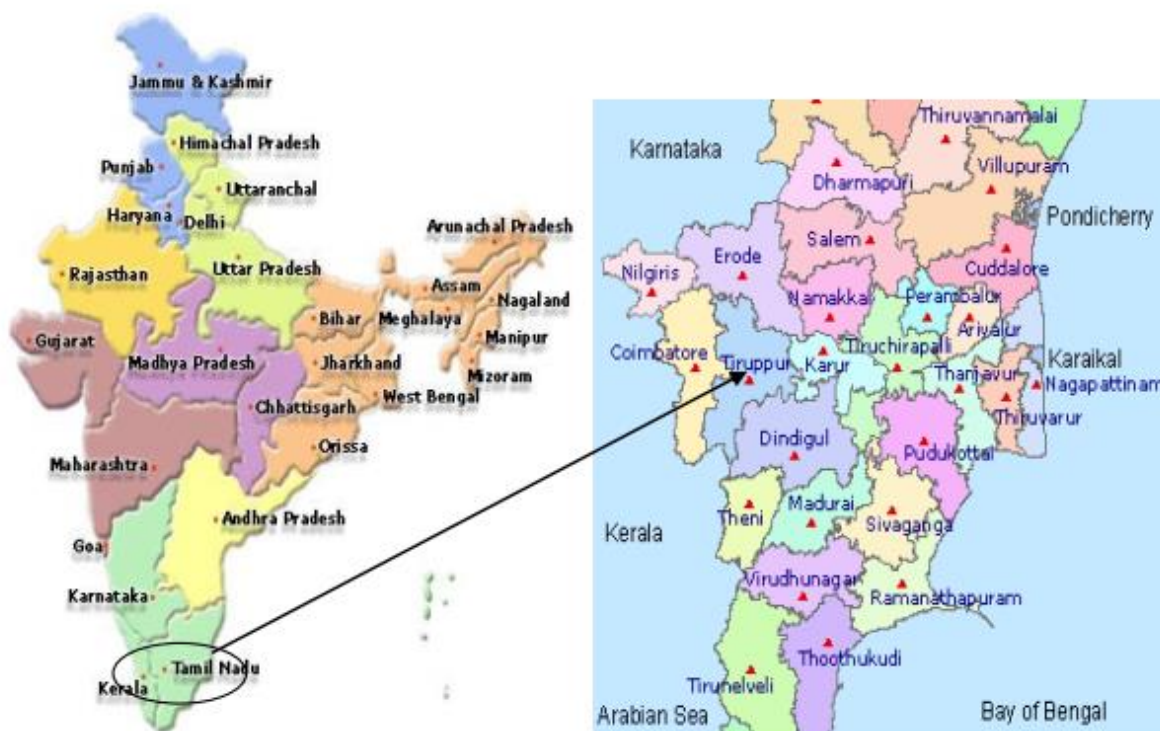
Villages: Suriyanallur, Kurukkapalayam, Nelali, Kozhumankuli, Kundadam, Uthiyur and Nandanvanapalayam  
 District: Tiruppur  
 State: Tamil Nadu  
 Country: INDIA

The project activity consists of Fourteen 1.5 MW wind turbines in the district of Tiruppur in the state of Tamil Nadu, India. The specific geographical coordinates of the individual WTGs are as follows:

| Sr. No. | WTG. No. | Latitude     | Longitude    |
|---------|----------|--------------|--------------|
| 1       | KD176    | N 10 52 02.9 | E 77 27 31.8 |
| 2       | KDE80    | N 10 54 07.8 | E 77 29 11.2 |
| 3       | TAY52    | N 10 56 12.0 | E 77 29 07.2 |
| 4       | TAY54    | N 10 55 34.0 | E 77 28 46.5 |
| 5       | KDE84    | N 10 54 35.0 | E 77 29 27.6 |
| 6       | TAY29    | N 10 52 26.0 | E 77 29 30.2 |
| 7       | Q165     | N 10 51 43.3 | E 77 25 52.6 |
| 8       | Q132     | N 10 52 57.4 | E 77 24 51.9 |
| 9       | Q133     | N 10 52 58.2 | E 77 25 11.3 |

|    |        |              |              |
|----|--------|--------------|--------------|
| 10 | KDE92  | N 10 54 21.7 | E 77 30 22.5 |
| 11 | TAY46  | N 10 55 38.7 | E 77 29 38.1 |
| 12 | TAY48  | N 10 55 38.5 | E 77 29 59.3 |
| 13 | TAY47  | N 10 51 9.5  | E 77 23 57.6 |
| 14 | KD 112 | N 10 55 18.7 | E 77 30 2.1  |

The project activity location is delineated in the maps given below:



### A.3. Parties and project participants

| Parties involved   | Project participants                        | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|--------------------|---|--|
| INDIA (Host Party) | M/s Hindustan Zinc Limited (Private Entity) | No   |
| Australia          | EKI Energy Services Limited                 | No   |

### A.4. Reference to applied methodologies and standardized baselines

**Title of the approved baseline and monitoring methodology:** “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.

**Reference:** ACM0002, Version 12.3.0 (EB 66)<sup>2</sup>

The following tools and guidance’s have been followed (References):

- Tool to calculate the emission factor for an electricity system (Version 02.2.1)<sup>3</sup>

<sup>2</sup> <https://cdm.unfccc.int/UserManagement/FileStorage/4W1SCKX3EMPO6AYGRJUTD7BQ8IVN0H>

<sup>3</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf>

- Tool for the demonstration and assessment of additionality (Version 06.0.0)<sup>4</sup>

#### A.5. Crediting period type and duration

|                                |                       |
|--------------------------------|-----------------------|
| Type of crediting period       | Renewable             |
| Crediting period from          | 01 Dec 13 - 30 Nov 20 |
| Length of the Crediting Period | 7 Years               |

### SECTION B. Implementation of project activity

#### B.1. Description of implemented project activity

The technology employed by the project activity converts kinetic energy in wind to mechanical energy and mechanical energy to electrical energy using wind turbine generators (WTGs). In this process, there are no greenhouse gas emissions or burning of any fossil fuels. The electricity is generated through sustainable means without causing any negative effect to the environment and therefore the technology is environmentally safe and sound.

The technical specifications of the WTGs are as below:

#### WTG (S82, 1.5 MW, 50 Hz) TECHNICAL DATA<sup>5</sup>

Rated capacity : 1500 kW  
 Rotor diameter : 82 m  
 Hub height : 78.5 m

#### Rotor with Pitch Control

Type : Upwind rotor with active pitch control  
 Number of blades : 3  
 Swept area : 5281 m<sup>2</sup>  
 Blade material : The rotor blades are made epoxy bonded fibreglass  
 Rotor speed : 16.30 rpm  
 Tip speed : 70 m/s

#### Generator:

Type : Single fed Induction Generator with slip-rings, variable rotor resistance with SUZLON-FLEXI-SLIP control system.

Hub : Cast spherical hub

Bearings : Spherical roller bearing

Tower : Steel Tubular, 76 m height

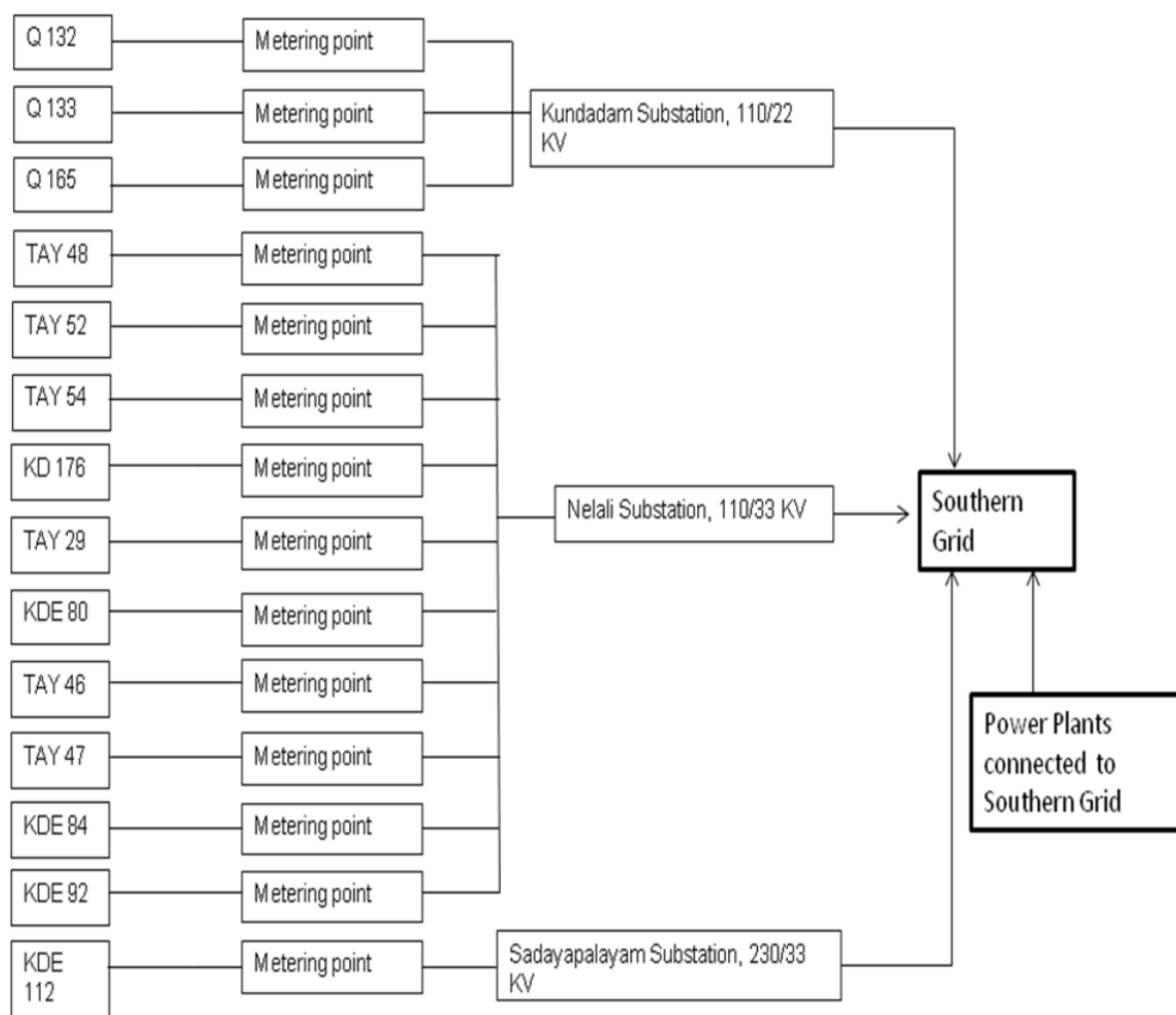
#### Technology Transfer

No technology transfer from other countries is involved in the project.

The schematic diagram of the project activity is as follows: -

<sup>4</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf>

<sup>5</sup> <https://www.suzlon.com/pdf/product/Suzlon-S82-product-brochure.pdf>



The details of the commissioning of the project is as follows:

| Location                          | Date of Commissioning | Load   |
|-----------------------------------|-----------------------|--------|
| U 2176, U 2177, U 2178            | 20/10/2011            | 4.5 MW |
| U 2180                            | 26/12/2011            | 1.5 MW |
| TZA-11,12,13,14,15,16,17,18,19,20 | 10/02/2012            | 15 MW  |

## B.2. Post-registration changes

### B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

No temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines.

### B.2.2. Corrections

Not Applicable

**B.2.3. Changes to the start date of the crediting period**

The new crediting period is 01-Dec 13 - 30 Nov 20 (Renewable) changed from: 01 Dec 12 - 30 Nov 19 as visible on UNFCCC CDM website<sup>6</sup>. As per UNFCCC guidelines, shifting the crediting period by one year can be done by emailing them. Hence, the Project Proponent had sent email to UNFCCC for shifting the crediting period by one year on 12<sup>th</sup> Sep 2018.

**B.2.4. Inclusion of monitoring plan**

Not Applicable

**B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents**

Not Applicable

**B.2.6. Changes to project design**

Not Applicable.

**B.2.7. Changes specific to afforestation or reforestation project activity**

Not applicable.

**SECTION C. Description of monitoring system**

The purpose of the monitoring plan is to define the organizational structure of the monitoring team, monitoring practices, QA and QC procedures and archiving procedures. The monitoring plan ensures that the emission reductions from the project activity are reported accurately and transparently.

**Roles and Responsibilities of the Monitoring Team**

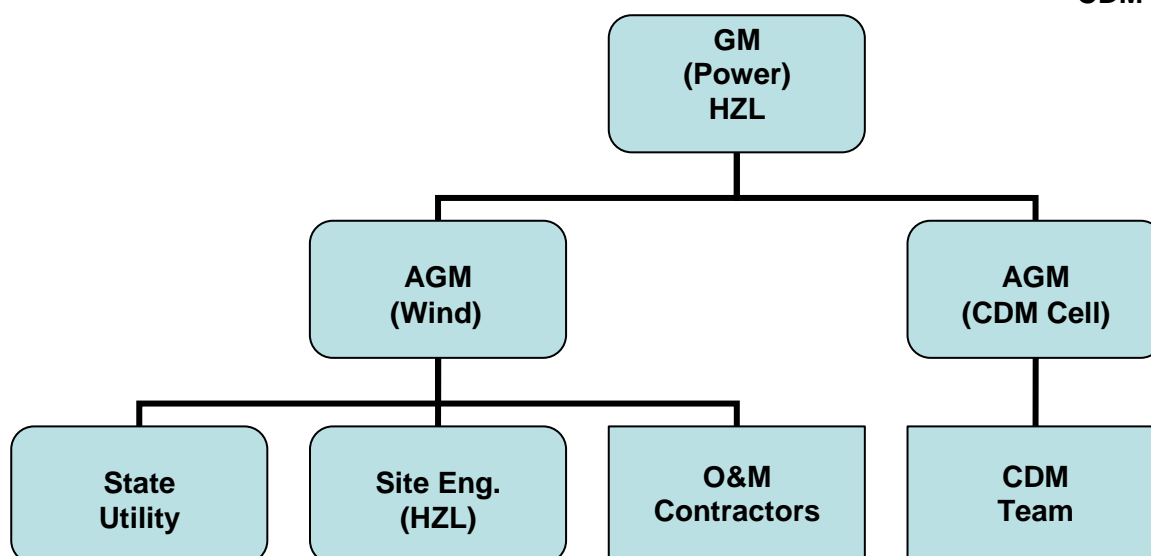
The authority and responsibility of project management as well as registration, monitoring, measurement and reporting lies with HZL. The project proponent has formulated a Monitoring Team to ensure proper and continuous monitoring of the emission reductions as well as performance of turbines and generation of power.

To ensure trouble free operation of all the wind turbines, HZL has entered into a comprehensive Operation and Maintenance agreement with the manufactures of the turbines. The contractor, Suzlon Infrastructure Limited, are responsible for the operation and maintenance of the WTGs. The O&M personnel are qualified engineers and are trained at the WTG manufacturing facility of Suzlon Infrastructure Limited.

The monitoring team interacts with the O&M contractors as well as the State Utility officials for executing the monitoring plan. The structure of the Monitoring Team is as follows:

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<sup>6</sup> <http://cdm.unfccc.int/Projects/DB/DNV-CUK1352807242.64/view>



| Monitoring Team              | Roles & Responsibilities   |
|------------------------------|--|
| General Manager (Power), HZL | <ul style="list-style-type: none"> <li>Communication with CDM EB</li> <li>Communication with state utility</li> </ul>  |
| AGM (CDM Cell), HZL          | <ul style="list-style-type: none"> <li>Overall coordination with monitoring team and DOE for verification activities</li> <li>Maintaining data records, documentation and archiving</li> </ul>                 |
| CDM Team                     | Assisting the General Manager (Wind) with overall coordination and with maintaining data records, documentation, archiving etc.  |
| AGM (Wind) HZL               | Coordinating with Site Engineer, O&M operators, and State Utility  |
| Site Engineer, HZL           | <ul style="list-style-type: none"> <li>Overseeing monitoring, operation and maintenance activities at site</li> <li>Interacting with State Utility and O&amp;M contractors for JMRs and calibration</li> </ul> |
| O&M contractors              | <ul style="list-style-type: none"> <li>Carrying out operation &amp; maintenance of WTGs</li> <li>Carrying out joint meter readings with state utility</li> </ul>   |
| State Utility                | <ul style="list-style-type: none"> <li>Carrying out joint meter readings with representative of project proponent (O&amp;M contractors)</li> <li>Calibration of energy meters</li> </ul>                       |

### Quality control and Quality Assurance procedures:

#### Calibration Procedures:

Energy meters are installed at each WTG for monitoring the energy exported and imported. The energy meters are tested for accuracy at least once in three years with reference to a portable standard meter. The meters is deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. The data registered by the energy meter is adopted for the purpose of emission reduction calculation as long as the error in the main meter is within permissible limits. If the energy meter is found to be beyond the permissible limits of error, TNEB officials shall be notified for rectification or replacement of the meter. The rectified / replaced energy meter would be calibrated.

#### Data collection and archiving

Monthly data is collected and maintained in hard copy (copies of TNEB statements). The project proponent shall keep complete and accurate records of all the data as a part of monitoring for at least a period of 2 years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante

| Data/Parameter  | EF <sub>grid,OM,y</sub>   |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
|---|---|---|--|------------|--------|------------|--------|------------|--------|--|--------|--|--------|--|--------|---|---------------|
| Unit  | tCO <sub>2</sub> /MWh   |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Description   | Operating Margin emission factor for Southern grid  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Source of data  | Referred from CO <sub>2</sub> Baseline Database for the Indian Power Sector prepared by Central Electricity Authority Version 6.0.  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Value(s) applied  | 0.9671  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Choice of data or measurement methods and procedures                  | <p>The operating margin emission factor has been published by CEA in accordance with the 'Tool to calculate the emission factor for an electricity system.' The option of ex ante calculation based on Simple Operating Margin Method have been applied using a three year generation weighted average (2007-08, 2008-09 and 2009-10) as given below:</p> <table border="1"> <thead> <tr> <th colspan="2">Operating Margin Estimation for Southern Grid (tCO<sub>2</sub>/MWh)</th></tr> </thead> <tbody> <tr> <td>OM 2007-08</td><td>0.9909</td></tr> <tr> <td>OM 2008-09</td><td>0.9729</td></tr> <tr> <td>OM 2009-10</td><td>0.9415</td></tr> <tr> <td>Net Electricity Generated (GWh), 2007-08</td><td>114634</td></tr> <tr> <td>Net Electricity Generated (GWh), 2008-09</td><td>121471</td></tr> <tr> <td>Net Electricity Generated (GWh), 2009-10</td><td>134717</td></tr> <tr> <td><b>Average OM (EF<sub>grid, OM,y</sub>)</b></td><td><b>0.9671</b></td></tr> </tbody> </table> | Operating Margin Estimation for Southern Grid (tCO <sub>2</sub> /MWh) |  | OM 2007-08 | 0.9909 | OM 2008-09 | 0.9729 | OM 2009-10 | 0.9415 | Net Electricity Generated (GWh), 2007-08 | 114634 | Net Electricity Generated (GWh), 2008-09 | 121471 | Net Electricity Generated (GWh), 2009-10 | 134717 | <b>Average OM (EF<sub>grid, OM,y</sub>)</b> | <b>0.9671</b> |
| Operating Margin Estimation for Southern Grid (tCO <sub>2</sub> /MWh) |   |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| OM 2007-08  | 0.9909  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| OM 2008-09  | 0.9729  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| OM 2009-10  | 0.9415  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Net Electricity Generated (GWh), 2007-08                              | 114634  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Net Electricity Generated (GWh), 2008-09                              | 121471  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Net Electricity Generated (GWh), 2009-10                              | 134717  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| <b>Average OM (EF<sub>grid, OM,y</sub>)</b>                           | <b>0.9671</b>   |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Purpose of data/parameter   | For the calculation of the Baseline Emission  |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |
| Additional comments   | This value is determined ex-ante and will be fixed for the crediting period   |   |  |            |        |            |        |            |        |  |        |  |        |  |        |   |               |

| Data/Parameter                                       | EF <sub>grid,BM,y</sub>   |
|--|---|
| Unit   | tCO <sub>2</sub> /MWh   |
| Description  | Build Margin emission Factor for Southern grid  |
| Source of data                                       | Referred from CO <sub>2</sub> Baseline Database for the Indian Power Sector prepared by Central Electricity Authority, Version 6.0.   |
| Value(s) applied                                     | 0.7634  |
| Choice of data or measurement methods and procedures | <p>The build margin emission factor has been published by CEA in accordance with the 'Tool to calculate the emission factor for an electricity system.' The build margin is calculated as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. The build margin has been taken corresponding to the year 2009-10, the latest year for which data is available</p> |
| Purpose of data/parameter                            | For the calculation of the Baseline Emission  |
| Additional comments                                  | This value is determined ex-ante and will be fixed for the crediting period   |



| <b>Data/Parameter</b>  | <b><math>EF_{grid,CM,y}/EF_{CO_2,grid,y}</math></b>   |  |  |                                       |        |                                   |        |  |        |
|--|---|--|--|---------------------------------------|--------|-----------------------------------|--------|--|--------|
| Unit   | tCO <sub>2</sub> /MWh   |  |  |                                       |        |                                   |        |  |        |
| Description  | Combined Margin CO <sub>2</sub> emission factor for Southern grid   |  |  |                                       |        |                                   |        |  |        |
| Source of data   | Estimated figure based on 75% of OM and 25% of BM values  |  |  |                                       |        |                                   |        |  |        |
| Value(s) applied   | 0.9161  |  |  |                                       |        |                                   |        |  |        |
| Choice of data or measurement methods and procedures                 | <p>The combined margin emission factor has been determined based on data published by the CEA, applying a 75% weightage for <math>EF_{grid,OM,y}</math> and 25% for <math>EF_{grid,BM,y}</math> in accordance with the 'Tool to calculate the emission factor for an electricity system.'</p> <table border="1"> <thead> <tr> <th colspan="2">Combined Margin Estimation for southern Grid (tCO<sub>2</sub>/MWh)</th></tr> </thead> <tbody> <tr> <td>Operating Margin (<math>EF_{grid,OM,y}</math>)</td><td>0.9671</td></tr> <tr> <td>Build Margin (<math>EF_{grid,BM,y}</math>)</td><td>0.7634</td></tr> <tr> <td>Combined Margin (<math>EF_{CO_2,grid,y}</math>)</td><td>0.9161</td></tr> </tbody> </table> | Combined Margin Estimation for southern Grid (tCO <sub>2</sub> /MWh) |  | Operating Margin ( $EF_{grid,OM,y}$ ) | 0.9671 | Build Margin ( $EF_{grid,BM,y}$ ) | 0.7634 | Combined Margin ( $EF_{CO_2,grid,y}$ ) | 0.9161 |
| Combined Margin Estimation for southern Grid (tCO <sub>2</sub> /MWh) |   |  |  |                                       |        |                                   |        |  |        |
| Operating Margin ( $EF_{grid,OM,y}$ )                                | 0.9671  |  |  |                                       |        |                                   |        |  |        |
| Build Margin ( $EF_{grid,BM,y}$ )                                    | 0.7634  |  |  |                                       |        |                                   |        |  |        |
| Combined Margin ( $EF_{CO_2,grid,y}$ )                               | 0.9161  |  |  |                                       |        |                                   |        |  |        |
| Purpose of data/parameter  | For the calculation of the Baseline Emission  |  |  |                                       |        |                                   |        |  |        |
| Additional comments  | This value is determined ex-ante and will be fixed for the crediting period   |  |  |                                       |        |                                   |        |  |        |

## D.2. Data and parameters monitored

|                                       |   |
|---------------------------------------|---|
| <b>Data/Parameter</b>                 | <b><math>EG_{BL,y} (EG_{y,export} - EG_{y,import})</math></b>   |
| Unit                                  | MWh   |
| Description                           | Net electricity exported to the southern grid by the project  |
| Measured/calculated/default           | Calculated  |
| Source of data                        | Statements issued by TNEB to the project proponent on electricity generation  |
| Value(s) of monitored parameter       | 61,354.81 <sup>7</sup>  |
| Monitoring equipment                  | Energy Meter  |
| Measuring/reading/recording frequency | Monitoring Frequency: Daily<br>Recording Frequency: Monthly   |
| Calculation method (if applicable)    | <p>The Net electricity exported is equal to difference between electricity exported to the grid and electricity imported from the grid.</p> <p><math>EG_{BL,y} = EG_{y,export} - EG_{y,import}</math></p>   |
| QA/QC procedures                      | The values can be cross checked with the invoice raised by the project proponent/ supplier to TNEB for the electricity supplied to the southern grid. However, as per latest practise of Tamil Nadu Generation and Distribution Corporation Ltd., they have considered the Distribution Line Loss for |

<sup>7</sup> As per latest practise of Tamil Nadu Generation and Distribution Corporation Ltd., they have considered the Distribution Line Loss for calculating Net Generation. Hence, this has been considered in calculating the Emission Reduction.

|                           |  |
|---------------------------|--|
|                           | calculating Net Generation. Hence, this has been considered in calculating the Emission Reduction. |
| Purpose of data/parameter | Calculation of Baseline emissions  |
| Additional comments       | The data is kept for two years after the crediting period or from last issuance.                   |

|                                       |  |
|---------------------------------------|--|
| <b>Data/Parameter</b>                 | <b>EG<sub>y,export</sub></b>   |
| Unit                                  | MWh  |
| Description                           | Electricity exported to the state electricity board by the project activity  |
| Measured/calculated/default           | Measured   |
| Source of data                        | Statements issued by TNEB to the project proponent on electricity generation   |
| Value(s) of monitored parameter       | 61,866.54  |
| Monitoring equipment                  | Energy Meter   |
| Measuring/reading/recording frequency | Monitoring Frequency: Daily<br>Recording Frequency: Monthly  |
| Calculation method (if applicable)    | Not Applicable   |
| QA/QC procedures                      | In order to ensure the optimum accuracy levels, the energy meters are being calibrated at least once in three years. |
| Purpose of data/parameter             | Calculation of Baseline emissions  |
| Additional comments                   | The data is kept for two years after the crediting period or from last issuance.                                     |

|                                       |  |
|---------------------------------------|--|
| <b>Data/Parameter</b>                 | <b>EG<sub>y,import</sub></b>   |
| Unit                                  | MWh  |
| Description                           | Electricity imported from the southern grid. This is a monitored parameter   |
| Measured/calculated/default           | Measured   |
| Source of data                        | Statements issued by TNEB to the project proponent on electricity generation   |
| Value(s) of monitored parameter       | 438.93   |
| Monitoring equipment                  | Energy Meter   |
| Measuring/reading/recording frequency | Monitoring Frequency: Daily;<br>Measuring Frequency: Monthly   |
| Calculation method (if applicable)    | Not Applicable   |
| QA/QC procedures                      | In order to ensure the optimum accuracy levels, the energy meters are being calibrated at least once in three years. |
| Purpose of data/parameter             | Calculation of Baseline emissions  |
| Additional comments                   | The data is kept for two years after the crediting period or from last issuance.                                     |

**D.3. Implementation of sampling plan**

Not Applicable.

**SECTION E. Calculation of emission reductions or net anthropogenic removals****E.1. Calculation of baseline emissions or baseline net removals****Emission Reductions**

The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity. The emission reduction  $ER_y$  by the project activity during a given year  $y$  is the difference between baseline emissions ( $BE_y$ ), project emissions ( $PE_y$ ) and emissions due to leakage ( $LE_y$ ), as follows:

$$ER_y = BE_y - PE_y$$

where

|        |   |  |
|--------|---|--|
| $ER_y$ | = | Emission reductions in year $y$ (t CO <sub>2</sub> /y) |
| $BE_y$ | = | Baseline Emissions in year $y$ (t CO <sub>2</sub> /y)  |
| $PE_y$ | = | Project emissions in year $y$ (t CO <sub>2</sub> /y)   |

**Baseline Emissions:**

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where:

|                    |   |  |
|--------------------|---|--|
| $BE_y$             | = | Baseline Emissions in year $y$ (tCO <sub>2</sub> )   |
| $EG_{BL,y}$        | = | Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year $y$ (MWh) |
| $EF_{CO_2,grid,y}$ | = | CO <sub>2</sub> Emission Factor in year $y$ (tCO <sub>2</sub> /MWh)  |

In accordance with the “Tool to calculate the emission factor for an electricity system” Version 02.2.1, combined margin CO<sub>2</sub> emission factor for grid connected power generation is calculated in section B.4 of the registered PDD.

The data used for the calculation of the baseline emission factor was obtained from the baseline calculations published by the CEA, *CO<sub>2</sub> Baseline Database for the Indian Power Sector – Version 6.0*<sup>8</sup> which uses “Tool to calculate the emission factor for an electricity system”. The relevant parts of the calculations are referenced in the methodology. A complete explanation of the assumptions employed by the CEA can be obtained from the *CO<sub>2</sub> Baseline Database for the Indian Power Sector -Version 6.0*.

$$BE_y = 61,354.81 \times 0.9161 = 56,207 \text{ tCO}_2\text{e (Rounded down figure)}$$

**E.2. Calculation of project emissions or actual net removals**

There are no Project emissions from the project activity,  $PE_y = 0$ .

**E.3. Calculation of leakage emissions**

Leakage emission is neglected as per the requirement of the methodology,  $LE_y = 0$

<sup>8</sup> [http://www.cea.nic.in/reports/planning/cdm\\_co2/user\\_guide\\_ver6.pdf](http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver6.pdf)

Hence,  $ER_y = BE_y - PE_y$

where

$ER_y$  = Emission reductions in year y (t CO<sub>2</sub>/y)

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

$PE_y$  = Project emissions in year y (t CO<sub>2</sub>/y)

= 56,207 – 0 = 56,207 tCO<sub>2</sub>e (Rounded down figure)

#### E.4. Calculation of emission reductions or net anthropogenic removals

|              | Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e) | Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e) | Leakage GHG emissions (t CO <sub>2</sub> e) | GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e) |                 |              |
|--------------|---|--|---|---|-----------------|--------------|
|              |   |  |   | Before 01/01/2013   | From 01/01/2013 | Total amount |
| <b>Total</b> | 56,207  | 0  | 0   | 0   | 56,207          | 56,207       |

#### E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

| Amount achieved during this monitoring period (t CO <sub>2</sub> e) | Amount estimated ex ante for this monitoring period in the PDD (t CO <sub>2</sub> e) |
|---|--|
| 56,207  | 66,024   |

##### E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

As per the registered PDD of the project activity, the estimated amount of ex ante emission reduction for a year, that is, for 365 days is 42,131 tCO<sub>2</sub>e. The no. of days in current monitoring period from 09/03/2019 to 30/09/2020 comes out to be 572 days. Hence, by applying unitary method, the estimated amount of emission reductions for the current monitoring period determined ex antes can be calculated as below: -

$$= (42131 * 572) / 365$$

$$= 66,024 \text{ tCO}_2\text{e}$$

The amount of emission reductions estimated ex ante for this monitoring period (09/03/2019 to 30/09/2020) comes out to be 66,024 tCO<sub>2</sub>e.

#### E.6. Remarks on increase in achieved emission reductions

It is to be noted here that as per the registered PDD, the emission reductions during the current monitoring period was estimated to be 66,024 tCO<sub>2</sub>e, whereas actual emission reductions achieved are 56,207 tCO<sub>2</sub>e, which is approximately 14.87 % lower than the estimated emission reductions. The generation of electricity depends upon the wind flow, which is influenced by natural phenomena and not within the control of the project participant.

#### E.7. Remarks on scale of small-scale project activity

Not applicable as this is a large-scale project activity.

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**Document information**

| <i>Version</i> | <i>Date</i>     | <i>Description</i>  |
|----------------|-----------------|---|
| 07.0           | 31 May 2019     | Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period;</li> <li>• Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes;</li> <li>• Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods;</li> <li>• Make editorial improvements.</li> </ul> |
| 06.0           | 7 June 2017     | Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Make editorial improvements.</li> </ul>   |
| 05.1           | 4 May 2015      | Editorial revision to correct version numbering.  |
| 05.0           | 1 April 2015    | Revisions to: <ul style="list-style-type: none"> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to the Host Party;</li> <li>• Remove reference to programme of activities;</li> <li>• Overall editorial improvement.</li> </ul>   |
| 04.0           | 25 June 2014    | Revisions to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;</li> <li>• Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>;</li> <li>• Editorial improvement.</li> </ul>  |
| 03.2           | 5 November 2013 | Editorial revision to correct table in page 1.  |
| 03.1           | 2 January 2013  | Editorial revision to correct table in section E.5.   |
| 03.0           | 3 December 2012 | Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).   |
| 02.0           | 13 March 2012   | Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).  |

| <i>Version</i>  | <i>Date</i> | <i>Description</i>                 |
|---|-------------|------------------------------------|
| 01.0  | 28 May 2010 | EB 54, Annex 34. Initial adoption. |
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