



**VOLUNTARY CARBON STANDARD 2007.1**

## **VERIFICATION REPORT**

**WIND ENERGY PROJECT BY RAMCO GROUP IN  
INDIA**

**Monitoring Period: 2006-03-28 to 2008-10-31  
(incl. both days)**

**Report No: 53610608 - 08/673**

**Date: 2011-05-12**

TÜV NORD CERT GmbH  
JI/CDM Certification Program  
Langemarckstraße, 20  
45141 Essen, Germany  
Phone: +49-201-825-3335  
Fax: +49-201-825-3290  
[www.tuev-nord.de](http://www.tuev-nord.de)  
[www.global-warming.de](http://www.global-warming.de)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Name of Verification company:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Date of the issue:</b>                   |
| TÜV NORD CERT GmbH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2011-05-12                                  |
| <b>Report Title:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Approved by:</b>                         |
| Verification report of "Wind energy project by Ramco group in India"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Rainer Winter                               |
| <b>Client:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Project Title:</b>                       |
| Madras Cements Limited                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Wind energy project by Ramco group in India |
| <b>Summary:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                             |
| <p>Madras Cements Limited has commissioned the TÜV NORD JI / CDM Certification Program to carry out the verification of the Project "Wind energy project by Ramco group in India" in Tamil Nadu &amp; Karnataka, India with regard to the requirements of VCS 2007.1 Standard.</p> <p>The project activity involves installation of 159.75 MW capacity wind power project consisting of 136 Wind Turbine Generators (WTGs) in Tirunelveli, Dindigul and Coimbatore districts of Tamil Nadu, and Hassan and Chitradurga districts of Karnataka.</p> <p>Reporting period: From 28-03-2006 to 31-10-2008</p> <p>In the course of the verification 7 Corrective Action Requests (CARs), 4 Clarification Requests (CLs) were successfully closed and 1 Forward Action Request (FAR) will be verified during the subsequent periodic verification.</p> <p>The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the validated PD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.</p> <p>As the result of the 1st periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:</p> <p><b>Emission reductions                      590,912      t CO2 equivalents</b></p> |                                             |
| <b>Work carried out by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Number of pages:</b>                     |
| Mr. Ma Paa Puratchikkanal<br>Mr. R Murali    Ms.C Indumathi<br>Ms. Manjari Chandra<br>Mr. R Narendra Kumar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 50                                          |

## Abbreviations

|                        |                                                       |
|------------------------|-------------------------------------------------------|
| <b>AE</b>              | Assistant Engineer                                    |
| <b>BAU</b>             | Business as usual                                     |
| <b>BESCOM</b>          | Bangalore Electricity Supply Company                  |
| <b>CA</b>              | Corrective Action / Clarification Action              |
| <b>CAR</b>             | Corrective Action Request                             |
| <b>CDM</b>             | Clean Development Mechanism                           |
| <b>CEA</b>             | Central Electricity Authority                         |
| <b>CESC</b>            | Chamundeshwari Electricity Supply Corporation         |
| <b>CO<sub>2</sub></b>  | Carbon dioxide                                        |
| <b>CO<sub>2e</sub></b> | Carbon dioxide equivalent                             |
| <b>CP</b>              | Certification Program                                 |
| <b>CL</b>              | Clarification Request                                 |
| <b>DGM</b>             | Deputy General Manager                                |
| <b>DNA</b>             | Designated National Authority                         |
| <b>EB</b>              | CDM Executive Board                                   |
| <b>EIA</b>             | Environmental Impact Assessment                       |
| <b>ER</b>              | Emission Reduction                                    |
| <b>FAR</b>             | Forward Action Request                                |
| <b>GHG</b>             | Greenhouse gas(es)                                    |
| <b>GWP</b>             | Global Warming Potential                              |
| <b>IPCC</b>            | Intergovernmental Panel on Climate Change             |
| <b>JMR</b>             | Joint Meter Reading                                   |
| <b>MP</b>              | Monitoring Plan                                       |
| <b>MR</b>              | Monitoring Report                                     |
| <b>QC/QA</b>           | Quality control/Quality assurance                     |
| <b>SEB</b>             | State Electricity Board                               |
| <b>TNEB</b>            | Tamil Nadu Electricity Board                          |
| <b>TNERC</b>           | Tamil Nadu Electricity Regularity commission.         |
| <b>UNFCCC</b>          | United Nations Framework Convention on Climate Change |
| <b>VCS</b>             | Voluntary Carbon Standard                             |
| <b>VCS - PD</b>        | VCS - Project Description                             |
| <b>VCU</b>             | Voluntary Carbon Unit                                 |
| <b>VVM</b>             | Validation and Verification Manual                    |
| <b>WTG</b>             | Wind Turbine Generator                                |

| <b>Table of Contents</b>                                                                                                      | <b>Page</b> |
|-------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>1 INTRODUCTION .....</b>                                                                                                   | <b>5</b>    |
| <b>1.1 Objective.....</b>                                                                                                     | <b>5</b>    |
| <b>1.2 Scope and Criteria .....</b>                                                                                           | <b>5</b>    |
| <b>1.3 VCS Project Description.....</b>                                                                                       | <b>6</b>    |
| 1.3.1 Project Characteristics .....                                                                                           | 6           |
| 1.3.2 Project Location .....                                                                                                  | 6           |
| 1.3.3 Technical Project Description.....                                                                                      | 6           |
| 1.3.4 Appointment of team members and technical reviewer.....                                                                 | 9           |
| <b>1.4 Level of Assurance .....</b>                                                                                           | <b>10</b>   |
| <b>2 METHODOLOGY .....</b>                                                                                                    | <b>11</b>   |
| <b>2.1 Review of Project Documentation .....</b>                                                                              | <b>12</b>   |
| <b>2.2 On-Site Assessment .....</b>                                                                                           | <b>12</b>   |
| 2.2.1 Review of Performance Records.....                                                                                      | 12          |
| 2.2.2 Follow-up Interviews .....                                                                                              | 12          |
| 2.2.3 Collection of Measurements.....                                                                                         | 13          |
| 2.2.4 Observation of established practices and testing of the accuracy of<br>monitoring equipment.....                        | 13          |
| <b>2.3 Determination of the reductions in GHG emissions .....</b>                                                             | <b>14</b>   |
| <b>2.4 Review of additional data from other sources if appropriate .....</b>                                                  | <b>14</b>   |
| <b>2.5 Review of monitoring results and verification of the correct<br/>    application of monitoring methodologies .....</b> | <b>15</b>   |
| <b>2.6 Resolution of any material discrepancy .....</b>                                                                       | <b>15</b>   |
| <b>3 VERIFICATION FINDINGS .....</b>                                                                                          | <b>17</b>   |
| <b>3.1 Remaining issues, including any material discrepancy, from<br/>    previous validation .....</b>                       | <b>17</b>   |
| <b>3.2 Project implementation .....</b>                                                                                       | <b>18</b>   |
| <b>3.3 Completeness of monitoring .....</b>                                                                                   | <b>21</b>   |
| <b>3.4 Accuracy of emission reduction calculations .....</b>                                                                  | <b>28</b>   |
| <b>3.5 Quality of evidence to determine emission reductions .....</b>                                                         | <b>31</b>   |
| <b>3.6 Management and operational system .....</b>                                                                            | <b>32</b>   |
| <b>4 VERIFICATION STATEMENT.....</b>                                                                                          | <b>34</b>   |
| <b>5 REFERENCES .....</b>                                                                                                     | <b>36</b>   |

## 1 INTRODUCTION

The Madras Cement Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project:

“Wind energy project by Ramco Group in India”

with regard to the relevant requirements of the Voluntary Carbon Standard 2007.1<sup>/VCS/</sup>. The verifiers have reviewed the implementation of the monitoring plan (MP) in the registered VCS project for the monitoring period 2006-03-28 to 2008-10-31,

The applied monitoring methodology is ACM0002 “Consolidated baseline methodology for grid connected electricity generation from renewable sources”.

### 1.1 Objective

The purpose of this verification, by independent checking of objective evidence, is as follows:

- to verify that the project is implemented as described in the project design document;
- to assess the implementation of the monitoring plan (MP) content in the VCS-PD;
- to assess the project's compliance with other relevant rules, including the host country (India) legislation;
- to confirm that the monitoring system is implemented and fully functional to generate voluntary emission reductions (VERs / VCUs ) without any double counting; and
- to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

### 1.2 Scope and Criteria

The verification of this project is based on the validated project design document<sup>/PD/</sup>, the monitoring report<sup>/MR/</sup>, emission reduction calculation spread sheet<sup>/ER/</sup>, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The TÜV NORD JI/CDM CP has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

## 1.3 VCS Project Description

### 1.3.1 Project Characteristics

Essential data of the project is presented in the following Table 1-1.

**Table 1-1:** Project Characteristics

| Item                            | Data                                                                                                                                                                                                                                                                                                              |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project title                   | Wind energy project by Ramco group in India                                                                                                                                                                                                                                                                       |
| Project owner                   | MADRAS CEMENT LIMITED                                                                                                                                                                                                                                                                                             |
| Any specific project categories | <input type="checkbox"/> Mega project ( $> 10^6$ t CO <sub>2eq</sub> / a)<br><input type="checkbox"/> Micro project ( $< 5000$ t CO <sub>2eq</sub> / a)<br><input type="checkbox"/> AFOLU project<br><input type="checkbox"/> Grouped project<br><input checked="" type="checkbox"/> No specific project category |
| VCS PD dated                    | Draft: 2009-04-17 Final: 2009-10-01                                                                                                                                                                                                                                                                               |
| Applied Methodology             | ACM0002, version 10                                                                                                                                                                                                                                                                                               |
| Project starting date           | 2003-01-30                                                                                                                                                                                                                                                                                                        |
| Crediting period                | <input type="checkbox"/> Renewable Crediting Period (7 y)<br><input checked="" type="checkbox"/> Fixed Crediting Period (10 y)                                                                                                                                                                                    |
| Start of crediting period       | 2006-03-28                                                                                                                                                                                                                                                                                                        |

### 1.3.2 Project Location

The details of the project location are given in table 1-2:

**Table 1-2:** Project Location

| No.                       | Project Location       |
|---------------------------|------------------------|
| Host Country              | India                  |
| Region:                   | Tamil Nadu & Karnataka |
| Project location address: | Mentioned in annex 1   |
| Latitude:                 | Mentioned in annex 1   |
| Longitude:                | Mentioned in annex 1   |

### 1.3.3 Technical Project Description

The project activity involves the implementation of 159.75 MW capacity wind power project consisting of 136 Wind Turbine Generators (WTGs) in Tirunelveli, Dindigul and Coimbatore districts of Tamil Nadu, and Hassan and Chitradurga districts of Karnataka. The project activity would generate about 324 GWh of electricity annually which would replace equivalent quantum of power at the Tamil Nadu Electricity board (TNEB), Bangalore Electricity Supply Company Ltd (BESCOM) and Chamundeshwari Electricity Supply Corporation Ltd (CESC). The latitude and longitude details of the 136 windmills (given in annex 1 of PDD) located in Tirunelveli, Dindigul and Coimbatore Districts were verified and found to be OK.

| Owner                                                       | Number and Capacity (KW) | Utilization         |
|-------------------------------------------------------------|--------------------------|---------------------|
| Madras Cements Limited                                      | 24 X 1650                | Export to Grid      |
|                                                             | 11 X 1650                | Captive Consumption |
|                                                             | 10 X 800                 | Export to Grid      |
|                                                             | 43 X 800                 | Export to Grid      |
| Thanjavur Spinning Mills Limited                            | 4 X 1250                 | Captive Consumption |
| Shri Vishnu Shankar Mill Limited                            | 6 X 1250                 | Captive Consumption |
|                                                             | 1 X 1650                 | Captive Consumption |
| Rajapalayam Mills Ltd                                       | 10 X 1250                | Captive Consumption |
|                                                             | 2 X 1650                 | Captive Consumption |
| Sandhya Spinning Mill Limited                               | 4 X 1250                 | Captive Consumption |
|                                                             | 1 X 350                  | Captive Consumption |
| Sudarsanam Spinning Mills                                   | 3 X 1250                 | Captive Consumption |
|                                                             | 1 X 1650                 | Captive Consumption |
| Rajapalayam Textile (a division of Rajapalayam Mills Ltd )  | 1 X 1250                 | Captive Consumption |
| Ramco Industries Limited                                    | 6 X 1250                 | Captive Consumption |
|                                                             | 2 X 800                  | Export to grid      |
|                                                             | 1 X 1500                 | Export to grid      |
|                                                             | 2 X 1650                 | Export to grid      |
|                                                             | 1 X 500                  | Captive Consumption |
|                                                             | 1 X 750                  | Captive Consumption |
| Rajapalayam Spintext (a division of Rajapalayam Mills Ltd ) | 2 X 1250                 | Captive Consumption |

The key parameters of the project are given in table 1-3:

**Table 1-3a:** Technical data of the project

| Parameter                | Unit | V 82      | E - 53   | E - 48   | E - 33    | S - 64   |
|--------------------------|------|-----------|----------|----------|-----------|----------|
| Make                     |      | Vestas    | Enercon  | Enercon  | Enercon   | Suzlon   |
| Capacity of generator    | kW   | 1650      | 800      | 800      | 330       | 1250     |
| Cut in wind speed        | m/s  | 3.5       | 3        | 3        | 3         | 3        |
| Cut out wind speed       | m/s  | 20        | 28-34    | 28-34    | 28        | 25       |
| Maximum rotational speed | rpm  | 14.4      | 31.5     | 31.5     | 45        | 20.8     |
| Rotor Diameter           | m    | 82        | 53       | 48       | 33.4      | 64       |
| Number of blades         |      | 3         | 3        | 3        | 3         | 3        |
| Hub height               | m    | 78        | 75       | 75       | 50        | 65       |
| Gearing                  |      | With gear | gearless | gearless | With gear | gearless |

| Parameter                | Unit | S - 33    | NM 750 - 200/48 | S 82      | V 39      |
|--------------------------|------|-----------|-----------------|-----------|-----------|
| Make                     |      | Suzlon    | NEG Micon       | Suzlon    | Vestas    |
| Capacity of generator    | kW   | 350       | 750/200         | 1500      | 500       |
| Cut in wind speed        | m/s  | 3.5       | 3.5             | 4         | 4         |
| Cut out wind speed       | m/s  | 25        | 25              | 20        | 25        |
| Maximum rotational speed | rpm  | 32        | 22/15           | 18.4      | 26.4      |
| Rotor Diameter           | m    | 33.4      | 48.2            | 82        | 47        |
| Number of blades         |      | 3         | 3               | 3         | 3         |
| Hub height               | m    | 50/60/70  | 55              | 78.5      | 50        |
| Gearing                  |      | With gear | With gear       | With gear | With gear |

**Table 1-3b:** Parameters confirmed during verification

Parameters mentioned in Annex1 are verified during verification.

### 1.3.4 Appointment of team members and technical reviewer

On the basis of a competence analysis and individual availabilities a verification team was appointed. Furthermore also the personnel for the technical review and the final approval was determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 1-4 below.

**Table 1-4:** Involved Personnel

|                                                                         | Name                     | Company                           | Function <sup>1)</sup> | Qualification Status <sup>2)</sup> | Sectoral competence <sup>3)</sup>   | Technical competence <sup>4)</sup> | Host country Competence             | Controlling competence              |
|-------------------------------------------------------------------------|--------------------------|-----------------------------------|------------------------|------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | Ma Paa<br>Puratchikkanal | TUV India Pvt, Ltd,<br>Bangalore  | TL/TE                  | SA                                 | <input checked="" type="checkbox"/> | T                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | R Murali                 | TUV India Pvt. Ltd,<br>Bangalore  | TM                     | A                                  | <input checked="" type="checkbox"/> | -                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| <input type="checkbox"/> Mr.<br><input checked="" type="checkbox"/> Ms. | C Indumathi              | TUV India Pvt. Ltd,<br>Bangalore  | TM                     | A                                  | <input checked="" type="checkbox"/> | T                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | Manjari Chandra          | TUV India Pvt. Ltd,<br>Bangalore  | TM                     | A                                  | <input checked="" type="checkbox"/> |                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | R Narendra<br>Kumar      | TUV India Pvt.<br>Ltd., Bangalore | OT <sup>3)</sup>       | T                                  | <input type="checkbox"/>            | -                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | Lendzian, Heiner         | TN CERT GmbH                      | TR <sup>3)</sup>       | A                                  | <input checked="" type="checkbox"/> | T                                  | <input type="checkbox"/>            | <input type="checkbox"/>            |
| <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | Rainer Winter            | TN CERT GmbH                      | FA/TR <sup>3)</sup>    | SA                                 | <input checked="" type="checkbox"/> | T                                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>1)</sup> TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

<sup>2)</sup> GHG Auditor Status: A: Assessor; E: Expert; SA: Senior Assessor; T: Trainee; TE: Technical Expert

<sup>3)</sup> No team member

<sup>4)</sup> As per S01-MU03 or S01-VA070 A2 (such as A, B, C.....)

## 1.4 Level of Assurance

The verification has been planned and organized to achieve a

☒ reasonable level of assurance

☐ limited level of assurance.

## 2 METHODOLOGY

The verification of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Publication of the monitoring report
- Desk review of the Monitoring Report<sup>/MR/</sup> submitted by the client and additional supporting documents.
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting
- Resolution of corrective actions (if any)
- Final verification reporting
- Technical review
- Final approval of the verification.

The sequence of the verification is given in the table 2.1 below:

**Table 2.1:** Verification sequence

| Topic                                         | Time                        |
|-----------------------------------------------|-----------------------------|
| Assignment of verification                    | 2008-11-18                  |
| On-site visit                                 | 2009-07-28 to<br>2009-08-01 |
| Draft reporting finalised                     | 2010-08-27                  |
| Technical review on draft reporting finalised | 2010-08-30                  |
| Final reporting finalised                     | 2010-10-14                  |
| Technical review on final reporting finalised | 2011-05-12                  |
| Final corrections                             | 2011-05-12                  |

The main verification steps are described below.

## 2.1 Review of Project Documentation

The VCS PD <sup>/PD/</sup> and supporting background documents related to the project design and baseline were reviewed.

Furthermore, the verification team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The references used in the course of this verification are summarized in section 5.

## 2.2 On-Site Assessment

### 2.2.1 Review of Performance Records

The verification team has carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment was conducted and monitoring data were checked with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include,

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- The duly calibration of all metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked completely.
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.

Responsibilities related to monitoring are executed as defined in the monitoring plan <sup>/PD/ & /MR/</sup> and were assessed and found to be OK.

The on-site audit was carried out between 2009-07-28 and 2009-08-01by verification team.

### 2.2.2 Follow-up Interviews

The verification team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

During verification the verification team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in Table 2-2.

**Table 2-2:** Interviewed persons and interview topics

| Interviewed Persons / Entities                          | Interview topics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project proponent representatives<br>Project consultant | <ul style="list-style-type: none"> <li>- General aspects of the project</li> <li>- Technical equipment and operation</li> <li>- Changes since validation</li> <li>- Monitoring and measurement equipment</li> <li>- Remaining issues from validation / previous verifications</li> <li>- Calibration procedures</li> <li>- Quality management system</li> <li>- Involved personnel and responsibilities</li> <li>- Training and practice of the operational personnel</li> <li>- Implementation of the monitoring plan</li> <li>- Monitoring data management</li> <li>- Data uncertainty and residual risks</li> <li>- GHG calculation</li> <li>- Procedural aspects of the verification</li> <li>- Maintenance</li> <li>- Environmental aspects</li> <li>- Editorial issues of the Monitoring Report</li> </ul> |

A comprehensive list of all interviewed persons is part of section 5 'References'.#

### 2.2.3 Collection of Measurements

The verification team has carried out interviews and reviews of records to assess if the collection of measurements is in accordance with the monitoring plan of the validated PD and the relevant VCS criteria.

The parameter monitored in this project activity is net electricity exported to grid by the windmills.

The energy generated in the project activity was exported to the grid or wheeled to the industrial facility during the reported monitoring period.

Electricity produced is being measured by main meter installed in the wind mills. In some connections check meter is also installed to cross check the main meter readings. The Net electricity supplied to the grid is recorded monthly by taking a Joint Meter Reading from the main meter in the presence of officials from TNEB, BESCOM, CESC and representatives of wind mill owners. The Joint meter reading contains the value of energy imported and exported to the grid during the recording period. The JMR<sup>/JMR/</sup> is issued to the wind mill owners (in Karnataka in a format

called B-Form) which includes electricity exported to grid, imported from grid, transmission loss and net electricity supplied to grid. This JMR is duly signed by TNEB/BESCOM/CESC representatives

During the on-site visit, the information about all the energy meters which was mentioned above was verified. In addition the joint meter readings <sup>/JMR/</sup> which were duly signed by the representatives TNEB/BESCOM/CESC and the PP were also verified. All the procedure followed in the site are found to be in line with the monitoring plan <sup>/PD/</sup> & the PPA<sup>/PPA/</sup> signed for the project and deemed to be OK. No significant, lack of evidence and missing data were detected.

#### **2.2.4 Observation of established practices and testing of the accuracy of monitoring equipment**

During the on-site visit, the verification team has checked the test methods and practices established for the monitoring instruments whether they are in accordance to local and international requirements and as in the validated PD

### **2.3 Determination of the reductions in GHG emissions**

The verification team has reviewed and checked the method for determination of GHG emissions and assessed if they are calculated in a conservative approach and in accordance to the methodology and relevant tools equations.

The GHG emission reduction achieved by the project activity is calculated as the difference between the baseline emission and the project emission as well as the leakage emission. There are no GHG emissions arising from the project being a green power project. Hence, the project emissions are zero. As the project activity does not involve power plant construction, fuel handling (extraction, processing, and transport), and land inundation, the leakage due to the project activity is not applicable as per the methodology.

Following the ACM0002 methodology, the combined margin (CM) methodology calculated ex-ante was chosen to calculate the baseline emission factor.

Baseline emission is equal to Net Electricity export by the project to the grid by the project activity ( $EG_y$ ) multiplied by the grid emission factor ( $EF_y$ ).

The operating margin (OM) and Build margin (BM) are as follows:  $W_{OM} = 0.75$  and  $W_{BM} = 0.25$  for operating margin emission factor ( $EF_{grid, OM, y}$ ) and the build margin emission factor ( $EF_{grid, BM, y}$ ). The calculation method of the OM and BM is derived from the guide of OM and BM calculation issued by CO<sub>2</sub> Baseline Database for the Indian Power Sector, User Guide (Version 4, Date: September, 2008) issued by CEA.

As per the CEA database the emission the operating margin and built margin for southern grid is

$$EF_{\text{grid, OM, y}} = 0.998157296$$

$$EF_{\text{grid, BM, y}} = 0.85573754$$

Therefore the combined margin is calculated as follows

$$EF_y = (0.75 \times EF_{\text{grid, OM}}) + (0.25 \times EF_{\text{grid, BM}}) = 0.92694 \text{ tCO}_2\text{equivalent / MWh}$$

Based on the net electricity supplied and the emission factor the net emission reductions are calculated for the reported monitoring period

## 2.4 Review of additional data from other sources if appropriate

Additional data<sup>/CEA/CR/PPA/EWA/</sup> collected are reviewed and the sources are verified through interviews and review of any websites as stated in the monitoring report.

## 2.5 Review of monitoring results and verification of the correct application of monitoring methodologies

The verification team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

## 2.6 Resolution of any material discrepancy

Material discrepancies identified in the course of the verification are addressed either as CARs, CLs or FARs.

A **Corrective Action Request (CAR)** is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for verification of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the first verification.

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in the next section 3 of this report.

### 3 VERIFICATION FINDINGS

In this section the assessments and findings from the desk review of the VCS PD, site visit, interviews and supporting documents as well as the final assessments are summarised. Table 3-1 includes an overview of all raised CARs, CLs and FARs.

**Table 3-1:** Overview of CARs, CLs and FARs issued

| No. | Topic / Chapter                                      | CAR      | CL       | FAR      |
|-----|------------------------------------------------------|----------|----------|----------|
| 3.1 | Remaining issues, including any material discrepancy |          |          | 1        |
| 3.2 | Project implementation                               | 2        |          |          |
| 3.3 | Completeness of monitoring                           | 3        | 4        |          |
| 3.4 | Accuracy of emission reduction calculations          | 2        |          |          |
| 3.5 | Quality of evidence to determine emission reductions |          |          |          |
| 3.6 | Management and operational system                    |          |          |          |
| -   | <b>SUM</b>                                           | <b>7</b> | <b>4</b> | <b>1</b> |

#### 3.1 Remaining issues, including any material discrepancy, from previous validation

##### Description

The verification team has reviewed the registered PD and found that there are no material discrepancies. The FAR raised during the validation<sup>VR/</sup> had been checked that the project activity has not been registered with UNFCCC EB. This FAR has to be reviewed during the next monitoring period.

##### Related Findings

- ☐ No CARs, CLs or FARs have been identified in this context
- ☒ The following finding(s) have been addressed:

| Finding:              | 3.1-1                        |                             |                                         |
|-----------------------|------------------------------|-----------------------------|-----------------------------------------|
| <b>Classification</b> | <input type="checkbox"/> CAR | <input type="checkbox"/> CL | <input checked="" type="checkbox"/> FAR |

|                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                                                                      | <p>The project has also applied for CDM benefits. The process is still under validation.</p> <p>In future it has to be ensured that there will be no double counting regarding emission reductions between CDM and VCS. The wind mills corresponding to the HTSC Nos listed in annex 2 of this report needs to be verified in order to avoid double counting</p>                             |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     |                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | <p>The registration and approval will be checked again at the next verification period.</p>                                                                                                                                                                                                                                                                                                  |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <p><input checked="" type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Appropriate action was taken</p> <p><input type="checkbox"/> Project documentation was corrected correspondingly</p> <p><input type="checkbox"/> Additional action should be taken</p> <p><input type="checkbox"/> The project complies with the requirements</p> |

### Final Assessment

The open issue in the validation report<sup>VR/</sup> was reviewed and confirmed that the project activity has not been registered with UNFCCC for this monitoring period of 2006-03-28 to 2008-10-31 (both days included)

☒ FAR 3.1-1 will be checked again during next verification period

## 3.2 Project implementation

### Description

The project activity is generation of renewable electricity from wind energy in Tirunelveli, Dindigul and Coimbatore districts of Tamil Nadu, and Hassan and Chitradurga districts of Karnataka by Ramco Group Companies.

The installed capacity of the project is 159.75 MW which consist of 136 wind turbine generators (WTGs) and the electricity is sold to southern grid of India and used for captive consumption in Ramco group industries which also replaces the grid electricity from southern grid of India. There are no changes in the Key equipment since the validation of the project during the monitoring period.

During the monitoring period covering 2006-03-28 to 2008-10-31 the project replaces 637.49GWh of net electricity from the southern grid of India.

The net electricity supplied to the grid or supplied for captive use is calculated by exported electricity minus imported electricity and wheeling charge (if applicable). An energy meter is installed at the output to account the electricity supplied to grid. This meter reading is noted every month which is used for ER calculation.

It was verified in the course of this verification that the actual project activity was implemented in accordance with the Validated PD<sup>/PD/</sup>.

### Related Findings

- ☐ No CARs, CLs or FARs have been identified in this context
- ☒ The following finding(s) have been addressed:

| Finding:                                                                                                                               | 3.2-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |                              |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|
| <b>Classification</b>                                                                                                                  | <input checked="" type="checkbox"/> CAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/> CL | <input type="checkbox"/> FAR |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                  | Page No 2 of MR says that 21 (11+10) wind mills of Madras cement limited are for captive consumption. This is not actual case. Please check.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |                              |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i> | <p>Page no. 2 of MR mentions 10x800 kW and 11x1650 kW machines as captive. However, only 11x1650 kW Vestas machines are for captive consumption, while the 10x800 kW machines were exporting power to grid up to September 2009. Post September 2009, these 10x800 kW Enercon machines have been used for captive consumption purpose. This can be observed from the JMR for the particular HTSC no. which do not contain wheeling charges up to September 2009. Thus, for current monitoring period in consideration, only 11x1650 kW machines are for captive consumption purpose, and the same has been included in MR version 02.</p> <p>The deviation from validated PD has been explained under section 10 of the revised MR version 03.</p> |                             |                              |

|                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | <p>Presently electricity generated from the 10x800 kW wind mills of Madras cements are used for captive purpose. But it is the real case only after September 2009. So during the monitoring period the wind mills are exporting power to grid. This is explained under section 10 as a deviation from validated PD which is verified with the power purchase agreement<sup>/PPA/</sup> and the joint meter reading statement<sup>/JMR/</sup>.</p> <p>CAR 3.2-1 is closed.</p> |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements                                                                                   |

| Finding:                                                                                                                                                                                   | 3.2-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Classification</b>                                                                                                                                                                      | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                                                                      | <p>As per validated PD the owner of the mill having HTSC No 973 is Ramco Industries Limited (RIL). But in the calibration details of MR it states that it belongs to Sri Ramco Spinners (SRS). Please Justify</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | <p>Wind mill corresponding to HTSC no. 973 is actually owned by Sri Ramco Spinners (SRS), and it can be verified from the calibration certificate by Tamil Nadu Electricity Board, which clearly states the owner as Sri Ramco Spinners. Hence, the same has been mentioned in the monitoring report under calibration details. It was erroneously reported in the VCS PD, that the HTSC no. 973 is owned by RIL. Please refer calibration details for HTSC. No. 973. Also, the commissioning certificate for HTSC No. 973 has been provided as Annexure 4, and it clearly mentions that the WTG is owned by Sri Ramco Spinners (SRS).</p> <p>The deviation from validated PD has been explained under section 10 of the revised MR version 03.</p> |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | <p>The wind mill corresponding to the HTSC no 973 is actually owned by the Sri Ramco Spinners which was verified with the commissioning certificate of 973 and calibration certificates. This is explained in section 10 of revised MR as a deviation from validated PD.</p> <p>CAR 3.2-2 is closed</p>                                                                                                                                                                                                                                                                                                                                                                                                                                             |

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i> | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Final Assessment

On the basis of this site visit and the reviewed project documentation it can be confirmed that w.r.t. the realized technology, the project equipments, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the validated PD<sup>/PD/</sup>. There are no major changes in the key equipment since the validation of the project. Also no change is envisaged. These facts have been verified during site visit.

☒ CAR3.2-1 & CAR 3.2-2 are closed

## 3.3 Completeness of monitoring

### Description

The monitoring reporting /MR/ is in line with the requirements of the validated PD monitoring plan as well as with the applied methodology ACM0002 Version 10<sup>/ACM0002/</sup> which is approved under VCS 2007.1.

The monitoring plan<sup>/PD/</sup> provides detailed information related to the collection and archiving of all relevant data needed to:

- Estimate or measure emissions occurring from GHG sources, sinks and reservoirs
- Determine the baseline emissions
- Estimate changes in emissions from the site

As per the Validated PD, Net electricity supplied by WTGs in the project activity is the only parameter which is to be monitored during the whole crediting period.

The monthly energy readings are noted down by TNEB/BESCOM/CESC persons along with the O&M representatives. The net electricity supplied to grid is calculated by considering export and import and the same has been written in Joint meter reading statement<sup>/JMR/</sup> issued monthly to each individual service connection by the TNEB/BESCOM/CESC.

The calibration certificates of the meters were verified. Though the calibration was not done in the mentioned frequency the PP for the meter regarding to the HTSC no

510, U1469 the PP applied maximum error for the months when the calibration validity is not there. The net energy supplied is calculated for the months where calibration non-validity months is as follows

Net electricity exported = import \* (1-0.5%) – (import \* (1+0.5%)) – wheeling charge

This is as inline with the EB 52 annex 60 “Guidelines for Assessing Compliance with the Calibration Frequency Requirements”

As most essential part of the verification exercise it is indispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include, but are not limited to:

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- The duly calibration of all metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked completely.
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.

The on-site audit was carried out by the verification team between 2009-07-28 and 2009-08-01. Before and during the on-site visit the verification team performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review. It is assessed that the data and parameter monitored by the above said approach is accurate, conservative and transparent. It is found to be valid and acceptable.

No significant, lack of evidence and missing data were detected during on-site visit. Nevertheless, the following CARs and CLs have been raised and closed successfully based on the revised Monitoring report

#### Related Findings

- ☐ No CARs, CLs or FARs have been identified in this context
- ☒ The following finding(s) have been addressed:

| Finding:                                                                                                                                                                                   | 3.3-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Classification</b>                                                                                                                                                                      | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                                                                      | <p>The MR states that the meters are calibrated once in five year as per state electricity board norms. Please submit the state electricity board norms which specify calibration requirements.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | <p>The latest TNERC tariff order titled "Comprehensive tariff order on wind energy" dated March 2009 mentions under paragraph 8.18 that the periodicity of calibration of meters will be governed by the Regulations issued by the Central Electricity Authority in this regard. Therefore, referring to the Central Electricity Authority (Installation and Operation of Meters) Regulations 2006 paragraph 18.1.b, it mentions that all meters shall be tested at least once in five years. Please refer to the TNERC tariff order dated May 2006 and March 2009 and Central Electricity Authority (Installation and Operation of Meters) Regulations 2006 provided as Annexure 1 , 2 &amp; 3 respectively</p> |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | <p>The TNERC "Comprehensive tariff order dated on wind energy" dated march 2008 is submitted which mentions the meters are tested as per regulations issued by the Central Electricity Authority (CEA). The Central Electricity Authority notification dated 17<sup>th</sup> March 2006 specifies the meters should be tested at least once in five years.</p> <p>CAR is closed.</p>                                                                                                                                                                                                                                                                                                                             |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements                                                                                                                                                                                                                                                                                                                                |

| Finding:                                                                                                              | 3.3-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Classification</b>                                                                                                 | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i> | <p>For April 2006 and end of October 2008 (boundary months) the net energy exported is calculated from the daily meter readings log which is not fulfills the requirements because of the following reasons.</p> <ul style="list-style-type: none"> <li>• For captive wind mills the wheeling charge is not deducted from net energy exported.</li> <li>• For the wind mills located in Karnataka the transmission loss is not deducted from the net energy exported</li> </ul> |

|                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | <p>For April 2006 and end of October 2008 (boundary months),</p> <ul style="list-style-type: none"> <li>• Wheeling charges have been deducted from net energy exported for wind mills owned by textile mills which are for captive consumption. However, the wheeling charges had not been deducted earlier for the captive wind mills of Madras Cements Ltd. The same have been rectified and included in the revised CER sheet "MCL VCS CER sheet v2"</li> <li>• For the wind mills located in Karnataka (ELP-27 and H-31), the transmission loss had been deducted from the net energy exported in the CER calculations submitted earlier. Please refer the back-up calculation sheet "Karnataka WTGs net export" provided as an annexure to verify the same.</li> </ul> |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | <p>The wheeling charges are deducted for the mills used for captive consumption. But for the wind mills located in Karnataka (ELP-27 and H-31), the transmission loss had not been deducted for the boundary months. Please check again.<br/>CAR is open</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Corrective Action #2</b><br>                                                                                                                                                            | <p>The transmission loss for the boundary months has been deducted in the revised ER computation sheet "MCL VCS CER sheet v3" in a conservative manner. Please refer to worksheet 'HTSC H31 &amp; ELP-27' under excel sheet "computation for boundary period" for further clarity on deduction of transmission loss for the boundary periods.</p>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>DOE Assessment #2</b>                                                                                                                                                                   | <p>The transmission loss of the whole boundary month has been taken from B-Form<sup>/JMR/</sup> and deducted from energy supplied to grid. Since the transmission loss has been considered for whole month the calculation is conservative.<br/>CAR 3.3-2 is closed</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <div> <input type="checkbox"/> To be checked during the first periodic verification                 <input checked="" type="checkbox"/> Appropriate action was taken                 <input checked="" type="checkbox"/> Project documentation was corrected correspondingly                 <input type="checkbox"/> Additional action should be taken                 <input checked="" type="checkbox"/> The project complies with the requirements             </div>                                                                                                                                                                                                                                                                                                   |

| Finding:                                                                                                              | 3.3-3                                                                                                 |                             |                              |
|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|
| <b>Classification</b>                                                                                                 | <input checked="" type="checkbox"/> CAR                                                               | <input type="checkbox"/> CL | <input type="checkbox"/> FAR |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i> | Meters of 271 & 510 (RIL) are not calibrated once in five year frequency. Please refer EB 52 Annex 60 |                             |                              |

|                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | For HTSC no. 271, the calibration was valid till 31.03.2009 and the monitoring period was ended on 31.10.2008. Therefore, the previous calibration was valid for the monitoring period in consideration. However, the applicable error as per accuracy class of the meters for HTSC no. 510 has been deducted from CER calculations as per EB 52 annex 60. The error has been deducted for the period of 15.03.2008 to 15.07.2008 which covers the period of non-availability of calibration certificates i.e. 26.03.2008 to 10.7.2008 and is conservative. Please refer to revised CER excel sheet "MCL VCS CER sheet v2" |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | The error is applied directly for net energy supplied which is not correct. The error should be applied separately for electricity exported to grid and imported from grid. Please correct the same.<br><br>CAR is open                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Corrective Action #2</b>                                                                                                                                                                | The error has been separately applied for electricity supplied to grid and imported from grid in the revised ER sheet "MCL VCS CER sheet v3". Please refer to the back-up calculation excel sheet "Error deduction for 510" for clarity on the error deduction.                                                                                                                                                                                                                                                                                                                                                            |
| <b>DOE Assessment #2</b>                                                                                                                                                                   | The maximum error is correctly applied for both electricity export and import separately in the latest version of CER calculation.<br><br>CAR 3.3-3 is closed                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements                                                                                                                                                                                                                               |

| Finding:                                                                                                                               | 3.3-1                                                                                                                                                                                                                                                                                |                                        |                              |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------|
| <b>Classification</b>                                                                                                                  | <input type="checkbox"/> CAR                                                                                                                                                                                                                                                         | <input checked="" type="checkbox"/> CL | <input type="checkbox"/> FAR |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                  | Point no. 5 of MR says the project uses ACM 0002 version 05. The methodology version number is not matching with the validated PD. Please check.                                                                                                                                     |                                        |                              |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i> | The validated PD mentions usage of approved methodology ACM0002 version 10. The usage of methodology version 05 was erroneously mentioned under section 5 of MR version 01, and the same has been rectified in revised MR version 02, to reflect the correct version of methodology. |                                        |                              |

|                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | <p>The MR now uses version 10 of ACM0002 methodology as mentioned in the validated PD.</p> <p>CAR 3.3-3 is closed</p>                                                                                                                                                                                                                                                                        |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements |

| Finding:                                                                                                                                                                                   | 3.3-2                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Classification</b>                                                                                                                                                                      | <input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR                                                                                                                                                                                                                                                                                             |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                                                                      | <p>Calibration details of ELP 27 (RIL) &amp; 1532 (MCL-Udumalpet) are missing. Please include the same in MR and submit the calibration certificate of ELP 27.</p>                                                                                                                                                                                                                           |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | <p>The calibration details of HTSC ELP 27 (RIL) and 1532 have been included in the revised MR version 02. Calibration certificate for ELP-27 has been provided as Annexure 5 along with the response</p>                                                                                                                                                                                     |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | <p>The calibration details of ELP 27 &amp; 1532 are included in the revised MR. The calibration certificate of ELP 27 is provided for verification.</p> <p>CAR is closed</p>                                                                                                                                                                                                                 |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements |

| Finding:                                                                                                              | 3.3-3                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Classification</b>                                                                                                 | <input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR                                                                                                                                            |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i> | <p>a) HTSC no of 1460 (MCL Udumalpet) is mentioned wrongly in the calibration details of MR. Please correct it.</p> <p>b) Calibration date of 2361 (MCL-Thandyarkulam) is mentioned 18.12.2008 which is wrong. Please correct the date.</p> |

|                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | a) HTSC no. 1460 has been corrected under the calibration details in revised MR version 02<br>b) The calibration date of HTSC no. 2361 has been corrected as per calibration certificate in revised MR version 02                                                                                                                                                                            |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | a) The HTSC number is corrected in the revised MR<br>b) The Calibration date of 2361 is corrected as per calibration certificate in revised MR<br><br>CAR is closed                                                                                                                                                                                                                          |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements |

| Finding:                                                                                                                                                                                   | 3.3-4                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------|
| <b>Classification</b>                                                                                                                                                                      | <input type="checkbox"/> CAR                                                                                                                                                                                                                                                                                                                                                                 | <input checked="" type="checkbox"/> CL | <input type="checkbox"/> FAR |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                                                                      | Please mention the details of the meters that were changed during monitoring period. Please include the date of change, meter number of old & new meter and reason for changing the meter in the MR.                                                                                                                                                                                         |                                        |                              |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | The details of energy meters changed during the monitoring period have been included in the revised MR under section 8, mentioning the date of change, meter number of old and new meters and reason for changing the meter.                                                                                                                                                                 |                                        |                              |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | The details of the energy meter which were changed during the monitoring period are included in the revised MR. Meters were immediately replaced by respective SEB because of meter failure.<br>CAR 3.3-4 is closed.                                                                                                                                                                         |                                        |                              |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements |                                        |                              |

### Final Assessment

All relevant evidences<sup>/JMR/, /cal/</sup> regarding the monitoring were fully checked by the verification team. All evidences are clearly identifiable and assessed to be correct. It could be evidenced that the monitoring system ensures for continuous operation. For the considered monitoring period, all indicators stated in the applicable monitoring

methodology ACM0002 (Version 10) and the registered PD<sup>/PD/</sup> were correctly monitored and reported.

- ☒ CAR 3.3-1, CAR 3.3-2, CAR 3.3-3, CL 3.3-1, CL 3.3-2, CL 3.3-3 & CL 3.3-4 are successfully closed

### 3.4 Accuracy of emission reduction calculations

#### Description

The verification team has verified and found out that GHG emission reduction achieved by the project activity is calculated as the difference between the baseline emission and the project emission as well as the leakage emission. There are no GHG emissions arising from the project being a green power project. Hence, the project emissions are zero. As the project activity does not involve power plant construction, fuel handling (extraction, processing, and transport), and land inundation, the leakage due to the project activity is not applicable as per ACM0002 version 10.

Following the ACM0002 methodology, the combined margin (CM) methodology calculated ex-ante was chosen to calculate the baseline emission factor.

Baseline emission is equal to Net Electricity export by the project to the grid by the project activity ( $EG_y$ ) multiplied by the grid emission factor ( $EF_y$ ).

The operating margin (OM) and Build margin (BM) are as follows:  $W_{OM} = 0.75$  and  $W_{BM} = 0.25$  for operating margin emission factor ( $EF_{grid, OM, y}$ ) and the build margin emission factor ( $EF_{grid, BM, y}$ ). The calculation method of the OM and BM is derived from the guide of OM and BM calculation issued by CO<sub>2</sub> Baseline Database for the Indian Power Sector, User Guide (Version 4, Date: September, 2008) issued by CEA.

As per the CEA database the emission the operating margin and built margin for southern grid is

$$EF_{grid, OM, y} = 0.998157296$$

$$EF_{grid, BM, y} = 0.85573754$$

Therefore the combined margin is calculated as follows

$$EF_y = (0.75 \times EF_{grid, OM}) + (0.25 \times EF_{grid, BM}) = 0.92694 \text{ tCO}_2\text{equivalent / MWh}$$

Both the values of Simple Operating Margin and Build Margin are selected under ex-ante approach. The grid boundary w.r.t the connected state grid is in Southern Regional Grid of India. The calculation of  $EF_y$  is current and publicly available and

published by the Central Electricity Authority on its web-site<sup>/CEA/</sup> and fixed ex-ante during the entire crediting period.

The only parameter to monitor is net electricity exported to grid. The evacuation facility of the project activity to deliver the power to grid is maintained by the respective SEB (TNEB/BESCOM/CESC). In the project activity total electricity generated is being measured by energy meter, which is jointly monitored by the project participant and BESCOM.

To calculate net electricity supplied by the project activity, the PP has mentioned some procedure to calculate net electricity supplied to Southern grid. The electricity supplied to grid and electricity drawn from the grid are measured in the main meter reading. The net electricity exported to grid is calculated as follows

Net electricity exported to grid = electricity exported to grid – electricity imported from grid – transmission loss/wheeling charge (if applicable)

For the months where the calibration validity is not there the net electricity exported to grid is calculated as follows

Net electricity exported to grid = (1-0.5%)\*electricity exported to grid – (1+0.5%)\*electricity imported from grid – transmission loss/wheeling charge (if applicable)

The net electricity is noted from joint meter reading<sup>/JMR/</sup> on monthly basis which is duly signed by the PP and TNEB/BESCOM/CESC. It is assessed that the data and parameter monitored by the above said approach is accurate, conservative and transparent. It is found to be valid and acceptable.

The validation team is convinced of the result of the emission coefficient calculation and emission reduction calculation<sup>/ER/</sup>. Also the emission reduction calculation is calculated based on the net electricity exported to the grid after applying the apportioning adjustments. It is deemed to be adequate, transparent and conservative.

The total net electricity supplied by the WTGs during the monitoring period is 637,488 MWh. The baseline emission factor has been fixed ex-ante as 0.92694 tCO<sub>2</sub>/MWh based on the CO<sub>2</sub> Baseline Database for the Indian Power Sector, User Guide (Version 4, Date: October, 2008) issued by CEA for NEWNE Grid<sup>/CEA/</sup>. Based on the net electricity supplied and the emission factor the net emission reductions are 590,912 tCO<sub>2e</sub>.

All the figures as per the monitoring plan were cross-checked by the verification team against basic monitored data and the calculations were found correct. The verification team has checked the input values as well as the computation in the emission reduction spreadsheet<sup>/ER/</sup>. The estimation of the emission reduction was realized in a transparent and conservative manner.

## Related Findings

- ☐ No CARs, CLs or FARs have been identified in this context
- ☒ The following finding(s) have been addressed:

| Finding:                                                                                                                                                                                   | 3.4-1                                                                                                                                                                                                                                                                                                                                                                                        |                             |                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|
| <b>Classification</b>                                                                                                                                                                      | <input checked="" type="checkbox"/> CAR                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> CL | <input type="checkbox"/> FAR |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                                                                      | Net energy exported from HTSC No 1383 & 1384 is accounted in both RIL & SRS in the ER sheet (double counted). Please correct it                                                                                                                                                                                                                                                              |                             |                              |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | The double counting of Net energy exported from HTSC no. 1383 and 1384 has been rectified in revised CER sheet "MCL VCS CER sheet v2" and the same reflected in the revised monitoring report "MCL VCS MR v2"<br>Please refer to revised CER sheet.                                                                                                                                          |                             |                              |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | The emission reduction is corrected in the revised ER sheet.<br><br>CAR is closed.                                                                                                                                                                                                                                                                                                           |                             |                              |
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i>                                                                                                                                  | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements |                             |                              |

| Finding:                                                                                                                                                                                   | 3.4-2                                                                                                                           |                             |                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|
| <b>Classification</b>                                                                                                                                                                      | <input checked="" type="checkbox"/> CAR                                                                                         | <input type="checkbox"/> CL | <input type="checkbox"/> FAR |
| <b>Description of finding</b><br><i>Describe the finding in unambiguous style; address the context (e.g. section)</i>                                                                      | Net energy exported readings of H-31 (RIL) are not matching with JMR. Please check                                              |                             |                              |
| <b>Corrective Action #1</b><br><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>                                                     | The net energy exported readings for H-31 have been rectified in the revised CER excel sheet, and are now in line with the JMR. |                             |                              |
| <b>DOE Assessment #1</b><br><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i> | The net energy export readings of H-31(RIL) are corrected in the revised ER sheet.<br>CAR is closed.                            |                             |                              |

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conclusion</b><br><i>Tick the appropriate checkbox</i> | <input type="checkbox"/> To be checked during the first periodic verification<br><input checked="" type="checkbox"/> Appropriate action was taken<br><input checked="" type="checkbox"/> Project documentation was corrected correspondingly<br><input type="checkbox"/> Additional action should be taken<br><input checked="" type="checkbox"/> The project complies with the requirements |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Final Assessment

All other relevant evidences were fully checked by the verification team during the on-site visit. All evidences are clearly identifiable and assessed to be correct. It could be evidenced that the monitoring system ensures for continuous operation. For the considered verification period, all indicators stated in the applicable monitoring methodology ACM0002 (Version 10) were correctly monitored and reported. Hence all the value applied for emission reduction calculation is found to be accurate and correct.

☒ CAR 3.4-1 & CAR 3.4-2 are closed

## 3.5 Quality of evidence to determine emission reductions

### Description

During the on-site visit, the verification team has reviewed and verified the respective documents that were used to calculate and determine the emission reductions. The records were easily traceable and referred to a monitored or calculated data or parameter.

The only key monitoring parameter with influence on the calculation of the emission reductions is the Net electricity supplied to the Grid and the grid emission factor. The power is measured with high accuracy and duly calibrated class power meters.

The grid emission factor which a validated value and has been fixed ex-ante for the entire crediting period is taken from the registered PD<sup>/PD/</sup>.

All necessary monitoring instruments are installed. The measuring devices use a proven and state of the art technology for measurement. The details of the meters are given in the monitoring report<sup>/MR/</sup>. Calibration has been carried out as defined in the monitoring plan and the records for the same were reviewed. Based on the same it is concluded that the recorded reading from these meters are accurate enough.

The net electricity supplied to grid by the WTGs belonging to the project activity as reported in the monitoring report<sup>/MR/</sup> and the emission reduction calculation sheet<sup>/ER/</sup> were verified with the Joint meter reading<sup>/JMR/</sup> given by TNEB/BESCOM/CESC. These certificates are issued by BESCOM a government body. Moreover, these JMRs are used for commercial billing by state electricity board. Hence these are

considered as highly authentic and reliable source of information. All evidences are clearly identifiable and assessed to be correct.

All the monitored data have been provisioned to be kept for at least 2 years after the end the issuance of VERs as per the requirement

### Related Findings

☒ No CARs, CLs or FARs have been identified in this context

### Final Assessment

The verification team had reviewed the data collected and archived for the determination of the baseline emissions and any project emissions during the crediting period claiming the emission reductions.

The quality of the documents developed by the project proponent to monitor and determine the emission reductions were easily traceable and reference. Documents archiving and storage are in secured locations.

## **3.6 Management and operational system**

### Description

The management and operational system of the project is reviewed in the course of verification. The operational and management structure is established in accordance with the validated PD and the responsibilities for proper plant operation were clearly defined.

All internal data are subjected to QA/QC measures. All monitored data are archived partly in physical and partly in Electronic format.

The allocation of responsibilities is documented in a written form and is followed as described in the PD and MR. This has been verified. Routines for the archiving of data are defined and documented. Calculations are laid down in the monitoring report are in line with VCS PD<sup>/PD/</sup>.

The monitoring personnel at site are well trained and follow reproducible routines as was evident during the site visit. Members of monitoring team were interviewed. Procedure for training and maintenance of critical equipments were discussed during site visit.

The operator reports to the Assistant Engineer (AE) - Wind Farm, who is responsible for collecting the required information from the operator. The AE – Wind Farm records the generation on a daily basis for each service connection point and reports the cumulative generation to the Manager - Electrical. The Manager – Electrical

reports to the DGM – Wind Farm on a daily basis. The DGM – Wind Farm is responsible for overall operation of the WTGs

The main meter readings are noted in presence of officials from both SEBs (TNEB/BESCOM/CESC) and the PP. The project activity has got dedicated metering system and thus the value reflected in the ER sheet is purely for the project activity.

All the energy meters are calibrated in the 5 year frequency as per state electricity regularity commission. In the case where the energy meter of the windmill was not calibrated in the reported monitoring period, the electricity data were adjusted as per EB 52 Annex 60. The monitoring report therefore satisfies the calibration procedure followed and the calibration frequency for the energy meters

#### Related Findings



No CARs, CLs or FARs have been identified in this context

#### Final Assessment

The monitoring procedures and responsibilities are documented in a written form and is followed as described in the Validated PD<sup>/PD/</sup>. Routines for the archiving of data are defined and documented. Calculations are laid down in the monitoring report is in line with validated PD<sup>/PD/</sup>. The monitoring personnel are well trained and follow reproducible routines. Thus, they have the necessary competence to carry out the relevant tasks with sufficient accuracy.

## 4 VERIFICATION STATEMENT

Madras Cements Limited has commissioned the TÜV NORD JI / CDM Certification Program to carry out the verification of the Project “Wind energy project by Ramco group in India” in Tamil Nadu & Karnataka, India with regard to the requirements of VCS 2007.1 Standard.

The project activity involves installation of 159.75 MW capacity wind power project consisting of 136 Wind Turbine Generators (WTGs) in Tirunelveli, Dindigul and Coimbatore districts of Tamil Nadu, and Hassan and Chitradurga districts of Karnataka.

Reporting period: From 28-03-2006 to 31-10-2008

In the course of the verification 7 Corrective Action Requests (CARs), 4 Clarification Requests (CLs) were successfully closed and 1 Forward Action Request (FAR) will be verified during the subsequent periodic verification.

The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the validated PD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

In detail the conclusions can be summarised as follows:

- all operations of the project are implemented and installed as planned and described in the validated project description.
- the monitoring plan is in accordance with the applied approved methodology ,ie, ACM0002 version 10
- the installed equipment essential for measuring parameters required for calculating emission reductions is calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 1st periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

|                                         | 2006   | 2007   | 2008   | Total ER in the monitoring period |
|-----------------------------------------|--------|--------|--------|-----------------------------------|
| Baseline emission (tCO <sub>2</sub> e)  | 106845 | 193037 | 291030 | 590912                            |
| Project emission (tCO <sub>2</sub> e)   | 0      | 0      | 0      | 0                                 |
| Emission reduction (tCO <sub>2</sub> e) | 106845 | 193037 | 291030 | 590912                            |



Bangalore, 2011-05-12

A handwritten signature in blue ink, appearing to read 'Ma. Paa. Puratchikkanal', with a horizontal line drawn underneath.

TÜV NORD JI/CDM Certification  
Program

Ma. Paa. Puratchikkanal

TÜV India Pvt. Ltd., Bangalore

Verification Team Leader

Essen, 2011-05-12

A handwritten signature in blue ink, appearing to be a stylized 'G' followed by 'est'.

TÜV NORD JI/CDM Certification  
Program

Final Approval

## 5 REFERENCES

**Table 5-1:** Documents provided by the project participant

| Reference   | Document                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>/PD/</b> | Validated VCS Project Description of the project "Wind energy project by Ramco group in India" Version 03 dtd 30-09-2009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>/VR/</b> | Validation report of VCS Project "Wind energy project by Ramco group in India" dtd 2009-11-16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>/MR/</b> | <p>Monitoring report of VCS project "Wind energy project by Ramco group in India" version 01 dtd 10/05/2010</p> <p>Monitoring report of VCS project "Wind energy project by Ramco group in India" version 02 dtd 16/09/2010</p> <p>Monitoring report of VCS project "Wind energy project by Ramco group in India" version 03 dtd 11/10/2010</p> <p>Monitoring report of VCS project "Wind energy project by Ramco group in India" version 04 dtd 09/05/2011</p>                                                                                                                                                                                                                                                         |
| <b>/ER/</b> | <p>Emission reduction calculation sheet of VCS project "Wind energy project by Ramco group in India" version 01 dtd 10/05/2010</p> <p>Emission reduction calculation sheet of VCS project "Wind energy project by Ramco group in India" version 02 dtd 16/09/2010</p> <p>Emission reduction calculation sheet of VCS project "Wind energy project by Ramco group in India" version 03 dtd 11/10/2010</p>                                                                                                                                                                                                                                                                                                                |
| <b>/CR/</b> | <p>Commissioning certificates of 800 KW turbines supplied by Enercon and commissioned during 27-02-07 to 15-03-08 by Madras Cements Limited from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1650 KW turbines supplied by Vestas and commissioned during 31-12-05 to 23-05-08 by Madras Cements Limited from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 29-09-03 to 21-10-04 by Tanjavur Spinning Mills Limited from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 29-09-03 to 12-08-05 by Shri Vishnu Shankar Mill Ltd</p> |

| Reference | Document                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | <p>from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1650 KW turbines supplied by NEG MICON and commissioned during 28-12-05 by Shri Vishnu Shankar Mill Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 21-09-03 to 29-09-05 by Rajapalayam Mills Ltd Mills Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1650 KW turbines supplied by NEG MICON and commissioned during 28-02-06 to 27-03-06 by Rajapalayam Mills Ltd Mills Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 21-09-03 to 23-09-04 by Sandhya Spinning Mills Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 350 KW turbines supplied by Suzlon and commissioned during 31-12-05 by Sandhya Spinning Mills Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 30-09-04 to 15-09-05 by Ramco Industries Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1650 KW turbines supplied by NEG MICON and commissioned during 28-12-05 by Ramco Industries Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 800 KW turbines supplied by Enercon and commissioned during 31-03-06 by Ramco Industries Ltd from Tamil Nadu Electricity Board.</p> <p>.</p> <p>Commissioning certificates of 500 KW turbines supplied by Vestas RRB and commissioned during 25-03-03 by Ramco Industries Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 750 KW turbines supplied by NEG MICON and commissioned during 21-03-04 by Ramco Industries Ltd from Tamil Nadu Electricity Board.</p> <p>Commissioning certificates of 1500 KW turbines supplied by Suzlon and commissioned during 10-10-07 by Ramco Industries Ltd from Tamil Nadu Electricity Board.</p> |

| Reference    | Document                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>/PPA/</b> | <p>Power Purchase Agreements between Madras Cements Limited and Tamil Nadu Electricity Board for 24 windmills of 1650 KW capacity</p> <p>Power Purchase Agreements between Madras Cements Limited and Tamil Nadu Electricity Board for 43 windmills of 800 KW capacity</p> <p>Power Purchase Agreements between Ramco Industries Limited and Tamil Nadu Electricity Board for 2 windmills of 800 KW capacity.</p> <p>Power Purchase Agreements between Ramco Industries Limited and Tamil Nadu Electricity Board for 1 windmill of 1500 KW capacity.</p> <p>Power Purchase Agreements between Ramco Industries Limited and Tamil Nadu Electricity Board for 1 windmill of 1650 KW capacity.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>/EWA/</b> | <p>Energy Wheeling Agreement between Madras Cements Limited and Tamil Nadu Electricity Board for 11 wind mills of 1650 KW capacity.</p> <p>Energy Wheeling Agreement between Madras Cements Limited and Tamil Nadu Electricity Board for 10 wind mills of 800 KW capacity.</p> <p>Energy Wheeling Agreement between Tanjavur Spinning Mills Limited and Tamil Nadu Electricity Board for 4 wind mills of 1250 KW capacity.</p> <p>Energy Wheeling Agreement between Shri Vishnu Shankar Mills Limited and Tamil Nadu Electricity Board for 6 wind mills of 1250 KW capacity.</p> <p>Energy Wheeling Agreement between Shri Vishnu Shankar Mills Limited and Tamil Nadu Electricity Board for 1 wind mill of 1650 KW capacity.</p> <p>Energy Wheeling Agreement between Rajapalayam Mills Limited and Tamil Nadu Electricity Board for 13 wind mills of 1250 KW capacity.</p> <p>Energy Wheeling Agreement between Rajapalayam Mills Limited and Tamil Nadu Electricity Board for 2 wind mills of 1650 KW capacity.</p> <p>Energy Wheeling Agreement between Sandhya Spinning Mills Limited and Tamil Nadu Electricity Board for 4 wind mills of 1250 KW capacity.</p> <p>Energy Wheeling Agreement between Sudarsanam Spinning Mills Limited and Tamil Nadu Electricity Board for 3 wind mills of 1250 KW capacity.</p> <p>Energy Wheeling Agreement between Sudarsanam Spinning Mills Limited and Tamil Nadu Electricity Board for 1 wind mill of 1650 KW capacity</p> <p>Energy Wheeling Agreement between Sudarsanam Spinning Mills Limited</p> |

| Reference      | Document                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | <p>and Tamil Nadu Electricity Board for 1 wind mill of 1650 KW capacity</p> <p>Energy Wheeling Agreement between Ramco Industries Limited and Tamil Nadu Electricity Board for 6 wind mills of 1250 KW capacity</p> <p>Energy Wheeling Agreement between Ramco Industries Limited and Tamil Nadu Electricity Board for 1 wind mill of 500 KW capacity</p> <p>Energy Wheeling Agreement between Ramco Industries Limited and Tamil Nadu Electricity Board for 1 wind mill of 750 KW capacity</p> |
| <b>/JMR/</b>   | Joint meter reading of all the service connection meters from April 2006 to November 2008                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>/QA/QC/</b> | Internal quality assurance and quality control records and procedures                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>/TD/</b>    | Technical details of the wind mills.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>/cal/</b>   | Calibration certificates of the energy meters involved in the monitoring of the project activity                                                                                                                                                                                                                                                                                                                                                                                                |

**Table 5-2:** Background investigation and assessment documents

| Reference          | Document                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>/ACM0002/</b>   | Approved CDM Methodology ACM0002, version 10: "Consolidated methodology for grid-connected electricity generation from renewable sources"                                                                                                                                                                                                                                                                                                                                                         |
| <b>/CPM/</b>       | TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>/IPPC/</b>      | <ol style="list-style-type: none"> <li>1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book</li> <li>2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book</li> </ol>                                                                                                                                                                                                                                                                                        |
| <b>/ISO 14064/</b> | <p>Greenhouse gases -- Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals</p> <p>Greenhouse gases -- Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements</p> <p>Greenhouse gases -- Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions</p> |

| Reference         | Document                                                                                                                                      |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>/ISO14065/</b> | Greenhouse gases -- Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition |
| <b>/AT/</b>       | Tool for the demonstration and assessment of additionality (Version 05.2; EB 39).                                                             |
| <b>VCS</b>        | Voluntary Carbon Standard 2007.1                                                                                                              |
| <b>/VDS-PD-T/</b> | VCS PD Template                                                                                                                               |
| <b>/VVM/</b>      | Validation and Verification Manual (Version 1.2 as per EB 55)                                                                                 |

**Table 5-3:** Websites used

| Reference       | Link                                                                     | Organisation      |
|-----------------|--------------------------------------------------------------------------|-------------------|
| <b>/cd4cdm/</b> | <a href="http://www.cd4cdm.org">www.cd4cdm.org</a>                       | UNEP Riso Centre  |
| <b>/ipcc/</b>   | <a href="http://www.ipcc-nggip.iges.or.jp">www.ipcc-nggip.iges.or.jp</a> | IPCC publications |
| <b>/vcs/</b>    | <a href="http://www.v-c-s.org">www.v-c-s.org</a>                         | VCSA              |
| <b>/unfccc/</b> | <a href="http://cdm.unfccc.int">http://cdm.unfccc.int</a>                | UNFCCC            |

**Table 5-4:** List of interviewed persons

| Reference     | Mol <sup>1</sup> |                                                                         | Name             | Organisation / Function      |
|---------------|------------------|-------------------------------------------------------------------------|------------------|------------------------------|
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | Mr. Sivakumar    | DGM, Madras Cements Limited  |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | S.V. Subba Raj   | Dy. Manager, Wind Farm       |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | G. Seenivasagan  | Jr. Manager, Wind Farm       |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | K.K. Thangngaraj | Incharge, Sashta Engineering |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | T. Kandasamy     | Operator, Sashta Engineering |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.                                 | M. Senthil Kumar | Asst. Manager, Electrical    |

| Reference     | Moi <sup>1</sup> |                                                                         | Name              | Organisation / Function              |
|---------------|------------------|-------------------------------------------------------------------------|-------------------|--------------------------------------|
|               |                  | <input type="checkbox"/> Ms.                                            |                   |                                      |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | J. Madava Raj     | Dy. Engineer, Wind Farm              |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | M. Venkatesan     | Engineer, Wind Farm                  |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | R. Ramachandran   | Operator, Wind Farm                  |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | K Idhaya Kumar    | Operator, Wind Farm                  |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | M. Kowna Garay    | Operator, Wind Farm                  |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | S. Jagadeshwaran  | Operator, Wind Farm                  |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | G. Ganesan        | Jr. Manager, Wind Farm               |
| <b>/IM02/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | Mr. Saurabh Kaura | Asst. Manager, BUNGE Emissions Group |

<sup>1)</sup> Means of Interview: (Telephone, E-Mail, Visit)

## Annex-I

| Investor: Madras cements Limited |                                            |                    |                                                                  |            |                                                                                                                                     |                                                                                                                                         |                        |
|----------------------------------|--------------------------------------------|--------------------|------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| HT Sc<br>No.                     | NO.s and<br>Capacity<br>(KW) of<br>turbine | Make of<br>Turbine | SF No. of<br>Turbine                                             | Location   | Latitude                                                                                                                            | Longitude                                                                                                                               | Commissioni<br>ng Date |
| D131                             | 1X800                                      | ENERCON            | 484/1,2                                                          | Pushpathur | N10° 34` 4.981"                                                                                                                     | E77° 24` 59.852"                                                                                                                        | 27.02.07               |
| D69                              | 7X800                                      | ENERCON            | 125/1A;188/1,2<br>;193/1B;185;17<br>7/1B,1C(P);177<br>/1C(P);171 | Pushpathur | N10° 36` 5.822"<br>N10° 36` 1.228"<br>N10° 35` 57.224"<br>N10° 36` 8.74"<br>N10° 36` 1.294"<br>N10° 35` 51.574"<br>N10° 35` 44.379" | E77° 24` 2.497"<br>E77° 24` 20.415"<br>E77° 24` 33.504"<br>E77° 24` 33.496"<br>E77° 24` 45.736"<br>E77° 24` 48.981"<br>E77° 24` 45.439" | 29.03.07               |
| D76                              | 1X800                                      | ENERCON            | 338                                                              | Pushpathur | N10° 35` 26.614"                                                                                                                    | E77° 24` 49.969"                                                                                                                        | 16.04.07               |
| D77                              | 1X800                                      | ENERCON            | 347/2B1&2B2                                                      | Pushpathur | N10° 35` 11.947"                                                                                                                    | E77° 24` 49.427"                                                                                                                        | 16.04.07               |
| D97                              | 1X800                                      | ENERCON            | 702/1A(P)                                                        | Pushpathur | N10° 36` 5.822"                                                                                                                     | E77° 24` 2.497"                                                                                                                         | 23.07.07               |
| D98                              | 1X800                                      | ENERCON            | 451/1(P)                                                         | Pushpathur | N10° 35` 25.7"                                                                                                                      | E77° 27` 25.556"                                                                                                                        | 23.07.07               |
| D99                              | 1X800                                      | ENERCON            | 461/1(P),457/1<br>(P)                                            | Pushpathur | N10° 35` 17.777"                                                                                                                    | E77° 27` 40.388"                                                                                                                        | 23.07.07               |
| D100                             | 1X800                                      | ENERCON            | 305(P)                                                           | Pushpathur | N10° 33` 22.967"                                                                                                                    | E77° 25` 31.349"                                                                                                                        | 23.07.07               |
| D101                             | 1X800                                      | ENERCON            | 1/1(P)                                                           | Pushpathur | N10° 33` 32.172"                                                                                                                    | E77° 25` 10.455"                                                                                                                        | 02.08.07               |
| D102                             | 1X800                                      | ENERCON            | 9                                                                | Pushpathur | N10° 33` 21.471"                                                                                                                    | E77° 25` 5.923"                                                                                                                         | 02.08.07               |

TÜV NORD CERT GmbH  
JI/CDM Certification Program  
Langemarckstraße, 20  
45141 Essen, Germany  
Phone: +49-201-825-3335  
Fax: +49-201-825-3290  
www.tuev-nord.de  
www.global-warming.de

Rev.0 / 2009-08-21



|      |       |         |                                                                                                                 |            |                                                                                                                                     |                                                                                                                                        |          |
|------|-------|---------|-----------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------|
| D122 | 1X800 | ENERCON | 228/2A2                                                                                                         | Pushpathur | N10° 33' 47.03"                                                                                                                     | E77° 26' 6.389"                                                                                                                        | 27.09.07 |
| D116 | 2X800 | ENERCON | 222, 210/1                                                                                                      | Pushpathur | N10° 35' 55.43"<br>N10° 35' 52.793"                                                                                                 | E77° 24' 59.435"<br>E77° 25' 12.37"                                                                                                    | 27.09.07 |
| D115 | 1X800 | ENERCON | 166/3 &<br>165/2 (P)                                                                                            | Pushpathur | N10° 33' 48.419"                                                                                                                    | E77° 24' 31.989"                                                                                                                       | 27.09.07 |
| D121 | 2X800 | ENERCON | 471 (P) SOUTH,<br>472 (P), 471 (P) N<br>ORTH                                                                    | Pushpathur | N10° 33' 12.822"<br>N10° 35' 18.626"                                                                                                | E77° 27' 16.773"<br>E77° 27' 10.868"                                                                                                   | 27.09.07 |
| D120 | 1X800 | ENERCON | 616/1A (P)                                                                                                      | Pushpathur | N10° 35' 34.50"                                                                                                                     | E77° 27' 15.17"                                                                                                                        | 27.09.07 |
| D119 | 2X800 | ENERCON | 649/1C2 (P), 644<br>(P)                                                                                         | Pushpathur | N10° 35' 52.105"<br>N10° 36' 6.094"                                                                                                 | E77° 27' 14.39"<br>E77° 27' 6.084"                                                                                                     | 27.09.07 |
| D118 | 1X800 | ENERCON | 644 (P)                                                                                                         | Pushpathur | N10° 39' 53.363"                                                                                                                    | E77° 27' 5.333"                                                                                                                        | 27.09.07 |
| D117 | 1X800 | ENERCON | 665/1A (P)                                                                                                      | Pushpathur | N10° 36' 33.779"                                                                                                                    | E77° 27' 5.877"                                                                                                                        | 27.09.07 |
| D129 | 7X800 | ENERCON | 670/1B (P), 347 (P),<br>349 (P) SOUTH<br>,<br>356/4A, 3G, 5C,<br>358/1 (P) NORTH,<br>416, 676 (P),<br>675/1 (P) | Pushpathur | N10° 36' 7.969"<br>N10° 36' 14.638"<br>N10° 36' 20.462"<br>N10° 36' 26.49"<br>N10° 36' 30.69"<br>N10° 36' 33.35"<br>N10° 36' 43.57" | E77° 28' 1.439"<br>E77° 28' 5.537"<br>E77° 27' 57.231"<br>E77° 27' 51.525"<br>E77° 27' 42.812"<br>E77° 27' 26.820"<br>E77° 27' 26.244" | 28.09.07 |
| D134 | 1X800 | ENERCON | 44/3A                                                                                                           | Pushpathur | N10° 35' 26.614"                                                                                                                    | E77° 24' 49.969"                                                                                                                       | 02.01.08 |
| D133 | 1X800 | ENERCON | 103/1B                                                                                                          | Pushpathur | N10° 37' 1.551"                                                                                                                     | E77° 26' 33.779"                                                                                                                       | 02.01.08 |
| D132 | 2X800 | ENERCON | 53/1 (P),<br>54/1 (P) & 2 (P)                                                                                   | Pushpathur | N10° 35' 11.947"<br>N10° 36' 46.863"                                                                                                | E77° 24' 49.427"<br>E77° 26' 44.245"                                                                                                   | 02.01.08 |
| D140 | 2X800 | ENERCON | 69/1B (P),<br>70/1, 2 (P)                                                                                       | Pushpathur | N10° 36' 1.294"<br>N10° 35' 44.379"                                                                                                 | E77° 24' 45.736"<br>E77° 24' 45.439"                                                                                                   | 15.03.08 |



|       |        |         |                                                                                                     |            |                                                                                                                                       |                                                                                                                                         |          |
|-------|--------|---------|-----------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|
| D139  | 2X800  | ENERCON | 78/5,6(P),<br>100/1(P),2(P)                                                                         | Pushpathur | N10° 35' 51.574"<br>N10° 36' 41.402"                                                                                                  | E77° 24' 48.981"<br>E77° 24' 31.245"                                                                                                    | 15.03.08 |
| D135  | 7X800  | ENERCON | 26/1(P),27/1(P)<br>, 12/1B3(P),<br>148/1,2(P),<br>144/4(P),<br>110/1A(P),<br>115/1(P),<br>110/3(P)) | Pushpathur | N10° 37' 17.098"<br>N10° 37' 24.643"<br>N10° 37' 30.434"<br>N10° 37' 10.15"<br>N10° 37' 13.54"<br>N10° 37' 4.232"<br>N10° 36' 57.384" | E77° 26' 55.041"<br>E77° 26' 38.692"<br>E77° 26' 51.136"<br>E77° 26' 28.152"<br>E77° 26' 10.488"<br>E77° 26' 7.092"<br>E77° 26' 13.319" | 15.03.08 |
| D138  | 2X800  | ENERCON | 225/2A2,2A3,2A<br>4,224/1(P),<br>125/1(P), 2(P)                                                     | Pushpathur | N10° 36' 51.945"<br>N10° 37' 1.115"                                                                                                   | E77° 25' 40.589"<br>E77° 25' 45.298"                                                                                                    | 15.03.08 |
| D137  | 1X800  | ENERCON | 204/2(P) &<br>126/1(P)                                                                              | Pushpathur | N10° 37' 15.869"                                                                                                                      | E77° 25' 47.388"                                                                                                                        | 15.03.08 |
| D136  | 1X800  | ENERCON | 199(P)                                                                                              | Pushpathur | N10° 37' 28.380"                                                                                                                      | E77° 25' 49.131"                                                                                                                        | 15.03.08 |
| U1459 | 1X1650 | VESTAS  | 186(P),188/1AA<br>(P)                                                                               | Udumalpet  | N10° 35.857'                                                                                                                          | E77° 14.145'                                                                                                                            | 27.07.07 |
| U1460 | 1X1650 | VESTAS  | 163/1                                                                                               | Udumalpet  | N10° 34.498'                                                                                                                          | E 77° 11.435'                                                                                                                           | 31.07.07 |
| U1464 | 1X1650 | VESTAS  | 59/3B(P),253/C<br>1(P)                                                                              | Udumalpet  | N10° 37.239'                                                                                                                          | E77° 12.081'                                                                                                                            | 16.08.07 |
| U1465 | 1X1650 | VESTAS  | 252/B1<br>C(P),253/C1(P)                                                                            | Udumalpet  | N10° 34.844'                                                                                                                          | E77° 11.315'                                                                                                                            | 16.08.07 |
| U1468 | 1X1650 | VESTAS  | 446/3,446/4                                                                                         | Udumalpet  | N10° 37.760'                                                                                                                          | E77° 21.854'                                                                                                                            | 22.08.07 |
| U1469 | 1X1650 | VESTAS  | 440/2A,2B                                                                                           | Udumalpet  | N10° 37.985'                                                                                                                          | E77° 21.804'                                                                                                                            | 22.08.07 |
| U1522 | 1X1650 | VESTAS  | 370/1C1 1C2(P)                                                                                      | Udumalpet  | N10° 38.175'                                                                                                                          | E77° 21.520'                                                                                                                            | 29.03.08 |



|       |        |        |            |                     |               |                |          |
|-------|--------|--------|------------|---------------------|---------------|----------------|----------|
| U1532 | 1X1650 | VESTAS | 525/2 (P)  | Udumalpet           | N10° 38.559'  | E77° 20.304'   | 31.03.08 |
| U1311 | 1X1650 | VESTAS | 161/1A3    | Thungavi            | N10° 37.476'  | E77° 18.987'   | 29.09.06 |
| U1310 | 1X1650 | VESTAS | 34/2C2 (P) | Thungavi            | N10° 37.644'  | E77° 19.306'   | 29.09.06 |
| 1528  | 1X1650 | VESTAS | 619        | Uthumalai           | N8° 58' 10.2" | E77° 32' 32.4" | 31.12.05 |
| 1529  | 1X1650 | VESTAS | 649        | Uthumalai           | N8° 58' 01.9" | E77° 32' 52.0" | 31.12.05 |
| 1530  | 1X1650 | VESTAS | 641        | Uthumalai           | N8° 57' 43.1" | E77° 32' 46.9" | 31.12.05 |
| 1531  | 1X1650 | VESTAS | 664        | Uthumalai           | N8° 58' 08.3" | E77° 32' 13.1" | 31.12.05 |
| 2037  | 1X1650 | VESTAS | 233        | Anaikulam           | N9° 00' 46.5" | E77° 28' 15.2" | 29.09.06 |
| 2038  | 1X1650 | VESTAS | 284        | Anaikulam           | N9° 00' 22.2" | E77° 28' 18.7" | 29.09.06 |
| 2039  | 1X1650 | VESTAS | 66         | N. Krishna<br>puram | N9° 00' 27.4" | E77° 29' 34.0" | 29.09.06 |
| 2067  | 1X1650 | VESTAS | 99         | Kurichampatti       | N8° 59' 27.1" | E77° 29' 48.8" | 30.09.06 |
| 2068  | 1X1650 | VESTAS | 83         | Kurichampatti       | N8° 59' 18.1" | E77° 29' 21.3" | 30.09.06 |
| 2505  | 1X1650 | VESTAS | 179        | Vadiyoor            | N8° 58' 097"  | E77° 27' .549' | 31.12.07 |
| 2506  | 1X1650 | VESTAS | 58         | Rajagopalaperi      | N8° 57' .193' | E77° 27' .533' | 22.01.08 |
| 2507  | 1X1650 | VESTAS | 324        | Rajagopalaperi      | N8° 57' .504' | E77° 27' .620' | 24.01.08 |
| 2509  | 1X1650 | VESTAS | 87         | Anaikulam           | N9° 00' 06.2" | E77° 27' 24.3" | 04.02.08 |
| 2510  | 1X1650 | VESTAS | 37         | Vadiyoor            | N8° 59' 02.7" | E77° 28' 06.4" | 13.02.08 |
| 2522  | 1X1650 | VESTAS | 196        | Rajagopalaperi      | N8° 56' .944' | E77° 27' .823' | 17.03.08 |
| 2616  | 1X1650 | VESTAS | 234        | Rajagopalaperi      | N8° 56' 40.7" | E77° 27' 48.0" | 22.04.08 |
| 2629  | 1X1650 | VESTAS | 654        | Uthumalai           | N8° 58' 20.3" | E77° 32' 47.7" | 23.05.08 |
| 2357  | 1X1650 | VESTAS | 525        | Thandayarkulam      | N8° 19' 45.8" | E77° 37' 30.2" | 04.06.07 |



|      |        |        |     |                |               |                |          |
|------|--------|--------|-----|----------------|---------------|----------------|----------|
| 2358 | 1X1650 | VESTAS | 538 | Thandayarkulam | N8° 19' 19.4" | E77° 37' 38.7" | 04.06.07 |
| 2359 | 1X1650 | VESTAS | 529 | Thandayarkulam | N8° 19' 39.6" | E77° 37' 12.8" | 04.06.07 |
| 2360 | 1X1650 | VESTAS | 568 | Thandayarkulam | N8° 19' 32.7" | E77° 37' 34.3" | 04.06.07 |
| 2361 | 1X1650 | VESTAS | 931 | Thandayarkulam | N8° 18' 45.0" | E77° 40' 06.8" | 05.06.07 |
| 2362 | 1X1650 | VESTAS | 754 | Thandayarkulam | N8° 18' 53.6" | E77° 40' 36.3" | 05.06.07 |
| 2367 | 1X1650 | VESTAS | 150 | Thandayarkulam | N8° 18' 40.9" | E77° 39' 30.4" | 14.06.07 |
| 2368 | 1X1650 | VESTAS | 502 | Thandayarkulam | N8 19' 55.1"  | E77° 36' 59.8" | 15.06.07 |

| Investor: Thanjavur Spinning Mills Ltd |                              |                 |                    |               |               |                |                    |
|----------------------------------------|------------------------------|-----------------|--------------------|---------------|---------------|----------------|--------------------|
| HT Sc No.                              | NO.s and Capacity of turbine | Make of Turbine | SF No. of Turbine  | Location      | Latitude      | Longitude      | Commissioning Date |
| 625                                    | 1X1250                       | SUZLON          | 123/5 (P)          | Dhanakarkulam | N8° 14' 55.9" | E77° 38' 12.8" | 29.9.03            |
| 626                                    | 1X1250                       | SUZLON          | 338/4 (P)          | Dhanakarkulam | N8° 14' 55.0" | E77° 38' 28.0" | 29.9.03            |
| 1041                                   | 1X1250                       | SUZLON          | 887/1C (P)         | Irukanthurai  | N8° 12' 33.9" | E77° 39' 16.4" | 21.10.04           |
| 1748                                   | 1X1250                       | SUZLON          | 884/2G (P), 2I (P) | Irukanthurai  | N8° 12' 15.1" | E77° 39' 24.3" | 30.3.06            |

| Investor: Shri Vishnu Shankar Mill Ltd |
|----------------------------------------|
|----------------------------------------|



|      |        |           |                            |               |               |                |          |
|------|--------|-----------|----------------------------|---------------|---------------|----------------|----------|
| 587  | 1X1250 | Suzlon    | 662/2D                     | Dhanakarkulam | N8° 13' 13.2" | E77° 39' 46.2" | 21.09.03 |
| 588  | 1X1250 | Suzlon    | 755/3A1 (P)                | Dhanakarkulam | N8° 12' 44.5" | E77° 39' 45.2" | 22.09.03 |
| 974  | 1X1250 | Suzlon    | 782/1                      | Dhanakarkulam | N8° 12' 57.4" | E77° 39' 59.5" | 30.09.04 |
| 976  | 1X1250 | Suzlon    | 920/3B (P)                 | Dhanakarkulam | N8° 13' 11.9" | E77° 39' 00.2" | 30.09.04 |
| 1333 | 1X1250 | Suzlon    | 54/1C (P)                  | Irukanthurai  | N8° 13' 28.4" | E77° 40' 45.5" | 16.07.05 |
| 1354 | 1X1250 | Suzlon    | 858/1B (P) &<br>857/2B (P) | Dhanakarkulam | N8° 13' 45.9" | E77° 40' 43.9" | 12.08.05 |
| 1527 | 1X1650 | NEG Micon | 142/1 (P)                  | Kavalakuruchi | N8° 56' 48.8" | E77° 32' 16.3" | 28.12.05 |

**Investor: Rajapalayam Mills Ltd**

|      |        |           |             |               |               |                |          |
|------|--------|-----------|-------------|---------------|---------------|----------------|----------|
| 576  | 1X1250 | SUZLON    | 674/ (P)    | Dhanakarkulam | N8° 13' 33.2" | E77° 39' 55.3" | 21.09.03 |
| 577  | 1X1250 | SUZLON    | 845/1 (P)   | Dhanakarkulam | N8° 13' 34.5" | E77° 40' 10.2" | 21.09.03 |
| 944  | 1X1250 | SUZLON    | 311/2A1,2A2 | Irukanthurai  | N8° 12' 48.4" | E77° 40' 17.3" | 28.09.04 |
| 972  | 1X1250 | SUZLON    | 363/2A (P)  | Irukanthurai  | N8° 12' 15.1" | E77° 39' 57.1" | 30.09.04 |
| 979  | 1X1250 | SUZLON    | 890/4       | Dhanakarkulam | N8° 13' 55.1" | E77° 40' 16.8" | 30.09.04 |
| 980  | 1X1250 | SUZLON    | 891         | Dhanakarkulam | N8° 14' 04.2" | E77° 40' 13.9" | 30.09.04 |
| 1022 | 1X1250 | SUZLON    | 837/2       | Irukanthurai  | N8° 12' 04.8" | E77° 38' 34.6" | 30.09.04 |
| 1347 | 1X1250 | SUZLON    | 129/9 (P)   | Irukanthurai  | N8° 12' 28.8" | E77° 41' 14.4" | 04.08.05 |
| 1348 | 1X1250 | SUZLON    | 36 (P)      | Irukanthurai  | N8° 12' 39.5" | E77° 41' 12.4" | 04.08.05 |
| 1467 | 1X1250 | SUZLON    | 137/3 (P)   | Irukanthurai  | N8° 12' 21.3" | E77° 40' 59.6" | 29.09.05 |
| 1582 | 1X1650 | NEG MICON | 245/2 (P)   | Uthumalai     | N8° 58' 07.9" | E77° 31' 44.7" | 28.02.06 |
| 1691 | 1X1650 | NEG MICON | 249/2 (P)   | Uthumalai     | N8° 58' 14.9" | E77° 31' 26.9" | 27.03.06 |



**Investor: Sandhya Spinning Mill Ltd**

|      |        |        |                      |               |               |                |          |
|------|--------|--------|----------------------|---------------|---------------|----------------|----------|
| 631  | 1X1250 | SUZLON | 393/3B(P)            | Irrukanthurai | N8° 11' 35.0" | E77° 39' 24.9" | 30.09.03 |
| 632  | 1X1250 | SUZLON | 329/4B(P)            | Dhanakarkulam | N8° 14' 57.7" | E77° 38' 43.0" | 30.09.03 |
| 1044 | 1X350  | SUZLON | 972/1B(P) &<br>2B(P) | Irrukanthurai | N8° 12' 17.7" | E77° 38' 39.4" | 18.11.04 |
| 1422 | 1X1250 | SUZLON | 404/2B               | Irrukanthurai | N8° 11' 20.0" | E77° 39' 15.1" | 27.09.05 |
| 1468 | 1X1250 | SUZLON | 145/2(P)             | Irrukanthurai | N8° 12' 07.7" | E77° 40' 48.2" | 29.09.05 |

**Investor: Sudarsanam Spinning Mills**

|      |          |           |                                           |               |               |                |          |
|------|----------|-----------|-------------------------------------------|---------------|---------------|----------------|----------|
| 578  | 1X1250   | Suzlon    | 851/1B(P)                                 | Dhanakarkulam | N8° 13' 25.5" | E77° 40' 30.6" | 21.09.03 |
| 579  | 1X1250   | Suzlon    | 854/1(P)                                  | Dhanakarkulam | N8° 13' 35.3" | E77° 40' 25.1" | 21.09.03 |
| 926  | 1X1250   | Suzlon    | 828/2(P)                                  | Dhanakarkulam | N8° 13' 14.7" | E77° 40' 19.8" | 23.09.04 |
| 1540 | 1 x 1650 | NEG Micon | 336/5,6,7A,<br>7B,8,9,10A,1<br>0B,11A,10B | Uthumalai     | N8° 57' 57.3" | E77° 32' 01.9" | 31.12.05 |

**Investor: Rajapalayam Textile**

|     |         |        |        |               |               |                |          |
|-----|---------|--------|--------|---------------|---------------|----------------|----------|
| 978 | 1X 1250 | SUZLON | 879/3C | Dhanakarkulam | N8° 14' 06.4" | E77° 40' 29.0" | 30.09.04 |
|     |         |        |        |               |               |                |          |

**Investor: Ramco Industries Ltd**

|      |          |        |                    |              |               |                |          |
|------|----------|--------|--------------------|--------------|---------------|----------------|----------|
| 1383 | 1 x 1250 | Suzlon | 483/1(P),2(P)<br>) | Irukanthurai | N8° 10' 34.3" | E77° 39' 05.0" | 15.09.05 |
|------|----------|--------|--------------------|--------------|---------------|----------------|----------|



|         |            |            |                             |                 |                |                |           |
|---------|------------|------------|-----------------------------|-----------------|----------------|----------------|-----------|
| 1384    | 1 x 1250   | Suzlon     | 94/1B(P)                    | Irukanthurai    | N8° 12' 58.7"  | E77° 40' 39.9" | 15.09.05  |
| 468     | 1 x 1250KW | Suzlon     | 301/3C<br>(part)            | Irukanthurai    | N8° 12' 25.7"  | E77° 40' 09.5" | 30.01.033 |
| 630     | 1 x 1250KW | Suzlon     | 386/3 (p)                   | Irukanthurai    | N8° 12' 32.1"  | E77° 30' 21.9" | 30.09.03  |
| 973     | 1 x 1250KW | Suzlon     | 886/3A1                     | Irukanthurai    | N8° 12' 42.8"  | E77° 39' 28.6" | 30.09.04  |
| 1525    | 1650 kW    | NEG MICON  | 212/2, 212/3<br>& 213/2 (P) | Uthumalai       | N8° 54' 47.6"  | E76° 33' 16.3" | 28.12.05  |
| 1526    | 1650 KW    | NEG MICON  | 207/3                       | Uthumalai       | N8° 55' 46.8"  | E75° 33' 16.3" | 28.12.05  |
| 271     | 1 x 1250KW | Suzlon     | 320/1 (p)                   | Kallupalayam    | N10° 55' 43.0" | E77° 04' 11.1" | 31.03.04  |
| 510     | 500        | Vestas RRB | 1227/6<br>(part)            | Pazhavor        |                |                | 25.03.03  |
| 426     | 750        | NEG MICON  | 178/2 (part)                | Panagudi        |                |                | 21.03.04  |
| ELP- 27 | 2 * 800    | Enercon    | 321/P                       | Gulihosahalli   |                |                | 31.03.06  |
| H - 31  | 1500       | Suzlon     | SN-12                       | Aidahalli Kaval |                |                | 10.10.07  |

**Investor: Rajapalayam Spintext**

|     |        |        |                    |               |               |                |          |
|-----|--------|--------|--------------------|---------------|---------------|----------------|----------|
| 975 | 1X1250 | Suzlon | 705/3              | Dhanakarkulam | N8° 13' 16.9" | E77° 38' 44.2" | 30.09.04 |
| 977 | 1X1250 | Suzlon | 682/1 A, 1A<br>(P) | Dhanakarkulam | N8° 13' 25.9" | E77° 39' 08.2" | 30.09.04 |
|     |        |        |                    |               |               |                |          |

**Annex-II**

**Wind mills applied for CDM benefit**

| Wind Mill HTSC No. |      |      |       |      |
|--------------------|------|------|-------|------|
| D97                | D120 | D135 | U1522 | 2357 |
| D98                | D119 | D138 | U1532 | 2358 |



|      |      |       |      |      |
|------|------|-------|------|------|
| D99  | D118 | D137  | 2505 | 2359 |
| D100 | D117 | D136  | 2506 | 2360 |
| D101 | D129 | U1459 | 2507 | 2361 |
| D102 | D134 | U1460 | 2509 | 2362 |
| D122 | D133 | U1464 | 2510 | 2367 |
| D116 | D132 | U1465 | 2522 | 2368 |
| D115 | D140 | U1468 | 2616 |      |
| D121 | D139 | U1469 | 2629 |      |