



Voluntary Carbon Standard 2007.1  
Validation Report

**No. 53802108-08/659**

Validation Report:

|                                                                                                                          |                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Name of Validation company:                                                                                              | Date of the issue:                                                                                                       |
| TÜV NORD CERT GmbH                                                                                                       | 2009-11-15                                                                                                               |
| Report Title:                                                                                                            | Approved by:                                                                                                             |
| <i>Bundled Wind power project in Tamil Nadu, India, co-ordinated by Tamil Nadu Spinning Mills Association (TASMA-II)</i> | Mr. Eric Krupp                                                                                                           |
| Client:                                                                                                                  | Project Title:                                                                                                           |
| <i>Tamil Nadu Spinning Mills Association (TASMA).</i>                                                                    | <i>Bundled Wind power project in Tamil Nadu, India, co-ordinated by Tamil Nadu Spinning Mills Association (TASMA-II)</i> |
| Summary:                                                                                                                 |                                                                                                                          |

M/s Tamil Nadu Spinning Mills Association. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project - "Bundled Wind power project in Tamil Nadu, India, co-ordinated by Tamil Nadu Spinning Mills Association (TASMA-II)", with regard to the relevant requirements of VCS 2007.1 Standard as well as criteria for consistent project operations, monitoring and reporting.

The project activity generates electricity which will be supplied to the Southern Grid of India and then distributed to connected end users.

The review of the VCS PD and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

A risk based approach has been followed to perform this validation. In the course of the validation 11 Corrective Action Requests (CAR) and 3 Clarification Requests (CR) were raised and successfully closed out.

The validation is based on the VCS PD, proof of title, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validators by project proponent.

As a result of the validation, the validators confirm that:

- The project additionality is sufficiently justified in the PD.
- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of ACM0002, version-10.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 75,80,930 tCO<sub>2</sub>e (total) is most likely to be achieved within the 10 years renewable crediting period.
- No restrictions or uncertainties were identified related to the validation.

| Work carried out by:                                            |                                                                                | Number of pages: |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|------------------|
| Ma. Paa.<br>Puratchikkanal<br>B.J.M. Amarnath<br>K.V. Sudarshan | N. Premjit Singh<br>S. Stalin<br>G. Ezhilarasu<br>B. Rampradap<br>A. Kirthika. | 37               |

|  |             |  |
|--|-------------|--|
|  | C. Indumati |  |
|--|-------------|--|

*[Table of Contents]*

|     |                                              |    |
|-----|----------------------------------------------|----|
| 1   | Introduction .....                           | 5  |
| 1.1 | Objective .....                              | 5  |
| 1.2 | Scope and Criteria .....                     | 5  |
| 1.3 | VCS project Description .....                | 6  |
| 1.4 | Level of assurance .....                     | 7  |
| 2   | Methodology .....                            | 8  |
| 2.1 | Review of Document .....                     | 8  |
| 2.2 | Follow-up Interviews .....                   | 8  |
| 2.3 | Resolution of any material discrepancy ..... | 10 |
| 3   | Validation Findings .....                    | 11 |
| 3.1 | Project Design .....                         | 11 |
| 3.2 | Baseline .....                               | 14 |
| 3.3 | Monitoring Plan .....                        | 28 |
| 3.4 | Calculation of GHG Emissions .....           | 30 |
| 3.5 | Environmental Impact .....                   | 30 |
| 3.6 | Comments by stakeholders .....               | 31 |
| 4   | Validation conclusion .....                  | 32 |
| 5   | References .....                             | 34 |

## 1 Introduction

### 1.1 Objective

The purpose of this validation is to have an independent third party assessment of the project design. In particular the project's baseline, the monitoring plan (MP), and the project's compliance with the requirements of:

- The requirements of VCS 2007.1 program guidelines
- Requirements of the Approved methodology, ACM0002 version 10
- To assess the project's compliance with other relevant rules;
- Other relevant rules, of VCS sustainability criteria are validated in order to confirm that the project design as documented is sound and reasonable and meet the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of Verified Emission Reductions (VERs).

### 1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (based on CDM approved methodology ACM0002. /Version 9: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" will be employed for the project), which are included in the VCS PD and other relevant supporting documents.

The items covered in the validation are described below:

- VCS 2007.1 & Host Country Criteria
  - To meet the requirements of VCS 2007.1 guidelines requirements, in particular,
  - Host country requirements / criteria
- VCS Project Description
  - Project design
  - Project boundaries and Predicted VCS project GHG emissions
- Project Baseline
  - Baseline methodology
  - Baseline GHG emissions

- Monitoring Plan
  - Monitoring methodology
  - Indicators/data to be monitored and reported
  - Responsibilities
- Project Additionality
- Background investigation and follow up interviews
- Draft validation reporting with CARs,CRs & FARs, if any
- Final validation reporting.

The information included in the PD<sup>/PDD/</sup> and the supporting documents were reviewed against the requirements and criteria mentioned above. The TÜV NORD CERT GmbH JI/CDM CP has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of VERs. The validation is based on the information made available to TÜV NORD JI/CDM CP and on the contract conditions.

The validation is not meant to provide any consulting to the project participant. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

### 1.3 VCS project Description

The project activity involves installation and commissioning of 812 WEGs (460.18MW) of varying capacities ranging between 225kW to 1650kW, the details of number of WEGs of different capacity are given in Table 1-1. The details of ownership, location and number of WEGs are as mentioned in Appendix 1 of VCS PD. The electricity generated from the WEGs is supplied to the Tamil Nadu Electricity Board (TNEB) which forms part of the Southern Grid. This power from GHG free source will displace power from Southern Grid which is primarily dominant by fossil fuel based and hence will effect reduced emissions in power generation from southern grid connected power stations. The proposed project falls under large-scale methodology ACM0002 version 10, of CDM methodologies. The PLF considered for the projects whose investment decision were in 2004 has been considered as 15% based on the minutes of meeting<sup>/ADD/2</sup> between TASMA members held on 23/08/2003 and for subsequent years the PLF is Investment Guidelines for TASMA members<sup>/ADD/3</sup> in which the same has been derived based on pass (location) wise and capacity the same is presented in table 1-2. In estimation of emission reductions for the PLF has been considered for the all the WTGs in the bundle as per above mentioned references has been considered The

estimated GHG emission reduction is 75,80,930tCO<sub>2</sub>e (total) or average 7,58,093 tCO<sub>2</sub>e per year for ten years of crediting period.

**Table 1-1: Capacity wise WEG numbers and Total capacity**

| SL. NO | CAPACITY (KW) | NO.OF MACHINES | TOTAL CAPACITY (MW) |
|--------|---------------|----------------|---------------------|
| 1      | 225           | 196            | 44.10               |
| 2      | 230           | 5              | 1.15                |
| 3      | 250           | 145            | 36.25               |
| 4      | 330           | 11             | 3.63                |
| 5      | 350           | 46             | 16.10               |
| 6      | 500           | 97             | 48.50               |
| 7      | 600           | 54             | 32.40               |
| 8      | 750           | 78             | 58.50               |
| 9      | 800           | 20             | 16.00               |
| 10     | 850           | 15             | 12.75               |
| 11     | 1250          | 120            | 150.00              |
| 12     | 1500          | 3              | 4.50                |
| 13     | 1650          | 22             | 36.30               |
|        | <b>TOTAL</b>  | <b>812</b>     | <b>460.18</b>       |

**Table 1-2: Pass and Capacity wise PLF**

|                | PLF in percentage     |                     |                  |
|----------------|-----------------------|---------------------|------------------|
| Capacity in MW | Aralvaimozhi Pass (A) | Shencottah Pass (B) | Palghat Pass (C) |
| 0.225          | 23.61%                | 20.04%              | 17.48%           |
| 0.230          | 22.81%                | 20.26%              | 16.74%           |
| 0.250          | 20.98%                | 18.64%              | 15.40%           |
| 0.330          | 19.84%                | 16.98%              | 14.18%           |
| 0.350          | 18.71%                | 16.01%              | 13.37%           |
| 0.500          | 27.45%                | 21.68%              | 20.49%           |
| 0.600          | 24.32%                | 20.03%              | 19.48%           |
| 0.750          | 22.39%                | 18.59%              | 17.91%           |
| 0.800          | 27.73%                | 21.88%              | 20.52%           |
| 0.850          | 26.84%                | 20.58%              | 21.14%           |
| 1.250          | 26.04%                | 21.00%              | 20.88%           |
| 1.500          | 25.50%                | 20.59%              | 20.77%           |
| 1.650          | 29.79%                | 22.93%              | 23.43%           |

#### 1.4 Level of assurance

The validation report is based on VCS PD, site visit interviews and documents provided by the project proponent, as well as information got from on-site visit. The validation opinion is assured and provides the credibility of all above.

## 2 Methodology

The validation of the project was carried out between November 2008 to November 2009.

|                    |   |                           |
|--------------------|---|---------------------------|
| Preparations       | : | 2009-06-01 to 2008-06-30  |
| On-site validation | : | 2009-07-20 to 2009-07-26, |
| (Draft) Reporting  | : | 2009-08-31                |
| (Final) Reporting  | : | 2009-11-15                |

The validation consisted of the following three phases:

- a desk review of the project design and the baseline and monitoring methodology
- follow-up interviews
- the resolution of outstanding issues and the issuance of the final Validation report and opinion

### 2.1 Review of Document

The draft PD<sup>/PD/</sup> submitted by the project participants in June 2009 and supporting background documents related to the project design and baseline were reviewed. Furthermore, the validation team used additional documentation by third parties like technical reports referring to the project design or to the basic conditions and technical data.

The documents that were considered during the validation process are given in chapter 5 of this report. They are listed as follows:

- Documents provided by the project proponent (Table 5-1)
- Background investigation and assessment documents (Table 5-2)
- Websites used (Table 5-3).

### 2.2 Follow-up Interviews

From 2009-07-20 to 2009-07-26, the TÜV NORD JI/CDM CP performed On-site validation visit with the project proponent.

During this visit, as well as earlier and after, interviews with the project proponent, the consultant,

project stakeholders and with local authorities were carried out to confirm selected information and to resolve issues identified in the document review.

The key interview and main topics of the interview are summarised in Table 2-1.

**Table 2-1 Interviewed persons and interview topics**

| Interviewed Persons / Entities                                                                        | Interview topics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Projects &amp; Operations Personnel<sup>/IM01/</sup></p> <p>2. Consultants<sup>/IM02/</sup></p> | <ul style="list-style-type: none"> <li>- Technical details of the project activity</li> <li>- WEGs Performance data</li> <li>- Approval procedures and status</li> <li>- Monitoring and measurement</li> <li>- Project activity starting date and commissioning date</li> <li>- Crediting period</li> <li>- VER allocation /ownership</li> <li>- TASMA I - CDM registered project</li> <li>- Guidelines established for TASMA I and TASMA II</li> <li>- TASMA project practices</li> <li>- Sustainable development issues</li> <li>- Environmental Impact Assessment</li> <li>- Local stake holder consultation process</li> <li>- Roles &amp; responsibilities, competency and training of the staff members w.r.t project management, monitoring and reporting</li> <li>- Operational Data - technical specification, capacity, estimated life time of the project plant units</li> <li>- Editorial aspects of PD</li> <li>- Baseline study and additionality</li> <li>- Details of emissions reduction calculations</li> <li>- Estimation of net energy (Import / Export)</li> <li>- QA/QC and calibration procedures</li> <li>- Data quality, archiving and reporting procedures</li> <li>- Data uncertainty and residual risks</li> </ul> |

| Interviewed Persons / Entities | Interview topics                                                                                                      |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|                                | <ul style="list-style-type: none"> <li>- GHG calculation</li> <li>- Procedural aspects of the verification</li> </ul> |

A detailed list including the functions or designations of the interviewed persons is given in chapter 5 (see. Table 5-4). This table also includes reference codes to be used in the validation protocol.

### 2.3 Resolution of any material discrepancy

A few Discrepancies were found during the validation and the validation report containing a set of CARs & CRs were submitted to the project proponent. The project design document was revised addressing the CARs & CRs issued by TÜV NORD JI/CDM CP.

After reviewing the revised and resubmitted project documentation<sup>/PDD/</sup>; resolving the CARs & CRs raised and outstanding concerns, TÜV NORD JI/CDM CP issues this final validation report and opinion.

The results are shown in Table 2-2:

**Table 2-2:** Summary of CAR and CR issued

| Validation topic 1)                 | No. of CAR | No. of CR |
|-------------------------------------|------------|-----------|
| Project Design (3.1)                | 5          | 2         |
| Baseline (3.2)                      | 2          | 1         |
| Monitoring plan (3.3)               | 4          | 0         |
| Calculations of GHG emissions (3.4) | 0          | 0         |
| Environmental Impact (3.5)          | 0          | 0         |
| Local Stakeholder Comments (3.6)    | 0          | 0         |
| <b>SUM</b>                          | <b>11</b>  | <b>3</b>  |

1) The letters in brackets refer to the validation protocol

For an in depth analysis/evaluation of all CARs and CRs can be referred to the below sections from 3.1 to 3.6.

### 3 Validation Findings

#### 3.1 Project Design

The proposed project uses wind power for electricity generation. Total installed capacity is 460.18MW, the numbers of WEGs with varying capacities are given in Table 1-1 of this report. The PLF considered for the projects whose investment decision were in 2004 has been considered as 15% based on the minutes of meeting<sup>/ADD/2</sup> between TASMA members held on 23/08/2003 and for subsequent years the PLF (Table 1-2) is based on Investment Guidelines for TASMA members<sup>/ADD/3</sup> in which the same has been derived based on pass wise and capacity. The report<sup>/ADD/3</sup> prepared by the third party has been circulated among the members to decide on investment and decision making to proceed with the WEG investment at different locations (pass). The estimated average electricity supplied to the grid is 863810.6 MWh per year. Key components of WEGs and different make capacity and numbers are given below in the Table 3-1 and Table 3-2 respectively:

**Table 3-1:** Key components of WEGs

| Components | Parameters                                                          |
|------------|---------------------------------------------------------------------|
| Main Tower | Metallic tower of height ranging from 45 m to 80 m                  |
| Nacelle    | Houses, Main shaft, Gearbox and Generator                           |
| Main shaft | Rotated by the Blade connected to gearbox/generator                 |
| Gearbox    | To step up Generator RPM (not used in some models)                  |
| Generator  | Induction Type generators                                           |
| Blade      | Fibre blades to take off at wind speeds from 4 m /sec to 2.5 m /sec |
| Hub        | Connects, the blade and main shaft and houses the brakes            |

**Table 3-2:** Make, capacity and number of WEGs

| SL. NO | MAKE                          | CAPACITY (KW) | NO. OF MACHINES | TOTAL CAPACITY (MW) |
|--------|-------------------------------|---------------|-----------------|---------------------|
| 1      | NEPC                          | 225           | 135             | 30.375              |
| 2      | Southern Wind Farms Ltd.,     | 225           | 48              | 10.80               |
| 3      | VESTAS RRB                    | 225           | 13              | 2.925               |
| 4      | ENERCON                       | 230           | 5               | 1.15                |
| 5      | Chiranjeevi Wind Energy Ltd., | 250           | 16              | 4.00                |

| SL. NO | MAKE                       | CAPACITY (KW) | NO.OF MACHINES | TOTAL CAPACITY (MW) |
|--------|----------------------------|---------------|----------------|---------------------|
| 6      | PIONEER WINCON             | 250           | 108            | 27.00               |
| 7      | SRIRAM EPC LTD             | 250           | 21             | 5.25                |
| 8      | ENERCON                    | 330           | 11             | 3.63                |
| 9      | SUZLON                     | 350           | 46             | 16.10               |
| 10     | VESTAS RRB                 | 500           | 97             | 48.50               |
| 11     | ENERCON                    | 600           | 18             | 10.80               |
| 12     | SUZLON                     | 600           | 4              | 2.40                |
| 13     | VESTAS RRB                 | 600           | 32             | 19.20               |
| 14     | NEG MICON/VESTAS           | 750           | 68             | 51.00               |
| 15     | NEPC                       | 750           | 2              | 1.50                |
| 16     | VESTAS                     | 750           | 8              | 6.00                |
| 17     | ENERCON                    | 800           | 20             | 16.00               |
| 18     | PIONEER ASIA WIND TURBINES | 850           | 15             | 12.75               |
| 19     | SUZLON                     | 1250          | 120            | 150.00              |
| 20     | SUZLON                     | 1500          | 3              | 4.50                |
| 21     | NEG MICON/VESTAS           | 1650          | 20             | 33.00               |
| 22     | VESTAS                     | 1650          | 2              | 3.30                |
|        | <b>TOTAL</b>               |               | <b>812</b>     | <b>460.18</b>       |

The project duration is: 20 years.

Project start date is: 2004/01/31 (commissioning date of the N.S.P Knitting Mills 500kW (HTSC No: 330) WEG, Which is the earliest commissioning date in the bundled project activity)

Crediting period is: Renewable Ten years starting from 2006/04/01, renewable once.

Tamilnadu Spinning Mills Association (TASMA) has ownership of the proposed project. Proof<sup>/DEC/</sup> of title was submitted. Also the right<sup>/DEC/</sup> for emission reduction for the entire crediting period is with TASMA Refer to Table 5-1.

The emission reduction was not double<sup>/DEC/</sup> counted. Also the project was not registered under any other emission trading mechanism<sup>/DEC/</sup> and hence there is no rejection history.

However, CAR and CR were raised.

| CAR/CR | Reference | Summary of project owner response | Revised sections (as applicable) | Conclusion |
|--------|-----------|-----------------------------------|----------------------------------|------------|
|        |           |                                   |                                  |            |

|                                                                                                                                                                                                                  |             |                                                                                                                                                                      |             |                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAR 3.1.1</b><br>The emission reductions mentioned in section 1.3 of VCS PD doesn't refer the exact years, and also clarify why there is difference in emission reductions for first year to all other years. | /PD/<br>1.3 | The exact years is added in the revised VCS PD. The emission reductions are revised in the PD and the calculation sheet supporting the same is submitted to the DOE. | /PD/<br>1.3 | The revised emission calculation sheet is submitted and the same has been verified, the emission reduction is consistent for all the years. CAR 3.1.1 is closed. |
| <b>CAR 3.1.2</b><br>The fonts used are not consistent through out the VCS PD. Also the guidance from the VCS PD template has to be removed in the respective sections of VCS PD.                                 | /PD/        | The fonts are made consistent through out the revised VCS PD. The template is removed from the respective sections of the PD.                                        | /PD/        | The fonts are now consistent with the VCS PD template and the guidance at respective sections has been removed. Hence CAR closed.                                |
| <b>CR 3.1.1</b><br>The location referred in section 1.5 of VCS PD is not presented in Appendix 1 of VCS PD.                                                                                                      | /PD/<br>1.5 | Included locations/ passes in the appendix 1 of the revised VCS PD                                                                                                   | /PD/<br>1.5 | The location and data pertaining to the same has been incorporated in the revised PD. Hence CR closed.                                                           |
| <b>CR 3.1.2</b><br>Justify the appropriateness of the argument "The plant load factor of WTG is ..... investment decision." in section 1.9 and page 9 of VCS PD.                                                 | /PD/<br>1.9 | Removed from the revised VCS PD                                                                                                                                      | /PD/<br>1.9 | Since the argument is irrelevant the same has been removed in the revised PD. Hence CR closed.                                                                   |

|                                                                                                                                                                                |       |                                                                                                                                                            |       |                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAR 3.1.3</b><br>A declaration from the project proponent as proof for fulfilling the points 1.12, 1.13, 1.14 and 8.1 of PD need to be provided.                            | /PD/  | Declaration has been submitted to DOE                                                                                                                      | /PD/  | The declaration by the project proponent has been verified and found to be ok. Hence CR closed.                                                                                                                                  |
| <b>CAR 3.1.4</b><br>Emission reduction calculation sheet is pending.                                                                                                           | /XLS/ | Submitted to DOE ( <b>attached as Emission reduction calculation sheet</b> )                                                                               | /XLS/ | The Emission calculation sheet <sup>/XLS/</sup> has been verified for correctness of PLF, Emission factor correctness and found ok. Hence CAR closed.                                                                            |
| <b>CAR 3.1.5</b><br>The commissioning date and Name of promoter provided in the master data sheet is contradicting for the WTGs as per the commissioning certificate provided. |       | The supportive for name change and commissioning dates has been provided to DOE in a CD. (the document in the CD is referred to the name as "name change") |       | The provided excel sheet for name change and commissioning dates has been checked with the name change certificate and the corrected commissioning dates were found to be ok. Hence the same is acceptable. CAR 3.1.5 is closed. |

### 3.2 Baseline

The project activity is grid connected renewable energy generation through wind electricity generators. The

purpose of the project activity is to generate electricity through renewable resources (wind) and displace equivalent amount of electricity in the regional grid which is predominant by fossil fuels. The selected baseline methodology is approved baseline methodology for "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (ACM0002 Ver.10).

The baseline under the adopted methodology ACM 0002 is calculated by multiplying the grid emission factor (kgCO<sub>2</sub>/kWh) and the net electricity exported (in kWh) by this project activity consisting 460.18 MW WEGs to the southern grid.

ACM0002 (Version 10) states that Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system". In this case the Combined Margin (weighted average of Simple Operating Margin and Build Margin) is estimated based on three years average (05-06, 06-07 and 07-08) of Simple Operating Margin and 20 % Build Margin of current year (07-08) is in line with steps of "Tool to calculate the emission factor for an electricity system". Both the value of Simple Operating Margin and Build Margin are selected under ex-ante approach. The grid boundary w.r.t the connected state grid is Southern Grid of India.

For the project activity, baseline emission reductions have been estimated using consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system, version 1.1" of the current generation mix, using the most recent statistics available<sup>/CEA/</sup> at the time of PD submission.

The ex-ante emission coefficient has been calculated based on the baseline information of the Southern grid of India is provided in section 4.1 of the VCS PD. The validation team has checked the underlying input values as well as the spreadsheet programming. As a result of this check the validation team is convinced of the results of the emission coefficient calculation and the chosen value. The resultant figure of 0.927 tCO<sub>2</sub>/GWh which is deemed to be appropriate, transparent and conservative.

Altogether the project activity reduces emissions of 75,80,930 tCO<sub>2</sub>e over the chosen ten year fixed crediting period.

## VCS 2007.1 Validation Report

The project satisfies all criteria for ACM0002. The application of baseline methodology is assessed as correct. There is no methodology deviation or revision. The selection of baseline scenario is assessed appropriately.

The additionality is assessed using project test-1.

| Step as per VCS 2007.1     | Argument                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1: Regulatory Surplus | <ul style="list-style-type: none"> <li>Local or National Legislation does not require the production of the underlying service or product with the chosen technology.</li> <li>- There is no legal requirement on the choice of a particular technology for power generation.</li> <li>- The applicable Environmental Regulations do not restrict the use of wind energy for power generation.</li> <li>The implementation of project activity is a voluntary initiative and it is not mandatory or a legal requirement. For power generation, the Electricity Act 2003 does not restrict or empower any authority to restrict the fuel choice, the applicable environmental regulations do not restrict the use of wind energy and there is no legal requirement on the choice of a particular technology.</li> <li>Project Proponents have been issued with all required regulatory</li> </ul> | <p>The Validation team has checked the National and Regional requirement. There is no mandatory law or regulation which enforced project promoters to adopt the wind electricity generation. Project Proponent has been issued with all required regulatory clearances before commissioning.</p> <p> <input checked="" type="checkbox"/> Step passed<br/> <input type="checkbox"/> Step not passed<br/> <input type="checkbox"/> Not applicable         </p> |

## VCS 2007.1 Validation Report

| Step as per VCS 2007.1                              | Argument                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     | clearances before commissioning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Step 2: Implementation Barriers: Investment Barrier | <p>The project proponent faces investment return constraints that can be overcome by the additional revenues with the generation of VCUs.</p> <p>An investment analysis of the project activity was conducted with the Project Internal Rate of Return (IRR) as the financial indicator. In accordance with the additionality tool, benchmark analysis is applied by comparing the project IRR (financial indicator) of the project activity with the required rate of return calculated based on the Weighted Average of Capital cost (WACC) for the respective years from 2004 to 2007. The Benchmark IRR for the project activity using WACC ranges from 14.34% to 15.68%.</p> <p>To arrive at this benchmark risk free rate from Indian Government bond rates published by the RBI for various years have been analyzed. Sensex details for various years till the project start date was also evaluated to understand the market returns. The difference in this annual market return and the interest rate on Central Government Securities available from RBI has been used to arrive at the market risk premium for the project. Beta calculation for power generating</p> | <p>Investment Barrier: Various elements have been checked during the additionality assessment. Validation team has checked the identified financial indicator (Project IRR), which is most suitable for the project type and decision context. In order to verify the relevant benchmark value of WACC, validation team has referred to all necessary supportive documents and information and the same is found to be OK. Project proponents have demonstrated through the investment analysis that the financial returns of the project activity are below the requisite benchmark. TUV-Nord considers the benchmark chosen is appropriate for the project activity. Using the investment analysis, the project proponents have demonstrated that the Project IRR for all the investors is below the applied benchmark. Thus, the established investment barrier has been assessed to be appropriate and sufficient. The arguments with supporting spreadsheets<sup>/XLS/</sup> provide</p> |

## VCS 2007.1 Validation Report

| Step as per VCS 2007.1 | Argument                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <p>industries has been carried out to arrive at the average beta applicable to this project activity.</p> <p>Along with this, RBI PLR of respective years on the debt, cost of equity and applicable rate of tax have been added together to arrive at benchmark WACC. Using the benchmark, the project proponent has demonstrated the Project IRR of the project well below without considering the VCS revenue. However, after considering the VCS revenues, the returns to the project activity were found to be improved with the Project IRR. This is also lower than the applied benchmark.</p> <p>Sensitivity analysis:</p> <p>The sensitivity analysis is also carried out, the project activity has been found sensitive to the parameters like Plant Load Factor (PLF), Project Cost and O&amp;M Cost and results of the same as presented in excel spread sheet are below the applied benchmark.</p> <p>From the above analysis it is apparent that there is significant risk associated with the project activity that impacts the viability of the project as highlighted through the sensitivity analysis. It is evident that the project activity having lower returns while comparing benchmark without VCS</p> | <p>proof for the non-viability of the project. The input data and assumptions for calculation of IRR like (profit after tax, project cost, net cash flow, additional depreciation, interest on term loan) are verified with references <sup>/IG/1,2</sup> provided by PP. The considered benchmark is appropriate.</p> <p>The estimated annual electricity is based on whose investment decision were in 2004 has been considered as 15% based on the minutes of meeting <sup>/ADD/2</sup> between TASMA members held on 23/08/2003 and for subsequent years the PLF is Investment Guidelines for TASMA members <sup>/ADD/3</sup> in which the same has been derived based on pass (location) wise and capacity the same is presented in table 1-2, which is in line with the EB 48 Annex11. The tariff has been taken as per the PPA/Wheeling agreement.</p> <p>The project revenue is sensitive to the electricity generation. Hence the sensitivity analysis has been carried out by the PP for the above variable. The calculation has been reviewed and it is concluded that the</p> |

## VCS 2007.1 Validation Report

| Step as per VCS 2007.1     | Argument                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | revenue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>project activity has project IRRs less than the chosen benchmark value for the corresponding decision making years, clearly indicating that the project is financially not feasible without carbon benefits.</p> <p>The sensitivity analysis has also been provided for individual developers with increase in the generation to a tune of +/- 10% and it has been verified that the Project IRR does not cross the bench mark.</p> <p> <input checked="" type="checkbox"/> Step passed<br/> <input type="checkbox"/> Step not passed<br/> <input type="checkbox"/> Not applicable         </p> |
| Step 3:<br>Common Practice | <p>From the Annual report <sup>1</sup> 2005-2006 of Central electricity authority (CEA), which shows that the Wind energy has only 6.48% of the installed capacity as compared to 33.63 % of hydro and 55.31% of thermal in Southern Regional electricity Grid. The above shows that power generation using wind energy in southern region face the common practice barrier due to preference for thermal generation because of higher capacity utilization and availability of fossil fuel sources in the state.</p> | <p>From the Common Practice it is analysis provided by the PP, it is found that the installed capacity of wind mills is low compared to other fossil fuel based plants. As a result of existence of the analysis of the barriers, the project activity has been concluded as not a common practice scenario in the region.</p> <p>OK</p> <p> <input checked="" type="checkbox"/> Step passed<br/> <input type="checkbox"/> Step not passed<br/> <input type="checkbox"/> Not applicable         </p>                                                                                               |

However, CAR and CR were raised.

<sup>1</sup> [http://cea.nic.in/power\\_sec\\_reports/Executive\\_Summary/2005\\_03/22-28.pdf](http://cea.nic.in/power_sec_reports/Executive_Summary/2005_03/22-28.pdf)

## VCS 2007.1 Validation Report

| CAR/CR                                                                                                                                                                                                                                                                                                                                                    | Reference | Summary of project owner response                                                                                                                                                                                                                                                                                                                    | Revised sections (as applicable) | Conclusion                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAR 3.2.1</b><br>The arguments under Regulatory surplus about the alternatives in section 2.5 of VCS PD is irrelevant and does not conform to VCS 2007.1 revision is requested.                                                                                                                                                                        | /PD/ 2.5  | Corrected in the revised VCS PD                                                                                                                                                                                                                                                                                                                      | /PD/ 2.5                         | The arguments has been modified and the same is in line with the VCS 2007.1 hence CAR is closed.                                                                                                                                                                                                                                        |
| <b>CAR 3.2.2</b><br>1. Proof of PLF has to be submitted.<br><br>2. The institutional barriers are not acceptable, as the change in policy would not affect the projects, which have already been set up and signed PPA.<br>3. Moreover, loan processing charge is a capital cost and accounting as revenue expenditure is not in conformity with accepted | /PD/ 2.5  | 1. The weighted average of PLF of all WTGs is calculated on the basis of PLF referred in Investment guidelines prepared by third party consultant. The calculation can be referred from emission reduction calculation sheet.<br>2. Removed from the implementation barrier given in the revised PDD<br><br>3. Corrected in the revised work sheets. | /PD/ 2.5                         | 1) The proof Minutes of meeting and Investment Guidelines by third party consultants and the emission reduction calculation sheet has been verified and found in order.<br><br>2) Now the argument is not part of revised PD.<br><br>3) Now loan processing cost is accounted in project cost and the same is not considered as revenue |

# VCS 2007.1 Validation Report

| CAR/CR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Reference | Summary of project owner response                                                                                                                                                                                                                                                                                                                                        | Revised sections (as applicable) | Conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>accounting principles.</p> <p>4. The tariff, assumed for sale to grid should be evidenced by PPA and wheeling should be evidenced by power bill.</p> <p>5. Proof and appropriateness for working capital.</p> <p>6. Assuming wheeling and banking charges for power supplied to grid is neither correct nor acceptable.</p> <p>7. Draft discussion paper does not recommend book depreciation at 5.28% on other assets as claimed in the worksheet assumptions. Since this rate has not been used in the worksheet, the row may be removed.</p> <p>8. Providing for IT (accelerated) depreciation on entire investment for tax computation does not appear</p> |           | <p>4. The sample copy of PPA and Electricity bill is submitted to DOE.</p> <p>5. Removed from the work sheet</p> <p>6. Wheeling and banking charges is considered for Captive users but not for sale to grid</p> <p>7. Removed from the revised worksheet</p> <p>8. Corrected in the revised worksheet</p> <p>9. The tax rate is corrected in the revised worksheets</p> |                                  | <p>expenditure.</p> <p>4) The PPA / Wheeling agreement for all the WTGs has been verified for the assumed Tariff and the same is found to be ok</p> <p>5) The working capital has been removed in the excel sheet.</p> <p>6) Now the wheeling charge has been considered only for captive consumers.</p> <p>7) The book depreciation has been removed and found in order.</p> <p>8) The tax computation is corrected with respect to IT Act in the revised financial analysis and found in order.</p> |

| CAR/CR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reference | Summary of project owner response                                                                                                                                                          | Revised sections (as applicable) | Conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>to conform to Sec.32 of IT Act read with Appendix I of IT rules.</p> <p>9. Tax rate has been taken uniformly at 33.66% in all the worksheets, though the worksheets represent the cash flows of WEGs commissioned in 2004, 2005, 2006 and 2007. The tax rate never remained constant during all these four years</p> <p>10. Tax computation does not appear to be correct. MAT may not arise for the project activity, irrespective of whether it is a firm/sole proprietary concern or company. Tax computation should follow the IT Act and in particular the rulings given on Sec. 80IA.</p> <p>11. Tax shield computation does not appear to be correct. It should be based on row 57 (as long as it is</p> |           | <p>10. Corrected in the revised IRR sheets.</p> <p>11. It is corrected in the revised worksheet</p> <p>12. Corrected in the revised worksheets</p> <p>13. Corrected in the revised PDD</p> |                                  | <p>9) The Tax rates has been revised based on the actual rates for the respective years.</p> <p>10) The tax computation has been corrected with respective to MAT. The MAT is applied only for companies and not for sole proprietary concern hence the revised IRR sheets found in order.</p> <p>11) Tax shield computation has been corrected in the revised sheets.</p> <p>12) The IRR sheets has been corrected based on cash generation considering the profit after tax,</p> |

| CAR/CR                                                                                                                                                                                                                                                                                                                                                                                                    | Reference | Summary of project owner response                                                                                                                                                            | Revised sections (as applicable) | Conclusion                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>negative)</p> <p>12. Adjusting current assets and bank borrowing for working capital in the cash flow statement is not acceptable. IRR is concerned with cash generation and not cash balance. It should include only profit after tax, depreciation &amp; amortization, tax shield, interest on term loan and salvage value</p> <p>13. Sensitivity analysis does not conform to Annex 45 of EB 41</p> |           |                                                                                                                                                                                              |                                  | <p>depreciation, amortization, tax shield, interest on term loan and salvage value in the revised sheets and found in order.</p> <p>13) Now O&amp;M, project cost were included for sensitivity analysis in the revised sheets.</p> <p>Based on the assessment of the provided proof and review of response and revised sheets the CAR 3.2.2. has been closed.</p> |
| <p>CR 3.2.1</p> <p>1. Clarify whether the selection of Sensex as proxy for <i>Rm</i> represent a well diversified market portfolio as claimed in p.30 of VCS-PD.</p>                                                                                                                                                                                                                                      |           | <p>1. Choice of stock market index is also be considerably influenced by the availability of historical data. In this regard, BSE 30 has the advantage of having the longest history and</p> |                                  | <p>1. The argument regarding consideration of stock market index BSE 30 with a longer history and well diversified companies with higher market capitalization is found to be justified.</p>                                                                                                                                                                       |

| CAR/CR                                                                                                                                                                                                             | Reference | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Revised sections (as applicable) | Conclusion                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>2. Godrej Industries has been selected as one of the power generating companies. Clarify whether this company is engaged in power generation.</p> <p>3. Justify the appropriateness of selected Beta value.</p> |           | <p>data is available for 20 years. The data on other indices, viz. S&amp;P CNX 500 and Nifty, are available only since 1991. It is an index composed of the 30 largest and the most actively traded stocks in the market. These companies hold around one fifth of the market capitalization of the BSE. It is regarded as the pulse of share market, the dips and rise of the Indian share market can be identified through the sensex. Hence it has been considered for calculating expected market return.</p> |                                  | <p>2. Since the Godrej industries is not involved in power generation the same has been removed for beta calculation.</p> <p>3. Since the beta value is considered based on diversified market portfolio,</p> |

| CAR/CR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Reference | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                    | Revised sections (as applicable) | Conclusion                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>4. Many of the projects in the bundle have been promoted by firms and sole proprietary concerns. It may be clarified whether firms and sole proprietary concerns are subject to MAT as MAT has been used to arrive at the post cost debt. That apart, use of MAT also does not appear to be in conformity with the provisions of IT Act, particularly section 80IA and the rulings given thereon.</p> <p>5. The logic of reducing the insurance premium by 0.95% from the 7<sup>th</sup> year onwards, while the TNERC</p> |           | <p>2. Removed Godrej industries beta and benchmark is revised</p> <p>3. The beta of an equity is calculated as the covariance between is return and the return on the well diversified market portfolio (sensex), divided by the variance of the return on the well diversified market portfolio (sensex)</p> <p>4. MAT applied is conformity with the provision of IT act as per section 80 IA.</p> |                                  | <p>hence the chosen beta value is appropriate.</p> <p>4. Now MAT has been applied only for companies and the revised spread sheets is found ok.</p> <p>5. The insurance premium has been revised based on investment guidelines suggested by third party consultant.</p> |

| CAR/CR                                                                                                                                                                                                                                                                                                                           | Reference | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                              | Revised sections (as applicable) | Conclusion                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Order released in May 2006 provides for 0.5% after 5<sup>th</sup> year may be explained.</p> <p>6. Balance sheet is not required and the sheet may be removed</p> <p>7. Following documents/documentary evidence should be submitted for each of the project:</p> <p>a. Quotations/POs for each component of project cost</p> |           | <p>5. The insurance premium suggested by third party consultant (investment guidelines) is 0.75% with 5% deceleration after 5 years. The same is considered in the revised work sheet</p> <p>6. The entire sub-sheet is connected to each other, hence cannot be removed.</p> <p>a. The project cost has been considered as per investment guidelines by third party consultant, which was</p> |                                  | <p>6. Since there is links to other excel sheets it is accepted not to remove.</p> <p>7. the CR has been closed based on verification of following documents</p> <p>a. The project cost has been considered based on Investment guidelines for TASMA members by third party consultant, however the Purchase orders has been verified during the site visit.</p> <p>b. The same has been</p> |

| CAR/CR                                                                                                                                                        | Reference | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                               | Revised sections (as applicable) | Conclusion                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>b. Supply of power to grid in the first year in the case projects which have wheeled the power for self consumption</p> <p>c. PPA</p> <p>d. Power bill</p> |           | <p>available to PP at the time of Investment decision. However, the DOE have verified all the individual POs during validation site visit.</p> <p>b. There is no supply of power to grid for 1<sup>st</sup> year in the projects which have wheeled the power for self consumption</p> <p>c. Scanned sample copy of PPA is submitted to DOE</p> <p>d. Scanned sample copy of Power bill is submitted to DOE</p> |                                  | <p>verified and found ok based on Power Purchase Agreement /Wheeling Agreement.</p> <p>c. The Power Purchase Agreement and wheeling Agreement has been verified during the site visit and the same found to be ok.</p> <p>d. The power bills for captive and sale to board has been verified for the chosen tariff rate.</p> <p>Based on the above arguments and provided proof the CR has been closed.</p> |

### 3.3 Monitoring Plan

The proposed project used CDM approved methodology ACM 0002/Version 10: "Consolidated Baseline Methodology for grid connected electricity generation from renewable sources", which is approved under VCS 2007.1.

The project satisfies all criteria for ACM0002. The application of monitoring methodology is assessed as correct.

The revised 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

This methodology stipulates that monitoring shall consist of metering the net electricity exported (to the grid) by the renewable technology. State electricity board is certifying agency for meter reading. The monthly statement for the respective wind mill is certificate for electricity generated by WEGs for the month being taken by State electricity board in presence of project proponent representative. The net electricity supplied to the grid would be calculated ex-post by added values of all WEGs meter readings.

During the on-site visit the monitoring personnel were interviewed<sup>/IM01/</sup> to cross check their roles & responsibilities, competency of the staff members w.r.t project management, monitoring and reporting, operation and maintenance scheduled<sup>/O&M/</sup>, monitoring plan<sup>/PD/</sup>, net electricity generation records<sup>/GR/</sup>, calibration procedures/frequency for the meters<sup>/CAL/</sup> and were found to be satisfactory. The net electricity generated by the all WEGs is collected / collated, reviewed and maintained by TASMA the same are clearly defined in section 3 of the PD.

However, CAR and CR have been raised.

| CAR/CR                                      | Reference | Summary of project owner response | Revised sections (as applicable) | Conclusion                                                                     |
|---------------------------------------------|-----------|-----------------------------------|----------------------------------|--------------------------------------------------------------------------------|
| <b>CAR 3.3.1</b><br>The applied methodology | /PD/      | Corrected in the revised VCS PD   | /PD/                             | The version of the applied methodology is same in both the sections of revised |

## VCS 2007.1 Validation Report

| <b>CAR/CR</b>                                                                                                                                                                                                        | <b>Reference</b> | <b>Summary of project owner response</b>      | <b>Revised sections (as applicable)</b> | <b>Conclusion</b>                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| version in section 3.1 of PD contradicts with the section 2.1 of PD.                                                                                                                                                 |                  |                                               |                                         | PD.<br>Ok                                                                                                                                                                                                                                        |
| <b>CAR 3.3.2</b><br><br>The notations, formulas used for the calculation of emission reductions project emissions are not consistent with the applied methodology version.                                           |                  | Corrected in the revised VCS PD               |                                         | The notations and formula used is now consistent with the applied methodology in the revised PD, hence CAR is closed.                                                                                                                            |
| <b>CAR 3.3.3</b><br><br>The exact frequency of calibration is missing in section 3.3 of VCS PD.                                                                                                                      |                  | Included in the revised VCS PD                |                                         | The calibration frequency is based on the CEA norms and the same states as once in five years and the same is now part of revised PD, however calibration frequency for the project would be once in three years. Hence the CAR has been closed. |
| <b>CAR 3.3.4</b><br><br>The exact source of emission factor for operating margin and the build margin were not mentioned in PD. Also it is not clear whether the emission factor fixed ex-ante or monitored ex-post. |                  | Included in the revised VCS PD as Appendix-3. |                                         | The exact reference and the source of emission factor used has been addressed in revised PD. The latest version 4 of CEA data base has been used and hence the CAR has been closed.                                                              |

### 3.4 Calculation of GHG Emissions

The calculation of emission reductions is based on subtracting project emissions and leakage from the baseline emissions. As the plant runs exclusively with wind energy without any usage of fossil fuel, and moreover the electricity supplied to grid is the net electricity after import hence the project emissions is considered as zero. Leakage is considered to be zero as per applied methodology.

Following the ACM 0002 methodology, the combined margin (CM) methodology calculated ex-ante was chosen to calculate the baseline emission factor.

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

The baseline emission factor is equal to the CM, which is applying the default weights are as follows:  $w_{OM} = 0.75$  and  $w_{BM} = 0.25$  for operating margin emission factor ( $EF_{OM}$ ) and the build margin emission factor ( $EF_{BM}$ ).

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: November, 2008) issued by CEA.

However, CAR 3.3.4 has been raised.

The calculation is assessed as transparent and conservative.

### 3.5 Environmental Impact

As per the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated 27<sup>th</sup>. January 1994 and further modified on 14<sup>th</sup> September 2006, 38 Categories of project activities are required to undertake environmental impact assessment studies. The details of these activities are available publicly<sup>2</sup>.  
<http://envfor.nic.in/legis/eia/sol533.pdf>

The proposed project doesn't fall under the list of activities requiring EIA as it will not involve any negative environmental impacts, as the WEGs installed for generation of power use wind (cleanest possible source of renewable energy).

No CARs/ CRs were raised.

---

<sup>2</sup> <http://envfor.nic.in/legis/eia/sol533.pdf>

### **3.6 Comments by stakeholders**

The promoters organized formal & informal stakeholder consultation with the objective to inform the local interested stakeholders which include villagers, technology suppliers, and farmers on the environmental and social impacts of the project activity and discuss their concerns related to the development and operation of the activity. A stakeholder consultation meeting of the project were conducted and the schedule of same is provided under section 6 of VCD PD.

A summary of the stakeholder comments have been included in the VCS PD. All comments were positive and it has been verified that all comments sufficiently have been addressed.

No CARs/ CRs were raised.

#### 4 Validation conclusion

M/s Tamil Nadu Spinning Mills Association. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project - *"Bundled Wind power project in Tamil Nadu, India, co-ordinated by Tamil Nadu Spinning Mills Association (TASMA-II)"*, with regard to the relevant requirements of VCS 2007.1 Standard as well as criteria for consistent project operations, monitoring and reporting.

The project activity generates electricity which will be supplied to the southern regional grid of India and then distributed to connected end users.

The review of the VCS PD and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

A risk based approach has been followed to perform this validation. In the course of the validation 11 Corrective Action Requests (CAR) and 3 Clarification Requests (CR) were raised and successfully closed out.

The validation is based on the VCS PD, proof of title, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validators by project proponent.

As a result of the validation, the validators confirm that:

- The project additionality is sufficiently justified in the PD.
- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of ACM 0002 Version 10.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 75,80,930tCO<sub>2</sub>e (total) is most likely to be achieved during the chosen 10 years crediting period.

No restrictions or uncertainties were identified related to the validation.



Mr. Ma. Paa. Puratchikkanal  
Team Leader  
Bangalore, 2009-10-23



Eric Krupp  
Final approval  
Essen, 2009-11-15

TÜV NORD JI/CDM Certification Program

## 5 References

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

| Reference | Document                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| /ADD/     | <ol style="list-style-type: none"> <li>1. Benchmark Analysis spread sheet</li> <li>2. Proof for assumptions in the investment analysis for the projects installed in 2004 - Minutes of meeting dated 23/08/2003 for investment decision for the members in TASMA</li> <li>3. Proof for assumptions in the investment analysis for the projects installed from 2005 onwards- Investment guidelines prepared by Financial Consultant dated December 2004 and circulated by TASMA to its members</li> </ol>                                                                                                                                 |
| /CC/      | Commissioning Certificates of all the 812 WTGs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| /CR/      | Calibration Report of all energy meters in the bundle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| /DAT/     | Assessed Master data sheet for company names, HTSC no, location, purchase order dates, capacity, commissioning dates etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| /DEC/     | Declaration letter from TASMA that the "the project has not created another form of environmental credit"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| /ER/      | <ul style="list-style-type: none"> <li>• Emission reduction worksheet for monitoring (draft)</li> <li>• Emission reduction estimation worksheet for monitoring (final)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| /IRR/     | <ul style="list-style-type: none"> <li>• IRR calculation sheets for all the WTHSGs consisting of Investment Analysis, Returns from Project activity and profitability projections of the Project for Companies and proprietorship firms and further classified for different years from 2004 to 2007 under the following sub categories Sale to board with and with out technology up gradation fund, captive consumption with and with out technology up gradation fund, with new and old tariff which ever applicable.</li> <li>• Summary of sensitivity analysis for all the year 2004 to 2007 based on the categories and</li> </ul> |

|              |                                                                                                                                               |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
|              | subcategories mentioned above.                                                                                                                |
| <b>/LSC/</b> | <ul style="list-style-type: none"> <li>Local stakeholder interview</li> </ul>                                                                 |
| <b>/ORG/</b> | Organization chart.                                                                                                                           |
| <b>/PDD/</b> | <ul style="list-style-type: none"> <li>PD draft version</li> <li>PD final version</li> </ul>                                                  |
| <b>/PO/</b>  | Purchase orders of all WTG's in the bundle                                                                                                    |
| <b>/PPA/</b> | Power purchase / Wheeling agreements for all the WTGs in the bundle.                                                                          |
| <b>/SC/</b>  | NOC for setting up of WTGs at respective project site by Electrical Inspectorate of TNEB for all the project in the bundle.                   |
| <b>/SD/</b>  | Proof of starting date of project activity based on Commissioning Certificate of N.S.P Knitting Mills 500kW (HTSC No: 330) WTG in the bundle. |

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

| Reference        | Document                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>/ACM0002/</b> | Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 10)                           |
| <b>/CEA/</b>     | CO2 Baseline Database for Indian Power Sector -User Guide, Ver 4 dated September 2008 published by CEA.                                   |
| <b>/CPM/</b>     | TÜV Nord JI / CDM CP Manual (incl. CP procedures and forms)                                                                               |
| <b>/GCP/</b>     | 1. Voluntary Carbon Standard Project Description Template<br>2. UNFCCC: Guidelines for Completing the Project Design Document (CDM- -PDD) |
| <b>/GHG/</b>     | The Greenhouse Gas Protocol, The GHG Protocol for Project Accounting                                                                      |
| <b>/IPPC-RM/</b> | 1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book                                                                |

| Reference | Document                                                                      |
|-----------|-------------------------------------------------------------------------------|
|           | 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book    |
| /KP/      | Kyoto Protocol (1997)                                                         |
| /MA/      | Decision 17/CP.7 (Marrakesh - Accords)                                        |
| /TOOL/    | "Tool to calculate the emission factor for an electricity system" version 1.1 |
| /VVM/     | Validation and Verification Manual                                            |

Table 5-3: Websites used

| Reference | Link                  | Organisation                         |
|-----------|-----------------------|--------------------------------------|
| /cea/     | www.cea.nic.in        | Central Electricity Authority        |
| /moef/    | http://envfor.nic.in/ | Ministry of Environment and Forests. |
| /unfccc/  | www.unfccc.int        | Unfccc website                       |
| /unfccc/  | http://cdm.unfccc.int | UNFCCC                               |
| /vcs/     | www.v-c-s.org         | VCS website                          |

Table 5-4: Interviewed Persons

| Reference |                                                                         | Name              | Organisation / Function      |
|-----------|-------------------------------------------------------------------------|-------------------|------------------------------|
| /IM01/    | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | K.Venkatachalam   | Chief Advisor - TASMA        |
| /IM01/    | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | V.Bharathi Kannan | CDM Co-ordinator , TASMA     |
| /IM01/    | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | K.Selvaraju       | CDM - Expert TASMA           |
| /IM01/    | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | R.Ponnambalam     | Site Incharge, G.K. Spinners |

## VCS 2007.1 Validation Report

|        |                                                                         |                      |                                      |
|--------|-------------------------------------------------------------------------|----------------------|--------------------------------------|
| /IM01/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | P.Prabhu<br>Srinivas | L.G.Balakrishnan, Senior<br>Engineer |
| /IM02/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | Atul Kumar<br>Singh  | Consultant -Cantor CO2               |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | K.Padmanabhan        | Site in charge                       |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | T.Ramakrishan        | Operator Enercon                     |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | C.Ramesh Kumar       | Manager (Site)                       |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | S.Prakash            | Operator Enercon                     |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | S.P.Lenin            | Suzlon Wind Farm -Engineer<br>(Site) |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | N.Sivanandham        | DTE,Suzlon Wind Farm<br>Pushpathur   |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | G.Eswarasamy         | Vestas RRB - Site In charge          |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | P. Easwaran          | Site In charge                       |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | R. Venkat            | Site In charge                       |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | S.Somasundaraj       | Manager Maintenance                  |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | K.Sivaraj            | Asst Manager                         |
| /IM03/ | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms. | P.Soundaraj          | Junior Engineer                      |

==XX==