# 5.0 MW SMALL SCALE WIND BASED POWER GENERATION FOR CAPTIVE USE BY BALKRISHNA INDUSTRIES LIMITED (BIL) IN RAJASTHAN, INDIA

Document Prepared by

ECOCAPITA CONSULTING PRIVATE LIMITED

| | |
|---|---|
| Project title | 5.0 MW Small Scale Wind Based Power Generation for Captive Use by Balkrishna Industries Limited (BIL) in Rajasthan, India |
| Project ID | 267 |
| Monitoring period | 01-August-2009 to 27-March-2016 |
| Original date of issue | 15-October-2024 |
| Most recent date of issue | 29-December-2025 |
| Version | 1.0 |
| *VCS Standard* Version | VCS Standard 2007.1 |
| Prepared by | Mr. Sahil Wali<br>Director<br>EcoCapita Consulting Private Limited<br>Contact - +916264902261<br>Email – projects@ecocapita.in |

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# PROJECT DETAILS

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

Balkrishna Industries Limited (BIL) has installed and operates a state electricity grid-connected wind farm in Jaisalmer District, Rajasthan, India. The wind farm consists of four Suzlon Wind Turbine Generators (WTGs) of 1250 kW rated capacity each, for a total capacity of 5.0 MW. The project activity generates electricity by converting the kinetic energy of the wind into mechanical energy that is used to turn a generator. Thus, wind energy is converted to electrical energy. The power generated in the Wind Turbine Generators (WTG) is thereafter evacuated to the electrical grid. The wind project by BIL reduces GHG emissions generated by the current energy mix in India's NEWNE power grid, which is dominated by power generated from other conventional sources such as coal.

The project activity during this monitoring period starting from 01-August-2009 to 27-March-2016 has reduced 37,319 $tCO_2e$, by displacing 41,126 MWh of power which would otherwise have been generated through the operation power from fossil fuel-based electricity generation in the NEWNE grid (now Indian Grid).

## 1.2 Audit History

| Audit type | Period | Program | Validation/verification body name | Number of years |
|---|---|---|---|---|
| Validation/ verification | 18-November-2009 | VCS | Perry Johnson Registrars Carbon Emissions Services | One year |
| Monitoring report 1 | 28-March-2006 to 31-July-2009 | VCS | Perry Johnson Registrars Carbon Emissions Services | 3 years and 4 months |
| Monitoring report 2 | 1-August-2009 to 27-March-2016 | VCS | Tuv Sud South Asia Pvt. Ltd. | 6 years and 7 months |

## 1.3 Sectoral Scope and Project Type

| | |
|---|---|
| Sectoral scope[1] | 01 |
| Project activity type | Energy Industries (Renewable /non-renewable sources) |

| | |
|---|---|
| Sectoral scope | NA |
| AFOLU project category[2] | NA |
| Project activity type | NA |

[1] *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*

[2] *See Appendix 1 of the* VCS Standard

## 1.4 Project Proponent

| | |
|---|---|
| Organization name | Balkrishna Industries Limited (BIL) |
| Contact person | Ashok B Jain |
| Title | Senior General Manager: Legal & Compliance |
| Address | 72 N.M. Joshi Marg 418, creative industrial estate, Mumbai |
| Telephone | +91-22-66663800 |
| Email | abjain@bkt-tires.com |

## 1.5 Other Entities Involved in the Project

| | |
|---|---|
| Organization name | EcoCapita Consulting Private Limited |
| Role in the project | Consultant |
| Contact person | Mr. Sahil Wali |
| Title | Director |
| Address | Ultimate Plaza 2, 24, Mandakini Colony, Kolar Road, Bhopal-462042/, Madhya Pradesh |
| Telephone | +91 6264902261 |
| Email | projects@ecocapita.in |

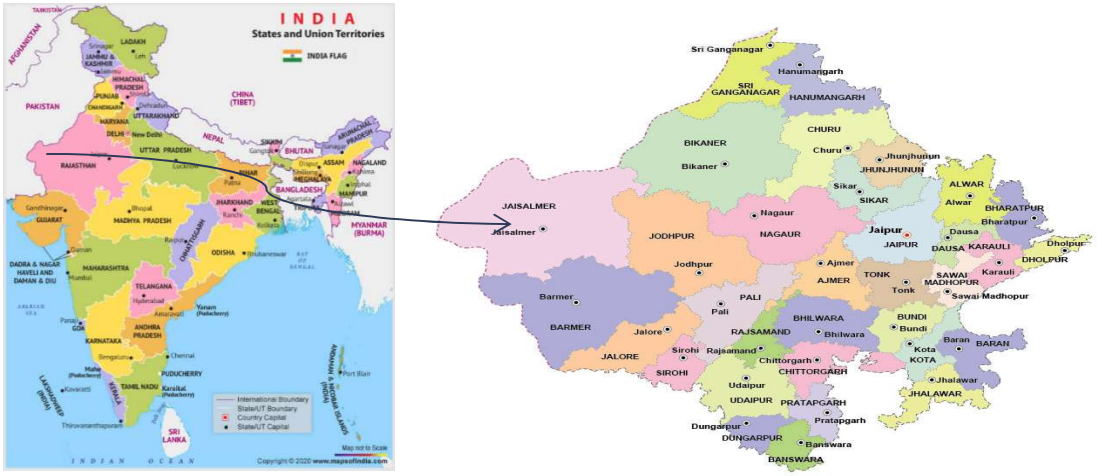
## 1.6 Project Start Date

| | |
|---|---|
| Project start date | 29-December-2004 |
| Justification | Commissioning date of all the WTGs. |

## 1.7 Project Crediting Period

| | |
|---|---|
| Crediting period | 10 years, fixed |
| Start and end date of first or fixed crediting period | 28-March-2006 to 27-March-2016 |

## 1.8 Project Location

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| S.No | WTG | Location | Latitude | Longitude |
|---|---|---|---|---|
| 1 | J-270 | Khasara No. 186/P1; Village: Mada; Tehsil Fatehgarh; Dist Jaisalmer; Rajasthan. | 28⁰39’57.1” N | 70⁰51’45.2” E |
| 2 | J-275 | Khasara No. 186/P1, 188/P2; Village: Mada; Tehsil Fatehgarh; Dist Jaisalmer; Rajasthan. | 26⁰39’48.1” N | 70⁰51’21.9” E |
| 3 | J-276 | Khasara No. 186/P1, 188/P1; Village: Mada; Tehsil Fatehgarh; Dist Jaisalmer; Rajasthan. | 26⁰39’37.9” N | 70⁰51’21.3” E |
| 4 | J-280 | Khasara No. 202/P1; Village: Mada; Tehsil Fatehgarh; Dist Jaisalmer; Rajasthan. | 26⁰39’38.6” N | 70⁰50’59.42” E |

[3] https://www.mapsofindia.com/maps/india/india-political-map.htm

## 1.9 Title and Reference of Methodology

| Type (methodology, tool, or module). | Reference ID, if applicable | Title | Version |
|---|---|---|---|
| [4]**TYPE I - RENEWABLE ENERGY PROJECTS** | AMS-I. D | Grid-connected renewable electricity generation | 13 |

## 1.10 Double Counting and Participation under Other GHG Programs

### 1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

### 1.10.2 Registration in Other GHG Programs

Was the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

## 1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

### 1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading programs and binding emission limits.

☐ Yes ☒ No

### 1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

[4] http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

☐ Yes ☒ No

### 1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

*If yes:*

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

*If yes:*

Has the project proponent(s) or authorized representative posted a public statement on their website saying, "Carbon credits may be issued through the Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities]."

☐ Yes ☒ No

## 1.12 Sustainable Development Contributions

The contribution of the project toward sustainable development are as below:

- Reduction in the consumption of fossil fuels in the grid for generating additional electricity equivalent to that generated by the windmills.
- Reduction of GHG emissions through the development of renewable energy-based technology.
- The project has reduced air pollutants and environmental impact due to an increased share of electricity generation through wind power.
- Since the project uses renewable wind resources for power generation, it does not lead to any emissions in the environment.
- Generation of employment opportunities for the people during the construction phase of the project leading to improvement in living standards of the local population.
- The project has created business opportunities in the nearby area.

The economic well-being of the nation is improved by the project activity due to reduced dependence on fossil fuels in power generation.

**Table 1: Sustainable Development Contributions**

| Row number | SDG target | SDG indicator | Net impact on SDG indicator | Current project contributions | Contributions over project's lifetime |
|---|---|---|---|---|---|
| 1) | 7.2 | 7.2.1 Renewable energy share in the total final energy consumption. | Implemented activities to increase | The project generated **41,126 MWh** of clean electricity using wind energy during this monitoring period. | Considering the average yearly electricity generation of **6,174 MWh/year** for this monitoring period and considering the whole life period (25 years) of this project, the project is capable of generating **6,174 * 25 = 154,350** MWh of clean electricity from wind energy. |
| 2) | 8.5 | By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value. | Implemented activities to increase | The project proponents through their respective O&M contractors improve the capacity of the people by providing on-the-job training to direct and indirect employees involved in the project activity. During this monitoring period, the project activity created employment opportunities for 2 individuals. | Given that this project activity involves four windmills, it has provided jobs to locals in the surrounding areas. |
| 3) | 13.0 | Tonnes of greenhouse gas emissions avoided or removed. | Implemented activities to increase | The project during the monitoring period has prevented the release of **37,319 $tCO_2e$** in the atmosphere. | Taking into account the average annual emission reductions of **5,603 tCO2e/year** for this monitoring period, the project is capable of removing **140,080 tCO2e** GHG from the atmosphere during its 25-year lifespan. |

## 1.13 Commercially Sensitive Information

No Commercially sensitive information has been excluded in the public version of this monitoring period.

# 2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

## 2.1 Stakeholder Engagement and Consultation

### 2.1.1 Stakeholder Identification

| | |
|---|---|
| **Stakeholder Identification** | The stakeholders consist of individuals or groups who may be impacted by the project, falling into various categories including government entities, international agencies, non-governmental organizations, religious aid organizations, and academic institutions.<br>Stakeholders can be defined by three steps approach as follows:<br><br>Step 1: Define Project Scope and Impact- Clearly outline the project's goals and potential effects on various individuals, groups, or organizations.<br><br>Step 2: Identify Internal and External Stakeholders- List both internal team members and external parties who may be impacted by or have an interest in the project. This includes local communities, farmers, businesses, regulatory bodies, and others.<br><br>Step 3: Consolidate Stakeholders: If there are large groups with similar interests (e.g., all rice farmers), consider a representative for the group during consultation. |
| **Legal or customary tenure/access rights** | This is a wind-based renewable energy project so there are no legal or customary tenure/access rights to territories and resources, including collective and conflicting rights, which are held by stakeholders, IPs, LCs, and customary rights holders. |

| | |
|---|---|
| Stakeholder diversity and changes over time | There is no change in the make-up of each group over time because we had equally involved all the stakeholders from the different communities or groups in our project. |
| Expected changes in well-being | From the wind-based renewable energy project there is no change in wellbeing and stakeholders' characteristics under the baseline scenario. |
| Location of stakeholders | The proposed location of stakeholder's consultation at Village: Mada; Tehsil Fatehgarh; Dist. Jaisalmer; Rajasthan, 345001, India. |
| Location of resources | This project is not resource-based so the stakeholders are not receiving any customary access from the project. |

### 2.1.2 Stakeholder Consultation and Ongoing Communication

| | |
|---|---|
| Ongoing consultation | The O&M team regularly conducts CSR programs to support the local community and uses these occasions to engage with stakeholders, gather feedback, and address grievances. A grievance book is also available at the Suzlon office, enabling locals to share their opinions or concerns about the project, ensuring ongoing communication and collaboration. |
| Date(s) of stakeholder consultation | 21-August-2009 |
| Communication of monitored results | The O&M team at Suzlon records all monitoring parameters and communicates these to stakeholders through an annual report published on Suzlon's official website[5]. |
| Consultation records | The O&M team publishes ongoing consultation records, including details of their CSR activities[6], on their official website. |
| Stakeholder input | All stakeholder opinions or comments are carefully reviewed, with resolutions and feedback provided as needed. No comments were received during this monitoring period.. |

[5] https://www.suzlon.com/in-en/investor-relations/financial-reports-presentations

[6] https://suzlonfoundation.org/wp-content/uploads/2019/10/Suzlon-CSR-Annual-Report-2015-16.pdf

### 2.1.3 Free, Prior, and Informed Consent

| | |
|---|---|
| **Consent** | There is no consent present in the project from IPs, LCs, and customary rights holders. There is no conflict present there which could hamper our project. |
| **Outcome of FPIC** | This FPIC process is not involved in the stakeholder consultation so there are no transparent agreement concerns from IPs, LCs, and customary right holders. The project is related to renewable energy which has not been imposed on any local property by the authority so there is less chance of encroaching on land, relocation of villagers, or forced physical and economic displacement. |

### 2.1.4 Grievance Redress Procedure

| Grievances received | Resolution and outcome |
|---|---|
| No grievances were received during the current and previous monitoring periods. | There is no complaint raised by the local people and stakeholders so there is no scope for the resolution. |

### 2.1.5 Public Comments

| Summary of comments received | Actions taken |
|---|---|
| There are no negative comments/complaints raised by the public during the current and previous monitoring period. | No action is required for project design updates. |

## 2.2 Risks to Stakeholders and the Environment

### 2.2.1 Management Experience

Balakrishna Industries Limited (BIL) leads the project with operational management provided by Suzlon, ensuring effective execution and strong community engagement. Suzlon, a global leader in renewable energy solutions, brings unmatched expertise with over 20.9 GW of wind energy installations across 17 countries on six continents. As a market leader with more than 111 wind farms and an installed capacity exceeding 14,950 MW, Suzlon has developed some of Asia's largest onshore wind farms, particularly in Gujarat, Rajasthan, Maharashtra, and Tamil Nadu. Serving both private and public sector power utilities, Suzlon's extensive portfolio highlights its

versatility and commitment to sustainable energy solutions. Beyond its technical achievements, Suzlon's CSR initiatives reflect its dedication to environmental protection, community strengthening, and responsible growth[7].

Suzlon's leadership team further strengthens its role in the project. Founded by the visionary late Tulsi Tanti, Suzlon's legacy of sustainability continues under a seasoned leadership team. CEO JP Chalasani, reappointed in 2023, brings over 40 years of experience in the Indian power sector, while COO Vinod R. Tanti, a founding member with 34 years at Suzlon, contributes deep technical expertise. CFO Himanshu Mody enhances the project's financial strategy with his background in corporate finance, while Head of Manufacturing Gurpratap S. Boparai drives operational excellence. CEO of Global Operations and Maintenance, Sairam Prasad, and board member Bernhard Telgmann each bring extensive experience in infrastructure and engineering. Leading strategic initiatives, CEO of New Business Ishwar Chand Mangal leverages his 28 years with Suzlon to ensure the project's innovative and sustainable direction[8].

Together, BIL and Suzlon's combined expertise, proven operational capabilities, and shared commitment to sustainability position them to meet project goals successfully, without the need for additional external partners or entities.

### 2.2.2 Risk assessment

| | Risk identified | Mitigation or preventative measure(s) taken. |
|---|---|---|
| **Natural and human-induced risks to Stakeholders' wellbeing** | No risk identified | There were no natural or human-induced risks to stakeholders' well-being, as the project experienced no harm from floods, earthquakes, storms, or other harmful activities. |
| **Risks to stakeholder participation** | No risk identified | There was no risk in involving stakeholders in the project site because there was no harm to them and no property loss due to our project implementation. |
| **Working conditions** | No risk identified | The project provides a safe and healthy work environment for the employees and workers.[9] |

[7] SUZLON GROUP PROFILE: https://www.suzlon.com/in-en/about-suzlon/corporate-profile

[8] LEADERSHIP: https://www.suzlon.com/in-en/about-suzlon/board-of-directors

[9] HUMAN RIGHTS POLICY: https://www.suzlon.com/NewPdf/Shareholders_Information/Corporate_Governance_Policies/2022-23/Human_Rights_Policy.pdf

| | | |
|---|---|---|
| Safety of women and girls | No risk identified | The project activities do not harm the women and girls, so there is no risk to their safety. |
| Safety of minority and marginalized groups, including children | No risk identified | There is no anguish present in the project activities so there is no need for risk mitigation measures for minorities, and marginalized groups, including children. |
| Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers) | No risk identified | Waste management is carried out under the guidelines for storage, handling, and disposal of hazardous and non-hazardous wastes. A management plan is in place, emphasizing the 3Rs (Reduce, Reuse, Recycle) and repurposing scrap and packaging materials.[10] |

## 2.3 Respect for Human Rights and Equity

### 2.3.1 Labor and Work

| | Risks identified[11] | Mitigation or preventative measure(s) taken. |
|---|---|---|
| Discrimination | No risk identified | The project is designed to be entirely inclusive, with no form of discrimination. |
| Sexual harassment | No risk identified | Although no incidents of sexual harassment have been reported, anyone experiencing such an issue can file a complaint with the relevant authority, and prompt action will be taken in response according to O&M Policy against |

[10]BUSINESS RESPONSIBILITY & SUSTAINABILITY REPORTING https://www.suzlon.com/NewPdf/Financial_Reports_&_Presentations/2023-24/Business_Responsibility_and_Sustainability_Report.pdf

[11] The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

| | | |
|---|---|---|
| | | Sexual Harassment at the workplace.[12] |
| Gender equity in labor and work | No risk identified | The project offered fair pay and provided gender equality in labour and work. |
| Forced labor | No risk identified | The proposed project is committed to respecting human rights and eliminating forced labour.[13] |
| Child labor | No risk identified | There was no Child labour used during the project and if any such incident occurs there is a Human Rights policy established by O&M for dealing with such situations. |
| Human trafficking | No risk identified | The project has no involvement in human trafficking. |

### 2.3.2 Human Rights

| Risks identified | Mitigation or preventative measure(s) taken. |
|---|---|
| No risk Identified | The project has upheld all human rights, and should any violation occur, strict action will be taken under the O&M Human Rights Policy.[14] |

### 2.3.3 Indigenous Peoples and Cultural Heritage

| Risks identified | Mitigation(s) or preventative measure taken. |
|---|---|
| No risk Identified | The project activity has no adverse impact on indigenous peoples or cultural heritage within the project area. All operations are conducted with respect for local traditions and cultural values. |

[12] Policy against Sexual Harassment at the workplace.: https://www.suzlon.com/NewPdf/Shareholders_Information/Corporate_Governance_Policies/2022-23/Policy_against_Sexual_Harassment_at_Workplace.pdf

[13] HUMAN RIGHTS POLICY: https://www.suzlon.com/NewPdf/Shareholders_Information/Corporate_Governance_Policies/2022-23/Human_Rights_Policy.pdf

[14] HUMAN RIGHTS POLICY: https://www.suzlon.com/NewPdf/Shareholders_Information/Corporate_Governance_Policies/2022-23/Human_Rights_Policy.pdf

### 2.3.4 Property Rights

| Risks identified | Mitigation or preventative measure(s) taken. |
|---|---|
| No risk Identified | The project remains steadfast in its commitment to protecting and preserving the property rights of stakeholders, IPs, LCs, and customary rights holders. |

### 2.3.5 Benefit Sharing

| | |
|---|---|
| **Summary of the benefit sharing plan** | There is no benefit-sharing agreement in the project activity. Hence, this section is not applicable. |
| **Benefit sharing during the monitoring period** | Not applicable. |

## 2.4 Ecosystem Health

| | Risk identified | Mitigation or preventative measure(s) taken during the monitoring period |
|---|---|---|
| **Impacts on biodiversity and ecosystems** | No risk identified | The project is related to renewable energy, which may have an impact on biodiversity. To avoid such situations O&M prioritizes biodiversity protection at the operational sites, implementing initiatives like bird-detecting sensors on wind turbines to prevent collisions and bird guards, diverters, and insulation on powerlines to reduce electrocution risks.[15] |
| **Soil degradation and soil erosion** | No risk identified | This is a renewable energy project so there is no harm or degradation of soil. |
| **Water consumption and stress** | No risk identified | This project develops through careful planning so there is no |

[15] Suzlon Energy Limited Sustainability Report FY23: https://www.suzlon.com/pdf/about/cg/Suzlon-Sustainability-Report-FY23.pdf

| | | |
|---|---|---|
| | | adherence to water consumption and stress. |

### 2.4.1 Rare, Threatened, and Endangered species

| | |
|---|---|
| **Species or habitat** | The project has not adversely impacted habitats for rare, threatened, or endangered species during the monitoring period. |
| **Areas needed for habitat connectivity** | The Project has not adversely impacted areas needed for habitat connectivity during the monitoring period. |

| | Risks identified | Mitigation or preventative measure(s) taken |
|---|---|---|
| **Habitats for rare, threatened, and endangered species** | No risk identified | Not Applicable |
| **Areas for habitat connectivity** | No risk identified | Not Applicable |

### 2.4.2 Introduction of species

Not applicable because this is a renewable energy project.

### 2.4.3 Ecosystem conversion

This section is not applicable because this project is related to renewable energy.

# 3 IMPLEMENTATION STATUS

## 3.1 Implementation Status of the Project Activity

The project commissioning date of the Wind turbines was 29-December-2004 and the start date of the crediting period was 28- March 2006 at Jaisalmer, Rajasthan, India.

The proposed project activity generates electricity by converting the kinetic energy of the wind into mechanical energy that is used to turn a generator. Thus, the wind energy is converted into electrical energy. The power generated in the wind turbine generators (WTG) is thereafter evacuated to the electric grid. The project activity was operational with planned operation and maintenance during the current monitoring period i.e. from 01-August-2009 to 27-March-2016. There were no incidents that occurred during the current monitoring period, which may impact

the applicability of monitoring methodology and GHG emission reduction calculation. The project activity was operated as per the details provided in the registered VCS PD.

## 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

There have been no project description deviations applied during this monitoring period of the project activity.

## 3.3 Grouped Projects

The project is not a grouped project activity.

## 3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

# 4 DATA AND PARAMETERS

## 4.1 Data and Parameters Available at Validation

| Data / Parameter | $EF_{Grid,BMy}$ |
|---|---|
| Data unit | $tCO_2e/MWh$ |
| Description | Build Margin Emission Factor of NEWNE Grid |
| Source of data | Applicable version of "User's Guide - $CO_2$ Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The User's Guide $CO_2$ Baseline Database for Indian Power Sector" Ver 4 is available at https://cea.nic.in/cdm-co2-baseline-database/?lang=en |
| Value applied | 0.60 $tCO_2/MWh$ |
| Justification of choice of data or description of measurement methods and procedures applied | Central Electricity Authority, the National Authority on electrical systems in India has calculated the emission factors using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1 and published their result in the User's Guide of '$CO_2$ Baseline Database for The Indian Power Sector' |
| Purpose of data | Calculation of baseline emissions |

| | |
|---|---|
| Comments | The ex-ante Build Margin Emission Factor, i.e. Option 1 as given on Pg 13 of Tool to calculate the emission factor for an electricity system, version 01.1, has been considered for calculating the emission factor of the grid. This value will remain constant throughout the crediting period. |

| | |
|---|---|
| Data / Parameter | $EF_{Grid,OMy}$ |
| Data unit | $tCO_2e/MWh$ |
| Description | Operating Margin Emission Factor of NEWNE Grid |
| Source of data | Applicable version of "User's Guide - $CO_2$ Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The User's Guide $CO_2$ Baseline Database for Indian Power Sector" Ver 4 is available at https://cea.nic.in/cdm-co2-baseline-database/?lang=en |
| Value applied | 1.01 $tCO_2/MWh$ |
| Justification of choice of data or description of measurement methods and procedures applied | Central Electricity Authority, the National Authority on electrical systems in India has calculated the emission factors using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1 and publishes their result in the User's Guide of '$CO_2$ Baseline Database for The Indian Power Sector' |
| Purpose of data | Calculation of baseline emissions |
| Comments | The ex-ante option for Simple Operating Margin as given in Pg 4 of Tool to calculate the emission factor for an electricity system Version 01.1, has been chosen for calculating the emission factor of the grid. The calculation is provided in Section 3.2 of the registered VCS-PD. This value will remain constant throughout |

| | |
|---|---|
| Data / Parameter | $W_{BM}$ |
| Data unit | Percentage |
| Description | The weighting of the Build Margin emission factor for wind power generation project activities |
| Source of data | 'Tool to calculate the emission factor for an electricity system' Ver 01.1 |
| Value applied | 25% |
| Justification of choice of data or description of measurement methods and procedures applied | A weighting factor to be used as per the guidelines of UNFCCC |
| Purpose of data | Calculation of baseline emissions |
| Comments | This value will remain constant throughout the entire crediting period. |

| | |
|---|---|
| Data / Parameter | $W_{OM}$ |

| | |
|---|---|
| Data unit | Percentage |
| Description | Weighting of Operating Margin emission factor for wind power generation project activities |
| Source of data | 'Tool to calculate the emission factor for an electricity system' Ver 01.1 |
| Value applied | 75% |
| Justification of choice of data or description of measurement methods and procedures applied | A weighting factor to be used as per the guidelines of UNFCCC |
| Purpose of data | Calculation of baseline emissions |
| Comments | This value will remain constant throughout the entire crediting period. |

| | |
|---|---|
| Data / Parameter | $EF_{CM}$ |
| Data unit | $tCO_2e/MWh$ |
| Description | Combined Margin emission factor of NEWNE |
| Source of data | 'Tool to calculate the emission factor for an electricity system' Ver 01.1 |
| Value applied | 0.9075 |
| Justification of choice of data or description of measurement methods and procedures applied | Calculated using data provided by CEA for all the regional grids in India and Tool to calculate the emission factor for an electricity system Ver 01.1.<br>Formula = $EF_{Grid,OMy} \times W_{OM} + EF_{Grid,BMy} \times W_{BM}$ |
| Purpose of data | Calculation of baseline emissions |
| Comments | This value will remain constant throughout the entire crediting period. |

## 4.2 Data and Parameters Monitored

| | |
|---|---|
| Data / Parameter | $EG_y$ |
| Data unit | MWh |
| Description | Net annual electricity supplied to the grid by the project. |
| Source of data | The monthly report "Break-up of net exports units (kWh) as recorded at the main meter of RVPNL" |
| Description of measurement methods and procedures to be applied | Net electricity supplied to the NEWNE grid will be calculated based on the difference between measured values of "export" and "import" on the RVPNL meter. The procedure for the metering and meter reading will be as per the provisions followed by the RVPNL. The joint reading is taken by the representative of the project proponent or the operation & maintenance contractor employed by the project proponent on one |

<table>
<tr><td></td><td>hand and RVPNL officials on the other. Based on these readings, the annual electricity supplied to the grid will be calculated.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Monthly</td></tr>
<tr><td>Value monitored</td><td><table><tr><td>Year</td><td>Net annual electricity supplied to the grid by the project $EG_y$ (MWh)</td></tr><tr><td>01-Aug-2009 to 31-Dec-2009</td><td>3056.80</td></tr><tr><td>01-Jan-2010 to 31-Dec-2010</td><td>6104.23</td></tr><tr><td>01-Jan-2011 to 31-Dec-2011</td><td>6825.68</td></tr><tr><td>01-Jan-2012 to 31-Dec-2012</td><td>6793.67</td></tr><tr><td>01-Jan-2013 to 31-Dec-2013</td><td>6609.03</td></tr><tr><td>01-Jan-2014 to 31-Dec-2014</td><td>6591.80</td></tr><tr><td>01-Jan-2015 to 31-Dec-2015</td><td>4374.05</td></tr><tr><td>01-Jan-2016 to 27-Mar-2016</td><td>770.98</td></tr></table></td></tr>
<tr><td>Monitoring equipment</td><td>Refer to Appendix 2</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The quantity of net electricity supplied can be cross-verified from the invoice raised on JVVNL by the project proponent and the readings available from the check meter available at the site. The meters will be calibrated once a year.</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of baseline emission.</td></tr>
<tr><td>Calculation method</td><td>-</td></tr>
<tr><td>Comments</td><td>The data will be archived for the entire crediting period and an additional period of two years after the crediting period is over or the last issuance of the last VCUs for the project, whichever occurs later.</td></tr>
</table>

## 4.3 Monitoring Plan

The Monitoring and Verification (M&V) procedures define a project-specific standard against which the project's performance (i.e. GHG reductions) and conformance with all relevant criteria will be monitored and verified. It includes

- suitable data collection, collation, and archiving methods
- data interpretation concerning its accuracy, adequacy, and consistency

These provide for clear, credible, and accurate monitoring for arriving at the key performance indicator of the project activity, i.e. reduction in GHG emissions, which can be reviewed and verified.

The general monitoring principles are based on

- Frequency of monitoring
- Minimizing uncertainty and improving performance reliability of the project

Reporting, reviewing, and archiving the data used for accounting of emission reduction due to the project activity

**Frequency of monitoring:**

The applied small-scale methodology, AMS-I-D, requires monitoring of the electricity supplied to the grid. The electricity generated by the WTGs is measured through a two-step procedure wherein the first metering is carried out continuously at the controller of the machine with the onboard meter. The monitoring of the WTGs is done from a common monitoring station as a part of the central monitoring system. The system consists of a state-of-the-art controlling and monitoring system for O&M contractors,

The project proponent has appointed an 'Operation and Maintenance' contractor for five years to operate the WTGs. The performance of the WTGs, safety in operation, and scheduled /breakdown maintenance are organized and monitored by the O&M contractor. The O&M contractor appointed by BIL will monitor the electrical power generation of the WTGs daily regularly and will maintain a log book recording daily generation details for each WTG connected to the JVVNL meters to which the WTGs are connected.

A long-term (20 years) wheeling and banking agreement (W&BA) has been signed with RVPN/JVVNL. The meter readings at the Metering Point are undertaken jointly by the representatives of the State Grid/JVVNL on one hand and the representative of M/s Suzlon Energy Limited and/or the appointed contractor for the Operation & Maintenance of the WTGs every month. Thereafter, JVVNL submits a monthly report that among other things also contains the apportioned values of power supplied to and drawn from the NEWNE Grid by the individual WTGs. The method of apportioning is given in Annexure 1 of the registered VCS PDD

These values of the measured parameters are thereafter entered in the project monitoring worksheet, a MS Excel-based spreadsheet for calculation of emission reduction due to the project activity.

**Uncertainties and Reliability:**

The amount of emission reduction is directly proportional to the amount of power generated in the project activity. The reliability of the monitoring system is dependent on the quality of the measurement devices. Hence all measuring instruments are calibrated and maintained as per the planned frequency as given in Section 3.2 to ensure reliability of the data used for calculating emission reduction.

In the event of failure of any equipment in the project activity, the project participant and the O&M contractor will take all necessary steps to make the WTG available for power generation at the earliest.

In case of failure or errors in any of the main meters used for arriving at the final power generation figure, the officials of RVPNL would immediately rectify the meter or replace it with a calibrated meter. The generation of wind power during the meter replacement would be considered from the backup meters available and provided for such an eventuality. In case if both meters, main and backup meters, are out of order for the same period, then there will not be any emission reduction accruing due to the project activity.

If any on-board meter on the WTGs, including those that are external to the project activity, fails, the average daily generation of the rest of the month, or of thirty days immediately preceding the period of failure, whichever is lower, will be taken to compute the total generation of the WTG in the period that the meter is down. The on-board meters are connected to the SCADA system and the power generation of each WTG can be monitored in real-time at the Central Monitoring Station (CMS) of the wind farm. The snapshot of generation for the month will be taken on the last day of every calendar month and will be kept as a record both in electronic as well as printed (paper) form.

If the crediting period of the project activity falls in between the billing cycle of RVPNL, the same would be recorded and made available during verification of emission reduction due to the project activity. The following apportioning procedure will be followed to arrive at the generation of power in that crediting period:

| Description | Unit | Calculation |
|---|---|---|
| Power generation at Controller of WTG for the specific part of the Month included in the crediting period(kWh) | kWh | $EG_P$ |
| Total generation at Controller for the same month | kWh | $EG_C$ |
| Generation as per RVPNL generation report for the month | kWh | $EG_M$ |
| Power generation used for calculating emission reduction for the specific part of the Month included in the crediting period(kWh) | kWh | $EG_M * (EG_P / EG_C)$ |

**Transmission Loss Consideration:**

To account for transmission loss from the controller generation data to the metering point, a transmission loss of 4.6% has been applied, as specified in Table 4 of the registered PDD. The controller generation data is adjusted by subtracting this transmission loss to ensure alignment and comparability with the 33kV metering data.

**Reporting and Archiving:**

Verification is done based on power export and import figures available from the Monthly Report submitted by M/s Suzlon Energy Limited (SEL) based on the Joint Meter Reading undertaken with JVVNL. Power generation in WTGs in the project activity is demonstrated from data logged in SCADA, and in the event of unavailability of such data, from the Log Book maintained for the purpose.

It will also be demonstrated that power generation as recorded by the on-board meters is higher than the power export from the project activity to the NEWNE Grid.

**Roles and Responsibilities:**

The representative of BIL will be responsible for

- Monitoring the project activity for smooth operation of the WTGs,
- Coordination with the O&M contractor to ensure the highest possible availability of the WTGs for generation,
- Collection and updating of all data in the project monitoring worksheet,
- Generation and distribution of monthly reports to the Management of the Project Proponent accounting for
    - The actual emission reduction achieved
    - Any specific event affecting the performance of the project
- Annual internal audit to verify the data updated in the emission reduction calculation worksheet against the Monthly Report "Break-up of Net Export Units (kWh) as recorded at Main Meter of RVPNL" as submitted by RVPNL.

**QA/QC Procedure:**

The project proponent has established a comprehensive Operations and Maintenance (O&M) contract with the service provider, ensuring a high standard of service delivery with a target of maintaining 95% uptime for the WTG wind farm on an annual basis. The service provider employs advanced diagnostic methods, such as optic fiber technology systems, along with physical on-site inspections, to identify and analyze the root cause of any failures or malfunctions in the Wind Turbine Generator (WTG) systems.

In the event of a failure within a WTG, the operations and maintenance team promptly conduct a thorough diagnostic process to ascertain the cause of the issue. This diagnostic process includes a detailed examination of the WTG systems to identify faults, followed by necessary corrective actions. These actions may involve component replacement, adjustments, or other repair measures to restore functionality.

Once the repairs are completed, the WTG undergoes rigorous testing and functional checks to verify that all systems are operating as intended. Only after these tests confirm the WTG's proper functionality is it returned to operational mode. This ensures optimal performance and adherence to the project's quality standards, minimizing downtime and maximizing efficiency across the wind farm.

# 5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

## 5.1 Baseline Emissions

The baseline emission considering only $CO_2$ from fossil fuel-based power plants on the NEWNE Grid is

$$BE_y = EG_y * EF_{Grid, CM,y}$$

[16]Following the direction given in paragraph 9a of AMS-I. D Ver 13, the Combined Margin emission factor for the electricity distribution grid has to be calculated using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1. Central Electricity Authority, the National Authority on electrical systems in India has calculated the emission factors using the same tool and has published their result in User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4[6]. The Combined Margin emission factor for wind energy systems has been calculated as per equation (13) on Pg 14 of 'Tool to calculate the emission factor for an electricity system' Ver 01.1 using ex-ante option for the Simple Operating Margin emission factor, and Option 1, i.e. ex-ante Build Margin emission factor as given in Table B Appendix C - Grid Emission Factors of User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4.

$$EF_{Grid,CM,y} = ( EF_{Grid,OM,y} * w_{OM} ) + ( EF_{Grid,BM,y} * w_{BM} ),$$

Where,

| | | |
|---|---|---|
| $EF_{Grid,CM,y}$ | = | Combined Margin emission factor of NEWNE Grid, tCO2/MWh |
| $EF_{Grid,OM,y}$ | = | Simple Operating Margin emission factor of NEWNE Grid, 1.01 tCO2/MWh |
| $EF_{Grid,BM,y}$ | = | Build Margin emission factor of NEWNE Grid, 0.60 tCO2/MWh |
| $w_{OM}$ | = | Operating Margin weighting factor for wind power projects, 0.75 |
| $w_{BM}$ | = | Build Margin weighting factor for wind power projects, 0.25 |

The GHG emissions in the baseline scenario is given below:

[16] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf

| Year | Net quantity of electricity exported to the grid, $EG_{BL,y}$ (MWh) | $EF_{Grid,CM,y}$ Grid Emission Factor ($tCO_2e/MWh$) | GHG Emission in the baseline scenario ($tCO_2e$) |
|---|---|---|---|
| 01-Aug-2009 to 31-Dec-2009 | 3,056.80 | 0.91 | 2,774 |
| 01-Jan-2010 to 31-Dec-2010 | 6,104.23 | 0.91 | 5,539 |
| 01-Jan-2011 to 31-Dec-2011 | 6,825.68 | 0.91 | 6,194 |
| 01-Jan-2012 to 31-Dec-2012 | 6,793.67 | 0.91 | 6,165 |
| 01-Jan-2013 to 31-Dec-2013 | 6,609.03 | 0.91 | 5,997 |
| 01-Jan-2014 to 31-Dec-2014 | 6,591.80 | 0.91 | 5,982 |
| 01-Jan-2015 to 31-Dec-2015 | 4,374.05 | 0.91 | 3,969 |
| 01-Jan-2016 to 27-Mar-2016 | 770.98 | 0.91 | 699 |

## 5.2 Project Emissions

The project activity uses wind power to generate electricity and hence the emissions from the project activity are taken as zero.

$PE_y = 0\ tCO_2e$

## 5.3 Leakage Emissions

Leakage emissions on account of the project activity are considered as zero as neither the wind energy generators are transferred from another activity nor any existing equipment of the project site would be transferred from the project site per the applied methodology.

$LE_y = 0\ tCO_2e$

## 5.4 GHG Emission Reductions and Carbon Dioxide Removals

| Vintage period | Baseline emissions ($tCO_2e$) | Project emissions ($tCO_2e$) | Leakage emissions ($tCO_2e$) | Reduction VCUs ($tCO_2e$) | Removal VCUs ($tCO_2e$) | Total VCUs ($tCO_2e$) |
|---|---|---|---|---|---|---|
| 01-AUG-2009 to 31-DEC-2009 | 2,774 | 0 | 0 | 2,774 | | 2,774 |
| 01-JAN-2010 to 31-DEC-2010 | 5,539 | 0 | 0 | 5,539 | | 5,539 |
| 01-JAN-2011to 31-DEC-2011 | 6,194 | 0 | 0 | 6,194 | | 6,194 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 01-JAN-2012 to 31-DEC-2012 | 6,165 | 0 | 0 | 6,165 | | 6,165 |
| 01-JAN-2013 to 31-DEC-2013 | 5,997 | 0 | 0 | 5,997 | | 5,997 |
| 01-JAN-2014 to 31-DEC-2014 | 5,982 | 0 | 0 | 5,982 | | 5,982 |
| 01-JAN-2015 to 31-DEC-2015 | 3,969 | 0 | 0 | 3,969 | | 3,969 |
| 01-JAN-2016 to 27-MAR-2016 | 699 | 0 | 0 | 699 | | 699 |
| **Total** | 37,319 | | | 37,319 | | 37,319 |

| | |
|---|---|
| **State the non-permanence risk rating (%)** | NA |
| **Has the non-permanence risk report been attached as either an appendix or a separate document?** | ☐ Yes ☒ No |
| **For ARR and IFM projects with harvesting, state, in $tCO_2e$, the Long-term Average (LTA).** | NA |
| **Has the LTA been updated based on monitored data, if applicable?** | ☐ Yes ☒ No<br>If no, provide justification. |
| **State, in $tCO_2e$, the expected total GHG benefit to date.** | NA |
| **If a loss occurred (including a loss event or reversal), state the amount of $tCO_2e$ lost:** | NA |

| Vintage period | Ex-ante estimated reductions/ removals | Achieved reductions/ removals | Percent difference | Explanation for the difference |
|---|---|---|---|---|
| 01-AUG-2009 to 31-DEC-2009 | 3,378 | 2,774 | -17.88 | Due to the variability in the Plant Load Factor |
| 01-JAN-2010 to 31-DEC-2010 | 8,059 | 5,539 | -31.27 | Due to the variability in the Plant Load Factor |
| 01-JAN-2011 to 31-DEC-2011 | 8,059 | 6,194 | -23.14 | Due to the variability in the Plant Load Factor |
| 01-JAN-2012 to 31-DEC-2012 | 8,059 | 6,165 | -23.50 | Due to the variability in the Plant Load Factor |

| | | | | |
|---|---|---|---|---|
| 01-JAN-2013 to 31-DEC-2013 | 8,059 | 5,997 | -25.59 | Due to the variability in the Plant Load Factor |
| 01-JAN-2014 to 31-DEC-2014 | 8,059 | 5,982 | -25.77 | Due to the variability in the Plant Load Factor |
| 01-JAN-2015 to 31-DEC-2015 | 8,059 | 3,969 | -50.75 | Due to the variability in the Plant Load Factor |
| 01-JAN-2016 to 27-MAR-2016 | 1,920 | 699 | -65.59 | Due to the variability in the Plant Load Factor |
| **Total** | 53,652 | 37,319 | | |

# APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

*There is no commercially sensitive information. Hence the section is not applicable.*

| Section | Information | Justification |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

# APPENDIX 2: DETAILS OF ENERGY METERS AND THEIR CALIBRATION DATES

| T/F01 | | | | T/F02 | | | | T/F03 | | | | Delay | Delayed Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Main | | Backup | | Main | | Backup | | Main | | Backup | | | |
| RJB00316 | | RJB00317 | | TNU00956 | | RJU00327 | | TNU00957 | | RJB00318 | | | |
| Accuracy Class – 0.2 s | | Accuracy Class – 0.2 s | | Accuracy Class – 0.2 s | | Accuracy Class – 0.2 s | | Accuracy Class – 0.2 s | | Accuracy Class – 0.2 s | | | |
| Calibration Date | Due Date | Calibration Date | Due Date | Calibration Date | Due Date | Calibration Date | Due Date | Calibration Date | Due Date | Calibration Date | Due Date | | |
| 20-Apr-2010 | 19-Apr-2011 | 20-Apr-2010 | 19-Apr-2011 | 21-Apr-2010 | 20-Apr-2011 | 21-Apr-2010 | 20-Apr-2011 | 21-Apr-2010 | 20-Apr-2011 | 21-Apr-2010 | 20-Apr-2011 | | |
| 11-Mar-2011 | 10-Mar-2012 | 11-Mar-2011 | 10-Mar-2012 | 11-Mar-2011 | 10-Mar-2012 | 11-Mar-2011 | 10-Mar-2012 | 11-Mar-2011 | 10-Mar-2012 | 11-Mar-2011 | 10-Mar-2012 | NO | |
| 14-Mar-2012 | 13-Mar-2013 | 14-Mar-2012 | 13-Mar-2013 | 14-Mar-2012 | 13-Mar-2013 | 14-Mar-2012 | 13-Mar-2013 | 14-Mar-2012 | 13-Mar-2013 | 14-Mar-2012 | 13-Mar-2013 | Yes | Mar-12 |
| 14-Dec-2012 | 13-Dec-2013 | 14-Dec-2012 | 13-Dec-2013 | 14-Dec-2012 | 13-Dec-2013 | 14-Dec-2012 | 13-Dec-2013 | 14-Dec-2012 | 13-Dec-2013 | 14-Dec-2012 | 13-Dec-2013 | NO | |
| 20-Jan-2014 | 19-Jan-2015 | 20-Jan-2014 | 19-Jan-2015 | 19-Jan-2014 | 18-Jan-2015 | 19-Jan-2014 | 18-Jan-2015 | 19-Jan-2014 | 18-Jan-2015 | 20-Jan-2014 | 19-Jan-2015 | Yes | Dec 13, Jan 14 |
| 16-Jan-2015 | 15-Jan-2016 | 16-Jan-2015 | 15-Jan-2016 | 16-Jan-2015 | 15-Jan-2016 | 16-Jan-2015 | 15-Jan-2016 | 15-Jan-2015 | 14-Jan-2016 | 15-Jan-2015 | 14-Jan-2016 | No | |
| 15-Apr-2016 | 14-Apr-2017 | 15-Apr-2016 | 14-Apr-2017 | 15-Apr-2016 | 14-Apr-2017 | 15-Apr-2016 | 14-Apr-2017 | 15-Apr-2016 | 14-Apr-2017 | 15-Apr-2016 | 14-Apr-2017 | Yes | Jan 16, Feb 16, March 16, Apr 16 |

The error factor has been applied for the periods 01-Aug-09 to 31-Dec-09 and 01-Jan-10 to 30-Apr-10 due to unavailability of calibration report. Additionally, delays in calibration led to the application of the emission factor for the periods 01-Mar-12 to 31-Mar-12, 01-Dec-13 to 31-Dec-13, 01-Jan-14 to 31-Jan-14, and 01-Jan-16 to 27-Mar-16.