

# VERIFICATION REPORT

## GRID CONNECTED WIND POWER PROJECT IN TAMIL NADU



Document Prepared By: URS Verification Private Limited (URS)

<b>Project Title</b>	Grid Connected Wind Power Project in Tamil Nadu
<b>Version</b>	04
<b>Report ID</b>	CCMS000105

<b>Report Title</b>	Grid Connected Wind Power Project in Tamil Nadu
<b>Client</b>	CLP Wind Farms (India) Private Limited
<b>Pages</b>	25
<b>Date of Issue</b>	16/10/2012
<b>Prepared By</b>	URS Verification Private Limited (URS)
<b>Contact</b>	Physical Address: F-31, Sector-6, Noida – 201301, India Tel: +91-11-41083363, +91-120 – 6404223, 6404224, Fax: +91- 120 - 4297916 Email: <a href="mailto:ceo@ursindia.com">ceo@ursindia.com</a> Website: <a href="http://www.ursindia.com">http://www.ursindia.com</a>
<b>Approved By</b>	Mr. Mukesh Singhal
<b>Work Carried</b>	Team Leader: Mr. Dinesh Mane

**Out By** Technical Reviewer : Mr. Vinay Singh

## Summary:

### A brief description of the verification and the project

URS Verification Private Limited (URS), have been commissioned by CLP Wind Farms (India) Private Limited, to verify the greenhouse gas emission reductions reported for the project “Grid Connected Wind Power Project in Tamil Nadu”, for the period 02-July-2010 to 10-June-2012, with regard to the relevant requirements for VCS and CDM activities. The verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable VCS and CDM requirements in order to be certified.

### The purpose and scope of verification:

The purpose of verification is to have an independent third party assessment of the monitoring period. In particular, the monitoring plan, and the project’s compliance with relevant VCS criteria are verified in order to confirm that the project implementation as documented, is sound and reasonable and meets the identified criteria. The project was verified by URS Verification Private Limited (URS) (Verification report No. CCMS000105 issued on 16/10/2012).

### The method and criteria used for verification:

The verification consists of the following three phases:

- I) a desk review of the VCS PD, MR and ER spreadsheet and validation report
- II) on-site visit and follow-up interviews with project stakeholders
- III) the resolution of outstanding issues and the issuance of the final verification report and opinion.

### Any findings, restrictions of uncertainties related to the verification:

There are no restrictions of uncertainties related to this verification. There were 9 CARs was raised which were closed satisfactorily. The details of the findings (CARs & CLs) are provided in section 3.5 below.

### Summary of the verification conclusion:

The GHG emission reductions were calculated on the basis of the approved methodology ACM0002 version 13, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” and the monitoring plan included in the registered VCS PD, version 03 of 28/06/2012.

In conclusion, it is URS’s opinion that the project “Grid Connected Wind Power Project in Tamil Nadu.” as described in the Monitoring Report version 05 of 15/10/2012, meets all relevant requirements for VCS and CDM activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0002 version 13, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”. Hence URS is able to certify that the emission reductions from the project during the monitoring period 02- July-2010 to 10-June-2012 amount to **90,312 tCO<sub>2</sub>e**.

**Abbreviations**

BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER(s)	Certified Emission Reduction(s)
CL	Clarification Request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DoC	Date of Commissioning
EB	Executive Board
EF	Emission factor
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
kW	kilo Watt
kWh	kilo Watt hour
MoV	Means of Verification
MR	Monitoring Report
MW	Mega Watt
MWh	Mega Watt hour
NGO	Non-Governmental Organization
O & M	Operation and Maintenance
PE	Project Emission
PP(s)	Project Proponent(s)
QA/QC	Quality Assurance / Quality Control
Ref.	Document Reference
SEB	State Electricity Board
SS(s)	Sectoral Scope(s)
UNFCCC	United Nations Framework Convention on Climate Change
URS	URS Verification Private Limited
VCS	Voluntary Carbon Standard
VCS - PD	Voluntary Carbon Standard - Project Description
WTG	Wind Turbine Generator

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## 1 INTRODUCTION

### 1.1 Objective

The purpose of this verification, to have an independent checking of objective evidence, is as follows:

- to verify that the project is implemented as described in the registered VCS PD;
- to confirm that the monitoring system is implemented and fully functional to generate Voluntary Emission Reductions (VCUs) without any double counting, and
- to establish that the data reported
- are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

### 1.2 Scope and Criteria

The verification of this VCS project is based on the monitoring report, VCS PD and supporting documents made available to the verifier and information collected through performing interviews during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The URS has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions. The VCS criteria refers to VCS Standard: VCS Version 3, (4 October 2012, v3.3) and VCS Programme Guide: VCS Version 3, (4 October 2012, v3.4), VCS Validation Verification Manual, v3 Program Definitions, v3.4. Verification is not meant to provide any consultancy towards the project proponents. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

### 1.3 Level of assurance

The level of assurance of this verification report is reasonable which is based on site visit, documents and evidences submitted to the verification team. The same was verified by the verification team and based on the review along with the opinion of technical expert, the assurance is found reasonable.

### 1.4 Summary Description of the Project

The project involves the installation and operation of WTGs having total capacity of 24.75 MW, comprising of 15 nos. of WTGs with each having capacity of 1.65 MW, Vestas make of CLP in Tamil Nadu state of India. The power generated by the project to the regional grid (Tamil Nadu State Electricity Board) which is inter-connected with the Southern Regional Grid of India. The unique identification of the machines is as below:

Sr. No.	Loc No.	Village	District	HTSC No.	DOC	Latitude	Longitude
1	TPK 221	Poomalaikundu	Theni	WTG T 110	2-Jul-2010	N9°52'46.15"	E77°26'10.50"
2	TPK 130	Poomalaikundu	Theni	WTG T 129	29-Jul-2010	N9°53'52.07"	E77°25'37.12"
3	TPK 58	Poomalaikundu	Theni	WTG T 127	29-Jul-2010	N9°54'52.23"	E77°26'16.84"
4	TJP 247	Jangalpatti	Theni	WTG T 135	29-Jul-2010	N9°53'19.14"	E77°28'54.39"
5	TJP 391	Jangalpatti	Theni	WTG T 133	29-Jul-2010	N9°52'32.08"	E77°28'35.14"
6	TPK 520	Poomalaikundu	Theni	WTG T 124	29-Jul-2010	N9°54'45.33"	E77°27'59.91"
7	TPK 603	Poomalaikundu	Theni	WTG T 126	29-Jul-2010	N9°54'29.73"	E77°27'00.05"
8	TSK 447	Seepalakottai	Theni	WTG T 131	29-Jul-2010	N9°52'36.71"	E77°27'22.31"
9	TPK 108	Poomalaikundu	Theni	WTG T 128	29-Jul-2010	N9°54'07.38"	E77°25'34.54"
10	TPK 529	Poomalaikundu	Theni	WTG T 125	29-Jul-2010	N9°54'30.80"	E77°27'31.72"
11	TJP 78	Jangalpatti	Theni	WTG T 123	29-Jul-2010	N9°54'08.24"	E77°28'35.82"
12	TJP 198	Jangalpatti	Theni	WTG T 136	29-Jul-2010	N9°53'23.69"	E77°29'16.57"
13	TJP 324	Jangalpatti	Theni	WTG T 134	29-Jul-2010	N9°52'56.42"	E77°28'51.89"
14	TSK 470	Seepalakottai	Theni	WTG T 132	29-Jul-2010	N9°52'32.26"	E77°28'10.93"
15	TPK 228	Poomalaikundu	Theni	WTG T 130	29-Jul-2010	N9°52'59.62"	E77°26'27.69"

## 2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

### 2.1 Validation Process

The project is a VCS validated project as per report ID URS/12/VCS/03 version 02 dated 30-June-2012.

### 2.2 Validation Findings

#### 2.2.1 Gap Validation

Not applicable. The project is a VCS validated project as per report ID URS/12/VCS/03 version 02 dated 30-June-2012.

## 2.2.2 Methodology Deviations

Not applicable as the project is complying with the applied and approved methodology ACM0002, version 13, that has been used in the registered VCS PD /03/.

## 2.2.3 Project Description Deviations

Verification team has been carried out an on site visit for this project on 14/08/2012, also reviewed the all the project description documents /6 /, /7/, /12/, /13/, /19/. Once reviewing all the said documents and conducting site visit it reveals that project is implemented as per registered PD and hence it confirms that no project description deviations are found in this project.

## 2.2.4 New Project Activity Instances

This is not a grouped project activity and hence it is not applicable.

## 2.3 Validation Conclusion

The project is a VCS validated project as per report ID URS/12/VCS/03 version 02 dated 30-June-2012.

## 3 VERIFICATION PROCESS

### 3.1 Method and Criteria

The verification consists of the following steps:

- A desk review of the VCS PD , Validation report, Monitoring report and supporting documents with the use of the relevant sections of a customised protocol according to the VCS Standard: VCS Version 3, (4 October 2012, v3.3);
- A desk review of the Monitoring Report and additional supporting documents which were submitted by the client. The relevant sections of the above mentioned customised protocol according to the VCS version 3 were used;
- Verification audit planning;
- On-Site assessment;
- Background investigation and follow-up interviews with personnel of the project developer; and
- Verification reporting (Draft Verification Report and Final Verification Report).

The criteria of this verification include the relevant rules and steps as set out in VCS Standard: VCS Standard: VCS Version 3, (4 October 2012, v3.3) and VCS Programme Guide: VCS Version 3, (4 October 2012, v3.4), VCS Validation Verification Manual, v3 Program Definitions, v3.4. Full data has been verified as per Verification audit planning and hence no sampling is required.

## 3.2 Document Review

The monitoring report, version 05 of 15/10/2012, the emission reduction calculations provided in the form of a spreadsheet, /4/, were assessed as part of the verification along with the related documents. In addition the Project Description (VCS PD) in particular the baseline estimations and the monitoring plan, and the validation report dated 30/06/2012 for the project were reviewed.

The following table lists the documentation that was reviewed during the verification.

Ref. No	List of documents
1.	Monitoring report version 01 dated 22/07/2012.
2.	Monitoring report version 05 dated 15/10/2012.
3.	Theni I ER sheet corresponding to /1/ dated 22/07/2012.
4.	Theni I ER sheet corresponding to /2/ dated 15/10/2012.
5.	Approved CDM Methodology ACM0002, version 13: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".
6.	VCS PD ver 3 dated 28/06/2012
7.	Validation report ver 2 dated 30/06/2012
8.	Calibration certificates for all electricity meters used in the project covering the monitoring period.
9.	Copies of Monthly Joint Meter reading reports of all Electricity Meters (with ref. HT SC no.) covering reported monitoring period (refer section 4.3 for more details).
10.	Copies of monthly invoices and energy bills covering the monitoring period from 02/07/2010 to 10/06/2012 raised by CLP.
11.	List of all Meters with their unique identification number of HT SC and make-serial number- meter standard of each meter.
12.	Commissioning Certificate indicating commercial operation date for all WTGs (refer section 4.3 for more details).
13.	Extract of operation and maintenance record of all WTGs along with O&M contract
14.	Photographic evidence of grid connectivity, i.e., electricity transmission and evacuation system including the photographs of all meters.
15.	Proof of training and competency of the O & M personnel.
16.	Extract of valid Power Purchase Agreement signed between TNEB and CLP

17.	Technical specifications of all 15 WTGs along with nameplate proof of rated capacities.
18.	Sample copies of Daily generation reports and daily generation log book covering this monitoring reports.
19.	Site layout plan for all the WTGs related to the project
20.	Single line diagram describing all the metering points for all the WTGs related to the project
21.	Valid ISO 9001:2008 certificate of CLP issued by ISOQAR dated 22/02/2011
22.	VCS Standard: VCS Version 3, (4 October 2012, v3.3) and VCS Programme Guide: VCS Version 3, (4 October 2012, v3.4), VCS Validation Verification Manual, v3 Program Definitions, v3.4
23.	UNFCCC Validation and Verification Standard version 02,
24.	Websites referred 1) <a href="http://cdm.unfccc.int/index.html">http://cdm.unfccc.int/index.html</a> 2) <a href="http://www.cea.nic.in">http://www.cea.nic.in</a> 3) <a href="http://www.cea.nic.in">http://www.cea.nic.in</a> 4) <a href="http://www.itouchmap.com">http://www.itouchmap.com</a> 5) <a href="http://www.tneb.org.in">http://www.tneb.org.in</a> 6) <a href="http://www.v-c-s.org">http://www.v-c-s.org</a>
25.	Notification on the installation and operation of meters published by Central Electricity Authority dated 17.03.2006. Refer below link

### 3.3 Interviews

On 14/08/2012 the verification team interviewed the project proponent M/s. CLP Wind Farms (India) Private Limited and the project developer (Vestas) for the cross verification and details of the project implementation and its activity.

### 3.4 Site Inspections

On 14/08/2012, URS Verification Team visited Jangalpatti, Poomalaikundu, Govindanagram & Seepalakottai villages in Theni & Uttamaplayam taluka of Theni district of Tamil Nadu state in India. During the on-site assessment of the project, URS assessed the implementation and

operation of the proposed project, reviewed the information flows for generating, aggregating and reporting the monitoring parameters, interviewed key personnel of the plant to confirm the operational and data collection procedures, cross-checked between information provided in the monitoring report and data of the plant, checked the monitoring equipment including calibration performance, reviewed calculations and assumptions made in determining the GHG data and emission reductions, checked the quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

The key personnel interviewed during the site inspection and the main topics of the interviews are summarized in the table below:

Sr. No.	Date	Name and Role	Organization	Topic
/a/	14/08/2012	G. Bharathidasan, Manager-Operations	CLP	O&M, Project implementation status, O&M status
/b/	14/08/2012	A. Ismayil, Site Operator	Batliboi	O&M record, Daily Generation from the WTGs, Break down in the machines and maintenance
/c/	14/08/2012	M. Easwaran, Sr. Operator	Batliboi	QA/QC procedures, review of internal audit, Technical description, Project implementation status, O&M status, management review, Emergency preparedness plan
/d/	14/08/2012	N. Kannan, Jr. Engineer	Vestas	Review of all relevant documents i.e., Monitoring reports, Baseline emission reduction sheet, Monitoring parameters, Management structure,

				review and records
/e/	14/08/2012	M. Gowtham, Sr. Operator	Batliboi	QA/QC procedures, review of internal audit, Technical description, Project implementation status, O&M status, management review, Emergency preparedness plan

**3.5 Resolution of Any Material Discrepancy**

Summary of Findings	CAR	CL	FAR
	10	0	0

<b>Date:</b>	16/08/2012	<b>Raised by:</b>		Dinesh Mane	
<b>Type of Finding</b>	CAR	<b>S. No. of Finding</b>	1	REFERENCE	MR
<b>Details of the Finding:</b>		16/08/2012			
The "Project Type" as per definition VCS is not mentioned in section 1.2 of VCS MR in line with MR template. Also, it is not mentioned in same section, whether the project is grouped project or not.					
<b>Project Participant Response</b>			04/09/2012		
The project type has been mentioned in the revised MR.					
The project is not a grouped project. The same has also been mentioned in Section 1.2 of the revised MR.					
<b>Documents/ information provided by the Project Participant:</b>					
Revised MR					

<b>Reasoning for acceptance:</b>	06/09/2012
The changes done in revised MR are acceptable hence this CAR is closed.	
<b>Close out by Lead Assessor</b>	06/09/2012

<b><u>Date:</u></b>	16/08/2012	<b><u>Raised by:</u></b>	Dinesh Mane		
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	2	REFERENCE	MR
<b>Details of the <u>Finding:</u></b>		16/08/2012			
The roles/responsibilities for the project proponent(s) is not mentioned in section 1.3 of MR (refer MR completing guidelines.)					
<b>Project Participant Response</b>			04/09/2012		
The roles and responsibilities for the project proponent has been included in section 1.3 of the revised MR.					
<b>Documents/ information provided by the Project Participant:</b>					
Revised MR					
<b>Reasoning for acceptance:</b>			06/09/2012		
The changes done in revised MR are acceptable hence this CAR is closed.					
<b>Close out by Lead Assessor</b>			06/09/2012		

<b><u>Date:</u></b>	16/08/2012	<b><u>Raised by:</u></b>	Dinesh Mane		
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	3	REFERENCE	MR
<b>Details of the <u>Finding:</u></b>		16/08/2012			
PP is requested to keep the format of the date consistent throughout the MR.					
<b>Project Participant Response</b>			03/09/2012		

The format of dates has been made consistent in the revised MR.	
<b>Documents/ information provided by the Project Participant:</b>	
Revised MR	
<b>Reasoning for acceptance:</b>	06/09/2012
The change done in revised MR is acceptable hence this CAR is closed.	
<b>Close out by Lead Assessor</b>	06/09/2012

<b><u>Date:</u></b>	16/08/2012	<b><u>Raised by:</u></b>	Dinesh Mane		
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	4	REFERENCE	MR
<b>Details of the <u>Finding:</u></b>		16/08/2012			
The section 2.1 of MR is not filled in Bullet forms as mentioned in MR completing guidelines.					
<b>Project Participant Response</b>			04/09/2012		
The Section 2.1 has been revised and made in line with MR completing guidelines.					
<b>Documents/ information provided by the Project Participant:</b>					
Revised MR					
<b>Reasoning for acceptance:</b>			06/09/2012		
The changes done in revised MR are acceptable hence this CAR is closed.					
<b>Close out by Lead Assessor</b>			06/09/2012		

<b><u>Date:</u></b>	16/08/2012	<b><u>Raised by:</u></b>	Dinesh Mane		
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	5	REFERENCE	MR
<b>Details of the <u>Finding:</u></b>		16/08/2012			

The tables of section 3.1 of MR are not filled as per table format in MR completing guidelines.	
<b>Project Participant Response</b>	04/09/2012
Section has been revised and made in line with MR completing guidelines.	
<b>Documents/ information provided by the Project Participant:</b>	
Revised MR	
<b>Reasoning for acceptance:</b>	06/09/2012
The changes done in revised MR are acceptable hence this CAR is closed.	
<b>Close out by Lead Assessor</b>	06/09/2012

<b><u>Date:</u></b>	16/08/2012	<b><u>Raised by:</u></b>	Dinesh Mane		
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	6	REFERENCE	MR
<b>Details of the <u>Finding:</u></b>		16/08/2012			
The tables of section 3.3 of MR are not filled as per table format in MR completing guidelines. Also it is requested to include calibration details of all the meters used in this monitoring period in same section.					
<b>Project Participant Response</b>			04/09/2012		
The calibration details have been included in section 3.3					
The tables have been filled as per the table format of the MR completing guidelines.					
<b>Documents/ information provided by the Project Participant:</b>					
Revised MR					
<b>Reasoning for acceptance:</b>			06/09/2012		
The changes done in revised MR are acceptable hence this CAR is closed.					
<b>Close out by Lead Assessor</b>			06/09/2012		

<b><u>Date:</u></b>	16/08/2012	<b><u>Raised by:</u></b>		Dinesh Mane	
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	7	REFERENCE	MR
<b>Details of the <u>Finding:</u></b>		16/08/2012			
The section 3.3 of MR is not filled in Bullet forms as mentioned in MR completing guidelines.					
<b>Project Participant Response</b>			04/09/2012		
The Section 2.1 has been revised and made in line with MR completing guidelines.					
<b>Documents/ information provided by the Project Participant:</b>					
Revised MR					
<b>Reasoning for acceptance:</b>			06/09/2012		
The changes done in revised MR are acceptable hence this CAR is closed.					
<b>Close out by Lead Assessor</b>			06/09/2012		

<b><u>Date:</u></b>	16/08/2012	<b><u>Raised by:</u></b>		Dinesh Mane	
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	8	REFERENCE	MR
<b>Details of the <u>Finding:</u></b>		16/08/2012			
PP is requested to put exact dates of the monitoring period months as per JMR.					
<b>Project Participant Response</b>			04/09/2012		
The exact dates of monitoring as per the JMR have been included in the revised MR. The ER sheet has been made consistent with the JMR for the monitoring period.					
<b>Documents/ information provided by the Project Participant:</b>					
JMR and Revised MR					
<b>Reasoning for acceptance:</b>			06/09/2012		

The exact dates of monitoring as per the JMR have been included in the revised MR. The ER sheet has been made consistent with the JMR for the monitoring period. The same is found to be OK. Hence this CAR is closed.	
<b>Close out by Lead Assessor</b>	06/09/2012

<b><u>Date:</u></b>	16/08/2012	<b><u>Raised by:</u></b>	Dinesh Mane		
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	9	REFERENCE	MR
<b>Details of the <u>Finding:</u></b>		16/08/2012			
<p>The export-import readings of March 2012 mentioned in ER sheet are not matching with actual JMR readings for all the 15 WTGs.</p> <p>Also the machine no. T110 is commissioned on 02/07/2010 however the JMR is considered from 10/07/2010.</p>					
<b>Project Participant Response</b>			04/09/2012		
The readings have been corrected as per actual JMR					
<b>Documents/ information provided by the Project Participant:</b>					
JMR March 2012 and July 2010 and Revised MR and ER sheet					
<b>Reasoning for acceptance:</b>			06/09/2012		
The JMR values are matching with the ER sheet and revised MR. Accordingly the ER changes from 90,056 to 90,312 tCO <sub>2</sub> e (after year wise rounding down values) and it is found to OK, hence this CAR is closed.					
<b>Close out by Lead Assessor</b>			06/09/2012		

<b><u>Date:</u></b>	10/10/2012	<b><u>Raised by:</u></b>	Dinesh		
<b><u>Type of Finding</u></b>	CAR	<b><u>S. No. of Finding</u></b>	10	Reference	MR
<b>Details of the <u>Finding:</u></b>		10/10/2012			

PP is requested to use the latest version of MR as per <b>Version: v3.2 Issued: 4 October 2012</b> as available on VCS website.	
<b>Project Participant Response</b>	<b>10/10/2012</b>
The MR is revised in version 3.2 as per VCS MR latest template.	
<b>Documents/ information provided by the Project Participant:</b>	
Revised MR	
<b>Reasoning for acceptance:</b>	<b>10/10/2012</b>
Revised is found to be acceptable in revised version and hence this CAR is closed.	
<b>Close out by Lead Assessor</b>	<b>10/10/2012</b>

## 4 VERIFICATION FINDINGS

### 4.1 Project Implementation Status

Implementation status of the project(s), including any material discrepancies between the project and the project description:

The project involves generation of electricity by using wind energy as a source. Thus the project avoids generation of CO<sub>2</sub> from fossil fuel that would have been used for power generation.

The verification team visited the site of the project and confirmed that the project proponent has installed 24.75 MW (15 x 1.65 MW rated), Make – Vestas Model V-82, Wind Turbine Generators (WTGs). These WTGs are installed in Jangalpatti, Poomalaikundu, Govindanagram & Seepalakottai villages in Theni & Uttamaplayam taluka of Theni district of Tamil Nadu state in India as mentioned in the registered VCS PD and the same is in operation.

The electricity generated through WTGs are supplied to the Southern regional grid. The WTGs are connected to TNEB substation. The first WTG was commissioned on 02/07/2010 for commercial operation and this has been confirmed by verifying the commissioning certificate issued by the TNEB /12/.

The crediting period for this project starts from 02/07/2010 as per the registered VCS PD /06/. The project boundary covers the physical, geographical site of the renewable energy generation source. This includes the WTGs installation, main transformer, sub-stations and the respective grid. The proposed project evacuates all the power generated by the WTGs in this project to the Southern grid. The same was confirmed by the verification team by checking "Joint meter reading report" /09/and "Generation report" of all the WTGs /18/.

During the site visit, the following equipments as addressed in the validated VCS PD were found operational:

WTGs of 24.75 MW of 15 x 1.65 MW rated capacities in Tamilnadu, Control Panels of the respective WTGs, EB meters for measuring and monitoring the electricity supplied to the grid by WTGs.

A dedicated main meter and check meter is installed near to each WTG and these meters are in full control of TNEB (State Electricity Board) and the PP has got no control on the calibration and maintenance of the meters. In addition to that each WTGs is equipped with a LCS which measures electricity continuously.

During the site verification, the team cross checked the generation data through the Joint Meter Reading report /9/ and Generation Report /18/ in Tamilnadu and Invoices /10/ of the project to note that the generation is well within the stated capacity of 24.75 MW only. Thus it is confirmed that the project boundaries and all the equipments related to the project are in line with what is described in the registered VCS PD, version 03 dated 28/06/2012 /06/.

The project is reducing CO<sub>2</sub> emissions to the extent of electricity displaced from the regional grid. The achieved amount of emission reductions for the first verification that covers from 02- July-2010 to 10-June-2012 is 90,239 tCO<sub>2</sub>e as per the baseline emission reduction sheet, Joint Meter Reading report /09/. Verification team has checked the calculations provided in the ER sheet /02/ and confirms that PP has quantified the values accurately.

Based on the site observation and the documents assessed during the site visit, URS confirms that project is implemented fully and accurately as described in the registered VCS PD, version 03 dated 28/06/2012.

Implementation status of the monitoring plan and the completeness of monitoring, including any material discrepancies between the project and the project description:

#### **Monitoring plan and the completeness of monitoring:**

Monitoring plan is implemented as per the applied monitoring methodology ACM 0002 version 13 /05/. As per the monitoring methodology, the following parameters are to be monitored:

- Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project during the monitoring period

As per the registered VCS PD, there is provision for monitoring of the following parameter:

$EG_{P,J,y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project during the monitoring period

As discussed in the above section, a main and a check meter is installed near WTG to monitor the net electricity supplied to the grid from the connected windmills. These meters are sealed and are in custody of TNEB. The power exported and imported from the grid is monitored continuously by the main meter and recorded monthly by the state utility personnel in presence of representative from PP's side at a specific time mutually agreed by both the parties. The main meter at substation records total generation, total export, and total import by all the connected WTGs to the sub-station through a particular feeder.

PP raises invoice against the Joint Meter Reading report for which payment is made by the state utility. Verification team conducted the site visit on 14/08/2012 confirms that the procedure

mentioned above is the actual scenario, followed at site and is in compliance with the revised VCS PD, version 03 dated 28/06/2012.

The critical parameter for the determination of emission reductions is the net electricity exported by the project to grid. The net electricity exported to the grid by the project plant is determined as the difference of electricity exported and electricity imported by the project. A set of meters are installed at the high voltage side of the step up transformer installed at the Project Site at the common metering point i.e. substation (grid interconnection point), which are cumulative type online digital meters. The meters at the substation will be in custody of State Electricity Board (TNEB).

Each WTG is equipped with individual controller which controls all activities of WTG and also records electricity generation. The electricity generation value is transmitted through (OFC) to Central Monitoring Station (CMS) where it is recorded in Supervisory Control and Data Acquisition (SCADA) system. The electricity generation data is monitored continuously and recorded at 24 hr frequency.

Each of these meters (being bidirectional meters) measures both export and import electricity in parallel. These meter readings are decisive for determining the electricity fed to the grid and emission reduction calculations. The electricity export and import readings are maintained at the plant site on daily basis in daily generation reports /18/. Depending on availability of officer of TNEB, Joint Meter Reading (JMR) /07/ is taken for both export and import electricity for all the meters and duly signed by the representatives of CLP, Vestas and TNEB for all main and check meters. On the basis of these JMRs, TNEB issues monthly JMR statement to PP. PP is raising their invoice /10/ for sale of electricity to TNEB on the basis of these JMR. The difference of final reading and initial reading of the meter determines the exported electricity (in kWh). Based on these JMRs, Energy Bills (Invoices) /10/ is raised by the PP every month. The monthly JMR readings are transposed in the ER calculation spread sheet and aggregated on annual basis to compute the power exported to the grid by the project and subsequently the emission reductions.

This project is supplying the electricity to the grid. The line loss and the transmission losses upto metering point are already accounted in the joint monthly reading report for the reporting of net electricity supplied to the grid. The value of grid supplied electricity has been considered for the VER calculation which has been sourced from Jointly Meter Reading Reports (JMR) and the same has been cross verified by the verification team from the corresponding invoices raised by the PP which is in line with the registered monitoring plan.

Daily import and export readings are noted by the site engineers of Vestas for all 15 wind turbines at generation meter and prepare the daily generation reports /18/ which is being regularly verified by site-in-charge. On the basis of these daily reports, monthly reports will be prepared by site in charge and send to PP on regular basis.

Also, the verification team cross-checked the electricity exported figures in the JMRs with the figures of monthly Energy Bills (Invoices) /10/. The same value is considered for the calculation of emission reduction. The verification team hereby confirms that there was no material misstatement in the calculation of emission reductions.

Any remaining issues from previous validation or verification:

There are no remaining issues from validation. The same has been verified and confirmed by the verification team for the entire verification period from 02-July-2010 to 10-June-2012 found to be correct and in line with the registered VCS PD/06/.

There are no validated methodology deviations found to be in this project.

## 4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Net electricity supplied to the grid: The energy meter readings are noted daily and compared to controller data to check for accuracy in measurement. Monthly joint meter readings are taken jointly by representatives of CLP and TNEB and then it is used to estimate the quantity of energy exported by the WTGs to the grid.

The JMR report is the source for the values used to determine the net electricity supplied by the WTGs to the grid which is in line with the requirement provided in the registered VCS PD. The formulas, summation and consistency of the data and parameters are correctly applied in ER spreadsheet.

The calculations and applied formulae and method for calculation of baseline emission are in accordance with the registered monitoring plan and are in line with the requirements of the applied methodology /05/. The formulae and the methods referred in the MR /2/ and the spread sheets /4/ for estimation of GHG reduction comply with the corresponding formulae and methods in the registered PD /6/.

The calculation of emission reductions is based on subtracting project emissions and leakage from the baseline emissions. As the turbines run exclusively with wind energy without any usage of fossil fuel, the project emissions are considered as zero. Leakage is considered to be zero as per applied methodology and PD. For the calculation of baseline emissions the ex-ante and validated fixed value of baseline parameters, i.e. Southern Grid Emission Factor is taken into account which is a validated and registered value. The value of the emission reductions depends on the net electricity exported by the project.

The baseline emissions reductions are based on the net electricity supplied by the WTGs to grid. Therefore the baseline emission equals the Emission Reductions.

### Baseline Emissions:

The formula used for the determination of baseline emissions which is line with the PD:

**Baseline Emissions (tCO<sub>2</sub>/yr) = Net electricity supplied to the southern regional grid (EG<sub>PJ, y</sub>) (MWh) X Baseline Emission factor (EF<sub>grid, CM, y</sub>) (tCO<sub>2</sub>/MWh)**

### Data fixed ex-ante:

Emission factor of the grid electricity is 0.8969 tCO<sub>2</sub>/MWh. The ex-ante parameter has been derived from CO<sub>2</sub> Baseline Database for the Indian Power Sector, User Guide (Version 7), and Gov. of India/24.3/. URS has verified the appropriateness of the value for the crediting period against the data source which is publicly available and found it to be correct and in line with the registered VCS PD /6/.

The net electricity exported to the grid for the period 02-July-2010 to 10-June-2012 (Both days included), is **100,695,870** kWh.

Based on this figure of net electricity exported to grid, emission reductions work out to be 90,239 tCO<sub>2</sub> (rounded down).

**Project Emissions:**

As the turbines run exclusively with wind potential without any usage of fossil fuel, the project emissions are considered as zero.

**Leakage:**

In accordance with ACM 0002 version 13, as no transfer of equipment has been carried out in the project, no leakage estimation is required.

An ER calculation was prepared by the PP and presented to the verification team. It is confirmed that the ER calculation is overall correct. The total emission reductions during the monitoring period are 90,312 tCO<sub>2</sub>.

No significant reporting risks have been identified for the data reported. The operational procedures for training, emergency preparedness, maintenance and calibration of monitoring equipments, monitoring measurements and reporting, record handling and maintenance, reviewing monitored data, internal audit, project performance reviews and corrective actions are available at the plant. All the monitored data are archived in electronic form. The data will be kept for the whole crediting period and additional 2 years thereby meeting the requirement of the PD.

**4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals**

The source of net electricity generation, as reported in the registered VCS PD and the JMR sheets have been used by the project proponent to calculate EG<sub>BL,y</sub>. URS has cross checked and verified the values against the JMR and invoices raised by PP to TNEB. The JMR sheet is deemed to be the most appropriate source of data for net electricity supplied to the grid as this is jointly measured by representative of PP and TNEB official (Government body) duly signed by both the parties. Emission factor of the grid electricity is 0.8969 tCO<sub>2</sub>/MWh. The ex-ante parameter has been derived from official source “CO<sub>2</sub> Baseline Database for the Indian Power Sector, User Guide” (Version 7), Government of India /24.3/.

Meter accuracy: the accuracy of measurement of electricity delivered is determined by the equipment accuracy and frequency of its calibration. The calibration frequency of meter is defined as once in three year as per the registered VCS PD.

All meters are 0.5 s class, and were tested by TNEB prior to commissioning. The same is also checked by verification team during verification.

The following table indicates the date of calibration along with equipment no.:

HTSC Number	Main Meter			Check Meter		
	Sr. No.	Calibration Dt.	Due Dt.	Sr. No.	Calibration Dt.	Due Dt.
T-110	TNB04059	31-Oct-09	30-Oct-12	TNB04075	6-Jan-10	5-Jan-13
T-123	TNB04086	21-Oct-09	20-Oct-12	TNB04070	6-Jan-10	5-Jan-13

T-124	TNB04074	6-Jan-10	5-Jan-13	TNB04028	2-Nov-09	1-Nov-12
T-125	TNB02942	17-Feb-10	16-Feb-13	TNB04052	15-Dec-09	14-Dec-12
T-126	TNB04089	17-Dec-09	16-Dec-12	TNB02945	17-Feb-10	16-Feb-13
T-127	TNB04073	6-Jan-10	5-Jan-13	TNB04025	2-Nov-09	1-Nov-12
T-128	TNB04093	14-Dec-09	13-Dec-12	TNB04078	6-Jan-10	5-Jan-13
T-129	TNB02941	17-Feb-10	16-Feb-13	TNB04053	15-Dec-09	14-Dec-12
T-130	TNB04050	15-Dec-09	14-Dec-12	TNB02944	15-Dec-09	14-Dec-12
T-131	TNB04048	6-Jan-10	5-Jan-13	TNB04084	31-Oct-09	30-Oct-12
T-132	TNB04051	15-Dec-09	14-Dec-12	TNB04049	15-Dec-09	14-Dec-12
T-133	TNB02946	17-Feb-10	16-Feb-13	TNB04090	17-Dec-09	16-Dec-12
T-134	TNB04071	6-Jan-10	5-Jan-13	TNB04023	31-Oct-09	30-Oct-12
T-135	TNB04061	31-Oct-09	30-Oct-12	TNB04076	6-Jan-10	5-Jan-13
T-136	TNB04060	31-Oct-09	30-Oct-12	TNB02943	17-Feb-10	16-Feb-13

The calibration documents /08/ provided by the Project proponent indicate that the energy meters were calibrated during this monitoring period. All the calibration report clearly indicates that the energy meters were performing satisfactorily and are within the permissible limit of error. It was found that the delivered electricity and the consequently emission reductions are found to be conservative.

These practices meet the requirements of the applied methodology and approved monitoring plan as in the registered VCS PD.

URS verified that the emission calculations are based on the authentic data from the joint meter reading sheets issued by the state electricity board. The source and reliability of the baseline ER sheet used to calculate the monthly emission reduction was checked and found to be consistent.

#### 4.4 Management and Operational System

The project proponent has management responsibilities; data monitoring procedures, periodical internal audits, management reviews and corrective actions in case of any deviations effectively is done monthly. The management system and the quality control procedures are as per the registered VCS PD and are found being followed. All the daily and monthly records are archived electronically and in paper format.

The PP follows standard monitoring procedures for the project as described in PD. During this monitoring period the roles and responsibilities are shared by plant personnel including for plant maintenance and operation, and for parameters to be monitored and monthly energy billing as described in PD /06/. Routines for the archiving of data are defined and well documented. The monitoring personnel of Vestas are well trained and have the essential competence to carry out the relevant tasks with sufficient accuracy /15/. The QA/QC procedures /21/ were verified and its practices were evident during the site visit. All internal data are subjected to QA/QC measures. Therefore it is evidenced that the management system for monitoring plan of the VCS project is in place with responsibilities properly identified. The data will be kept for the whole crediting Period and additional 2 years as given in the PD.

The overall authority of the project site belongs to Vestas. The Joint meter readings are noted in presence of officials from plant and the TNEB mutually and the net electricity exported individual or common WTGs are provided by the TNEB to PP. Appropriate data management inclusive of data acquisition and aggregation, data management system is being followed for the project. No significant, lack of evidence and missing data were detected during on-site verification. It is evident from the monitoring data that the monitoring system ensures for continuous (except some routine breakdowns or outage) operation /13/. All internal data are subjected to QA/QC measures are under CLP which is an ISO 9001:2008 /21/ certified organisation and has proper procedures for data handling. The same has been verified during the site visit.

**5 VERIFICATION CONCLUSION**

URS Verification Private Limited (URS) has performed verification of the emission reductions reported for the project "Grid Connected Wind Power Project in Tamil Nadu" VCS PD /06/ for the period 02- July-2010 to 10-June-2012, with regard to the relevant requirements for CDM and VCS activities.

The project proponent of the project entitled "Grid Connected Wind Power Project in Tamil Nadu" is responsible for:

- the preparation of greenhouses gas emissions data and the reported greenhouse gas emission reductions from the project on the basis set out in the monitoring plan contained in the registered VCS project description version 03 of 28/06/2012
- the development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of greenhouse gas emission reductions of the project .

It is the responsibility of URS to express an independent verification opinion about the project's conformity with the requirements of VCS and CDM and on the reported greenhouse gas emission reductions from the project.

Based on documented evidence and corroborated by an on-site assessment URS can confirm that:

- the project has been implemented and operated as per the validated VCS-PD;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS and CDM requirements;
- the monitoring is in place as per the applied baseline and monitoring methodology;
- the monitoring complies with the monitoring plan in the revised VCS-PD;
- the monitoring plan in the registered VCS-PD is as per the applied baseline and monitoring methodology.

It is URS's opinion that the GHG emission reduction stated in the monitoring report version 05 of 15/10/2012 for the "Grid Connected Wind Power Project in Tamil Nadu" for the period 02- July-2010 to 10-June-2012 are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology "ACM 0002", "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 13 and the monitoring plan contained in the registered VCD PD version 3 of 28/06/2012.

Hence URS is able to certify that the emission reductions from the project during the monitoring period 02- July-2010 to 10-June-2012 amount to 90,312 tCO<sub>2</sub>e, the split up of which is as follows:

Reporting period: From 02- July-2010 to 10-June-2012

The net GHG emission reductions from the Project during this monitoring period is 90,312 tCO<sub>2</sub>e. Vintage wise breakdown of the net GHG emission reductions are as follows,

Year	Months considered in year	EG <sub>PJ,y</sub> (Net Generation in kWh)	Baseline Emissions (tCO <sub>2</sub> e)	Project emissions (tCO <sub>2</sub> e)	Leakage (tCO <sub>2</sub> e)	Emission reductions (tCO <sub>2</sub> e)
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2010	July 2010 to December 2010	28,219,350	25,309	0	0	25,309
2011	January 2011 to December 2011	56,071,560	50,290	0	0	50,290
2012	January 2012 to My 2012	16,404,960	14,713	0	0	14,713
<b>Total</b>		<b>100,695,870</b>	<b>90,312</b>	<b>0</b>	<b>0</b>	<b>90,312</b>

Verified GHG emission reductions or removals in the above reporting period:

GHG Emission Reductions or Removals	1CO <sub>2</sub> e
Baseline Emissions	90,312
Project Emissions	0
Leakage	0
<b>Net GHG emission reductions or removals</b>	<b>90,312</b>

Date: 16/10/2012

Mukesh Singhal



Managing Director

URS Verification Pvt. Ltd.

