VALIDATION

REPORT

for the GHG Project

GRID CONNECTED WIND POWER PROJECT IN TAMIL NADU.

Document Prepared By: URS Verification Private Limited (URS)

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Prepared By	URS Verification Private Limited (URS)
Contact	Physical Address: D-3, Amar Colony Lajpat Nagar-IV, New Delhi – 110024, India Tel: Tel: 011- 41083363 Email: ceo@ursindia.com

	Website: http:// www.ursindia.com
Approved By	Mr. Mukesh Singhal
Work Carried Out By	Team Leader: Mr. Dinesh Mane Technical Reviewer : Mr. Vinay Singh

Summary:

A brief description of the validation and the project:

M/s CLP Wind Farms (India) Private Limited has commissioned URS Verification Private Limited (URS) for the validation of the GHG project: "Grid Connected Wind Power Project in Tamil Nadu.", with regard to the relevant requirements of the VCS Guidelines/ VCSA Rules for project activities, as well as criteria for consistent project operations, monitoring and reporting. This project activity consists of electrical energy generation using wind energy and to supply it to the Southern grid of India. In this way the project activity reduces the GHG emissions which would have been generated by the fossil fuel dominated power grid of India.

The purpose and scope of validation:

The purpose of a validation is to have an independent third party assessment of the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Verified Carbon Units (VCUs).

The validation scope is defined as an independent and objective review of the Project Description (PD). The PD is reviewed against the relevant criteria (see above) and decisions by the VCS Board, including the approved baseline and monitoring methodology ACM0002 version 13.0.0. The validation team has, based on the recommendations in the Validation employed a rules-based approach, focusing on the identification of significant risks for project implementation and the generation of VCUs. The validation is not meant to provide any consulting towards the project proponents. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

The method and criteria used for validation:

The validation consists of the following three phases:

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

Any findings, restrictions of uncertainties related to the validation:

There are no restrictions of uncertainties related to this validation. There were 3 CARs raised which were closed satisfactorily. The details of the findings (CARs & CLs) are provided in section 2.5.

Summary of the validation conclusion:

In summary, the validation team considers that the underlying reason of GHG project cycle, and investment analysis is sufficiently evidenced. Thus it is the validation team's opinion that the "Grid Connected Wind Power Project in Tamil Nadu.", as described in the PD version 03 dated 28/06/2012 meets all the relevant VCSA requirements for the VCS project and relevant criteria of India and correctly applies the baseline and monitoring methodology ACM0002 Version 13.0.0. The validation team of URS thus recommends the proposed project to be registered as a VCS project activity with the VCSA.

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1 INTRODUCTION

1.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Verified Carbon Units (VCUs).

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the Project Description (PD). The PD is reviewed against the relevant criteria (see below) and decisions by the VCS Board, including the approved baseline and monitoring methodology. The validation team has, based on the recommendations in the Validation employed a rules-based approach, focusing on the identification of significant risks for project implementation and the generation of VCUs. The validation is not meant to provide any consulting towards the project proponents. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

The items covered in the validation are described below:

- VCS Standard version v3.2, 01 February, 2012
  - To meet the requirements of VCS guidelines version 3.3 requirements, in particular,
  - Project country requirements / criteria
- VCS Project Description
  - Project design
  - Project boundaries and predicted VCS project GHG emissions
- Project baseline
  - Baseline methodology
  - Baseline GHG emissions
- Monitoring Plan
  - Monitoring methodology
  - Indicators/data to be monitored and reported

- Responsibilities

- Project additionality

- Background investigation and follow up interviews

- Draft validation reporting with CARs, CLs & FARs, if any

- Final validation reporting.

The information included in the VCS-PD and the supporting documents were reviewed against the requirements and criteria mentioned above. URS has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of VCUs. The validation is based on the information made available to URS and on the contract conditions.

1.3 Level of assurance

The validation report is based on VCS PD, supporting documents (refer below section 2.2) 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.

1.4 Summary Description of the Project

The project activity involves the implementation of grid connected wind power project of 24.75 MW (= 1.65 MW X 15 WTG) at Theni site in Tamil Nadu state of India. This project activity reduces the GHG emissions which would have been generated by the fossil fuel dominated in the Southern Grid of India. The estimated annual emission reduction is 54,105 tCO2e and the estimated annual net generation is 60,325 MWh. Moreover, the location of the project activity site, as mentioned in the VCS PD was cross-checked during on site visit by the validation team and found to be in line with the PD. The first WTGs (HTSC no. WEG T 110) of project activity was commissioned on 2ndJuly 2010 which is considered as starting VCS start date; the same is verified through reviewing the commissioning certificate of all 15 commissioned WTGs. /20/.

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation was executed in the following steps:

- Receipt of PD (version 03, 28/06/2012)
- On-site visit (14/06/2012)
- Issue of corrective action requests (CARs) and clarification requests (CLs)

and the draft validation report

- Desk review of revised and final PD (version 03, 28/06/2012)
- Review of response provided by PP on corrective action requests (CARs) and clarification requests (CLs) raised by validation team

- Issue of the final validation report and protocol

2.2 Document Review

/1/	VCS PD, version 01 dated 10/06/2012
/2/	VCS PD [final version], version 03 dated 28/06/2012
/3/	Spread sheets for IRR and emission reduction calculations & Grid Emission Factor corresponds to /1/.
/4/	Spread sheets for IRR and emission reduction calculations & Grid Emission Factor corresponds to /2/.
/5/	Proof for "Right of use": a) Purchase Order issued by PP to Vestas Wind Tech India Pvt. Ltd. dated 31/08/2009 b) PPA between CLP & TNEB dated 02/07/2010
/6/	Validation contract between URS Verification Pvt. Ltd. (URS) and CLP Wind Farms (India) Private Limited(CLP) for this project activity, dated 30/05/2012.
/7/	Proof of starting date of VCS project activity: Commissioning Certificate issued by TNEB to CLP India, dated 02/07/2010 for one (WEG T 110) WTGs
/8/	Proof of the investment decision of this project activity: Board Decision byCLP Wind Farms (India) Private Limited (CLP) for the Carbon credit benefits, dated: 28/08/2009
/9/	1. Purchase agreements including lease agreement for land with M/s. Vestas Wind Technology Private Limited (Vestas) dated 19-March-2010 2. O&M agreement between CLP Wind Farms (Theni - Project II) Private Limited (CLP)and M/s. Vestas Wind Technology Private Limited (Vestas) dated 17-March-2010
/10/	Proof of Conformity of PLF as per Annex 11, EB 48, i.e. (Hydro Tasmania Consulting) HTC Wind Assessment Report, dated 13/07/2009
/11/	Power purchase Agreements for all 15 WEGs between CLP Wind Farms (India) Private Limited& Tamil Nadu Electricity Board
/12/	a) Letter of Invitation for local stakeholder consultation process, dated 01/02/2010 b) Minutes of Meeting of Local Stakeholder's Consultation, dated 18/02/2010 c) List of Attendees in the Local Stakeholder's consultation, dated 18/02/2010
/13/	Proof of Operational and management structure for implementation and monitoring of project activity dated 07/06/2012
/14/	Statutory clearances: a) Wind Energy Generator- Commissioning Certificate issued by Tamil Nadu

	Electricity Board b) Letter of Approval for installation of Wind Energy Generator issued by Tamil Nadu Generation Distribution Corporation Ltd.
/15/	Proof of the company name: "Certificate of Incorporation", dated 29/07/2008as per the Companies Act, 1956 (No. 1 of 1956)
/16/	Wind Turbine Brochure: Technical specifications for key equipment (including proof for capacity and Make provided by the equipment manufacturer of V82 -1.65MW, VESTAS)
/17/	Meter details installed at the plant site along with proof containing information on sr. no., accuracy class issued by manufacturer
/18/	Monitoring Training plan and records by CLP Wind Farms (India) Private Limited (CLP)
/19/	Key photographs of the current site activities along with photographs of the name plates of generating equipments
/20/	Commissioning certificates of all WTGs (refer Appendix I for details)
/21/	SLD (Single Line Diagram) of the Electricity System showing from the Electricity generator point to the injection point (final metering point) to the grid
/22/	Proof for Expected insurance charges i.e. Quotation for insurance premium dated 05 Jun 2009
/23/	Offer Letter from Vestas dated 12/05/2009
/24/	Proof of relation in between "CLP Wind Farms (India) Private Limited" and "Gujarat Paguthan Energy Corporation Private Limited (GPEC)"
/25/	TNERC Tariff Order dated 20 March 2009, http://tnerc.tn.nic.in/order-20-03-2009.htm
/26/	Proof of interest rate i.e. RBI Prime Lending Rate, (http://www.rbi.org.in/scripts/WSSView.aspx?Id=13953)
/27/	Extract of PP's Annual Reports for last three years, 2008-09, 2009-10, 2010-11
/28/	Lay out drawing of the Project activity
/29/	Proof of operational life time of the project activity, certified by DET NORSKE VERITAS, dated 06/02/2008
/30/	Declaration from PP dated 07/06/2012 stating that the project will be withdrawn from VCS Registry if the project gets registered with UNFCCC CDM program and not claim any credit under VCS Registry from the date of registration with UNFCCC,
/31/	Declarations states that PP stating no intention of creating and trading of another form of environmental credits out of VCUs would be created from this given project

	(Cp para 1.13 of VCS PD template) and technology and capacity would not change during the entire crediting period. dated 07.06.2012
/32/	Baseline and monitoring methodology: "Consolidated Baseline Methodology for grid connected electricity generation from renewable sources" Reference: ACM0002, Version 13.0.0 (EB 67), Sectoral scope: 1
/33/	Tool to calculate the emission factor for an electricity system, version 02.2.1, EB 63 Annex 19, http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf retrieved on 19/06/2012
/34/	Tool for the demonstration and assessment of additionality, version 6, EB 65 Annex 21, http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf, retrieved on 19/06/2012
/35/	Carbon dioxide database version-07 published by Central Electricity Authority.http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm , retrieved on 18/06/2012, Website Language: English
/36/	http://envfor.nic.in/legis/eia/so1533.pdf - EIA notification from MoEF dated 14/09/2006. http://moef.nic.in/downloads/rules-and-regulations/3067.pdf- Amendment of EIA notification dated 01/12/ 2009
/37/	Extract of CERC 2006 for testing of Monitoring requirement.http://www.cercind.gov.in/Archive2006.html
/38/	Medium-term forecast of Central Bank of host country i.e. RBI (Link: http://rbi.org.in/scripts/NotificationUser.aspx?Id=3445&Mode=0) page number 34, para 98.
/39/	Guidelines on the assessment of investment analysis", EB 62 Annex 5, http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf
/40/	UNFCCC websitehttp://cdm.unfccc.int/index.html
/41/	VCS website http://www.v-c-s.org/
/42/	RBI Prime Lending Rate (http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/78814.pdf)
/43/	As per prevailing tax rates for FY 07-08 (http://www.servicetax.gov.in/st-proc-home.htm)
/44/	Companies Act, 1956 (www.fastfacts.co.in/resources/DepCoAct.rtf)

/45/	Appendix IA of Income Tax Act Rules (http://law.incometaxindia.gov.in/DIT/File_opener.aspx?page=ITRU&schT=rul&csId=4a23cee1-1818-45d6-ab19-f155e08ed789&rNo=&sch=&title=Taxmann - Direct Tax Laws)
/46/	Income Tax Act for FY 07-08 (www.apcca.com/Attach/incomtax.xls)
/47/	Report on Geographical Co-ordinates of WTGs by Vestas, dated 20/06/2012
/48/	E-mail communication from PP on Commercially Sensitive Information, dated 22/06/2012
/49/	Sample copy of JMR & Invoice of the project activity, as provided by M/s CLP Wind Farms (India) Pvt. Ltd.

2.3 Interviews

On 14th June 2012 the validation team visited the site office of CLP Wind Farms (India) Private Limited at Theni, Tamil Nadu. Representative of the project participant were interviewed to confirm the stated information and to resolve issues identified in the document review. As of 14th June 2012 all WEGs were commissioned. The onsite visit interview were conducted at the project proponent onsite office .During the onsite visit interview, the relevant documents including purchase agreements /9/, Land lease agreement /9/and PPA /11/ were provided and assessed. The implementation activity of this project activity was confirmed from these documents. Based on the review of these documents, it is confirmed that, the project is a Greenfield project.URS conducted a physical site visit for this project as part of the validation process. URS can confirm the project design, operation and monitoring plan and all baseline scenario information based on the interviews and document verification. The main topics of the interviews are summarized in the table in the following section.

2.4 Site Inspections

On 14/06/2012, the validation team performed validation onsite inspection with the project proponent.

Sr. No	Date	Name	Designation/ Organization	Topic
1	14/06/2012	Mr. Naman Sanghvi	Asst. Manager /CLP	Project Design, Project Implementation schedule
2	14/06/2012	Mr. Bharathi Dasan	Site in charge/Vestas	Monitoring & Metering system, O&M activities

3	14/06/2012	Mr. S. Suresh Kumar	Villager/ Poomalaikundu village	Local stakeholder consultation
4	14/06/2012	Mr. Velusamy	Villager/ Poomalaikundu village	Local stakeholder consultation

During this visit, as well as earlier and after, interviews with the project proponent, project stakeholders were carried out to confirm selected information and to resolve issues identified in the document review.

2.5 Resolution of Any Material Discrepancy

The material discrepancies (corrective actions, clarifications or other findings)raised by the validation team during the validation process are described in the following table:

Summary of Findings	**CARs**	**CLs**	**FARs**
	03	**00**	**00**

Date:	**20/06/2012**	**Raised by:**		Validation Team	
Type of Finding	**CAR**	**S. No. of Finding**	01	REFERENCE	VCS PD
Details of the Finding:		20/06/2012			
1. The grid Emission factor in VCS PD mention as 0.8969 tCO2e/MWh. However, as per ER sheet it comes to 0.8970 tCO2e/MWh. Pl correct the same throughout the VCS PD. 2. The Plant Load Factor is not discussed in VCS PD. Pl include the same.					
Project Participant Response		27/06/2012			
1. We have used rounded down emission factor of 0.8969 tCO_2e/MWh in VCS PD and Emission Reduction calculation sheet 2. Plant load factor details included in VCS PD section					
Documents/ information provided by the Project Participant:					
Revised PD					

Reasoning for acceptance or non-acceptance:	28/06/2012
Revised PD is found to be appropriate.	
Close out by Lead Assessor	29/06/2012

Date:	**20/06/2012**	**Raised by:**		Validation Team	
Type of Finding	**CAR**	**S. No. of Finding**	02	REFERENCE	----
Details of the Finding:		20/06/2012			
PP need to include source of "VCU Sale Price" and "INR: USD Exchange Rate" provided in input parameter sheet of spreadsheet /2/ selected at the time of investment decisions.					
Project Participant Response		27/06/2012			
Required details added in ER sheet					
Documents/ information provided by the Project Participant:					
Revised IRR sheet					
Reasoning for acceptance or non-acceptance:		28/06/2012			
Revised IRR sheet is OK					
Close out by Lead Assessor		29/06/2012			

Date:	**20/06/2012**	**Raised by:**		Validation Team	
Type of Finding	**CAR**	**S. No. of Finding**	03	REFERENCE	VCS PD
Details of the Finding:		20/06/2012			

a) PP is requested to provide values and sources of all the parameters used in investment analysis along with actual values in section 2.5 of VCS PD. b) Also the offer letters does not belong to CLP WF but issued in the name of GEPC. PP is requested to explain the same. c) As the benchmark of this project activity is equity IRR, however interest is applied on whole project value. Pl clarify.	
Project Participant Response	27/06/2012
a) References related to the sources of values are updated in the worksheet and PD. b) Vestas offered the project to GPEC and GPEC decided to implement the project through its 100% subsidiary – CLP WF. Same can be verified through Board approval note of Project investment and shareholding certificate of CLP WF is submitted to DOE as evidence of the same. c) It is corrected and value of IRR is changed from 9.79 to 7.98%.	
Documents/ information provided by the Project Participant:	
1. Board note for approval of the Project 2. Shareholding pattern of CLP WF 3. Revised IRR sheet.	
Reasoning for acceptance:	28/06/2012
a) References related to the sources of values which updated in the worksheet and PD are found to be OK. b) PP has provide the supporting evidences for the change in name of company, the same has been verified to be correct. It can be concluded that GPEC is now holding by CLP Wind farms Pvt. Ltd. and CLP Wind Farms (Theni - Project II) Private Limited is subsidiary firm of CLP India Pvt. Ltd. which is PP of this project. Hence this CL is closed c) It is corrected and value of IRR is changed from 9.79 to 7.98% same is found to be correct. ..	
Close out by Lead Assessor	29/06/2012

3 VALIDATION FINDINGS

3.1 Project Design

Project scope, type, technologies and measures implemented, and eligibility of the project:

The project activity involves the implementation of the grid connected wind power project of 24.75 MW (15 x 1.65MW rated), Make – Vestas Model V-82, Wind Turbine Generators (WTGs) /16//.The power generated from the Project is supplied to Tamil Nadu Electricity Board ("TNEB") through Antipatti S/S 110 kV / 33-22kV substation. The same has been verified by the documents provided by the PP such as all statutory clearances /14/ and from Power Purchase Agreement /11/.The geographical coordinates of individual WTGs along with their date of commissioning are provided in Appendix 1 of this report.

All WTGs are located across Jangalpatti, Poomalaikundu, & Seepalakottai villages in Theni & Uttamaplayam taluka of Theni district of Tamil Nadu state in India.

The installed capacity of the power plant i.e. 24.75 MW are not expected to undergo any change within the crediting period, the same is confirmed by validation team during on site visit interview with project proponent for this project activity.

The verified details of key equipment implemented under the project activity are illustrated below and confirmed through document review of manufacturer's technical specification document /16/ and purchase order /9/:

TECHNICAL DESCRIPTION	**SPECIFICATION**
Rotor Diameter	82 m
Hub Height	78 m
Air Brake	Full blade pitch by three separate hydraulic pitch cylinders.
Nominal Revolutions	14.4 rpm
Rated voltage	690V
Generator	
Type of generator	Asynchronous water cooled
Rated power output	1650 kW

TECHNICAL DESCRIPTION	SPECIFICATION
Rotor	
No of blades	3
Swept area	5,281 m2
Control	
Type	Microprocessor-based monitoring of all turbine functions with the option of remote monitoring. Output regulation and optimization via Active-Stall
Operational Data	
Cut- in wind speed	3.5 m/s
Nominal wind speed	13 m/s
Cut-out wind speed (10 minutes)	20 m/s
Gearbox	
Type	Planetary/helical stages

The technology being used in the project activity is indigenously available and is deemed to represent current good practice and state-of-the-art technology.

The electricity generated by the project activity is being supplied to the Southern regional grid of India. The PPAs for each WTGs have already been signed between Tamil Nadu Electricity Board ("TNEB") and CLP Wind Farms (India) Private Limited ("CLP") for a 20 years period for export of electricity to the grid /11/. The estimated net electricity supplied figure works out as 60,325 MWh per operational year. The project will result in total emission reductions of 54,105 tCO2e per annum. The operation and maintenance of the project would be done by Vestas as per the agreement with them. Expected project operational lifetime is of 20 years which is verified from the proof of operational lifetime certified by third party i.e. DNV /29/.

The PLF of the project activity has been calculated to 27.82%which is based on the Wind Assessment Report dated 13 July 2009 prepared by M/s. Hydro Tasmania Consulting (HTC) /10/ (a third party engineering consultancy contracted by the PP). This is in line with the requirement of § 3 (b) of annex 11 of EB 48. The net electricity supplied to the grid will be calculated ex-post by the difference of measured export and measured import of electricity directly by meter as described in the monitoring plan of the PD.

This grid connected wind power plant has obtained all local and sectoral statutory clearances as specified under Indian Electricity Act 2003 i.e. Commissioning Certificates and Letter of Approval for installation of Wind Energy Generator issued by Tamil Nadu Generation Distribution Corporation Ltd. and hence confirmed that project has got all statutory clearances required to install the project./14 .

Project proponent: CLP Wind Farms (India) Private Limited is the project proponent for this project activity. This has been verified from the PPAs /11/.

Project start date: The project activity was commissioned on 2 July 2010 when the set of first WTG (WEG T 110) in the project activity were commissioned, which is considered as project starting date as per section 3.8.1 of VCS Standard version 3.2; the same is verified through commissioning report /20/.

Project crediting period:

The project crediting period is of 10 years which can be renewed for 2 times. The starting date of crediting period is 02/07/2010.

Project scale and estimated GHG emission reductions or removals:

The GHG emission reductions of this project activity is 54,105 tCO_2e per year hence comes under "Projects" scale as per version 3.2 of VCS standard .

Project activities:

This project activity is not a multiple project activities.

Project location:

The latitude and longitude of the project activity areas mentioned in the VCS PD /2/ and this was cross-checked from Google earth. Moreover, the location of the project activity site (geographical co-ordinates), as mentioned in the VCS PD/2/ was further cross-checked during on site visit by the validation team.

All WTGs are located in Jangalpatti, Poomalaikundu, &Seepalakottai villages in Theni &Uttamaplayam taluka of Theni district of Tamil Nadu state in India.

Project compliance with applicable laws, statutes and other regulatory frameworks:

Letter of Approval for installation of Wind Energy Generator issued by Tamil Nadu Generation Distribution Corporation Ltd. has been verified by validation team to check the compliance with Government regulations and Commissioning Certificates of project sites WTGs /20/ documents and hence confirmed that project has got all statutory clearances required to install the project./14/

Ownership and other programs:

- **Right of use**:
  Purchase orders /9/, establishing ownership rights including commissioning certificate /20/and PPA /11/were reviewed by validation team as a proof of title in respect of rights of use accorded to the project proponent and it is found to be acceptable /5/.

- **Emissions trading programs and other binding limits:**

- The part of project activity has applied for registration under CDM and is currently under validation . However the PP has provided the letter of declaration if the projects get registered under CDM then they will not claim any VCS benefits. Hence no double counting *applies for this project as per declarations provided by PP /30/, /31/.*

- **Participation under other GHG programs:**
- This project activity has applied for registration under CDM and is currently under validation.. Apart from CDM, it has neither applied nor been rejected under any other GHG program. This was cross checked through the back ground investigation *(http://cdm.unfccc.int/Projects/Validation/DB/QEJVYBH36RERGDA2GCQSJDVCZH1DK8/view.html)* as well the declaration given by the PP. mentions that project has not created any other environmental Credits /31/.

- **Other forms of environmental credit sought or received:**

  The declaration given by the PP mentions that project has not created any other environmental Credits /30/.

- **Rejection by other GHG programs:**
  This project activity has applied for registration under CDM and is currently under validation . Apart from CDM, it has neither applied nor been rejected under any other GHG program. This project is not participating under other GHG programs . This was cross checked through the back ground investigation (*http://cdm.unfccc.int/Projects/Validation/DB/QEJVYBH36RERGDA2GCQSJDVCZH1DK8/view.html*) as well the declaration given by the PP /30/.

Additional information relevant to the project

- **Eligibility criteria for grouped projects**
  This is not a group project activity.

- **Leakage management for AFOLU projects**
  This is not a AFOLU project activity.

- **Commercially sensitive information**
  There is no commercially sensitive information in this project activity. The same is confirmed from PP by email /48/

- **Any further information**
  There is no further information required presented here.

3.2 Application of Methodology

3.2.1 *Title and Reference*

Methodology Details	Description
Title and version of the baseline and monitoring methodology and version	ACM0002 version 13.0.0: "Consolidated Baseline Methodology for grid connected electricity generation from renewable sources" EB 67, annex 13
Reference	***http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT***
Sectoral scope	1: Energy industries (renewable - / non-renewable sources

3.2.2 *Applicability*

The project activity has applied the approved baseline and monitoring methodology ACM0002, Version 13.0.0 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", /32/ which also refers to the use of latest version of the "Tool to calculate the emission factor for electricity an electricity system" version 02.2.1 /33/.

The methodology is applicable to the grid connected renewable power generation project activities involving electricity capacity additions that include installation of wind power plant/unit. The validation team has reviewed the design and technical specification of the project activity, connection to the electricity system and definition of the project boundary as published by the appropriate authority of the host country. The project applicability was confirmed against each condition in the approved consolidated methodology ACM0002, Version 13.0.0 and the "Tool to calculate the emission factor for an electricity system", Version 02.2.1 referred to in the approved methodology. The summary of the applicability criteria is listed below:

Applicability criteria as per methodology /32/	**Means of Validation**
The project activity is grid connected renewable power generation project and meets the applicability conditions of the chosen methodology as demonstrated below:	The project activity is the installation of a new grid-connected renewable power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant) and has been checked from the document review i.e. purchase orders /9/. Furthermore, the electricity generated by the project activity will be supplied to southern grid (project electricity generation system as per the delineation of CEA /35/) and this has been checked from the

This methodology is applicable to grid-connected renewable power generation project activities that: *(a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant);* *(b) involve a capacity addition;* *(c) involve a retrofit of (an) existing plant(s); or* *(d) involve a replacement of (an) existing plant(s).*	Power Purchase Agreement /11/ signed between the PP and respective State electricity board which explicitly mention that the generated electricity from the project activity will be sold to the respective State electricity board.
The methodology is applicable under the following conditions: • *The project activity is the installation, or modification/retrofit of a, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;*	The project activity is the installation of a greenfield wind power plant. Hence, the applicability criterion is satisfied, the same has been checked from the document review i.e. purchase orders /9/ and from the onsite visit.
In the case of capacity additions, retrofits or	The project activity is not a capacity addition, retrofit or replacement of an existing power plant. Hence, this applicability

replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2: on page 10 to calculate the parameter $EG_{PJ,y}$): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	criterion is not required to be satisfied.
• In case of hydro power plants, at least one of the following conditions must apply: • The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or • The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m2 • The project activity results in new single or	The present VCS GHG project is not a hydro power plant; hence this paragraph is not applicable for the subject project case.

multiple reservoirs and the power density of each reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m2	
In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m2 all the following conditions must apply: • The power density calculated for the entire project activity using equation 5 is greater than 4 W/m2; • Multiple reservoirs and hydro power plants located at the same river and where are designed together to function as an integrated project1 that collectively constitute the generation capacity of the combined power plant; • Water flow between multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity; • Total installed capacity of the power units, which are driven using water from the reservoirs with power density lower than 4 W/m2, is lower than 15 MW; • Total installed capacity of the power units, which are driven using water from	The present VCS GHG project is not a hydro power plant; hence this paragraph is not applicable for the subject project case.

reservoirs with power density lower than 4 W/m2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.	
The methodology is not applicable to the following: • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • Biomass fired power plants; • Hydro power plant that result in new single reservoir or in the increase in existing single reservoir where the power density of the reservoir is less than 4 W/m2.	The present VCS GHG project is not a hydro power plant; hence this paragraph is not applicable for the subject project case. The project activity does not involve switching from fossil fuels to renewable energy sources. Hence, the applicability criterion is satisfied. The project activity is not a biomass fired power plant. Hence, the applicability criterion is not applicable. The project activity is not a hydro power plant. Hence, the applicability criterion is not applicable.

Thus the validation team confirms that the project participant correctly applied the approved CDM methodology /32/ to the project activity.

3.2.3 *Project Boundary*

Project activity boundary is delineated as physical and geographical boundary of the Wind power plant and is adequately described in the VCS PD /2/.

The validation team was able to confirm that all the identified emission sources which are impacted by the project activity are addressed by the approved methodology /32/ and can be seen in the Table below. Hence a clarification of revision to or deviation from the approved methodology /32/ is not requested.

Source	Gas	Included?	Justification by validation team

Source		Gas	Included?	Justification by validation team
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO_2	Yes	This is the main emission source because the as this emission of CO_2 due to 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 .
		CH_4	No	This gas is not applicable to this wind project activity.
		N_2O	No	This gas is not applicable to this wind project activity.
Project Activity	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam.	CO_2	No	The project activity is a wind power project and not a geothermal project. Thus, these emission sources are not applicable to the proposed project.
		CH_4	No	
		N_2O	No	
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	No	The project activity is a wind power project and not a solar thermal or a geothermal project. Thus, these emission sources are not applicable to the proposed project.
		CH_4	No	
		N_2O	No	
	For hydro power plants, emissions of CH_4 from the reservoir.	CO_2	No	The project activity is a wind power project and not a hydro power project. Thus, these emission sources are not applicable to the proposed project.
		CH_4	No	
		N_2O	No	

3.2.4 *Baseline Scenario*

The identified baseline scenario for the project activity, in line with the methodology ACM 0002 version 13.0.0 /32/, is the equivalent electricity that would have been generated, in absence of the project activity, by the operation of the grid-connected fossil fuel based power plants belonging to the Southern grid.

As per methodology (p4) baseline is as follows:

"If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

• 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".

Determination of Baseline Emission

According to ACM0002 version 13.0.0 /32/, the emission factor can be calculated in a transparent and conservative manner as follows:

The grid emission factor of for the project activity has been calculated ex-ante as per the "Tool to calculate the emission factor for an electricity system."

This has been calculated using the Central Electricity Authority CO2 Baseline Database version 7 /35/. Central electricity Authority (CEA) (under Ministry of Power, Government of India) have worked out baseline emission factor for two regional grids in India and made them publicly available. The data from CO2 Baseline Database for the Indian Power Sector Version 7.0 /35/ is the most recent data at the time of submission of VCS-PD for validation by PP on 08.06.2012(Cp p5 of tool to calculate emission factor of an electricity system, version 02.2.1 /33/).

Validation team has checked the calculation of the combined margin grid emission factor and confirmed that the applied value of the emission factor follows the tool /33/. And the values of OM and BM incorporated in the PD /2/ is taken from publically available CO2 baseline emission database for the Indian Power Sector i.e. by CEA (Govt of India) /35/.

Nevertheless, following steps to demonstrate the calculation of combined margin emission factor in accordance with "Tool to calculate emission factor of an electricity system", version02.2.1.

Step 1 –Identify the relevant electricity systems

In line with the requirements specified in the tool /33/, the PP has used a regional grid definition as applicable for large countries like India having layered electricity dispatch systems. The Indian power system is divided in two grids, the Northern, Eastern, Western and North- Eastern (NEWNE) Grid and Southern Grid. The project activity is partially situated in the state of Tamilnadu hence for the purpose of estimation of baseline emission factor the consideration of South Grid for the implemented project activity is found to be appropriate and correct.

Step 2–Choose whether to include off-grid power plants in the project electricity system (optional);

of the tool gives an option to include off-grid power plants in the project electricity system. CEA in its database for the Indian Power Sector User Guide - Version 7.0 /35/ has considered only grid power plants for the analysis and the same is found to be in line with tool for validation team.

Step 3 – – Select a method to determine the operating margin (OM);
Simple OM method, out of the four methods provided in the tool /33/ for calculating the operating margin ($EF_{grid,OM,y}$) is selected. The tool /33/ specifies that the simple OM method can only be used if the low-cost/must-run resources constitute less than 50% of total grid generation in :1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. The Simple OM method selected is justified and appropriate as the average proportion of low-cost/must run resources is less than 50%and the same is validated from User guide of CEA database, version 7.. The ex-ante option for determining the simple OM is opted by the PP.

Step 4– Calculate the operating margin emission factor according to the selected method;
The PP has considered the national published data (CEA database, ver. 07 /35/) for simple OM .The simple OM emission factor calculated by the CEA is the generation weighted average CO_2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost/must power plants (User Guide – CO_2 Baseline Database, ver-7for the Indian power sector /35/).

The value of simple operating margin for each year and the data for the calculation of EF grid, simple OM,y is published by the CEA /35/ and is publically available. However, validation team has carried checked the published value of simple OM from the data available in CEA, version 7/35/ and found that PP has rightly calculated the generation weighted average value and this is in line with the tool /33/ .
Hence, EF_{gridOM}= 0.9513 tCO_2/MWh for South grid

Hence validation team confirms that the PP has rightly followed the CEA database version 07 /35/ and the EF_{gridOM} for the grid is based on three year generation weighted average is inconformity with the tool to calculate emission factor, version 02.2.1 /33/.

Step 5— Calculate the build margin (BM) emission factor;
Option (b) the set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently has been considered by CEA and the same has been selected in the VCS PD/2/.

Validation team checked independently and confirm that the selection of the options is correct. This conclusion has been made based on the analyzing both the options, and it was found that the set of power as per option (b) comprises of larger annual generation and hence confirm the requirement of the tool /33/. In validating this step, validation team further confirms that:

(i) the identified power capacity additions comprise 20% of the system generation for the year under consideration.

(ii) none of the considered power capacity additions considered under (i) above have been built more than ten years earlier.

PP has fixed the Build Margin emission factor as ex-ante for the whole crediting period.

The PP has considered the national published data (CEA database, ver 07 /35/) for BM.

The CEA database /35/ provides a BM value of 0.7339 tCO_2/MWh for South grid . As part of validation of Step 6 of the tool /33/, Validation team has checked the BM for the year 2010-11 and found the same to be correct and in line with the tool.

Step 6 of the tool /33/ requires calculation of the combined margin emission factor as per the following equation:

$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$

$EF_{grid,CM,y} = EF_{CO2,grid,y}$ = 0.8969tCO_2/MWh

According to the tool /33/ on selecting alternative weights, the default weights applicable for solar and wind projects are W_{OM} = 0.75 and W_{BM} = 0.25 for the first and subsequent crediting period have been applied. The combined margin emission factor has been calculated as; EF_y = 0.8969tCO_2/MWh(The official published data for simple OM and BM is considered for calculation of CM). The CM for the first crediting period is fixed ex-ante. Hence the validation team confirms that the PP has correctly calculated the combined margin grid emission factor and is in line with the tool to calculate emission factor, version 02.2.1 /33/.

Table A-3: Assessment of assumptions used in Baseline Emissions

Parameter	Value Applied	Unit	Source of Information	Validator Conclusion
BASELINE EMISSIONS				
Rated Installed Capacity of the plant	24.75	MW	Technical Specification as mentioned in PO issued by PP/9/	Cross checked with technical specification provided by the manufacturer as mentioned in the PO issued by PP /9/and found correct.
Plant Load Factor	27.82	%	Third party PLF Report /10/	As per the report by third party contracted (M/s HTC) by the PP, in line with EB 48 annex 11 requirements /10/.

Combined margin for the Southern grid	0.8969 tCO_2/MWh	tCO_2/MWh	Baseline Carbon Dioxide Emission Database Version 7.0, from CEA data base / 35/	Cross checked with the Baseline Carbon Dioxide Emission Database Version 7.0, from CEA data base /35/ and found to be correct

3.2.5 Additionality

Investment analysis

Project proponent has demonstrated the additionality of the project activity through the investment analysis that the financial returns of the project activity are insufficient to justify the required investment. URS has adopted a six-pronged strategy to ascertain the veracity of the conclusion drawn by the project proponent, viz.

a) determining the suitability of the benchmark applied for the type of financial indicator presented;

b) conducting an assessment of parameters and assumptions used in calculating the financial indicator and determining the accuracy and suitability of parameters;

c) cross-checking the parameters against third-party or publicly available sources;

d) reviewing annual financial reports related to the project participant;

e) assessing the correctness of computations carried out and documented; and

f) subjecting the critical assumptions of the project activity to reasonable variations to determine under what conditions variations in the result would occur, and the likelihood of these conditions.

Suitability of financial indicator and benchmark:

The project proponent has chosen equity IRR to demonstrate the additionality of the project. Additionality Tool (Ver.06.0) permits the use of financial indicator, viz. IRR, for demonstrating the additionality using benchmark analysis. The tool permits the use of either project IRR or equity IRR. The project developer has chosen to demonstrate the financial unattractiveness of the project through equity IRR. Since the project proponent is demonstrating the financial unattractiveness of the project, equity IRR is appropriate, as it is often used by the project developers to make a decision on investing in the project. As such, selection of equity IRR as financial indicator to demonstrate the additionality of the project is appropriate and conforms to the Additionality Tool.

Additionality tool (ver.06.0) states that the discount rates and benchmarks shall be derived from "Government/official approved benchmark, where such benchmarks are used for investment decisions", among others. However, it is imperative that the benchmark selected should be

suitable for the type of financial indicator presented. The proponent has chosen the benchmark in accordance with the Appendix A of Guidelines on the assessment of investment analysis i.e. expected return on equity to reflect private investment and / or project type. The input parameters selected for the *expected return on equity*calculations were also checked and found to be correct. Accordingly, the cost of equity is being determined as the value provided in Appendix A. However, as per paragraph 7 of the appendix to the guidelines, the default values provided in the appendix are real term values that can be converted to nominal values by adding the inflation rate.

The default value for expected return on equity for energy industry in India in real term rates as per appendix to the "Guidelines on the assessment of investment analysis", is calculated after tax and it is 11.75%.

The medium-term inflation forecast from Reserve Bank of India which is the central bank of the host country is 4.25% /38/.

During assessments of the validity of the calculation the sources from which the default value for expected return on equity / 39/ as well as the medium-term inflation forecast from Reserve Bank of India is derived are analysed and verified /38/. Both, the validity of input parameters as well as the arithmetical validity of the computation is confirmed by the validation team. In order to comply with the requirements of EB 62, Annex 5, para. 13 the PP correctly taken average of medium-term inflation forecast from Reserve Bank. The availability and validity of the information used in input parameters has been assessed against EB 62, Annex 5, para. 6. By this means the validation team concludes that the benchmark calculation is correct with regards to the formulae used and its input parameters.

Finally, the benchmark chosen is suitable for the type of financial indicator selected, what is sought to be compared is the expected return on investment (equity IRR) with the default value for expected return on equity for energy industry in India in real term rates as per appendix to the Guidelines on the assessment of investment analysis is 11.75% and the medium-term inflation forecast from Reserve Bank of India which is the central bank of the host country is 4.25%. Thus the determined benchmark is 16%.Therefore, the benchmark selected by the project developer is appropriate and conforms to the Additionality Tool. The project proponent has also demonstrated that the expected return from the project activity i.e. equity IRR is lower than determined benchmark (16%).

Parameters and assumptions used:

The three important parameters, which determine the IRR of the project, are project cost, financing pattern, and profitability estimates. The project cost includes, WEG cost, financing cost and O&M costs etc..All the constituents of the project cost are based on the offer letters/23/ and detail estimation, whereas the financing cost is calculated based on the bank term loan sheet and other costs are audited Tax rate is as per the service tax rate applicable at that time and mentioned in as per prevailing tax rates for FY 07-08. The financing debt equity ratio is 70:30 /25/, which is accepted financing pattern for wind power projects as per TNERC order.

For Tamil Nadu state, the PLF is calculated to 27.82% as per HTC report also cross checked as recommended by TNERC in its order /25/and hence it is appropriate. This complies with the requirements of the Guidelines for the reporting and validation of plant load factors (EB48, Annex 11). Power tariff i.e. Rs.3.39/kWh is based on PPA, which is in line with the tariff recommended by TNERC for wind power projects. O&M cost based on offer letter /23/ and insurance cost are based on Quotation for insurance premium dated 05 June 2009/22/.

The project proponent has adopted Income Tax Act stipulated WDV (written down value)depreciation for income tax calculation, which are accepted accounting methods. The block of assets has been computed for depreciation purpose as per the accepted accounting principles. Tax liability has been calculated as per the income tax rules for FY 07-08. In computing the income tax liability, the project developer has taken into account the accelerated depreciation (80%), which the wind turbines are eligible and the Tax holiday (u/s 80IA of the Income Tax Act, 1961), which the infrastructure projects(under which the project activity falls) are entitled for the 10 consecutive years out of the first 15 years. The tax rate 33.99%considered corresponds to the tax rate prevailing at the time of taking decision date on 28/08/2009.

Cross checking parameters:

The cost of WEGs, power evacuation costs, O&M cost, insurance costs, interest costs, depreciation and tax rate have been cross checked with quotations, purchase orders Companies Act, Income Tax Act, PPA entered into by the project proponent with the Utility and the TNERC order. The input costs considered appear to be in order. The details of crossing of all parameters with the actual situation is done below:

Parameter	Value applied for IRR	Sources of Information	Actual value of this parameter after implementation	Sources of Information	Opinion by validation team
Project life (Years)	20	As per the Project Life Certificate	20	As per the Project Life Certificate	It is found to be in line. Hence it is accepted.
Installed Capacity (MW)	24.75	As proposed	24.75	As built	The same is found to be correct, hence accepted.
Project cost (INR in million)	1425	Project offer from Vestas	1460	As per CA certificate. Apportioned to the Project capacity of 24.75 MW	It is found to be conservative.
Term Loan (INR in million)	997.50	Based on Debt-Equity of TNERC tariff order	949	As per actual loan disbursement	It is found to be conservative.

Interest rate (percent)	11.50%	RBI Prime Lending Rate (http://www.rbi.org.in/scripts/WSSView.aspx?Id=13953)	2.5% + BPLR - IDFC	As per actual loan disbursement	It is found to be conservative.
Repayment period (years)	10	As per para 7.6 of Wind tariff order of TNERC dated 20-3-2009	12	As per actual loan disbursement	It is found to be conservative.
Moratorium (months)	12	As per para 7.6 of Wind tariff order of TNERC dated 20-3-2009	6	As per actual loan disbursement	It is found to be conservative.
PLF (percent)	27.82%	Based on third party assessment	21.73% (2010-11) 25.82% (2011-12)	Actual generation	It is found to be conservative.
O&M cost (INR million/WTG)	1.5	Project offer from Vestas	1.6	As per Agreement	It is found to be conservative.
Power tariff (INR/kWh)	3.39	Wind tariff order of TNERC dated 20-3-2009	3.39	PPA	It is found to be correct, hence accpeted
Book Depreciation (percent) -Civil works - Plant & machinery	5.28%	Companies Act, 1956 (www.fastfacts.co.in/resources/DepCoAct.rtf)	5.28%	Companies Act, 1956 (www.fastfacts.co.in/resources/DepCoAct.rtf)	It is found to be correct hence accepted.
IT Depreciation (percent) - Civil works	80%	Appendix IA of Income Tax Act Rules (http://law.incometaxindia.gov.in/DIT/File_opener.aspx?page=ITRU	80%	Appendix IA of Income Tax Act Rules (http://law.incometaxindia.gov.in/DIT/File_	- It is found to be correct.

- Plant & machinery		&schT=rul&csId=4a23cee1-1818-45d6-ab19-f155e08ed789&rNo=&sch=&title=Taxmann - Direct Tax Laws)		opener.aspx?page=ITRU&schT=rul&csId=4a23cee1-1818-45d6-ab19-f155e08ed789&rNo=&sch=&title=Taxmann - Direct Tax Laws)	
Income Tax (percent)	33.99%	Income Tax Act for FY 08-09	32.44%	As per the current tax rates	It is found to be conservative.

Financial reports of project proponent:

URS requisitioned the statement of accounts/27/ of the project participant for the 3 financials years i.e. FY 2008-09, 2009-10 and 2010-11 to cross check the diversion of any Official Development Assistance (ODA). This shows that there was no involvement of ODA in the project activity and the same was verified by the validation team and found to be correct.

Assessment of correctness of computation:

The assessment involves checking the data input taken from quotation/documents, adoption of correct accounting principle and arithmetical accuracy. URS checked the quotation/ other documents (purchase order, O&M doc.) and ensured that right input has been taken in the project cost and projections. The accounting principles adopted with respect to the computation of interest during implementation, block of assets, pro-rata expenses and tax computation are found to be in order. The arithmetical accuracy is also found to be correct. The accounting principle adopted by the project proponent for computing IRR is in conformity with the “Guidance on the Assessment of Investment Analysis” version 5 as contained in annex 5 to EB 62 report. IRR has been computed for 20 years. In computing the IRR, the project proponent has taken into account profit after tax and depreciation. From the total, the repayment of term loan has been deducted, which is the accepted accounting principle, in as much as the repayment of term loan is made out of cash flow, i.e., profit after tax and depreciation. In the calculation of the equity IRR, total investment costs have been considered as the net cash outflow, which is as per annex 5 to EB 62. Based on the above, the equity IRR for CLP amounts to 7.98% in contrast to the benchmark of 16%. In the above background, URS is convinced that the project is additional and not a business-as-usual scenario. However, this conclusion was checked by subjecting the critical assumptions to reasonable variations.URS validated the input values and confirmed its appropriateness and consistent application of the values that are valid and applicable at the time of investment decision by the project participant in accordance with the guidance 6 of the ‘Guidelines on the assessment of investment analysis’ Version 05.

It was confirmed by the validation team from the available evidence and relevant accounting practices that in the estimation of the post tax equity IRR, the PP had applied the accepted local accounting and taxation principles. The PP had presented the unprotected spreadsheet versions of all investment analysis, having readable formulas. URS could confirm that the investment

analysis is presented in a transparent manner, to the extent that the reader can reproduce the results. All the input values considered for the investment analysis were prevailing at the time of investment decision and are in conformity with the relevant guidelines of CDM EB. Thus the assessment of input parameters was done in accordance with paragraph 110 & 111 of VVM version 1.2. The post tax Equity IRR thus calculated with the above mentioned input parameters work out to be 7.98% without considering the benefits from the carbon credits which is less than the benchmark of 16%. PP has performed the sensitivity analysis as given below

Sensitivity analysis:	**IRR**	**Benchmark**
The Guidance on assessment of investment analysis requires the robustness of the conclusion arrived at to be proved through a sensitivity analysis by varying the critical assumptions to a reasonable variation (±10%). The project proponent has identified Energy Generation, Project Cost , O & M cost as well as the electricity tariff in Tamil Nadu as the most critical assumptions. Since the electricity tariff paid for electricity from WTGs at the Tamil Nadu is fixed as per the PPA the validation team verified that it is not appropriate to incorporate this tariff in the sensitivity analysis. Accordingly, the sensitivity analysis has been conducted to analyze the impact of change in (a) capital cost by 10%, (b) net generation by 10%, (c) operation & maintenance (O&M) cost by 10% and d) the tariff paid at the site by 10%. The profitability of meeting or crossing the required benchmark has been further analysed as follows: The sensitivity analysis reveals that even under more favourable conditions, the IRR would not cross the benchmark value of 16% as given in the following table: **Parameters**	**CLP** 7.98%	**16%**

The results of the sensitivity analysis are detailed below:

Base case	***7.98%***		***Comments***
Variable Parameter	***Decrease***	***Increase***	
	10%	***10%***	
Energy Generation	***4.82%***	***11.16%***	*The energy generation has been determined based on the analysis conducted by third party engineering consultants , Hydro Tasmania. Any significant increase in energy generation is not envisaged, however, even in the extreme case of an increase of 10% in energy generation, it can be observed that the IRR does not cross the benchmark.*
Project Cost	***11.08%***	***5.51%***	*The project cost primarily comprises of the cost of civil works and plant and machinery which is unlikely to decrease significantly. Even with a decrease of 10% in the project cost, it can be observed that the IRR does not cross the benchmark.*
Tariff	***4.82%***	***11.16%***	*The Tariff has been fixed as per the TNERC Tariff Order dated 20 March 2009 The project proponent has also signed a Power Purchase Agreement with TNEB for this purpose and any change in the tariff is unlikely.*
O&M	***8.36%***	***7.59%***	*The variation in the cost of Operations and Maintenance does not affect the Equity IRR by a significant margin due to its low value.*

Also the sensitivity analysis carried out as per the EB 62 annex 05 Guidelines on assessment of investment analysis, the values of IRR do not cross the benchmark (equity IRR). The validation team therefore concurs with the project participant that the project activity is additional since it is not financially viable without the benefits from carbon finance.

URS carried out its own independent assessment, which reveals that the project would become non additional only if

- Net Generation goes up by 24.4%
- Capital cost goes down by 21.5%
- O&M cost goes down by 252%
- Tariff of Tamil Nadu goes up by 24.4%

URS considers that such a reduction in capital cost or hike in net generation is highly unrealistic and unlikely to happen for the following reasons:

Net generation: As stated above the PLF values are based on HTC report. The same are also consistent with that published by Tamil Nadu Electricity Regulatory Commission which are government organization and based on historical trends and wind potential in the respective region. The variation with those values, that too by as much as 24.4% is highly unrealistic. URS is convinced that achievement of such a high PLF is not possible.

Capital cost: As stated above, the cost taken into computation is based on quotations. Orders have already been placed and wind mills are commissioned. The cost, therefore, represents firm cost and as such the question of any reduction in the cost, that too by as much as -21.5% is highly unrealistic. URS agrees with the argument put forth by the project Proponent.

O & M cost: As stated above, the cost taken into computation is based on quotations and the PO placed for the project. The project does not crosses the benchmark even if the O&M cost goes down by -252% and hence the argument is found to be satisfactory and hence accepted by validation team.

Tariff rate: The project crosses the benchmark if the tariff rate goes up by 24.4% in Tamil Nadu, which is not possible. As it is preferential tariff for 20 years hence fixed

Barrier analysis

Barrier analysis has not been chosen to demonstrate additionality of the proposed VCS project activity in the PD.

Common practice analysis

The project proponent has chosen India as the geographical region for common practice analysis. As per the guidelines of EB65 annex 21 India is an appropriate geographical region Thus the validation team has been convinced that the chosen geographical region for the common practice analysis is appropriate in the context of the proposed project activity.

PP has applied the common practice analysis as per the para 43 of the “Demonstration and assessment of additionality”, tool version 06 EB 65 Annex 21.

Over the years there have been two different regulatory / investment regimes in the state of Tamil Nadu for wind power projects. Regime 1 – Central regime (MNES policy)

- Projects installed prior to September 2001
- Wind power projects were governed by MNES policy with tariff set at Rs. 2.25 per unit for the base year 1994-95 with a 5% annual escalation, wheeling and banking charges of 2%, etc.

Regime 2 – State regime (TNEB and TNERC policies / orders)

- Projects installed after September 2001

- Wind power projects were governed by (a) TNEB order of 2001 with fixed tariff of Rs. 2.70 per unit, wheeling and banking charged of 5%, etc. (b) TNERC order of 2006 with fixed tariff of Rs. 2.9 per unit, etc.

The same has been verified by the validation team and it is found that all private wind farm installations, in the similar regulatory and investment climate as that of the project activity and with similar capacity in the state of Tamil Nadu, are in CDM/VCS pipeline. Thus, it is concluded that the implementation of the wind power projects is not a common practice in the region as per the 'Demonstration and assessment of additionality' tool version 6.0.0.

Furthermore, the PP has also complemented the common practice analysis by applying para 47 of the additionality tool. The PP has correctly excluded the projects after taking +- 50% of the project capacity (i.e. from 12.375 MW to 37.125 MW) as well as projects registered. Excluding projects due to non-comparable installed capacity is deemed appropriate considering lower transaction costs and economies of scale for projects of larger scale. As per para 47 of the guideline, step 2 of the guideline, N_{all} is arrived by taking output range of 12.375 MW to 37.125 MW, based on which, thermal, hydro, biomass & wind projects and others have been considered. N_{all} comes out to be 258. This was checked from the websites of central electricity authority, ministry of new and renewable energy.

As per para 47 of the guideline, step 3 of the guideline N_{diff} is arrived and found to be 0 and Nall-Ndiff is less than 3. Now the factor F is calculated which comes out to be 0 which is less than 0.2 and hence the project activity is not a common practice in the region. The spreadsheet is also submitted by project proponent and was checked by the validation team and found to be satisfactory, hence accepted by the validation team.

Summary

Based on the above description of assessment of investment analysis and common practice analysis and the arguments put forth by PP as explained in the PD /2/,Validator is of the opinion that the proposed project activity qualifies the all the steps of tool for the demonstration and assessment of additionality and thus not a business as usual. Hence emission reductions created the proposed project activity are additional to what would have been generated in the absence of proposed project activity.

3.2.6Quantification of GHG Emission Reductions and Removals

The GHG emissions reduction calculations are transparently documented and appropriate assumptions regarding the expected amount of electricity generated have been used to forecast emission reductions.

According to the applied formulae in the PD /2/, the emission reductions (ER_y) by the project activity during the crediting period is the difference between the baseline emissions (BE_y) and project (PE_y), which is expressed as follows:

$ER_y = BE_y - PE_y$

Quantification of baseline emissions

The baseline emissions are equal to the emission reductions due to the project activity. According to the applied meth, the baseline emissions are demonstrated in PD and are calculated as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

Where:

BE_y	=	Baseline emissions in year y (tCO2/yr)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y (MWh/yr)
$EF_{grid,CM,y}$	=	Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO2/MWh)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ for greenfield plants

$$EG_{PJ,y} = EG_{facility,y} \quad \textbf{(1)}$$

Where:

$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year *y* (MWh/yr)
$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

$EG_{facility,y}$ is the quantity of net electricity generation supplied by the project plant/unit to the grid. It shall be determined as a difference between (i) quantity of electricity supplied by the project plant/unit to the grid and quantity of electricity delivered to the project plant/unit from the grid.

EF, $_{CO2,grid,y}$ in this case is taken as Combined margin CO_2 emissions factor for grid connected power generation in year y.

$EG_{PJ,y}$ is estimated as 60,325 MWh

Quantification of project emissions

Project activity emissions

According to the chosen baseline methodology ACM0002 Version 13.0.0, project emissions are accounted for as follows:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE_y	=	Project emissions in year *y* (tCO_2e)
$PE_{FF,y}$	=	Project emissions from fossil fuel consumption in year *y* (tCO_2)
$PE_{GP,y}$	=	Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year *y* (tCO_2e)
$PE_{HP,y}$	=	Project emissions from reservoirs of hydro power plants in year *y* (tCO_2e)

Since, the project activity is a wind power project, there are no project emissions from fossil fuel consumption, release of non-condensable gases or water reservoirs.

Hence, $PE_y = 0$

Quantification of leakage

The main emissions potentially giving rise to leakage in the context of electricity sector projects are emissions arising from activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). According to ACM0002 Version 13.0.0, these emission sources are neglected and therefore no leakage emissions are required to be considered.

Summary of GHG emission reductions or removals

So emission reduction is direct multiplication of quantity of net electricity supplied to the grid as a result of the implementation of the VCS project in year y (MWh) (export-import figure) and the grid emission factor.

The emissions reductions due to the project activity were estimated ex-ante to be 54,105 tCO_2e per year in the VCS PD /2/ and calculated as follows:

$ER_y = EG_{,y} * EF_{grid,CM,y}$

= 60,325 * 0.8969= 54,105 tCO_2e(rounded down value)

Uncertainties associated with the calculation of emissions

No uncertainties associated with the calculation of emissions are found

3.2.7 *Methodology Deviations*

No methodology deviations applied to this GHG project.

3.2.8 *Monitoring Plan*

Data and parameters available at validation

The project adopts the ex-ante calculation of emission factor of the grid. The OM and BM are calculated as fixed factors for the first renewable crediting period by choosing data vintage based on ex-ante Indian Power Sector database data published by CEA /35/.

The parameters for determining the GHG emissions reductions have been clearly demonstrated in

section 4.1and 4.2 of the VCS PD /2/. The combined margin emission factor for 0.8969tCO_2/MWh

The validation team has verified the value used against the sources and conclude that all relevant parameters to calculate the GHG emissions reductions of the project have been sufficiently considered and the value of the parameters are real, measurable and conservative.

Data and parameters monitored

"Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y" $EG_{PJ,y}$"

The VCS PD /2/ has mentioned this monitoring parameter. The monitoring plan related to electricity metering consists of one parameter monitoring representing metering of net electricity at the evacuation point to the grid by dedicated meters. The quantity of net electricity supplied to the grid in year y will be calculated as difference of exported and imported electricity in an export-import meter. The export and import will be measured continuously and recorded monthly.

Applicability and eligibility of monitoring equipment and procedures

Steps undertaken to assess the monitoring plan

Compliance of the monitoring plan with the approved methodology

The project applies monitoring methodology ACM0002 v 13.0.0. "Consolidated baseline methodology for grid-connected electricity generation from renewable sources". As per the ACM 0002 version 13 the monitoring shall consist of metering the electricity generated by the renewable technology installed by the project proponent. As verified during the site visit, monitored parameter $EG_{facility,y}$ i.e. net power supplied to the grid is measured by main meter and check meters installed at the substation jointly by representatives of substation and PP. Accuracy, calibration, periodical testing and maintenance procedures of monitoring equipment are clearly mentioned in the section 4 of PD /2/. Validation team has reviewed the same and is convinced that the same is adequate and will lead to correct measurement of the net electricity exported to the grid. Also the TNEB, a State governmental body of Tamil Nadu and JMR /49/ issued by TNEB is used for commercial purpose and can be considered as authentic and correct. URS has validated the same by referring JMR issued by them. All the wind mills of project activity are falling same wind farm so measurement and monitoring procedures for delivering net export of power to the grid remains same for all WEG and is verified during site visit.

According to the VCS PD /2/, the project's monitoring plan outlines the followings:-

- Monitoring parameters: the monitoring parameter of the project includes quantity of net electricity supplied to the grid in year y (= Total export – Total import) by the project activity.
- Operational and management structure: management structure is illustrated for the VCS project monitoring;
- Monitoring Equipment and Relative Location: metering equipment to monitor export and import of electricity (to calculate Quantity of net electricity supplied to the grid in year y by the project activity);

- Quality Control and Data Archive: arrangement of meter calibration; archiving of the data collected during monitoring; and collection of monitored data and report preparation.

Quantity of net electricity supplied to the grid in year y is monitored as per the requirement of the monitoring methodology /32/ applied for the project activity.

Implementation of the plan

According to document review in the VCS PD /2/ and on-site interviews with the representatives of the PP, detailed monitoring procedures, management team, and functions are clearly demonstrated in the PD which will enable subsequent verification of the project's emission reductions in line with the applied methodology. The validation team confirms that, the specific uncertainty levels, methods and associated accuracy level of measurement instruments and calibration procedures used for various parameters and variables are identified in the VCS PD /2/, along with detailed quality assurance and quality control procedures. The calibration of meters will be done once in 3 years which confirms the accuracy of the meter and the method and frequency of calibration of the electricity meter to the national standards /37/. All the monitored data will be archived until 2 years after the crediting period to facilitate cross-checking of ER during the crediting period.

3.3 Environmental Impact

The project activity is a 24.75 MW Wind power plant. Validation team based on document review, using official source i.e. EIA Notification of MoEF dated 14/09/2006 /36/ and its amendment on 01/12/2009 and using sectoral expertise concluded that India does not require prior environmental clearance for grid connected wind project.

There is no adverse environmental impacts form the project activity and the proposed GHG project contributes to generation of renewable electricity and is expected to benefit the economic development of the region. Thus the project activity is expected to have only beneficial impacts on the environment.

3.4 Comments by stakeholders

PP sent the notices to the stakeholders on 01/02/2010. A Local Stakeholders meeting was carried out at project site on the 18/02/2010 /12/.The validation team noted that all the relevant stakeholders (local stakeholders -who were affected by the project) were appropriately identified by the PP . PP invited the local stakeholders through public notices well in advance of the date of the meeting.The meeting was well attended, by various stakeholders, including representatives from Gram Panchayat (mostly village heads - Sarpanches), local residents, and representatives of equipment suppliers. Hence PP has utilized appropriate media to invite these stakeholders. The project activity and its purpose explained to the stakeholders during meeting. 46 number of stakeholders were directly asked to comment on the project in an open meeting among local stakeholders /12/. A summary of the comments /12/ received and a note on how due account was taken of the concerns raised in the above public consultation are included in VCS PD /2/. This also states that appropriate immediate responses were provided to them. From the background of the stakeholders, it was reasonably believed that the general attitude of the local residents, who were likely to be affected by the project, was positive towards the project and same has been verified from the onsite visit interviews with the local stakeholders. Validation team reviewed all relevant information (as explained above) of local

stakeholder consultation meeting and confirms that the process for conducting the local stakeholders meeting is adequate and credible.

In general, the interviewees showed adequate understanding of the nature of the project and felt that there would be no adverse impacts on the environment arising from the project activity. The interviewees also considered that the local economy would be benefited from the project activity.

4 VALIDATION CONCLUSION

The project proponent is M/s CLP Wind Farms (India) Private Limited from India. By generating renewable electricity which will displace fossil fuel based grid electricity, the project results in the reductions of CO_2 emissions that are real, measurable and give long term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would have occurred in the absence of the project activity.

The project is likely to result in an average emission reduction of 54,105 tCO_2e per annum over the crediting period of ten years. The emission reduction forecast has been checked and is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Detailed responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been addressed.

In summary, the validation team considers that the underlying reason of GHG project cycle, and investment analysis is sufficiently evidenced. Thus it is the validation team's opinion that the "Grid Connected Wind Power Project in Tamil Nadu.", as described in the PD version 03 dated 28/06/2012 meets all the relevant VCSA requirements for the VCS project and relevant criteria of India and correctly applies the baseline and monitoring methodology ACM 0002, Version 13.0.0. The validation team of URS Verification Private Limited (URS) thus recommends the proposed project to be registered as a VCS project activity with the VCSA.

Date:30/06/2012

URS Verification (P) Ltd. URS

MUKESH SINGHAL

MANAGING DIRECTOR

URS Verification Private Limited

Appendix 1

Geographicall Co-ordinates of individual WEGs along with their date of commissioning of project site

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

Sr. No.	Loc No.	Village	District	HTSC No.	DOC	Latitude	Longitude
	470			132	2010		
15	TPK 228	Poomalaikundu	Theni	WEG T 130	29-Jul-2010	N9°52'59.62"	E77°26'27.69"