



Voluntary Carbon Standard 2007.1
Final Validation Report

Report No: 53610608-08/673

Validation Report:

Name of Validation company:	Date of the issue:
TÜV NORD CERT GmbH	2009-11-16
Report Title:	Approved by:
Wind energy project by Ramco group in India	Mr. Winter Rainer
Client:	Project Title:
Madras Cements Limited	Wind energy project by Ramco group in India
Summary:	

Madras Cements Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project – “Wind energy project by Ramco group in India”, 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 would generate about 324 GWh of electricity annually which would replace equivalent quantum of power at the Southern grid. The generated electricity which are supplied to the Southern Grid of India will be either distributed to connected end users or wheeled back for captive consumption.

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 13 Corrective Action Requests (CAR), 14 Clarification Requests (CR) and 1 Forward action request (FAR) were raised and successfully closed out. FAR has to be checked in every verification stage.

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 fulfils criteria of VCS 2007.1 provided.

- 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 2995919 t CO₂e (total) is most likely to be achieved in the 10 years renewable crediting period.

No restrictions or uncertainties were identified related to the validation.

Work carried out by:	Number of pages:
Mr. Ma Paa Puratchikkanal Mr. K V Sudarshan Ms. C. Indumathi Ms. Manjari Chandra Mr. R. Murali	58

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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 additionality, the monitoring plan (MP) and the project's compliance with

- The requirements of VCS 2007.1 program guidelines;
- Requirements of the CDM Approved methodology, ACM 0002/ version 10, which is approved by VCSA;
- To assess the project's compliance with other relevant rules, including the project country (India) legislation and
- 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/VCUs¹) without any double counting.

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 ACM0002. /Version 10: “Consolidated methodology for grid-connected electricity generation from renewable sources”) 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
 - Roles and Responsibilities
- Project Additionality
- Background investigation and follow up interviews
- Draft validation reporting with CARs, CRs & FARs, if any
- Final validation reporting

¹ As per VCS, Verified Emission Reductions (VERs) are considered to be VCUs only after successful registration in an approved VCU Registry

The information included in the VCS PD^{/PD1/, /PD2/, /PD3/} 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 the implementation of 159.75 MW capacity wind power project consisting of 136 Wind Turbine Generators (WTGs) in Tirunelveli, Dindigul and Coimbatore districts of Tamil Nadu, and Hassan and Chitradurga districts of Karnataka. The project activity would generate about 324 GWh of electricity annually which would replace equivalent quantum of power at the Tamil Nadu Electricity Board (TNEB), Bangalore Electricity Supply Company Ltd (BESCOM) and Chamundeshwari Electricity Supply Corporation Ltd (CESC) The latitude and longitude² details of the 136 windmills (given in annex 1 of PDD) located in Tirunelveli, Dinugal and Coimbatore Districts were verified and found to be OK.

The estimated electricity supplied to the grid from the project activity is 324 GWh per year. The estimated GHG emission reduction is 2995919 tCO₂e to be achieved during the renewable ten year crediting period.

1.4 Level of assurance

The validation report is based on VCS PD^{/PD1/, /PD2/, /PD3/}, financial spreadsheets^{/IRR1/-/IRR 7/} and supporting documents made available to the validation team and information collected through performing interviews and during the on-site assessment. The validation opinion is assured provided the credibility of all above.

² <http://www.satsig.net/maps/lat-long-finder.htm>

2 Methodology

The validation of the project was carried out from March 2009 to October 2009.

Preparations: 2009-03-28 to 2009-04-05
On-site validation: 2009-07-06
(Draft) Reporting: 2009-08-07
(Final) Reporting: 2009-11-03

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^{PD1/} submitted by the Madras Cements Limited in May 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 host party legislation, 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 2009-07-28 to 2009-08-01, the TÜV NORD JI/CDM CP performed validation site visit with the project proponent in Coimbatore, Dindigul and Tirunelveli districts of Tamil Nadu.

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 interviewee and main topics of the interviews are summarised in Table 2-1.

Table 2-1 Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations Personnel /IM01/	- General aspects of the project - Project design, Commissioning and implementation

Interviewed Persons / Entities	Interview topics
2. Consultants /IM02/	- Technical equipment and operation of the project - Performance of the project - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring and measurement equipment - QA/QC Testing and calibration procedures - Monitored data management - Data quality, archiving and reporting procedures - Desk review findings - Bundling criteria - Applicability of chosen methodology - Data uncertainty and residual risks - GHG calculation - Procedural aspects of the validation

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^{/PD3/}; resolving the CARs & CRs raised and outstanding concerns, TÜV NORD JI/CDM CP issues this final validation report and opinion.

13 CARs, 14CRs and 1 FAR were raised during the Validation. Please refer to Section 3, table 3.

3 Validation Findings

The findings of validation are summarised in table 3:

Table 3: Summary of CAR, CR and FAR issued

Validation topic	No. of CAR	No. of FAR	No. of CR
D- Project Design	02	01	04
B- Baseline and additionality	09	–	06
M- Monitoring plan	02	–	02
C- Calculation of GHG emissions	–	–	02
E- Environmental Impact	–	–	–
L- Local Stakeholder Comments	–	–	–
SUM	13	01	14

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

3.1 Project Design

The proposed project utilizes wind energy for electricity generation. Total installed capacity is 159.75 MW with estimated electricity generation of about 324 GWh per year. The calculation was assessed by the validation team and deemed as correct. The project activity consists of Vestas V 82 (1650 kW), enercon e – 53 (800 kW), enercon e – 48 (800 kW), enercon e – 33 (330 kW), SUZLON S – 64(1250 kW), SUZLON S – 33 (350 kW), NEG Micon NM 750 –200/48 WTG , SUZLON S 82 (1500 kW), Vestas RRB V 39 –(500 KW) wind Machines.

Supporting documents like purchase orders^{/PO1-PO136/} of 136 WTGs by every investor were made available to the TÜV NORD JI/CDM CP. It was found that the purchase order/PO / issued by the suppliers of the WTGs specifies the technical details for the respective WTG. Information was also collected through performing interviews with the PP and during the on-site assessment.

Technical details and equipment specifications used in the project are as detailed in annex 2 of the PDD which were verified from the purchase orders and found to be OK.

The project duration is: 20 years.

Start date of the project is 2003-01-30 (Date of Commissioning of first WEG in the grouped project activity).

Crediting period for the project activity: 2006-03-28 to 2016-03-27.

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There are seven individual investors in this bundled project activity. These investors have authorized Madras Cements Limited for all carbon related activities and communication. Authorization letters^{/AL1/} to ^{/AL6/} in this regard have been verified.

Proof of title was verified from the authorization of Madras Cements Limited by other investors in the bundle ^{/AL1-AL 6/}. Refer to Table 5-1.

The emission reduction has not been double counted. The project has applied for CDM benefits. The process is under validation and not yet registered with UNFCCC. The VCS crediting period will end from the date on which it is registered as a CDM project with UNFCCC^{/UD-LET/}. Madras Cements Limited is responsible for managing all carbon credits^{/AL1-AL6/}. There is no rejection history for the project activity.

However, CAR D1-D2 , CR D1-D4 were raised and successfully closed out. FAR D1 has been raised.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR D1 There is confusion w.r.t the name of PP. In some cases it is Ramco Group while in others it is Madras Cements Limited (MCL).	/PD 1/	Uniformity is now maintained in the revised VCS PD. MCL is the flagship company of Ramco Group and since it is responsible for the Windmills that are installed by all the group companies, the terms are used interchangeably.	/PD 2/ /PD 3/	The Authorization letters ^{/AL 1-AL 6/} were checked and concluded that Madras Cements Limited has been authorized as the Project Proponent for the VCS project activity. More over the following website http://www.madras-cements.com/Group%20Website/Cem.htm was checked and found that Madras cements Limited is the flagship company of Ramco group, hence representing the name of

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				Company interchangeably is deemed acceptable. Anyhow, necessary revisions have been made in PD by maintaining uniformity in PP’ s name as Madras Cements Limited which is found to be OK. CAR D1 is closed.
CAR D2 Please explain in detail about the newly commissioned WTGs, which are under CDM process and also included in VCS credits.	/PD 1/	All the windmills commissioned post April 2007 by MCL are under the CDM process.	/PD 2/ /PD 3/	The details of windmills of Madras Cements Limited which are under CDM process (annex 1 of this report) have been checked and concluded that those wind mills under CDM are in validation stage and have yet been issued with credits. Subsequently following FAR 1 has been raised to verify the same during each monitoring period in order to avoid double counting. CAR D2 is closed.
CR D1 Under section 1.2, it is	/PD 1/	Necessary corrections have been made.	/PD 2/ /PD 3/	Section 1.2 has been revised to

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
mentioned as the bundled project and not mentioned as grouped project. Please clarify?				grouped projects which satisfies the criteria of VCS standards. CR D1 is closed.
CR D2 Under section 1.4, the following the information's are missing 1. Purpose of th project activity 2. Pre project scenario-No project activity 3. Project scenario 4. Baseline scenario 5. Contribution to GHG emission Reductions 6. View of the project participant on the contribution of the project activity to sustainable development	/PD 1/	The explanation has been included in the PD. View of the project participant on the contribution of the project activity to sustainable development is explained in section 1.16	/PD 2/ /PD 3/	The PD has been correctly modified by including necessary informations pertaining to purpose of the Project activity, pre-project scenario, Project scenario, Baseline scenario, contribution to GHG emission reductions and sustainable development. Thus the PD is in line with VCS standards requirements and verified to be OK. CR D2 is closed.
CR D3 Please provide authorization letter from all the project investors stating Madras Cements Limited is responsible for all	/PD 1/	Authorization letter is attached with this response.	/PD 2/ /PD 3/	The authorization letters /AL1-AL6/ from each investor authorizing Madras Cements Limited as the Project proponent has been submitted for

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
communication related to this VCS Bundled project.				verification. It is verified and found to be OK. CR D3 is closed.
CR D4 Under section 1.10, there are no relevant informations related to compliance with relevant local laws and regulations related to the project. Please clarify?	/PD 1/	The explanation has been included in the revised version of the PDD.	/PD 2/ /PD 3/	1. NOC given by the Chief Engineer, Non Conventional Energy Sources department of Tamilnadu Electricity Board (TNEB) and Karnataka was verified. 2. More over Power Purchase Agreements with State electricity utility (TNEB & BESCOM & CESCO) for sale of electricity as per the Electricity act, 2003 have been checked Thus it is acceptable that the Project is in compliance with local laws and regulations. CR D4 is closed.
FAR D 1 The project has also applied for CDM benefits. The process is still under validation. In future it has to be ensured that there will be	/PD 3/	---	---	During every VCS Verification the verification team has to check the status of the project under CDM validation on the UNFCCC

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
no double counting regarding emission reductions between CDM and VCS. The wind mills corresponding to the HTSC Nos listed in annex 1 of this report needs to be verified in order to avoid double counting				website and to ensure that is still not registered as a CDM Project. This is to avoid double counting and to be consistent with the Policy announcement from the VCS association: “Further Guidance for projects that are registered in two GHG programs”.

3.2 Baseline

The proposed project adopts CDM approved methodology ACM 0002 / Version 10: Consolidated 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 baseline methodology is assessed as correct. There is no methodology deviation or revision.

The project participant used ACM 0002 version 10 approach to determine the emission coefficient of the indicative simplified baseline and monitoring methodologies for selected large scale CDM project activity which states that the baseline scenario in case of installation of a new grid-connected renewable power plant/unit is “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”. The selection of baseline scenario is assessed to be appropriate.

The project proponent has calculated the weighted average simple operating margin (OM) based on the latest three year statistics data (year of 2005-06, 2006-2007, 2007-08) as per Central Electricity Authority guidelines version 4.0 October 2008 and the Operating Margin Emission Factor for Southern grid is 0.998157296 tCO₂/MWh. The value for Build Margin (BM) for 2007-2008 is directly used, i.e., 0.85573754 tCO₂/ MWh and

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a weightage factor of 75% & 25% is used for OM and BM to arrive at the Combined Margin value of 0.92694742 tCO₂/MWh.

The additionality has been assessed using project test. The implementation barrier: investment barrier and common practice approach have been established to demonstrate the additionality.

Step as per VCS 2007.1	Argument	Assessment
Step 1: Regulatory Surplus	- Local or National Legislation does not require the production of the underlying service or product with the chosen technology. - There is no legal requirement on the choice of a particular technology for power generation. - The applicable Environmental Regulations do not restrict the use of wind energy for power generation. - 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. - Project Proponents have been issued with all required regulatory clearances before commissioning.	The Validation team has checked the National and Regional requirements and there are no local law that refrains from the establishing wind projects in India. Hence the argument is appropriate for this project activity. ☒ Step passed ☐ Step not passed ☐ Not applicable
Step 2: Investment Barrier	The project faces capital or investment return constraints that can be overcome by the additional revenues associated with the generation of VER/VCU. So the PP has chosen Benchmark Analysis to demonstrate the	Various elements have been checked during the additionality assessment. Validation team has checked the identified financial indicator (Project IRR and equity

Step as per VCS 2007.1	Argument	Assessment									
	additionality of the projects in the bundle. Madras Cements Limited (MCL) and Ramco Industries limited (RIL) (though only one term loan has been taken, majority is through equity), are the two investors where the project have been funded mostly through internal accruals and equity IRR is the financial indicator, therefore the benchmark has been chosen as Return on Equity. The cost of equity has been determined based upon the Capital Asset Pricing Model (CAPM), where Expected Return on Equity = Risk free return + Market risk Premium * Beta YTM (Yield to Maturity) at primary issues over a period of 10 years has been considered to represent the risk free rate. The stock index (Bombay Stock Exchange) over a period of 23 years (01/04/1979 to 31/03/2002) prior to the investment decision making has been used towards determining the market return (Rm). The market return during that period has been estimated at 16.67%. Thus the market risk premium estimated is 7.23%. The asset beta which represents the power industry beta co-efficient is levered as per the capital structure of the concerned project activity and arrived at 0.96. Thus the benchmark return on equity has been calculated as 16.48%. For project activities which involve both equity and debt	IRR), which are more suitable for the project type and decision context. In order to verify the relevant benchmark value of Return on equity and WACC, validation team has referred all necessary supportive data and 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 Equity IRR for the investors MCL and RIL are as follows <table border="1"> <thead> <tr> <th>SNO</th><th>Investor</th><th>Equity IRR</th></tr> </thead> <tbody> <tr> <td>1</td><td>Madras Cements Limited</td><td>10.24%</td></tr> <tr> <td>2</td><td>Ramco Industries Limited</td><td>12.48%</td></tr> </tbody> </table> Above mentioned Equity IRRs for the 2 investors including the one getting highest return i.e., 12.48% from the project activity are lower than the chosen benchmark Return on equity of 16.48%. Using the investment analysis, the project proponents have	SNO	Investor	Equity IRR	1	Madras Cements Limited	10.24%	2	Ramco Industries Limited	12.48%
SNO	Investor	Equity IRR									
1	Madras Cements Limited	10.24%									
2	Ramco Industries Limited	12.48%									

Step as per VCS 2007.1	Argument	Assessment																		
	component and where the capital structure of the projects is heavily levered (more debt than equity), Weighted average costs of capital (WACC) have been considered as the benchmark for the project activity. To arrive at this benchmark Cost of equity has been arrived from CAPM method. Depending on the capital structure of the project and the leverage, the beta has been once again levered to suit the risk profile of the project type The tax rate for leveraging has been taken as MAT. Along with this, the cost of debt has been ascertained from the general prime lending rates that the major banks offered in the year March'2002. The post tax cost of debt has been calculated by multiplying the pre-tax cost of debt with (1-effective tax rate). Thus along with the calculate value cost of equity, cost of debt the rate of tax have been added together to arrive at benchmark WACC of 16.84%. Since Equity IRR is chosen as financial indicator to demonstrate the additionality in respect to the investors MCL and RIL, Return on Equity is one of the appropriate benchmarks as per the Guidance on Investment Analysis EB 41, Annex 45, and version 2. As Project IRR is chosen as the financial indicator to demonstrate the additionality for PPs RML, Sudarsanam Spinning Mills, Sree Vishnu Spinning Mills, Sandhya Spinning Mills, Thanjavur Spinning Mills; WACC is one	demonstrated that the Project IRR for the following investors which are as follows: <table border="1" data-bbox="1050 443 1501 1025"> <tr> <th data-bbox="1050 443 1102 645">Sr . NO .</th><th data-bbox="1102 443 1374 645">Name of Customer</th><th data-bbox="1374 443 1501 645">Project IRR</th></tr> <tr> <td data-bbox="1050 645 1102 719">1</td><td data-bbox="1102 645 1374 719">RML</td><td data-bbox="1374 645 1501 719">10.47 %</td></tr> <tr> <td data-bbox="1050 719 1102 792">2</td><td data-bbox="1102 719 1374 792">Sudarshan Spinning Mills</td><td data-bbox="1374 719 1501 792">11.74 %</td></tr> <tr> <td data-bbox="1050 792 1102 866">3</td><td data-bbox="1102 792 1374 866">Sree Vishnu Spinning Mills</td><td data-bbox="1374 792 1501 866">10.82 %</td></tr> <tr> <td data-bbox="1050 866 1102 940">4</td><td data-bbox="1102 866 1374 940">Sandhya Spinning Mills</td><td data-bbox="1374 866 1501 940">15.71 %</td></tr> <tr> <td data-bbox="1050 940 1102 1025">5</td><td data-bbox="1102 940 1374 1025">Thanjavur Spinning Mills</td><td data-bbox="1374 940 1501 1025">13.67 %</td></tr> </table> Above mentioned Project IRRs for the 5 investors including the one getting highest return i.e., 15.71% from the project activity are lower than the chosen benchmark WACC of 16.84%. Thus, the established investment barrier has been assessed to be acceptable. The arguments with supporting spreadsheets^{/IRR1-IRR7/} provide 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) were verified with references provided by PP and found to be OK. The Return on Equity Calculations^{/BM /} based on CAPM model were verified	Sr . NO .	Name of Customer	Project IRR	1	RML	10.47 %	2	Sudarshan Spinning Mills	11.74 %	3	Sree Vishnu Spinning Mills	10.82 %	4	Sandhya Spinning Mills	15.71 %	5	Thanjavur Spinning Mills	13.67 %
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Step as per VCS 2007.1	Argument	Assessment																								
	of the appropriate benchmarks as per the Guidance on Investment Analysis EB 41, Annex 45, and version 2. A sensitivity analysis also has been carried out with +/- 10% variation in PLF and Weighted average costs of capital (WACC) have been considered as the benchmark for the project activity. the same is provided as below: Sensitivity analysis with increase in PLF <table border="1"> <thead> <tr> <th>Investors</th><th>Project IRR without VER Revenues for Base Case</th><th>10% increase in PLF</th></tr> </thead> <tbody> <tr> <td>Madras Cements Limited</td><td>10.24%</td><td>12.08%</td></tr> <tr> <td>Ramco Industries Limited</td><td>12.48%</td><td>14.98 %</td></tr> <tr> <td>RML</td><td>10.47 %</td><td>12.33 %</td></tr> <tr> <td>Sudarshan Spinning Mills</td><td>11.74 %</td><td>13.79 %</td></tr> <tr> <td>Sree Vishnu Spinning Mills</td><td>10.82 %</td><td>12.67 %</td></tr> <tr> <td>Sandhya Spinning Mills</td><td>15.71 %</td><td>18.19 %</td></tr> <tr> <td>Thanjavur Spinning Mills</td><td>13.67 %</td><td>15.86 %</td></tr> </tbody> </table>	Investors	Project IRR without VER Revenues for Base Case	10% increase in PLF	Madras Cements Limited	10.24%	12.08%	Ramco Industries Limited	12.48%	14.98 %	RML	10.47 %	12.33 %	Sudarshan Spinning Mills	11.74 %	13.79 %	Sree Vishnu Spinning Mills	10.82 %	12.67 %	Sandhya Spinning Mills	15.71 %	18.19 %	Thanjavur Spinning Mills	13.67 %	15.86 %	and found to be acceptable. Reserve Bank of India - Annual Report 2001-02 was checked in respect to the risk free rate and thus the applied rate of 9.44% is found to be correct. The stock index (Bombay Stock Exchange) over a period of 23 years (01/04/1979 to 31/03/2002) was checked from the website http://www.bseindia.com/histdata/hindices.asp and thus applied expected market return rate 16.67% was verified to be the prevailing rate prior to the investment decision, hence found to be OK. Thus the calculated value of the market risk premium as 7.23% is verified to be OK. The equity Beta calculation/BETA/ has been verified and the unlevered beta value of 0.96 is found to be acceptable. Hence the Return on equity calculation has been verified to be OK. Thus the arrived benchmark value is value of 16.48% is found to be appropriate. The WACC calculations were verified and found to be OK. The cost of equity used in WACC calculation which has been calculated based on CAPM model was verified and found to be OK. The following website, http://finmin.nic.in/stat_s_data/monthly_economic_r
Investors	Project IRR without VER Revenues for Base Case	10% increase in PLF																								
Madras Cements Limited	10.24%	12.08%																								
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Step as per VCS 2007.1	Argument	Assessment
		eport/index.html was verified and thus the cost of debt 11.50% is found to have applied correctly. Cost of debt (post tax) as 10.62 % has been verified to be correct. Thus, the overall WACC calculation is deemed to be acceptable. The estimated annual electricity generation is based on the PLF of 23%, which is based IWPA (Indian Wind Power Association) data on the load factors of the wind turbines located in Tirunelveli and Coimbatore districts of Tamil Nadu and based on the discussion in tariff order July 2008. Actual Generation report^{/PLF1/} Generation Report from Indian Wind power Association^{/PLF 2/}, TNERC Order showing 23% PLF^{/PLF 3/} and PLF justification sheet^{/ PLF 4/} have been verified in respect to the estimated PLF of 23% during investment decision. Thus as per IWPA (Indian Wind Power Association) data which was prevailing during the investment decision, the CUF of 23% is deemed acceptable as there were no tariff orders pertaining to wind during investment decision period. However for the wind turbines installed by MCL, the installation started in the year 2005 when the tariff discussion was happening.

Step as per VCS 2007.1	Argument	Assessment
		Therefore, for those machines a CUF of 27.46% has been taken as per the TNERC tariff order 2006. The amended TNERC tariff order dated 18-05-2006^{/tnerc/} was verified corresponding to the chosen PLF of 27.46%. Though the order was released subsequent to starting time of MCL turbines installation, the turbines have been installed till 2008. As majority of wind mills were commissioned after 2006, the common PLF of 27.46% taken from tariff order dated 2006 has been used. As the discussion on this tariff order for PLF was going on from 2005, the PLF can be applicable in common to all the wind mills pertaining to MCL installed from 2005-2008. Hence the applied PLF of 27.46% is deemed to be acceptable. For WTGs installed in Karnataka, the KERC tariff order dated 18th January 2005^{/kerc/} was checked and the applied PLF of 26.50 % is found to be OK. The PLF is sensitive to the electricity generation. Hence the sensitivity analysis has been carried out by the PPs for the above variables. The calculation has been reviewed and it is concluded that the project activity IRR is less than the benchmark value, clearly indicating that the project is

Step as per VCS 2007.1	Argument	Assessment
		financially not feasible without carbon benefits. The sensitivity analysis has also been provided for individual developers with increase in the PLF and to a tune of +10% and it has been verified that the Project IRR does not cross the bench mark. Thus from the investment analysis, it can be clearly understood that the project is financially un-attractive and hence it is additional. ☒ Step passed ☐ Step not passed ☐ Not applicable
Step 3: Common Practice	Common practice analysis has been carried out with the publicly available data. In the absence of the identified project activity the equivalent quantum of power would have been drawn from the Southern Regional Grid which is mostly dominated by the thermal power generating stations. The installed capacity of the utilities connected to the Southern Regional Grid as on 31st March, 2003 is 28,750.76 MW³ and the generation is 134,667.16 GWh⁴. On the contrary the installed capacity of the wind power project in the southern region as on 31st December, 2002 is 1085.8 MW⁵ and the corresponding generation is 1576.75 GWh⁶. Hence to	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. The reference websites /CEA 1-CEA 2/ showing installed capacity and the generation for the utilities connected to the Southern regional grid. More over the reference websites/^{mnes1-mnes2/} were checked for the installed capacity and the generation of the wind power project in the southern region and thus concluded that installed capacity of the utilities within the southern region is only 3.77% and

³ http://www.cea.nic.in/power_sec_reports/general_review/0304/chap-2.pdf

⁴ http://www.cea.nic.in/power_sec_reports/general_review/0304/chap-3.pdf

⁵ http://www.mnes.nic.in/annualreport/2002_2003_English/ch5_pg3.htm

⁶ http://www.mnes.nic.in/annualreport/2003_2004_English/ch5_pg3.htm

⁷ http://www.cea.nic.in/power_sec_reports/general_review/0304/chap-3.pdf

⁸ http://www.mnes.nic.in/annualreport/2003_2004_English/ch5_pg3.htm

Step as per VCS 2007.1	Argument	Assessment
	conclude, percentage of the installed capacity of wind power project to the installed capacity of the utilities within the southern region is only 3.77% and the same for generation is 1.17 %. As per the information available upon the power scenario in Tamilnadu, the generation of the utilities connected to the TNEB grid during the period 2002-2003 is 30,821 GWh⁷ where as generation from wind is 1305 GWh⁸, during the period 2002-2003. Hence prior to the commencement of the project activity percentage generation from wind to the generation from the utilities is only 4.23%. In light of the above discussion it can be concluded that level of penetration of wind power project in the regional as well as state grid is quite insignificant when compared against the contribution from the utilities. Hence the project activity is not commonly observed in the region.	the same for generation is 1.17 % . The CEA and MNES websites /CEA 2/ and /MNES/ were checked in respect to the generation of the utilities connected to the TNEB grid during the period 2002-2003 and also the generation from wind during the period 2002-2003. Th is found to be acceptable that the percentage generation from wind to the generation from the utilities is only 4.23%. Hence from the arguments under common practice it has been concluded that wind energy generation was not a common practice in the state of Tamil Nadu and Karnataka at the time of starting of this Project activity. Hence, OK. ☒ Step passed ☐ Step not passed ☐ Not applicable

Thus the validation team arrived at the opinion that the project activity is assessed to be additional.

However, following CARs and CRs issues were raised and consequent upon the correct response received from the project promoter, the issues have been closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR B1	/IRR1a-7a/	The following evidences have been submitted for the	/IRR1b-7b/	The following

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
Explain and provide proof for the following parameters & assumptions used for financial calculations: 1. PLF (for WTGs installed pre 2006 & post 2006 in Tamilnadu & Karnataka)		CUF assumption 1. CUF for all turbines in Tamilnadu for all investors except MCL has been taken as 23 % (since all investors had begun investing in started installing windmills from the year 2002 onwards and the tariff discussion have been published only in the year 2005.The following evidences are submitted. IWPA Document in the year 2002. Actual CUF achieved by the machines after the commissioning Discussion on CUF in the tariff orders and submissions by IWPA to TNERC. For MCL and WTGs installed in Karnataka reference has been taken from the respective tariff orders since these were published / being discussed during the commissioning of the WTGs.		documents, 1. Indian Wind Power Association (IWPA) Document in the year 2002 /PLF 1/ . 2. Actual CUF achieved by the machines after the commissioning /PLF 2/ 3. Discussion on CUF in the tariff orders and submissions by IWPA to TNERC /PLF 3/ were verified and the IWPA PLF of 23% is deemed to be acceptable as there was no tariff order pertaining to wind during the period of 2002-2003 in Tamil nadu. Hence the assumed PLF of 23% for WTGs installed during

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				pre-2006 in Tamilnadu has been verified to be OK. The amended TNERC tariff order dated 18-05-2006/ tnerc/ was verified corresponding to the chosen PLF of 27.46% used for those wind mills installed post 2006 and found to be acceptable. KERC Tariff order dated 18th January 2005 /kerc/ was checked and the applied PLF of 26.50 % for WTGs installed in Karnataka after 2006 is found to be OK. CAR B1 is closed.
CAR B2	/IRR	1. Project Capital	/IRR	1.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
Explain and provide proof for the following parameters & assumptions used for financial calculations: 1. Project Capital cost 2. Operation & Maintenance expenses 3. Power tariff (for WTGs installed post 2007) 4. MAT rate 5. Interest rate	1a-7a/	cost Purchase orders have been submitted. 2. Operation & Maintenance expenses. O&M agreements have been submitted. For MCL the turbines are still under the three year free O&M period , therefore for these WTGs , O&M expenses incurred by other PPs on WTGS of the same make and capacity , have been taken 3. Power tariff (for WTGs installed post 2007) Tariff orders have been submitted as evidence for power tariff from WTGS that are exporting to the grid. 4. MAT rate The base rate for MAT Rate was 7.5 % upto 2006-07 and was increased to 10 % in the year 2007-08. The surcharges and cesses have been varying over the years and as a reference document an extract from ‘Taxmann’s Direct Taxes ready reckoner by Vinod K Singhania’ is submitted along with this response. 5. Interest rate Loan sanction letter have been submitted	1b-7b/	Purchase orders /^{P01-P0136/} have been checked and the Project capital cost are in line with the order and verified to be OK. 2. Operation and Maintenance Agreements corresponding to each suppliers /^{O&M 1/} /^{O&M 2/} /^{O&M 3/} /^{O&M 4/} have been checked and the expenses are found to have applied correctly. 3. Tariff orders have been checked and the given power tariffs are found to be correct. 4. Taxmann’s

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		wherever loan has been taken. The letter mentions the interest rate.		Direct Taxes ready reckoner by Vinod K Singhanian document was verified and the base rate for MAT applied has been found to be OK. 5. Loan sanction letters/^{LSL}/ for all the investors who have applied for loan were been verified and their respective interest rates are found to have applied correctly. CAR B2 is closed.
CAR B3 1. Page 20, the reference given for government bond rate pertains to the year 2005-2006. But the year	/PD1/	1. The bond rate for the year 2001-02 has been included in the calculation, since this is the rate that was available and applicable at the time of the start of the bundled	/PD 2/ /PD 3/	1.The applied Government Bond rate was verified from the document Reserve Bank of

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
mentioned in the PDD is 2004-05. More over please clarify the reason for selecting the rate corresponding to this particular year as the Government bond rate in calculating return on equity. 2. In page 24, provide details of calculation or reference, for values used as weighted average cost of debt (pre tax & post tax).The values mentioned in the PDD differ from the base case excel spread sheets of each Investor Company. Please clarify?		project activity. 2. The correction has been made and uniformity has been maintained. For the purpose of IRR calculation, actual cost of debt has been taken in the calculation as per the terms of the loan sanction letter. However , since the benchmark has to be based on values, data and conditions that are generally prevailing in the economy and not pertaining to the project activity, the prime lending rate corresponding to five major banks in India has been selected as the pre tax cost of debt. Post tax cost of debt has been calculated based on the MAT Rate prevalent in 2002.		India - Annual Report 2001-02 /RBI-AR/ and rate pertains to time of decision making which is deemed acceptable and found to be OK. 2.The revised correction in the values of cost of debt (pre tax & post tax) used in WACC calculation is found to be OK. More over, the website http://finmin.nic.in/stats_data/monthly_economic_report/index.html/plr/ has been checked. Thus the prime lending rate used in cost of debt calculation correspond

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				s to the rate prevailing during investment decision 2002 and hence found to be OK. CAR B3 is closed.
CAR B4 In Tanjavur spinning Mills IRR sheet, Power bill of the month prior to the month in which decision was taken should be submitted as evidence for the tariff assumed	/IRR 5a/	The HT tariff in Tamil Nadu has been uniform over the last 7 years as Rs. 3.50 per unit. A sample EB bill has been submitted with this response as an evidence towards that. Sample power bills have been submitted with this response.	/IRR 5b/	HT tariff bills have been verified and the evidence for tariff assumption is found to be correct. CAR B4 is closed.
CAR B5 In Tanjavur spinning Mills IRR sheet, 1. Basis for restricting the book depreciation to 95% may be furnished. 2.MAT rate assumed does not appear to be correct	//IRR 5a/	1. Book depreciation has been corrected in the revised assessment and has now been provided for 100 % of the asset value. 2. The base rate for MAT Rate was 7.5 % upto 2006-07 and was increased to 10 % in the year 2007-08. The surcharges and cesses have been varying over the years and as a reference document	/IRR 5b/	Revised book depreciation for 100% of the asset value has been verified to be acceptable. 2. Taxmann's Direct Taxes ready reckoner by Vinod K Singhania

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		an extract from 'Taxmann's Direct Taxes ready reckoner by Vinod K Singhania' is submitted along with this response.		was verified. Thus the base rate for MAT as 7.5 % is found to be correct. CAR B5 is closed.
CAR B6 In Tanjavur spinning Mills IRR sheet, 1. Assuming the drawal of entire term loan in the first year is neither acceptable nor correct as of the 4 windmills, 2 got commissioned on 29.9.2003, 1 on 21.10.2004 and the last one on 30.3.2006. 2. Interest computation should be strictly in conformity with the terms given in the loan sanction letter	/IRR 5a/	1. The term loans and the amount drawn are now as per the loan sanction dates and the commissioning dates of the windmills. The IRR has been revised 2. Interest computation is now strictly with the terms given in the loan sanction letter.	/IRR 5 b/	1. Loan sanction letters ^{/LSL/} from each bank to Tanjavur spinning Mills have been verified and the revised term loan section is in line with loan sanction letters and found to be OK. 2. Loan sanction letters ^{/LSL/} have been verified and the interest computation are found to be in accordance with loan

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				sanction letters and verified to be OK. CAR B6 is closed.
CAR B7 In Ramco Industries Limited IRR sheet, Power bill of the month prior to the month in which decision was taken should be submitted as evidence for the tariff assumed.	/IRR 7a/	The HT tariff in Tamil Nadu has been uniform over the last 7 years as Rs. 3.50 per unit. A sample EB bill has been submitted with this response as an evidence towards that. Sample power bills have been submitted with this response	/IRR 7b/	HT tariff bills ^{/tariff/} have been verified and the evidence for tariff assumption is found to be correct. CAR B7 is closed.
CAR B8 In Ramco Industries Limited IRR sheet, 1. Reason given in the worksheet (2 NEG Micon windmills of 1.65 MW each) is not acceptable. These windmills commenced generation on 28.12.2005, not 2004. As per TNEB website, there seems to have been no change in tariff since March 2003	/IRR 7a/	1.The worksheet has been revised and corrected. The tariff has been taken as per the tariff prevailing in 2005 i.e. Rs. 2.7 / Kwh. No change has been made. 2. The correction has been made and projections for electricity	/IRR 7b/	1. The TNEB website ^{/tneb/} was checked and the tariff prevailing in 2005 i.e. Rs. 2.7 / Kwh.and found to have applied correctly. 2. The commission

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
2. Statement made in the worksheet (6 Suzlon windmills of 1.25 MW each) is not correct as of the 6 windmills, 1 commenced generation in 2002-03, 2 in 2003-04, 1 in 2004-05 and 2 in 2005-06.		generation have now been made on the basis of the actual dates of commissioning,		ing certificates / ^{CRRIL 1/-} /CRRIL 6/ have been checked and thus the projections of electricity generation have been modified correctly. CAR B8 is closed.
CAR B9 In Ramco Industries Limited IRR sheet, 1. Assuming the drawal of entire term loan in the first year is neither acceptable nor correct as of the 8 windmills (6 Suzlon, 1 Vestas RRB and 1 Vestas Windtech) which are financed by loan, 1 commenced generation on 30.1.2003, 1 on 25.3.2003, 1 on 30.9.2003, 1 on 21.3.2004,	/IRR 7a/	1. The term loan and the amount drawn is now as per the loan sanction dates and the commissioning dates of the windmills. The IRR has been revised .It is to be noted that the company has taken loan for only two WTGs i.e. WTG with HT Sc 1383 and 1384.	/IRR 7b/	1.Loan sacnction letters /LSL/ and Comissioning certificates / CRRIL 1/- /CRRIL 6/ have been verified. Thus term loan section revised as per sanction letters are found to be OK.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
1 on 31.3.2004, 1 on 30.9.2004 and 2 on 15.9.2005. 2. As per Worksheet 80% of investments in 6 windmills purchased from Suzlon and the entire investment made in Vestas – RRB and Vestas-Wind tech windmills are financed through debt. The loan amount considered is not in conformity with these assumptions.		2. The IRR has been revised .It is to be noted that the company has taken loan for only two WTGs i.e. WTG with HT Sc 1383 and 1384.		2.The revised IRR calculation has been verified to be OK. Loan sanction letters corresponding to WTG with HT Sc 1383 and 1384 have been verified and the loan amount is in conformity with these assumptions and found to be OK. CAR B9 is closed.
CRB1 In Tanjavur spinning mills Limited IRR, 1. Projections of first 3 years are not acceptable as 2 windmills commenced generation on 29.9.2003 (2003-04), 1 on 21.10.2004 (2004-05) and the last one on 30.3.2006	/IRR 5a/	1. The projections have now been made on the basis of the actual dates of commissioning,		1. Necessary changes in respect to projections have been revised, which are found to be correct.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
(2005-06). The generation, revenue and expenditure should be consistent with the commencement of generation of windmills 2. Since windmills commenced generation on different dates and 3 years free O&M service is given by the machinery supplier, providing for O&M cost from 4th year onwards on all the windmills is not acceptable		2. The projections have now been made on the basis of the actual dates of commissioning and starting date of the O&M agreement.		2. Operation and maintenance contracts /O&M/ of each suppliers corresponding to the investor Tanjavur Spinning Mills Limited /O&M1-O&M 4/ and the commissioning certificates /CR TSML/ have been checked and the revised projections have been found to be correct. CR B1 is closed.
CR B2 In TSML IRR, 1. providing full book depreciation irrespective of the commencement date of generation of	/IRR 5a/	1. Book depreciation has been provided based on the commencement of the generation from those respective windmills.	/IRR 5b/	1. Necessary modifications have been done in respect to depreciation

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
windmill is not in conformity with accepted accounting principles 2. The tax computation does not seem to be in conformity with Sec. 80IA.		2. Due to the capital intensive nature of the spinning mills where the plant and machinery is depreciated at a higher rate, the taxable income of these is negative. However the book profits are positive. Thus, these companies pay tax under the MAT regime. On account of the taxable income being negative, they are not liable to pay corporate income taxes. Thus the tax holiday under section 80 IA cannot be accounted for these spinning units as they are not paying any tax. Extracts from the Annual report of these spinning units are submitted with this response as evidence towards the fact that these units are paying MAT and not corporate tax.		calculations which were verified to be correct. 2.It has been verified from the annual report that taxable income of these Companies are negative Thus the tax holiday under section 80 IA cannot be accounted which is found to be deemed acceptable . CR B2 is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR B3 In TSML IRR sheet, 1.As windmills must have been acquired in different financial years (as they commenced generation on different dates), accounting for the cash outflow in the first year is not in conformity with accepted accounting principle. 2.Cash inflow for IRR calculation should include tax shield enjoyed by the company on account of accelerated depreciation on WEGs.	/IRR 5a/	1.Cash flows have been accounted for in the year in which the windmills have commenced generation. 2.As explained above the spinning units do not pay any corporate tax. Therefore they do not enjoy any tax shield. RIL and MCL are paying corporate tax. Therefore, a tax shield has been provided for the windmills installed by these companies.	/IRR 5b/	1.The cash flows have been correctly accounted for in year in which wind mills have commenced generation and found to be OK. 2.Tax shield has been provided for the windmills installed by RIL and MCL which are found to be correct. CR B3 is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR B4 In RIL IRR sheet, 1. Basis for restricting the book depreciation to 95% may be furnished. Tax rate assumed in the case of 2 NEG Micon windmills of 1.65 MW does not seem to correspond to tax rate prevailing during the year 2005-06.	/IRR 7a/	1.. Book depreciation has been corrected in the revised assessment and has now been provided for 100 % of the asset value.	/IRR 7b/	1. Necessary modifications have been done in respect to depreciation calculations which were verified to be correct. CR B4 is closed.
CR B5 Section 2.4, under power generation mix,	/PD 1/	Updated version 4 of CEA has been used in the revised PDD.	/PD 2/	The updated version is in line

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
the reference has been given as CEA version 3. please use updated version				with the latest version 4 of CEA which has been verified from the /CEA/ website and found to be correct. CR B5 is closed.
CR B6, Under section 2.5, please clarify the following points, 1. Page 22, market risk premium calculation, the Rf is used as 9.44%. Please clarify? 2. Page 27, provide documentary evidence to support the statement that huge hindrance & evacuation	/PD 1/	1. In the context of the present project activity YTM9 (Yield to Maturity) at primary issues over a period of 10 years has been considered to represent the risk free rate .The value is 9.44 % in the year 2001-02. Documentary evidences have been provided as evidence.	/PD 2/ /PD 3/	1. The Reserve Bank of India RBI-Annual Report 2001-2002 was verified and Rf value of 9.44% is deemed to be acceptable . 2. Documentar y evidences /ETN/ showing

⁹ Reserve Bank of India - Annual Report 2001-02

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
infrastructure in Tamilnadu is not quite encouraging. 3. Under step 3, Page 27, the references & statistics are corresponding to the years only 2002 -03 & 04. What about the WTGs installed after 2004?. Please clarify?		3. The project start date is in 2003. Therefore the common practice analysis should explain in details the scenario prevailing during that time. Therefore the information that has been provided corresponds to that period. The data and information for the period of 2004 has been removed from the revised version of the PDD.		evacuation problem has been checked and found to be deemed acceptable as huge hindrance while exporting power to grid in Tamil Nadu. 3.The clarification regarding the common practice analysis which has been done based on the prevailing practice during project start date 2003, is found to be OK. CR B6 is closed.

3.3 Monitoring Plan

The proposed project uses CDM approved methodology ACM0002 /Version 10: Grid Connected Renewable electricity Generation, which is approved under VCS 2007.1.

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

The monitoring plan^{/PD3/} 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

The parameters to monitor are electricity exported to the grid, electricity imported from the grid and net electricity generated.

The primary source of above data are the daily TNEB, BESCOM and CESCO meter readings taken by project proponent's site staff from the TNEB, BESCOM and CESCO meter. From the daily readings taken by project proponent staff daily emission reductions would be calculated and recorded in the log book. This value of emission reductions would then be added or subtracted from the JMRs. Thus the project conforms to the requirement of ACM0002, version 10.

in the event when verification period dates and billing cycle of WTGs in the project activity, do not coincide the description of common monitoring procedure adopted for the wind mills in 3 different districts of TamilNadu and also Karnataka are found to be OK.

The Net electricity generated from the Windfarms in this project activity is calculated based on the difference of electricity exported to the grid and imported from the grid. The transmission loss for this net electricity generated from the windfarms is calculated by taking the difference between electricity export and import with the sum of individual WTG generation or group generation by the WTGs every month.

The on-site visit was carried on from 2009-07-28 to 2009-08-01. Three members of the Validation team attended the site visit.

Before and during the on-site visit the Validation team performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

During the onsite-visit the information above was verified by the joint meter reading reports which have been duly signed by the representatives of TNEB, BESCOM and CESCO submitted by the PP. This was found to be in line with the monitoring plan^{/PD3/}, the PPA^{/PPA1-PPA5/} and ^{/EWA 1- EWA 14/} signed for the project and deemed to be ok.

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Calibration of meters shall be done by TNEB officials and BESCOM , CESCO officials in presence of Suppliers as per respective State Electricity Board norms.

Responsibilities related to monitoring are clearly defined in the monitoring plan and were assessed and found to be OK.

However, following CAR and CR were raised and successfully closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR M1 Under section 3.4, 1. Complete details of monitoring equipments including meter no, meter make & accuracy levels have to be given. 2. Is there any back up arrangements for data archiving & storage. If so please clarify?	/PD 1/	1. Since the monitoring equipment that includes the energy meter is subject to replacement during periodic accuracy checks, the details are not included in the PDD. However, these details are submitted to the DOE. 2. The site staff takes daily readings from EB meter connected to each HT Sc. Therefore, the emission reduction that is based in the monthly meter readings (JMRs), can easily be backtracked. These daily reading would be archived and stored for a period of two years + crediting period.	/PD 2/ /PD 3/	The details of the monitoring equipment submitted have been verified to be OK. More over the monitoring details have been checked and verified during site visit also and found to be OK. 2. During site visit it was verified and concluded that there are adequate arrangements for data archiving and

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				storage and thus found to be OK. CAR M1 is closed.
CAR M2 Since the project start date is day 28 of March 2006, moreover, the JMRs from each district may be different; hence it is not clear how energy readings will be compiled into ER sheet. For eg, the JMR period is from 15 to 15 in Coimbatore, and Palladam it is 5 to 5 of every month. There is no procedure for calculating ‘part of the month’ ER included in the PD. ER calculation sheet shall be provided for better understanding of monitoring plan. Also no procedure is mentioned related to apportioning in respect to wind mills located in Karnataka. Please set right all the above said anomaly.	/PD 1/	Clarity has now been provided on the procedure for handling data uncertainties in the revised VCS PD and the procedure for apportioning is provided in the explanation. Same procedure for apportioning would be followed for the wind mills located in Karnataka.	/PD 2/ /PD 3/	The procedure for handling data uncertainties has been cleared out along with apportioning details which are found to be deemed acceptable. CAR M2 is closed.
CR M1 Under section	/PD 1/	All the details have been included in the	/PD 2/ /PD 3/	Monitoring plan is

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
3.3, description of measurement methods and procedures to be applied are not in line with the following, • Monitoring: • Data type: • Frequency: • Recording: • Archiving policy: • Responsibility: • Calibration frequency: • Accuracy:		revised version of the PDD. The accuracy class of the meters has not been mentioned because it might be subjected to change if it gets replaced after the accuracy test checks/calibration checks.		complete with the inclusion of required information. QA/QC Procedures which were verified to be OK. CR M1 is closed.
CR M2 Under section 3.2, the following points are not provided, • Purpose of monitoring • Types of data and information to be reported, including units of measurement • Origin of the data) • Monitoring, including estimation, modeling, measurement or calculation approaches	/PD 1/	All the details have been provided in revised version of PDD.	/PD 2/	The revised PD is complete with required information corresponding to monitoring and QA/QC procedures. CR M2 is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
- Monitoring times and periods, considering the needs of intended users - Monitoring roles and responsibilities - Managing data quality				

3.4 Calculation of GHG Emissions

The validation team checked and found out that GHG emission reduction achieved by the project activity is calculated as the difference between the baseline emission and the project emission as well as the leakage emission. There are no GHG emissions arising from the project being a green power project. Hence, the project emissions are zero. As the project activity does not involve power plant construction, fuel handling (extraction, processing, and transport), and land inundation, the leakage due to the project activity is not applicable as per ACM 0002.

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

Baseline emission is calculated by multiplying the net quantity of electricity supplied by the project activity (EGy) with the CO₂ baseline emission factor for the electricity displaced due to the project (. Also refer section 3.2.

The baseline emission factor is equal to the CM, which is applying the default weights are as follows: wOM = 0.75 and wBM = 0.25 for operating margin emission factor (EF OM, y) and the build margin emission factor (EF BM, y).

The calculation method of the OM and BM is derived from the guide of OM and BM calculation issued by CO₂ Baseline Database for the Indian Power Sector, User Guide (Version 4, Date: October, 2008) issued by CEA.

The validation team has checked the underlying input values as well as the computation in the emission reduction spreadsheet^{ER}^{2/}. The estimation of the emission reduction was realized in a transparent and conservative manner and is well documented under section 4.2 – 4.4 of the PD.

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As per the final PD^{/PD3/} this project is expected to reduce emissions of 2995919 tCO₂e over a 10 years renewable crediting period.

The following clarifications were raised and closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR E1 1. Provide Emission reduction calculation & VER calculation in excel sheet.		Emission reduction calculation has been provided with the response.	/ER1/	The emission reduction calculation sheet has been provided which is verified to be OK. CR E1 is closed.
CR E2 Pl. consider the headlines and describe in the subchapters only the necessary things. 4.1. only in general the methodological choice. 4.2. the calculation of baseline emission in detail i.e. calculation of grid emission factor and net electricity supplied to the grid 4.3. information/assumptions regarding leakage and project emission. 4.4 Calculation of the emission reduction in		The necessary explanations have been provided in revised version of the VCS PD.		The revised explanations in respect to emission reduction calculation is found to meet the requirements and verified to be OK. CR E2 is closed.

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

3.5 Environmental Impact

The project activity does not fall under the purview of Environmental Impact Assessment notification of the Ministry of Environment and Forests (MoEF), Government of India (GOI) and the project activity is exempted from environmental clearances. The project activity has no significant impact on the environment. It has been verified from the website <http://www.envfor.nic.in/legis/eia/sol195.pdf>

No CARs/CRs were raised.

3.6 Comments by stakeholders

The stakeholder consultation was conducted during the period 27th Feb 2008 to 6th June 2008 at the project sites. The following are the local stakeholders identified for the project activity:

- Local community
- Local village administration
- Tami Nadu Electricity Board (TNEB)

Stakeholders' meeting notification was given in a form of invitation and information local stakeholders which were sent for the stakeholder meeting.

A summary of the stakeholder comments have been submitted as a separate document All comments were positive and it has been verified that all comments sufficiently have been addressed in the submitted document and it is verified and found to be OK.

No CARs/CRs were raised.

4 Validation conclusion

Madras Cements Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project - "Wind energy project by Ramco group in India", 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 would generate about 324 GWh of electricity annually which would replace equivalent quantum of power at the Southern grid. The generated electricity which are supplied to the Southern Grid of India will be either distributed to connected end users or wheeled back for captive consumption.

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 13 Corrective Action Requests (CAR), 14 Clarification Requests (CR) were raised and successfully closed out and 1 FAR has been raised and needs to be checked in every verification stage.

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 fulfils criteria of VCS 2007.1 provided.

- 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 2995919 t CO₂e (total) is most likely to be achieved within the 10 years renewable crediting period.

No restrictions or uncertainties were identified related to the validation.



Ma. Paa. Puratchikkanal

Team Leader

Bangalore, 2009-11-05



Rainer Winter

Final approval

Essen, 2009-11-16

5 References

Table 5-1: Documents provided by the project proponent

Reference	Document
/PD1/ /PD2/ /PD3/	VCS PD for Madras Cements Limited dated at 2009-04-17, Version 1 VCS PD for Madras Cements Limited dated at 2009-09-30, Version 2 VCS PD for Madras Cements Limited date dated at 2009-10-1, Version 3
/PHT/	Photographs of the Project Site
/IRR 1 a/ /IRR 2 a/ /IRR 3 a/ /IRR 4 a/ /IRR 5 a/ /IRR 6 a/ /IRR 7a/	Financial calculation sheet corresponding to RML version 1 Financial calculation sheet corresponding to Sudarshan Spinning Mills version 1 Financial calculation sheet corresponding to Sree Vishnu Spinning Mills version 1 Financial calculation sheet corresponding to Sandhya Spinning Mills Mills version 1 Financial calculation sheet corresponding to Thanjavur Spinning Mills version 1 Financial calculation sheet corresponding to Madras Cements Limited version 1 Financial calculation sheet corresponding to Ramco Industries Limited version 1
/IRR 1 b/ /IRR 2 b/ /IRR 3 b/ /IRR 4 b/ /IRR 5 b/ /IRR 6 b/ /IRR 7 b/	Financial calculation sheet corresponding to RML version 2 Financial calculation sheet corresponding to Sudarshan Spinning Mills version 2 Financial calculation sheet corresponding to Sree Vishnu Spinning Mills version 2 Financial calculation sheet corresponding to Sandhya Spinning Mills Mills version 2 Financial calculation sheet corresponding to Thanjavur Spinning Mills version 2

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Reference	Document
	Financial calculation sheet corresponding to Madras Cements Limited version 2 Financial calculation sheet corresponding to Ramco Industries Limited version 2
/BM /	Benchmark calculation
/Beta/	Beta calculation
/ER 1/ /ER 2/	Emission reduction calculation sheet corresponding to VCS/PD2/ Emission reduction calculation sheet corresponding to VCS/PD3/
/CR MCL 1/	Commissioning certificates of 800 KW turbines supplied by Enercon and commissioned during 27-02-07 to 15-03-08 by Madras Cements Limited from Tamil Nadu Electricity Board.
/CR MCL 2/	Commissioning certificates of 1650 KW turbines supplied by Vestas and commissioned during 31-12-05 to 23-05-08 by Madras Cements Limited from Tamil Nadu Electricity Board.
/CRTSML/	Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 29-09-03 to 21-10-04 by Tanjavur Spinning Mills Limited from Tamil Nadu Electricity Board.
/CRSVSML 1/	Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 29-09-03 to 12-08-05 by Shri Vishnu Shankar Mill Ltd from Tamil Nadu Electricity Board.
/CRSVSML 2/	Commissioning certificates of 1650 KW turbines supplied by NEG MICON and commissioned during 28-12-05 by Shri Vishnu Shankar Mill Ltd from Tamil Nadu Electricity Board.
/CR RML1/	Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 21-09-03 to 29-09-05 by Rajapalayam Mills Ltd Mills Ltd from Tamil Nadu Electricity Board.
/CR RML2/	Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 21-09-03 to 23-09-04 by Sandhya Spinning Mills Ltd from Tamil Nadu Electricity Board.
/CRSSM1/	Commissioning certificates of 1650 KW turbines supplied by NEG MICON and commissioned during 28-02-06 to 27-03-06 by Rajapalayam Mills Ltd Mills Ltd from Tamil Nadu Electricity Board.
/CRSSM2/	Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 21-09-03 to 23-09-04 by Sandhya Spinning Mills Ltd from Tamil Nadu Electricity Board.

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Reference	Document
/CRSSM3/	Board.
/CRRIL 1/	Commissioning certificates of 1650 KW turbines supplied by NEG MICON and commissioned during 31-12-05 by Sandhya Spinning Mills Ltd from Tamil Nadu Electricity Board.
/CRRIL 2/	Commissioning certificates of 350 KW turbines supplied by Suzlon and commissioned during 31-12-05 by Sandhya Spinning Mills Ltd from Tamil Nadu Electricity Board.
/CRRIL 3/	Commissioning certificates of 1250 KW turbines supplied by Suzlon and commissioned during 30-09-04 to 15-09-05 by Ramco Industries Ltd from Tamil Nadu Electricity Board.
/CRRIL 4/	Commissioning certificates of 1650 KW turbines supplied by NEG MICON and commissioned during 28-12-05 by Ramco Industries Ltd from Tamil Nadu Electricity Board.
/CRRIL 5/	Commissioning certificates of 800 KW turbines supplied by Enercon and commissioned during 31-03-06 by Ramco Industries Ltd from Tamil Nadu Electricity Board.
/CRRIL 6/	Commissioning certificates of 500 KW turbines supplied by Vestas RRB and commissioned during 25-03-03 by Ramco Industries Ltd from Tamil Nadu Electricity Board.
	Commissioning certificates of 750 KW turbines supplied by NEG MICON and commissioned during 21-03-04 by Ramco Industries Ltd from Tamil Nadu Electricity Board.
	Commissioning certificates of 1500 KW turbines supplied by Suzlon and commissioned during 10-10-07 by Ramco Industries Ltd from Tamil Nadu Electricity Board.
/PPA1/	Power Purchase Agreements between Madras Cements Limited and Tamil Nadu Electricity Board for 24 windmills of 1650 KW capacity
/PPA 2/	Power Purchase Agreements between Madras Cements Limited and Tamil Nadu Electricity Board for 43 windmills of 800 KW capacity
/PPA 3 /	
/PPA 4 /	Power Purchase Agreements between Ramco Industries Limited and Tamil Nadu Electricity Board for 2 windmills of 800 KW capacity.
/PPA 5/	Power Purchase Agreements between Ramco Industries Limited and Tamil Nadu Electricity Board for 1 windmill

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Reference	Document
	of 1500 KW capacity. Power Purchase Agreements between Ramco Industries Limited and Tamil Nadu Electricity Board for 1 windmill of 1650 KW capacity.
/EWA1/ /EWA2/ /EWA3/ /EWA4/ /EWA5/ /EWA6/ /EWA7/ /EWA8/ /EWA9/ /EWA10/ /EWA11/ /EWA12/ /EWA13/ /EWA14/	Energy Wheeling Agreement between Madras Cements Limited and Tamil Nadu Electricity Board for 11 wind mills of 1650 KW capacity. Energy Wheeling Agreement between Madras Cements Limited and Tamil Nadu Electricity Board for 10 wind mills of 800 KW capacity. Energy Wheeling Agreement between Tanjavur Spinning Mills Limited and Tamil Nadu Electricity Board for 4 wind mills of 1250 KW capacity. Energy Wheeling Agreement between Shri Vishnu Shankar Mills Limited and Tamil Nadu Electricity Board for 6 wind mills of 1250 KW capacity. Energy Wheeling Agreement between Shri Vishnu Shankar Mills Limited and Tamil Nadu Electricity Board for 1 wind mill of 1650 KW capacity. Energy Wheeling Agreement between Rajapalayam Mills Limited and Tamil Nadu Electricity Board for 13 wind mills of 1250 KW capacity. Energy Wheeling Agreement between Rajapalayam Mills Limited and Tamil Nadu Electricity Board for 2 wind mills of 1650 KW capacity. Energy Wheeling Agreement between Sandhya Spinning Mills Limited and Tamil Nadu Electricity Board for 4 wind mills of 1250 KW capacity. Energy Wheeling Agreement between Sudarsanam Spinning Mills Limited and Tamil Nadu Electricity Board for 3 wind mills of 1250 KW capacity. Energy Wheeling Agreement between Sudarsanam Spinning Mills Limited and Tamil Nadu Electricity Board for 1

Reference	Document
	wind mill of 1650 KW capacity Energy Wheeling Agreement between Sudarsanam Spinning Mills Limited and Tamil Nadu Electricity Board for 1 wind mill of 1650 KW capacity Energy Wheeling Agreement between Ramco Industries Limited and Tamil Nadu Electricity Board for 6 wind mills of 1250 KW capacity Energy Wheeling Agreement between Ramco Industries Limited and Tamil Nadu Electricity Board for 1 wind mill of 500 KW capacity Energy Wheeling Agreement between Ramco Industries Limited and Tamil Nadu Electricity Board for 1 wind mill of 750 KW capacity
/AL1/	Letter from Tanjavur Spinning Mills Limited authorizing Madras Cements Limited to carry out all VCS related activities and communication.
/AL2/	Letter from Shri Vishnu Shankar Mills Limited authorizing Madras Cements Limited to carry out out all VCS related activities and communication.
/AL3/	Letter from Rajapalayam Mills Limited authorizing Madras Cements Limited to carry out out all VCS related activities and communication.
/AL4/	Letter from Sandhya Spinning Mills Limited authorizing Madras Cements Limited to carry out out all VCS related activities and communication.
/AL5/	Letter from Sandhya Spinning Mills Limited authorizing Madras Cements Limited to carry out out all VCS related activities and communication.
/AL 6/	Letter from Sudarsanam Spinning Mills Limited authorizing Madras Cements Limited to carry out out all VCS related activities and communication. Letter from Ramco Industries Limited authorizing Madras Cements Limited to carry out out all VCS related activities and communication.

Reference	Document
/PO1 to /PO136/	Purchase orders for all the 136 WTGs
/LSL/	Loan sanction letters from the respective banks for 6 investors except Madras Cements Limited (100% equity, so no loan sanctioned letter is required)
/O&M 1/ /O&M 2/ /O&M 3/ /O&M 4/	Operation & Maintenance agreements from M/s. Enercon (India) Limited. Operation & Maintenance agreements from Suzlon Energy Limited Operation & Maintenance agreements from NEG MICON Operation & Maintenance agreements from Vestas RRB
/tariff/	Tariff bill
/SHC/	Stake holder meeting documents, Attendance sheet
/UD-LET/	Undertaking letter from Madras Cements Limited, the project participant of “ Wind energy project by Ramco group in India” regarding claim for VER/VCU under VCS standard.

Table 5-2: Background investigation and assessment documents

Reference	Document
/ACM 0002/	Indicative simplified baseline and monitoring methodologies for selected large-scale CDM project activity categories (Version 10)
/Tool 1/	Tool for the demonstration and assessment of additionality (Version 05.2)
/Tool 2/	Tool to calculate the emission factor for an electricity system (Version 01.1)

Reference	Document
/IPPC-RM/	1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/PLF 1/ /PLF 2/ /PLF 3/ /PLF 4/	Actual Generation report Generation Report from Indian Wind power Association TNERC Order showing 23% PLF PLF justification sheet
/MAT/	Evidence document showing that the investors Tanjavur Spinning Mills Limited, Shri Vishnu Shankar Mills Limited, Rajapalayam Mills Limited, Sandhya Spinning Mills Limited, Sudarsanam Spinning Mills Limited are paying MAT
/TAX/	Evidence document showing income tax rates
/ETN/	Evidence document showing lack of evacuation facility in Tamil Nadu.
/RBI-AR/	Reserve Bank of India - Annual Report 2001-02

Table 5-3: Websites used

Reference	Link	Organisation
/vcs/	www.v-c-s.org	VCS website
/unfccc/	www.unfccc.int	UNFCCC website
/cea/	http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm	Central Electricity Authority
/cea 1/	http://www.cea.nic.in/power_sec_reports/general_review/0304/chap-2.pdf	Central Electricity Authority
/cea 2/	http://www.cea.nic.in/power_sec_reports/general_review/0304/chap-3.pdf	Central Electricity Authority

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Reference	Link	Organisation
/mnes 1/	http://www.mnes.nic.in/annualreport/2002_2003_English/ch5_pg3.htm	Ministry of Non-conventional Energy Sources
/mnes 2/	http://www.mnes.nic.in/annualreport/2003_2004_English/ch5_pg3.htm	Ministry of Non-conventional Energy Sources
/plr/	http://finmin.nic.in/stats_data/monthly_economic_report/index.html	Ministry of Finance
/bse/	http://www.bseindia.com/histdata/hindices.asp	BSE
/enfor/	http://envfor.nic.in/divisions/ccd/cdm_iac.html	Ministry of Environment and Forests, GoI, India
/tnerc/	http://tnerc.tn.nic.in/orders/NCESamend.pdf	Tamil Nadu Electricity Regulatory Commission
/kerc/	http://www.kerc.org/order2005/Order%20on%20NCE%20Tariff%20(FINAL).doc	Karnataka Electricity Regulatory Commission
/IT/	http://www.incometaxindia.gov.in/incometaxindiacr/contents/taxrates/taxrates_2008_09_c.htm	Income Tax, India
/CAPM/	http://www.investopedia.com/articles/06/CAPM.asp	Investopedia.inc
/satsig/	http://www.satsig.net/maps/lat-long-finder.htm	Satellite Signal

Table 5-4: Interviewed Persons

Reference		Name	Organisation / Function
/IM02/	☒ Mr. ☐ Ms.	Mr. Saurabh Kaura	BUNGE Emissions Group

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Reference		Name	Organisation / Function
/IM01/	☒ Mr. ☐ Ms.	Mr . Sivakumar	Madras Cements Limited

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Wind Mill SC No.	No. of WEGs & Capacity in 'KW'	Make	S.F. Nos.	Location	Latitude	Longitude	Date of commissioning.
D97	1X800	ENERCON	702/1A(P)	Pushpathur	N10 36 5.822	E77 24 2.497	23.07.2007
D98	1X800	ENERCON	451/1(P)	Pushpathur	N10 35 25.7	E77 27 25.556	23.07.2007
D99	1X800	ENERCON	461/1(P), 457/1(P)	Pushpathur	N10 35 17.777	E77 27 40.388	23.07.2007
D100	1X800	ENERCON	305(P)	Pushpathur	N10 33 22.967	E77 25 31.349	23.07.2007
D101	1X800	ENERCON	1/1(P)	Pushpathur	N10 33 32.172	E77 25 10.455	02.08.2007
D102	1X800	ENERCON	9	Pushpathur	N10 33 21.471	E77 25 5.923	02.08.2007
D122	1X800	ENERCON	228/2A2	Pushpathur	N10 33 47.03	E77 26 6.389	27.09.2007
D116	2X800	ENERCON	222, 210/1	Pushpathur	N10 35 55.43, N10 35 52.793	E77 24 59.435, E77 25 12.37	27.09.2007
D115	1X800	ENERCON	166/3 & 165/2(P)	Pushpathur	N10 33 48.419	E77 24 31.989	27.09.2007
D121	2X800	ENERCON	471(P) SOUTH, 472(P), 471(P) NORTH	Pushpathur	N10 33 12.822, N10 35 18.626	E77 27 16.773, E77 27 10.868	27.09.2007
D120	1X800	ENERCON	616/1A(P)	Pushpathur	N10 35 34.50	E77 27 15.17	27.09.2007
D119	2X800	ENERCON	649/1C2(P), 644(P)	Pushpathur	N10 35 52.105, N10 36 6.094	E77 27 14.39, E77 27 6.084	27.09.2007
D118	1X800	ENERCON	644(P)	Pushpathur	N10 39 53.363	E77 27 5.333	27.09.2007
D117	1X800	ENERCON	665/1A(P)	Pushpathur	N10 36 33.779	E77 27 5.877	27.09.2007
D129	7X800	ENERCON	670/1B(P), 347(P), 349(P) SOUTH, 356/4A, 3G, 5C, 358/1(P) NORTH, 416, 676(P), 675/1(P)	Pushpathur	N10 36 7.969, N10 36 14.638, N10 36 20.462, N10 36 26.492, N10 36	E77 28 1.439, E77 28 5.537, E77 27 57.231, E77 27 51.525, E77 27 42.812, E77 27 26.820,	28.09.2007

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					30.692, N10 36 33.355, N10 36 43.574	E77 27 26.244	
D134	1X800	ENERCON	44/3A	Pushpathur	N10 35 26.614	E77 24 49.969	02.01.2008
D133	1X800	ENERCON	103/1B	Pushpathur	N10 37 1.551	E77 26 33.839	02.01.2008
D132	2X800	ENERCON	53/1(P), 54/1(P) & 2(P)	Pushpathur	N10 35 11.947, N10 36 46.863	E77 24 49.427, E77 26 44.245	02.01.2008
D140	2X800	ENERCON	69/1B(P), 70/1,2(P)	Pushpathur	N10 36 1.294, N10 35 44.379	E77 24 45.736, E77 24 45.439	15.03.2008
D139	2X800	ENERCON	78/5,6(P), 100/1(P),2(P)	Pushpathur	N10 35 51.574, N10 36 41.402	E77 24 48.981, E77 246 31.245	15.03.2008
D135	7X800	ENERCON	26/1(P),27/1(P), 12/1B3(P), 148/1,2(P), 144/4(P), 110/1A(P), 115/1(P), 110/3(P))	Pushpathur	N10 37 17.098, N10 37 24.643, N10 37 30.434, N10 37 10.151, N10 37 13.542, N10 37 4.232, N10 36 57.384	E77 26 55.041, E77 26 38.692, E77 26 51.136, E77 26 28.152, E77 26 10.488, E77 26 7.092, E77 26 13.319	15.03.2008
D138	2X800	ENERCON	225/2A2,2A3,2A4,224/1(P), 125/1(P), 2(P0	Pushpathur	N10 36 51.945, N10 37 1.115	E77 25 40.589, E77 25 45.298	15.03.2008
D137	1X800	ENERCON	204/2(P) & 126/1(P)	Pushpathur	N10 37 15.869	E77 25 47.388	15.03.2008
D136	1X800	ENERCON	199(P)	Pushpathur	N10 37 28.380	E77 25 49.131	15.03.2008
U1459	1X1650	VESTAS	186(P),188/1AA(P)	Udumalpet	N10 35.857	E77 14.145	27.07.2007
U1460	1X1650	VESTAS	163/1	Udumalpet	N10 34.498	E 77 11.435	31.07.2007
U1464	1X1650	VESTAS	59/3B(P),253/C1(P)	Udumalpet	N10 37.239	E77 12.081	16.08.2007
U1465	1X1650	VESTAS	252/B1 C(P),253/C1(P)	Udumalpet	N10 34.844	E77 11.315	16.08.2007
U1468	1X1650	VESTAS	446/3,446/4	Udumalpet	N10 37.760	E77 21.854	22.08.2007

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U1469	1X1650	VESTAS	440/2A, 2B	Udumalpet	N10 37.985	E77 21.804	22.08.2007
U1522	1X1650	VESTAS	370/1C1 1C2 (P)	Udumalpet	N10 38.175	E77 21.520	29.03.2008
U1532	1X1650	VESTAS	525/2 (P)	Udumalpet	N10 38.559	E77 20.304	31.03.2008
2505	1X1650	VESTAS	179	Vadiyoor	N8 58 097	E77 27 .549	31.12.2007
2506	1X1650	VESTAS	58	Rajagopalaperi	N8 57 .193	E77 27 .533	22.01.2008
2507	1X1650	VESTAS	324	Rajagopalaperi	N8 57 .504	E77 27 .620	24.01.2008
2509	1X1650	VESTAS	87	Anaikulam	N9 00 06.2	E77 27 24.3	04.02.2008
2510	1X1650	VESTAS	37	Vadiyoor	N8 59 02.7	E77 28 06.4	13.02.2008
2522	1X1650	VESTAS	196	Rajagopalaperi	N8 56 .944	E77 27 .823	17.03.2008
2616	1X1650	VESTAS	234	Rajagopalaperi	N8 56 40.7	E77 27 48.0	22.04.2008
2629	1X1650	VESTAS	654	Uthumalai	N8 58 20.3	E77 32 47.7	23.05.2008
2357	1X1650	VESTAS	525	Thandayarkulam	N8 19 45.8	E77 37 30.2	04.06.2007
2358	1X1650	VESTAS	538	Thandayarkulam	N8 19 19.4	E77 37 38.7	04.06.2007
2359	1X1650	VESTAS	529	Thandayarkulam	N8 19 39.6	E77 37 12.8	04.06.2007
2360	1X1650	VESTAS	568	Thandayarkulam	N8 19 32.7	E77 37 34.3	04.06.2007
2361	1X1650	VESTAS	931	Thandayarkulam	N8 18 45.0	E77 40 06.8	05.06.2007
2362	1X1650	VESTAS	754	Thandayarkulam	N8 18 53.6	E77 40 36.3	05.06.2007
2367	1X1650	VESTAS	150	Thandayarkulam	N8 18 40.9	E77 39 30.4	14.06.2007
2368	1X1650	VESTAS	502	Thandayarkulam	N8 19 55.1	E77 36 59.8	15.06.2007