VALIDATION REPORT

"21 MW WIND ENERGY FARM AT PALLADAM, TAMILNADU BY HZL" IN INDIA

REPORT NO. 2012-9581

REVISION NO. 01

DET NORSKE VERITAS

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VALIDATION REPORT

Date of first issue: 2012-03-29	ConCert Project No.: PRJC-340180-2011-CCS-IND
Approved by: Ole A. Flagstad	Organisational unit: DNV KEMA Energy & Sustainability Accredited Climate Change Services
Client: Hindustan Zinc Limited	Client ref.: Mr. V. Jayaraman

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Summary:
Project Name: 21 MW Wind energy farm at Palladam, TamilNadu by HZL
Country: India
Methodology: ACM0002 **Version:** 12.3.0
GHG reducing Measure/Technology: Grid connected wind power based renewable electricity generation
Sectoral Scope 1: Energy industries, renewable, TA 1.2
ER estimate: 42 131 tCO_2e per year (average)
Size
☒ Large Scale ☐ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested ☐ Clarifications Requested
☒ Full Approval and submission for registration ☐ Rejected
In summary, it is DNV's opinion that the project activity "21 MW Wind energy farm at Palladam, TamilNadu by HZL" in India, as described in the PDD, version 03.1 of 28 September 2012, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 12.3.0. Hence DNV requests the registration of the project as a CDM project activity.

Report No.: 2012-9581	Subject Group: Environment
Report title: "21 MW wind energy farm at Palladam, TamilNadu by HZL" in India	
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Work verified by: Murali Govindarajulu	
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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction(s)
CL	Clarification request
CM	Combined Margin
CMP	CDM Modalities and Practices
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
C-WET	Centre for Wind Energy Technology
DNV	DNV Climate Change Services AS
DNA	Designated National Authority
DoC	Date of Commissioning
FAR	Forward Action Request
GBI	Generation Based Incentive
GHG	Greenhouse gas(es)
HZL	Hindustan Zinc Limited
IPCC	Intergovernmental Panel on Climate Change
IREDA	Indian Renewable Energy Development Agency
IRR	Internal Rate of Return
LoA	Letter of approval
MAT	Minimum Alternate Tax
MNRE	Ministry of New and Renewable Energy
MoEF	Ministry of Environment and Forests
MoP	Ministry of Power
NCDMA	National CDM Authority
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
PP	Project Participant
PPA	Power Purchase Agreement
tCO_2e	Tonnes of CO_2 equivalent
SISL	Suzlon Infrastructure Services Limited
TNERC	Tamil Nadu Electricity Regulatory Commission
UNFCCC	United Nations Framework Convention on Climate Change
WTG	Wind Turbine Generators

1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed a validation of the project activity "21 MW Wind energy farm at Palladam, TamilNadu by HZL" in India. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is India and the Annex I Party has not been identified yet. The host Party fulfils the participation criteria and has approved the project and authorized the project participants Hindustan Zinc Limited. The DNA from India confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology ACM0002, version 12.3.0 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".

The project activity envisages generation of electricity from the renewable source of wind energy. To achieve this, 14 wind electricity converters (WEC), each of 1500 kW capacity, are installed in the villages Suriyanallur, Kurukkapalayam, Nelali, Kozhumankuli, Kundadam, Uthiyur, Nandanavanampalyam in the district of Tiruppur in the state of Tamil Nadu, India. The project activity is expected to generate 45 990 MWh of electric power / year, which will replace an equivalent amount of fossil fuel intensive power in the system grid. The total emission reductions from the project are estimated to be on the average 42 131 tCO_2e per year over the selected 7 years' first renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change. As a result, the project results in 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 occur in the absence of the project activity.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is DNV's opinion that the project participants are able to implement the monitoring plan.

In summary, it is DNV's opinion that the project activity "21 MW Wind energy farm at Palladam, TamilNadu by HZL" in India, as described in the PDD, version 03.1 dated 28 September 2012, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 12.3.0. Hence, DNV requests the registration of the project as a CDM project activity.

Bangalore and Oslo, 2012-11-06

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Ole A. Flagstad
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2 INTRODUCTION

Hindustan Zinc Limited has commissioned DNV Climate Change Services AS (DNV) to perform a validation of the "21 MW Wind energy farm at Palladam, TamilNadu by HZL" project in India (hereafter called "the project"). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

2.1 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 UNFCCC 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 CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0002 (version 12.3.0) /29/. The validation was based on the recommendations in the Validation and Verification Manual /28/ .

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

3 METHODOLOGY

The validation consisted of the following three phases:

I a desk reviw of the project design documents

II follow-up interviews with project stakeholders

III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

3.1 Desk review of the project design documentation

The following tables list the documentation that was reviewed during the validation.

3.1.1 Documentation provided by the project participants

/1/ HZL: *CDM-PDD for project activity "21 MW* Wind energy farm at Palladam, TamilNadu by HZL*" in India*, Version 1 dated 19 December 2011, version 2.2 dated 12 July 2012 and version 03.1 dated 28 September 2012

/2/ HZL: Agreement dated 28 March 2011 between HZL and Shubh Realty (South) Private Limited for lease of land for project activity

/3/ HZL: Agreement dated 28 March 2011 between HZL and Suzlon Infrastructure Services Limited (SISL) for construction works related to project

/4/ HZL: Agreement dated 28 March 2011between HZL and SISL for supply of electrical items.

/5/ HZL: Agreement dated 28 March 2011 between HZL and Suzlon Energy Limited, for supply of nacelle, generator, control cabinet, gear box etc.

/6/ HZL: Agreement dated 28 March 2011 between HZL and Suzlon Power Infrastructure Ltd for supply of power evacuation equipment.

/7/ HZL: Agreement dated 28 March 2011 between HZL and Suzlon energy Limited for supply of rotor blades.

/8/ HZL: Agreement dated 28 March 2011 between HZL and Suzlon Towers & Structures Limited for supply of tower etc.

/9/ HZL: Agreement dated 28 March 2011 between HZL and SISL for supply of transformer etc.

/10/ Hindustan Zinc Limited: Agreement dated 28 March 2011 between HZL and SISL for unloading of equipment at site, erection and commissioning.

/11/ HZL: Agreement dated 28 March 2011 between HZL and SISL for O&M services.

/12/ HZL: Power Purchase Agreement (PPA) 4 nos. dated 30 September 2011 and 10 nos. dated 10 February 2012 for 21 (14 x 1.5) MW wind power plant.

/13/ HZL: Site specific Wind resource assessment report ref no. PEC/WRA/HZL/04 issued by Power & Energy Consultants, on 20 October 2011

/14/ HZL: MS Excel sheet containing IRR analysis, version 1, dated 19 December 2011 and version 03 dated 13 September 2012

/15/ HZL: MS Excel sheet containing details of benchmark calculations, version 1, dated 30 November 2011, version 3 dated 13 September 2012

/16/ HZL: MS Excel sheet containing estimated CER, version 1, dated 19 December 2011, version 3 dated 12 July 2012

/17/ HZL: Approval note for investment dated 10 December 2010 in wind power projects of installed capacity 150 MW including the 14 x 1.5 MW plant in Tamil Nadu

/18/ Suzlon Energy Limited: Techno-commercial offer dated 4 December 2010 for supply of equipment for proposed HZL wind power projects, terms of O&M Services along with details of specifications of S-82 model of 1500 kW capacity (Technical Sheet)

/19/ HZL: MAT eligibility Certificate dated 26 September 2011 issued by Mahendra Pokhrana & Co, Chartered Accountants

/20/ HZL: Local Stakeholder Consultation Meeting records consisting of notice in English and Tamil newspapers dated 2 September 2011 regarding meeting scheduled on 12 September 2011, photographs, attendance sheet and minutes of meeting dated 12 September 2011

/21/ HZL: Commissioning certificates issued by (1) Executive Engineer, Tamil Nadu Generation and Distribution Corporation Limited, and (2) Superintending Engineer, Udumulpet, as per details below:

Letter ref	**HTSC No**	**WTG No.**	**DoC**	**Issued by**	**on**
592/2012	TZA-11	TAY-29	10-02-2012	(1)	29-02-2012
591/2012	TZA-12	KDE-80	10-02-2012	(1)	29-02-2012
590/2012	TZA-13	KDE-84	10-02-2012	(1)	29-02-2012
589/2012	TZA-14	KDE-92	10-02-2012	(1)	29-02-2012
588/2012	TZA-15	TAY-47	10-02-2012	(1)	29-02-2012
587/2012	TZA-16	TAY-48	10-02-2012	(1)	29-02-2012
586/2012	TZA-17	TAY-46	10-02-2012	(1)	29-02-2012
593/2012	TZA-18	TAY-52	10-02-2012	(1)	29-02-2012
584/2012	TZA-19	TAY-54	10-02-2012	(1)	29-02-2012
585/2012	TZA-20	KD-176	10-02-2012	(1)	29-02-2012
2176	U-2176	Q-165	20-10-2011	(2)	09-11-2011
2177	U-2177	Q-133	20-10-2011	(2)	09-11-2011
2178	U-2178	Q-132	20-10-2011	(2)	09-11-2011
2180	U-2180	KD-112	20-10-2011	(2)	09-11-2011

/22/ HZL: Copy of e-mail dated 2 September 2011 to the UNFCCC Secretariat confirming desire to seek CDM status for the proposed project and copy of email dated 2 September 2011 from CDM Registration and Issuance confirming receipt of project information notification

/23/ HZL: Copy of e-mail dated 2 September 2011 to the NCDMA, India, confirming desire to seek CDM status for the proposed project and copy of e-mail dated 6 September 2011 from NCDMA acknowledging receipt of information

/24/ HZL: Certificate from Nyati Mundra & Co, dated 30 June 2012 affirming project cost and source of funds.

/25/ HZL: Policy Schedule from The Oriental Insurance Company Limited for the period 17 August 2010 to 16 August 20011 for mines, smelters, power plants of HZL including for wind power plants with premium rate of 1.15% of the value of fixed assets

/26/ HZL: Registration of project with MNRE for generation based incentive

http://110.234.218.202/iredawindmill/form/ReportgbiScheme.aspx

3.1.2 Letters of approval

/27/ National CDM Authority, Ministry of Environment and Forests (DNA of India): Letter of approval no. 4/6/2012-CCC dated 14 September 2012 for the project activity

3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

/28/ CDM Executive Board: *Validation and Verification Manual*, version 1.2

/29/ CDM Executive Board: *Baseline and monitoring methodology "Approved consolidated baseline and monitoring methodology"ACM0002*, version 12.3.0

/30/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, Version 2.2.1

/31/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, Version 6.0.0

/32/ CDM Executive Board: *Guidelines on the demonstration and assessment of prior consideration of the CDM*, version 04, EB 62, Annex 13

/33/ CDM Executive Board: *Guidelines on the assessment of investment analysis*, Version 05, EB 62, Annex 5

/34/ CDM Executive Board: *Guidelines for completing the Project Design Document(CDM-PDD)*, version 07

/35/ CDM Executive Board: *Guidelines for reporting and validation of Plant Load Factors*, version 01, EB 48, Annex 11

/36/ CDM Executive Board: Glossary of CDM terms, version 06,EB 66, Annex 63

3.1.4 Documentation used by DNV to validate / cross-check the information provided by the project participants

/37/ CDM Executive Board: Project No. 4209, "Grid connected wind energy project in Tamil Nadu by Simran Wind Project Pvt Ltd" http://cdm.unfccc.int/Projects/DB/DNV-CUK1291798550.29/view

/38/ CDM Executive Board: Project No. 3884, "Grid connected wind energy project in Tamil Nadu by Super Wind Projects Pvt Ltd" http://cdm.unfccc.int/Projects/DB/DNV-CUK1280379317.22/view

/39/ CDM Executive Board: Project No. 3327, "Wind Power Project at Tamilnadu by Powerica Ltd" http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1264590823.08/view

/40/ CDM Executive Board: Project No. 4540, "19.8 MW grid connected wind farm project by K P R Mills Ltd, Tamil Nadu, India at villages:" http://cdm.unfccc.int/Projects/DB/SIRIM1299217620.46/view

/41/ CDM Executive Board: Project No. 4930, "Vaayu India Wind Power Project in Tamilnadu' http://cdm.unfccc.int/Projects/DB/DNV-CUK1308823376.98/view

/42/ CEA: CO_2 Baseline Database for the Indian Power Sector. Version 6, Date: March 2011, http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm and user guide, version 6.0, dated March 2011 (Last accessed on 21September 2012) http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver6.pdf

/43/ MoEF: Requirement of Environment Impact Assessment (EIA) studies, dated 14 September 2006 and its amendments (Last accessed on 21September 2012) http://envfor.nic.in/legis/env_clr.htm

/44/ Centre for Wind Energy Technology: Revised list of models and manufacturers of wind turbines, possessing valid approval, Ref. No. C-WET/S&C/RLMM/2010-11/06, dated 18 May 2010

/45/ MNRE: "Policies for development of renewable energy in India", Ministry of New & Renewable Energy, Government of India, (Last accessed on 21 September 2012) http://www.indiaenergyportal.org/viewPolicies.php?id=PO1&theme=

/46/ Indian Wind Turbine Manufacturers Association: Directory of Indian Wind Power, 2010

/47/ CDM Executive Board: Confirmation of Prior consideration of CDM for this project available at registration of prior CDM consideration for this project activity on 2 September available at http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html

/48/ CDM Executive Board:Web hosting of project for global stakeholder consultation from 23 December 2011 https://cdm.unfccc.int/Projects/Validation/DB/EGN9QWSFTOTWJ68573EY07TNS8FRWD/view.html

/49/ C-WET: "India state wise installed capacity" available at (Last accessed on 21September 2012) http://www.cwet.tn.nic.in/html/information_isw.html

/50/ IT department: Rates of depreciation as per IT act, III, 8G(XIII)(l), (Last accessed on 21September 2012) http://law.incometaxindia.gov.in/dittaxmann/incometaxacts/2008itact/sec_080-ia.htm

Deduction under section 80-IA of Income Tax Act 1961 (Last accessed on 21 September 2012)
http://www.caclubindia.com/articles/deduction-u-s-80-ia-of-income-tax-act-1961-4392.asp
Depreciation as per Companies Act, (Last accessed on 21 September 2012) http://taxguru.in/company-law/rates-of-depreciation-under-the-companies-act-as-mentioned-in-schedule-xiv.html

/51/ Indian Electricity Act, 2003 and its amendments, (Last accessed on 21Septemebr 2012)
http://www.powermin.nic.in/acts_notification/electricity_act2003/pdf/The%20Electricity%20Act_2003.pdf
Central Electricity Authority: Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 and its amendments.
2012)http://www.powermin.nic.in/whats_new/pdf/Metering_Regulations.pdf

/52/ Google Maps: Project location in the district of Tiruppur in the state of Tamil Nadu, India

/53/ Indian Wind Turbine Manufacturers Association: "Guidelines / Incentives for wind power generation in various states"(Last accessed on 21August 2012) - http://www.indianwindpower.com/policy_environment.php

/54/ Global Wind Energy Council: "Global Wind Report" Annual Market Update 2010 - available at (Last accessed on 21September 2012)
http://www.indianwindpower.com/pdf/gwecReport_2010.pdf

/55/ IREDA: "Assessment of investment climate for wind power development in India for Indian Renewable Energy Development Agency (IREDA)" (Last accessed on 21 September 2012)
http://ireda.gov.in/pdf/Assessment.pdf

/56/ IREDA: "Compendium of state government policies on renewable energy sector in India" (Last accessed on 21September 2012)
http://ireda.gov.in/Compendium/index%20copy.htm

/57/ Ministry of New and Renewable Energy: "STRATEGIC PLAN FOR NEW AND RENEWABLE ENERGY SECTOR FOR THE PERIOD 2011-17"(Last accessed on 21 September 2012)
http://mnre.gov.in/file-manager/UserFiles/strategic_plan_mnre_2011_17.pdf

/58/ TNERC: Tariff order no. 1/20 March 2009 expiring on 31 March 2011 extended by order no. 1/8 April 2011 till 31 December 2011, again further extended to 30 June 2012 by order no. 4 dated 15 December 2011,

/59/ Suzlon Energy Limited: Technical Overview – S-82/1.5 MW available at (Last accessed on 21Septemebr 2012)
http://www.suzlon.com/pdf/S82%20product%20brochure.pdf

/60/ Stock information available on (Last accessed on 21 September 2012)
http://m.moneycontrol.com/
BF Utilities http://www.moneycontrol.com/india/financials/bfutilities/profit-loss/BFU
Tata Power
http://www.moneycontrol.com/india/financials/tatapowercompany/profit-loss/TPC
Neyveli Lignite Corporation
http://www.moneycontrol.com/india/financials/neyvelilignitecorporation/profit-loss/NLC
GIPCL
http://www.moneycontrol.com/india/financials/gujaratindustriespowerco/profit-loss/GIP
CESC http://www.moneycontrol.com/india/financials/cesc/profit-loss/CES
Reliance Infra

http://www.moneycontrol.com/india/financials/relianceinfrastructure/profit-loss/RI38
NTPC http://www.moneycontrol.com/india/financials/ntpc/profit-loss/NTP
Jai Prakash Power Ventures
http://www.moneycontrol.com/india/financials/jaiprakashpowerventures/profit-loss/JHP01

/61/ TaxGuru Complete tax solutions - Tax rates applicable for A.Y. 2011-2012 http://taxguru.in/income-tax/tax-rate-applicable-for-a-y-2011-12-on-income-dividend-wealth-mat-stt-capital-gain-and-presumptive-income.html
(30% + 7.5% + 3% on sum) (18% + 7.5% + 3% on sum)

/62/ INVESTOPEDIA: Unlevered beta:
http://www.investopedia.com/terms/u/unleveredbeta.asp#axzz21oDH2zVA

/63/ Directorate of Service Taxes: "Levy of Service tax" available at http://www.servicetax.gov.in/st-proc-home.htm being @10% plus 2% and 1% cess

/64/ "Corporate Finance: Theory and Practice" (Wiley Series in Finance) by Aswath Damodaran.
http://ebookee.org/-request_ebook-Corporate-Finance-Theory-and-Practice_344125.html

/65/ MoEF: Requirement of Environment Impact Assessment (EIA) studies, dated 14 September 2006, http://envfor.nic.in/legis/eia/so1533.pdf
Government gazette notification no. S.O. 3067 (E) dated 1 December 2009, http://moef.nic.in/downloads/rules-and-regulations/3067.pdf

/66/ RBI : Redemption yield on Government of India Securities based on SGL transactions, dated 12 November 2010, (Last accessed on 21September 2012)
http://www.rbi.org.in/scripts/BS_ViewBulletin_Test.aspx?Id=11733

/67/ BSE SENSEX: Historical data Indices, BSE 100, BSE 200: http://beta.bseindia.com/indices/IndexArchiveData.aspx?expandable=3

/68/ "STATE-WISE/YEAR-WISE LIST OF COMMISSINED BIOMASS POWER/COGENERATION PROJECTS (AS ON 31.03.2011)" available at
http://mnre.gov.in/schemes/grid-connected/biomass-powercogen/
Achievements - Bio energy, Tamil Nadu Energy Development Agency
http://www.teda.in/site/index/id/2O8i9U4E3U
Bagasse based co-generation in Tamil Nadu:
http://www.tangedco.gov.in/bagasse.php
"Ocean Energy" available at http://www.eai.in/ref/ae/oce/oce.html
CDM Project search available at http://cdm.unfccc.int/Projects/projsearch.html

/69/ Texas Forest Service: Nominal Rate and Real rate calculator available at http://tfsfrd.tamu.edu/tdss/Basic/rates.htm

/70/ Reserve Bank of India: Survey of professional forecasters: Results of 12th round, dated 5 August 2010, available at
http://www.rbi.org.in/scripts/PublicationsView.aspx?id=12477

/71/ IREDA: Guidelines - Generation based incentive for wind based power generation
http://114.143.207.231/IREDA/upload/OPERATIONAL%20GUIDELINES%20for%20Wind%20GBI%20and%20AD%20as%20on%2026.05.2010.doc
Confirmation link for GBI registration of the project
http://110.234.218.202/iredawindmill/form/ReportgbiScheme.aspx

3.2 Follow-up interviews with project stakeholders

On 21 February 2012 DNV visited the Tiruppur wind project site and performed interviews with project stakeholders.

	Date	Name	Organization	Topic
/72/	21 February 2012	Vishnu Khandelwal J.Arul Ezhilan Sasanka Bhargava K R Manojh R Ramakrishnan V Prabhakaran	HZL HZL E&Y Suzlon – CRM SEL – Senior Engineer SEL - Engineer	• Project baseline • Investment decision • CDM prior consideration. • Applicability criteria • Additionality issues • Project design, IRR analysis, • Monitoring and verification procedure • Quality systems and procedures • Review of the stakeholder consultation process. • Common practice analysis • Documentation review

The PDD /1/ submitted for global stakeholder consultation was revised (version no.03.1 dated 28 September 2012) to address various issues raised during validation and salient changes are as below:

- The benchmark of post-tax return on equity has been revised from 16.87% to 15.27%.
- The version of methodology applied is changed to 12.3.0
- Action plan for earmarking of 2% of estimated CER revenue towards sustainable development activities has been included
- Change of start date of crediting period to 1 December 2012

3.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;

- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity "21 MW Wind energy farm at Palladam, TamilNadu by HZL" in India is enclosed in Appendix A to this report.

Table 2 of the validation protocol documents the findings of the desk review of the project design documentation and follow-up interviews with project stakeholders. Any findings raised in Table 2 are listed in Table 3 of the protocol, and changes to the description of the project design as a result of these findings will be addressed in Table 3. Table 2 thus may not reflect all aspects of the project as described in the final PDD submitted for registration.

A corrective action request (CAR) is raised if one of the following occurs:

(a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

(b) The CDM requirements have not been met;

(c) There is a risk that emission reductions cannot be monitored or calculated.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FAR shall not relate to the CDM requirements for registration.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities		
Requirement	***Reference***	***Conclusion***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**) or a **corrective action request (CAR)** if a requirement is not met.*

Validation Protocol Table 2: Requirement Checklist				
Checklist question	***Reference***	***Means of verification (MoV)***	***Assessment by DNV***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD	*Gives reference to documents where the answer to the checklist question or item is found.*	*Means of verification (MoV) are **document review (DR)**, **interview (I)** or any other follow-up actions (e.g., on site visit and telephone or email interviews) and **cross-checking (CC)** with available information relating to projects or technologies similar to the proposed CDM project activity under validation.*	*The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.*	*OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A **corrective action request (CAR)** is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A **clarification request (CL)** is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A **forward action request (FAR)** during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Corrective action and/ or clarification requests	***Ref. to checklist question in table 2***	***Response by project participants***	***Validation conclusion***
*The **CARs** and/ or **CLs** raised in Table 2 are repeated here.*	*Reference to the checklist question number in Table 2 where the CAR or CL is explained.*	*The responses given by the project participants to address the CARs and/or CLs.*	*The validation team's assessment and final conclusions of the CARs and/or CLs.*

Validation Protocol Table 4: Forward Action Requests		
Forward action request	***Ref. to checklist question in table 2***	***Response by project participants***
The FARs raised in Table 2 are repeated here.	*Reference to the checklist question number in Table 2 where the FAR is explained.*	*Response by project participants on how forward action request will be addressed prior to first verification.*

Figure 1: Validation protocol tables

3.4 Internal quality control

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation team

				Type of involvement						
Role	***Last Name***	***First Name***	***Country***	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.2 competence	Financial expertise
Team leader (Validator)	Ranganathan	Seshan	India	✓	✓	✓	✓		✓	
Assessor under training	Sudarshan	Komaranapur a Venkatachar	India	✓	✓	✓				
Expert	Srinivasan	M V	India							✓
Technical reviewer	Govindarajulu	Murali	India					✓	✓	

The qualification of each individual validation team member is detailed in Appendix B to this report.

4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the PDD, version 03.1 dated 28 September 2012.

4.1 Participation requirements

The project participants are Hindustan Zinc Limited of host Party of India. The host Party (India) meets all relevant participation requirements.

A letter of approval (LoA) was issued by DNA of India /27/ on 14 September 2012, authorizing Hindustan Zinc Limited of host Party India as project participant and confirming that the project assists in achieving sustainable development.

The letter of approval was received from the project participant. DNV does not doubt the authenticity of the letters of approval. DNV considers the letters are in accordance with paragraphs 45- 48 of the VVM /28/.

The project is owned by Hindustan Zinc Limited /27/ and the validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards India /24/.

4.2 Project design

The project envisages installation of 14 x 1500 kW wind turbines, located in seven villages, namely Kozhamankuli (1), Suriyanallur (2), Nelali (5), Uthiyur (1), Kurukkapalayam (1), Kundadam (3), and Nadanavanapalyam (1) in the district of Tiruppur in the State of Tamil Nadu in India. The location of each turbine and its commissioning were verified during site visit /72/ and details contained in the commissioning certificates /21/. The verified details are as shown in the following table:

No.	WTG No.	HSTC No.	Survey no.	Village	Latitude	Longitude	DoC
1	TAY -29	TZA - 11	23/2	Kozhamankuli	N 10 52 26.0 (10.8739)	E 77 29 30.2 (77.4917)	10-Feb-12
2	KDE-80	TZA - 12	241(P)	Suriyanallur	N 10 54 07.8 (10.9022)	E 77 29 11.2 (77.4864)	10-Feb-12
3	KDE - 84	TZA - 13	1389(P)	Nelali	N 10 54 35.0 (10.9097)	E 77 29 27.6 (77.4910)	10-Feb-12
4	KDE -92	TZA - 14	601/2 (P)	Uthiyur	N 10 54 21.7 (10.9060)	E 77 30 22.5 (77.5063)	10-Feb-12
5	TAY - 47	TZA - 15	1348/2 (P)	Nelali	N 10 51 9.5 (10.85264)	E 77 23 57.6 (77.3993)	10-Feb-12
6	TAY - 48	TZA - 16	1329 /(3)P	Nelali	N 10 55 38.5 (10.9274)	E 77 29 59.3 (77.4998)	10-Feb-12
7	TAY - 46	TZA - 17	1205/5 (P)	Nelali	N 10 55 38.7 (10.92742)	E 77 29 38.1 (77.4939)	10-Feb-12
8	TAY - 52	TZA - 18	182/1(P),2(P),3 (P),5(P),6(P)	Kurukkapalayam	N 10 56 12.0	E 77 29 07.2	10-Feb-12
9	TAY - 54	TZA - 19	921/1,2(P),3 & 918/1 (P)	Nelali	N 10 55 34.0	E 77 28 46.5	10-Feb-12
10	KD - 176	TZA - 20	515/3A(P)	Suriyanallur	N 10 52 02.9 (10.8674)	E 77 27 31.8 (77.4588)	10-Feb-12
11	Q - 165	U - 2176	430/2(P)	Kundadam	N 10 51 43.3 (10.8620)	E 77 25 52.6 (77.4313)	9-Nov-11
12	Q - 133	U - 2177	96(P)	Kundadam	N 10 52 58.2 (10.8828)	E 77 25 11.3 (77.4198)	9-Nov-11
13	Q - 132	U - 2178	78/1(P),2(P)	Kundadam	N 10 52 57.4 (10.8826)	E 77 24 51.9 (77.4142)	9-Nov-11
14	KD - 112	U - 2180	892/1(P)	Nandanvanapalyam	N 10 55 18.7 (10.9219)	E 77 30 02.1 (77.5006)	9-Nov-11

All the WTGs are of SUZLON S-82 type /59/, with rated capacity of 1 500 kW (total project capacity: 21 MW) (14 x 1.5 MW), rotors with pitch control, generators of induction type, with tubular steel structure was confirmed by a review of the copy of the purchase orders placed /4//5//7//8/ and physical verification during site visit /72/.

The date of purchase orders for equipment, erection, and commissioning /2//4//5//6//7//8//9/ as well as the date of order for civil construction of foundation and support for the equipment /3/ is verified to be 28 March 2011, which is correctly regarded as the start date of the project in line with the definition /36/, being the date on which first financial commitment was made for project implementation.

The useful life of the project is expected to be 20 years, which is as per the details submitted by the supplier /18/ and is in line with the general specifications of such installations /37//38//39//40//41/ in the host country.

The PP has opted for renewable crediting period of seven years with the possible start date of crediting period indicated as 1 December 2012, or the date of registration, which is in line with the CDM requirements.

The installation, commissioning, operation, monitoring and maintenance of the WTG's are covered by the O&M Contract /11/ entered into by the PP with Suzlon Infrastructure Services Limited for the entire life (20 years) of the project. The technology used in the project activity is indigenously available in India and no transfer of technology is envisaged.

DNV considers the project description of the project contained in the PDD to be complete and accurate. The PDD complies with the relevant forms and guidance for completing the PDD /34/.

4.3 Application of selected baseline and monitoring methodology

The project applies the approved baseline methodology ACM0002, version 12.3.0, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" /29/. The project applies the prescribed applicable tools, "Tool for the demonstration and assessment of additionality", (Version 06.0.0) /31/, and "Tool to calculate the emission factor for an electricity system" (Version 02.2.1) /30/.

The justification of the applicability of the methodology to this project activity is as per following details:

- The project activity proposes to exploit the wind power potential, a renewable source, to generate electric power which is evacuated into the Southern grid /12/
- The project activity does not involve capacity additions, retrofit or replacement. The agreement for land lease /2/, copy of order for civil construction /3/, and copies of purchase orders for supply, erection and commissioning of 2100 kW capacity WTGs /4/ to /10/ have been verified to confirm that this is a greenfield project activity; this was further confirmed during site visit and interviews with the site personnel /72/, and the respective commissioning certificates /21/
- Power is proposed to be generated by undertaking new installation of wind electricity generators at a site where no renewable energy power plant was operated prior to the implementation of the project activity. This has been verified during the site visit /72/ and from the purchase orders for WTGs /4/ to /10/ and the commissioning certificates /21/.
- No retrofit or capacity additions or replacements at the existing plants are involved. This has been verified during the site visit /72/.

- The project activity is connected to the Southern grid /12/; the system boundaries are clearly identified and information on the characteristics of this grid is available /42/.
- This is a wind power project, and does not involve power generation based on hydro potential or by biomass utilization.
- The project does not involve any kind of fuel switch as this is a wind power project.

It is further confirmed that the project activity complies with all the applicability conditions of the applied tools, namely, "Tool for the demonstration and assessment of additionality", and "Tool to calculate the emission factor for an electricity system".

The assessment of the project's compliance with the applicability criteria of ACM0002 (version 12.3.0) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

4.4 Project boundary

The project system boundary consists of all the 14 wind energy turbines, the transformer yards, transmission lines, pooling sub-stations, the connected Southern grid system and all the power plants connected to it.

Details of emission sources included in the project boundary are as follows:

Source	GHG Involved	Description
Baseline emissions	Carbon dioxide	CO_2 emissions equivalent to the amount of net electricity exported to the grid by the project activity that would have otherwise been generated by the other power plants connected to the Southern grid
Project emissions	Not Applicable	Not Applicable
Leakage	Not Applicable	Not Applicable

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by ACM0002 (version 12.3.0).

4.5 Baseline identification

As the proposed project activity consists of installing a new grid connected renewable power plant comprising of wind energy turbines and the project is additional, cf. Section 4.6, the baseline scenario is in accordance with ACM0002, version 12.3.0 /29/ which is as follows:

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", version 2.2.1/30/.

The approved baseline methodology /29/ has been correctly applied to identify realistic and credible baseline scenario, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumption and data used by the project participants are listed in the PDD and/or supporting documents. All documentation relevant for establishing the baseline scenario are correctly quoted and interpreted in the PDD /1/. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable.

4.6 Additionality

The additionality of the project activity has been demonstrated by applying the step-wise approach given in the "Tool for demonstration and assessment of additionality", version 6.0, /31/. Following steps have been included:

1. Identification of alternatives to the project activity
2. Investment analysis to determine that the project activity is not financially feasible, and,
3. Common practice analysis.

4.6.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

The Project Participant Hindustan Zinc Limited has CDM projects of total installed capacity 123.2 MW duly registered (UNFCCC reference no. 1824 – 34.4 MW and no. 1856 – 88.8 MW) and is aware of the CDM benefits.

The PP has placed the orders for land lease, supply of various components and the project equipment vide contracts and various purchase orders /2//4//5//6//7//8//9/ dated 28 March 2011; the documents evidencing the order for civil construction is also dated 28 March 2011.Thus, the earliest date on which either the implementation or construction or real action of a project activity begins or the earliest date when the PP has committed to expenditure related to project implementation is 28 March 2011; accordingly, 28 March 2011 has been considered as the start date of the project activity which is in line with the definition of starting date /36/.

Since the start date of the project activity, 28 March 2011, is after 2 August 2008, the project proponent has notified UNFCCC and NCDMA, the host Party DNA on 2 September 2011, which is within six months from the start date of project activity. DNV has verified the copies of e-mails and also has confirmed that the project appears on the prior consideration link /47/.

The PP, Hindustan Zinc Limited, has by an email dated 2 September 2011 /22/ confirmed its plans to implement a CDM project to the Secretariat, UNFCCC, in Tiruppur district of Tamilnadu, in the prescribed format and UNFCCC Secretariat acknowledged the receipt of the same /22/. Further, DNV has confirmed the same from UNFCCC website /47/.

The PP has also intimated the National Clean Development Mechanism Authority (NCDMA), India, Ministry of Environment and Forests (MoEF) (host Party DNA), by e-mail dated 2 September 2011 /23/ regarding the proposed project activity. NCDMA has acknowledged the receipt of such information by e-mail dated 6 September 2011.

Further, the project is webhosted for global stakeholder consultation on 23 December 2011 /48/, which is within two years of the intimation to the DNA and UNFCCC thereby complies

with the EB guidelines on prior consideration of CDM /32/ .DNV has also evidenced the CDM consideration from the approval of the investment proposal of HZL and therefore find CDM to be seriously considered in the decision to proceed with the project activity.

Thus, it is demonstrated that the CDM was seriously considered in the decision to proceed with the project activity and all the prescribed actions have been fulfilled to register the same in a verifiable manner. Therefore, DNV confirms that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM /32/.

4.6.2 Identification of alternatives to the project activity

The applied methodology ACM0002 version 12.3.0 /29/ specifies that, the baseline scenario for grid connected new renewable power plants is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of the grid connected power plants and by the addition of new generation sources connected to the grid, as reflected by the combined margin.

Two alternatives to the project activity have been considered. These are,

i) Implementation of the project activity without CDM benefits, and,

ii) Continuation of current scenario (status quo)

In the event of the second scenario, an equivalent amount of electricity would, in the absence of the project activity, have been generated by the operation of grid connected power plants and by the addition of new generation sources. Both alternatives are in compliance with the laws and regulations of India and might be considered as baseline scenarios. DNV considers the listed alternatives to be credible and complete.

4.6.3 Investment analysis

Choice of approach

The project proposes to export generated electricity to the grid, which generates revenues on account of sale of electricity, thus providing a stream of revenue other than of CDM. Thus, Simple Cost Analysis is not applicable.

The alternative of continuation of current scenario, sourcing of power from the existing grid, does not involve any investment on the part of the project proponent. Thus, the alternative to the project does not involve any investment and hence investment comparison analysis is not applicable. This is in line with the EB “Guidelines on the assessment of investment analysis” /33/. Thus, the selected benchmark analysis for demonstrating the additionality of the project activity is considered appropriate by DNV.

Benchmark selection

The project being a wind based power generation project, can be promoted by an entity other than the project participant and hence the benchmark shall be based on parameters that are standard in the market. Thus, the PP’s choice of expected / required return on equity on post-tax basis as the benchmark, calculated on parameters that are standard in the market, is considered appropriate.

Further, as per paragraph 12 of the “Guidelines on the assessment of investment analysis” /33/, required / expected return on equity is an appropriate benchmark for equity IRR. The PP has selected post-tax equity-IRR as the financial indicator for comparison against the required return on equity (post-tax).

In order to calculate the required return on equity the PP has used the Capital Asset Pricing Model (CAPM) by adopting the methodology widely accepted and enunciated in detail in the monograph titled "Corporate Finance: Theory and Practice" (Wiley Series in Finance) by Aswath Damodaran /64/.

The required return on equity is calculated by using the formula,

$R_e = R_f + \beta_s (R_m - R_f)$, where,
R_e, is the required return on equity,
β_s, is the Beta value of power generation companies in India
Rf, is the risk free rate of return, and
Rm, is the market return.

DNV has verified and confirmed that the benchmark has been computed based on the following:

1. All the data considered is available for twenty years, which is the project life time /59//18/ and is the period for which financial analysis has been considered.
2. The data was available at and corresponds to the time of making the investment decision /17/
3. The data pertains to similar business; in this case, data of power generating companies (nearest similar business) in the absence of reliable data of wind power generating companies /60/, and
4. While evaluating Beta values, care has been taken to include companies whose data from stock exchange is available at least for the previous five years /60/.

With particular reference to individual parameters listed which are required to be substituted in the equation above, following be noted:

1. The risk-free rate is the assured return of Indian Government (host Country) securities corresponding to 20 years maturity period /66/. Accordingly, the value of risk-free return rate for substitution in the formula is 8.3%.
2. The market return is the most conservative (the lowest) "market risk" return that an investor could have obtained by investing in scrips of BSE 100, BSE 200 or BSE SENSEX; these are the only three indices in the host Country for which reliable data is available for 20 years (post 1991). The market return is calculated as the Compounded Annual Growth Rate (CAGR) and is calculated by the formula:

   $CAGR = [\{(\text{Ending Value} / \text{Beginning Value})^{1/\text{No. of years}} - 1]$
   The CAGR computed for the three indices for which data is available for the analysis period of 20 years is as follows:

1	Market return (CAGR) computed as per BSE 100 Index	16.37%
2	Market return (CAGR) computed as per BSE 200 Index	15.87%
3	Market return (CAGR) computed as per BSE SENSEX	16.19%

   The most conservative value of 15.87% among the above tabulated computed values of market return corresponding to the CAGR based on BSE 200 is considered for calculating the benchmark, required return on equity (RoE).

3. Beta values that are available in the public domain are "levered"; the current project is funded from own funds (zero debt and 100% equity) and in order to make them comparable, the published Beta values of the companies have been "unlevered" as per the following formula :
   Unlevered Beta = [Equity Beta/ {1+ (1-B)*A}], where,
   A = (mean debt / mean equity), and B = (mean tax/ mean Profit Before taxes) /62/. Accordingly, values have been sourced and the final results of unlevered beta and the mean unlevered beta to be considered for substitution in the formula are as follows:

Sr. No.	Company	Levered Equity Beta	Un-levered Beta
1	CESC Limited	1.0713	0.7088
2	Gujarat Industries Power Co Ltd	1.2145	0.7860
3	Tata Power	0.9953	0.7119
4	Reliance Infrastructure Limited	1.7585	1.3015
5	Neyveli Lignite Corp Limited	1.4702	1.1625
6	BF Utilities	2.0982	1.5101
7	NTPC	0.6200	0.4467
8	Jaiprakash Power Ventures Limited	1.7082	0.7416
Average Unlevered beta			0.9211

Thus, the following conservative values for substitution in the formula for benchmark have been arrived at:
Risk free market return: 8.3
Market return based on BSE-200: 15.87
Unlevered beta value: 0.9211
Computing the required return on equity (RoE) based on above values,
RoE = 8.3 + (0.9211) (15.87-8.3)
= 8.3 + (0.9211)(7.54)
=15.27%

Thus, DNV has verified the calculations and the data and confirm that the benchmark of 15.27% arrived at is in order.
Further, it is seen that the default value for the post-tax expected return on equity for Group I projects from India is 11.75% as per the "Guidelines on the assessment of investment analysis", version 5, EB 62, Annex 5 /33/. Converting this benchmark to real terms adopting the Reserve Bank of India (RBI)'s forecast of Expected Inflation Rate of 5% over the next ten years as per the "Survey of Professional forecasters" dated 2 February 2011 /70/ the benchmark works out to 16.75%.

Compared to this value of benchmark, the benchmark calculated as per the CAPM method (15.27%) is found to be more conservative and hence DNV confirms that the benchmark of 15.27% used for investment analysis of this project for comparison against the projected post-tax return on equity is appropriate.

Input parameters

The PP has also submitted an MS Excel sheet containing details of investment analysis /14/ along with supporting sheet for the benchmark (required return on equity) /15//15/ calculation.

The investment analysis has been carried out for 20 years /14/ which is also the lifetime of the project activity /59/. The input parameters used in the MS Excel sheet have been assessed to be appropriate and correct as per following details:

Parameter	Value of the parameter used in the investment analysis	Assessment of the input parameters
Installed capacity of the project	21 MW (14 x 1500 kW)	DNV verified the capacity from the note dated 6 June 2011 put up for approval /17/ and supplier's offer /18/ of the project activity. The model offered for supply (S-82), capacity of the offered turbines (1500 kW) and the number of machines (14 nos.) were also verified with the supplier's offer. Further, the copies of purchase orders for various components of the project equipment and for erection and commissioning of equipment /4//5//7//8//9//10/ dated 28 March 2011 were also verified which aggregate to 14 x 1500 kW (21 MW).
Total project cost	INR 1 251.89 Million	The total project cost was verified from the note dated 4 December 2010 put up for approval /17/ of the project activity. This was crosschecked from the offer of Suzlon Energy Limited dated 4 December 2010 /18/ for supply, necessary connected civil works, erection and commissioning, including cost of land, submitted by the PP, which formed the basis of the investment decision taken on 4 December 2010 /17/. This was further cross verified by comparing the actual cost of procurement as per the purchase orders for power generating and evacuation equipment /4//5//6//7//8//9/, land transfer documents /2/, orders for civil construction /3/, erection and commissioning /10/. The total cost of project as per the above referred documents is confirmed to be INR 1 251.89 Million which is on par with the assumed cost as per quotation. The actual cost incurred by the PP is further confirmed by the certificate /24/ issued by a Chartered Accountant which confirms that the total cost incurred for the project as INR 1 251.9 Million . Further, the project cost assumed for investment analysis is

<table>
<tr><td></td><td></td><td>compared with the project cost of five registered wind power projects /37//38//39//40//41/ from the same state of Tamil Nadu in the host Country.
<table>
<tr><th>Project ID / Ref/</th><th>Installed capacity (MW)</th><th>Total project cost (INR in Million)</th><th>Cost / MW (INR in Million)</th></tr>
<tr><td>4209 /37/</td><td>21</td><td>1 462.68</td><td>69.65</td></tr>
<tr><td>3884 /38/</td><td>33</td><td>1 999.80</td><td>60.60</td></tr>
<tr><td>3327 /39/</td><td>16.5</td><td>1 090.00</td><td>66.06</td></tr>
<tr><td>4540 /40/</td><td>19.8</td><td>1 286.50</td><td>64.97</td></tr>
<tr><td>4930 /41/</td><td>50.4</td><td>2 990.60</td><td>59.33</td></tr>
<tr><td>Project</td><td>21</td><td>1 251.89</td><td>59.61</td></tr>
</table>
It can be inferred from the above details of cost per MW computed from registered projects that the cost for the project activity is lower than the cost of four of the five projects; in the case of one project the project cost is almost on par exceeding only by 0.47%; thus, it can be stated that the project cost is on par or lower than other recently registered CDM registered projects located in Tamil Nadu.
Thus, the total project estimated cost of INR 1 251.89 Million considered for investment analysis is considered appropriate.</td></tr>
<tr><td>Plant load factor</td><td>25% being equivalent to 45 990 MWh of net power fed to grid</td><td>The PLF of the selected sites of Tiruppur district of Tamil Nadu is based on the PLF determination report ref no. PEC/WRA/HZL/04 /13/ provided by Power & Energy Consultants, a third party engineering and consultancy firm, which was received by the PP 0n 20 October 2011. The wind resource assessment has been carried out based on the data captured by wind mast installed at Kundadam, in Tiruppur District, where the wind farm project was proposed to be set up.
The decision to invest in the project was made based on suppliers’ estimate of PLF and it was also resolved at that time that third party determination of PLF for the selected site would be made; in pursuance of this, wind resource assessment by Power & Energy Consultants was received by PP on 20 October 2011. The power generation estimate provided by the suppliers in their offer for supply of equipment /18/ was 24.86% on which original investment analysis was based, against 25% estimated by the third</td></tr>
</table>

		party. Therefore, in the interest of conservativeness, the PLF estimate provided by the third party was adopted for the revised investment analysis. The determination of wind resource assessment and the PLF estimate for the project by the third party consultants meets the requirement of EB guidance in the matter of reporting of PLF /35/. Based on these, DNV is of the opinion that the 25% PLF used for estimating the power likely to be generated is reasonable and appropriate.
Power tariff, and generation based incentive (GBI)	INR 3.39 / kWh GBI of INR 0.50/kWh	The tariff adopted for carrying out the investment analysis has been sourced from TNERC order prevailing at the time of decision making. Referring to section 9 of TNERC order no. 1 dated 20 March 2009 /58/ the tariff is confirmed to be INR 3.39 / kWh. The decision to invest in the project was based on the note dated 10 December 2010 at which time the order was available and valid. As per this order, a sum of INR 3.39 per kWh is payable for all wind mills from 1 April 2009. The wind mills of this project were commissioned during November 2011 – February 2012. This was cross checked with Power Purchase Agreement (PPA) dated 30 September 2011 and 10 February 2012 /12/. Section 5 of the PP specifies that the energy supplied shall be billed at INR 3.39 / kWh. Generation based incentive at the rate of INR 0.50/kWh has been considered for computing the total revenue from power production from the project activity in the investment analysis presented by the PP /14/. DNV has referred to the guidelines for generation based incentives for wind power projects as per the directives of Indian Renewable Energy Development Agency (IREDA) /71/and has confirmed that the rate of INR 0.50/kWh considered, as also the ceiling, is in line with the guidelines. Further, as per paragraph 1 (i) of the guidelines /71/, the PP can opt for either GBI or accelerated depreciation but not for both. The registration of the project under the GBI scheme has also been confirmed /71/. Accordingly, in the investment analysis presented, the PP has considered only the GBI and has not considered accelerated depreciation, which is appropriate. Thus, DNV has confirmed that all the parameters used by the PP in the investment analysis for computing the income from exported power as appropriate.
O&M costs	INR 1.425	The O&M costs were verified from the offer letter of

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<td>million / WTG payable from 3rd year onwards with a 5% annual escalation; 10.3% service tax extra on charges payable</td>
<td>Suzlon Energy Limited as per which it is INR 1.425 million / WTG (S-82 model) with service tax as extra.
DNV has further crosschecked the O&M charges considered by also comparing it with other recently registered projects the details of which are as follows :
<table>
<tr><th>Project Ref</th><th>O&M Cost details</th></tr>
<tr><td>4209 /37/</td><td>O&M Payable INR 22 million from 3rd year; Total project cost: INR 1462.68 million; ie O&M charge payable is 1.5% of project cost / year from 3rd year onwards; 5% annual escalation</td></tr>
<tr><td>4930 /41/</td><td>O&M Payable is 1.3% of project cost from 1st year onwards; total project cost: 2990.6 million; over 20 years, 47.8% of project cost would be spent as O&M expenses</td></tr>
<tr><td>3327 /39/</td><td>O&M Payable is INR 2.5 million / WTG; Cost/WTG:109 million; thus, O&M payable is 2.3% of project cost from 1st year with 7.5% annual escalation</td></tr>
<tr><td>3884 /38/</td><td>1.87% of project cost from 3rd year onwards; 5% annual escalation;</td></tr>
<tr><td>4540 /40/</td><td>1.25% of project cost from 1st year onwards with an escalation of 5% per annum after five years; 34.6% of the project cost would be paid as O&M expenses.</td></tr>
<tr><td>Project under validation</td><td>O&M payable is INR 1.425 million/WTG from 3rd year onwards; Cost/WTG: INR 89.285 million; ie O&M payable is 1.6% of project cost; 5% annual escalation; over 20 years, 44.9% would be spent as O&M expenses</td></tr>
</table>
Reviewing the above data it is seen that the project O&M charges are lower than or on par with three projects; however, in case of two projects it is slightly higher but is not enough to vary the final results. Thus, DNV is of the view that the O&M charges, which was based on the offer made by the equipment supplier and considered for investment analysis is in order.</td>
</tr>
<tr>
<td>Insurance charges</td>
<td>0.11 million / WTG</td>
<td>The insurance charges adopted have been verified from the existing insurance policy taken by PP’s other existing wind power projects which is at the rate of 0.123%</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td>A comparison with other registered projects is as follows:
<table>
<tr><th>Project reference</th><th>Insurance cost details</th></tr>
<tr><td>4209</td><td>0.09%</td></tr>
<tr><td>4230</td><td>0.12%</td></tr>
<tr><td>3884</td><td>0.09%</td></tr>
<tr><td>3327</td><td>N/A</td></tr>
<tr><td>4540</td><td>N/A</td></tr>
<tr><td>Project under validation</td><td>0.11 M / WTG (0.123%)</td></tr>
</table>
The value assumed is based on the actual cost incurred by the PP on similar wind projects in the past and the information was available at the time of taking the decision. Thus, DNV is of the opinion that since the insurance charges are based on existing rates of premium charged by the company's insurers and are within the range of other registered projects, the charges adopted are appropriate.</td></tr>
<tr><td>Depreciation rates</td><td>5.28%</td><td>The depreciation rate applicable as per section 205 of the Companies Act, Schedule XIV, II.1 (b) is 5.28% /50/ which has been used by the PP and hence considered appropriate.</td></tr>
<tr><td>Income tax rate and holiday</td><td>Regular rate : 33.22%
Minimum Alternate Tax (MAT) rate: 19.93%
IT holiday for 10 years</td><td>The company is liable to pay income tax on the profits made at the rate of 33.22% as per the tax rates applicable for Assessment Year 2011-2012 or MAT at 19.93% /61/. PP has submitted a Certificate dated 26 September 2011 from Mahendra Pokhrana & Co, Chartered Accountants, confirming the eligibility of the company to pay MAT at 19.93% /19/.
Further, benefit under section 80-IA in respect of infra-structure facilities, which includes power generation and distribution companies, are eligible for 100% deduction of net taxable profit for period of 10 continuous years; this provision has been appropriately applied from 2012-2013 to 2021-2022.</td></tr>
<tr><td>Salvage value</td><td>10% of value of machinery and equipment plus actual cost incurred towards land acquisition</td><td>PP has calculated the residual value of the machinery and equipment at 10% of cost. The salvage value is calculated as the residual value of machinery and equipment plus the original investment on land and has been included in the cash flow in the 20th year.
DNV has also verified that the salvage value considered in other registered projects /37/ to /41/ is also on similar lines.</td></tr>
</table>

		Thus, the salvage value considered is appropriate.

This is a fully (100%) equity funded project which is confirmed by the Certificate issued by Nyati Mundra & Co., Chartered Accountants /24/. Working capital has not been considered in the investment analysis presented /14/.

Calculation and conclusion

DNV has received the investment analysis in MS Excel spread sheet format /14/, which is unprotected, with no hidden cells / sections, references for all assumptions have been provided, and all algorithms presented in a transparent manner. The investment analysis has been conducted for 20 years, the full term of the life of the project /18//59/.

The PP has also submitted a detailed worksheet with computation details of benchmark /15/; workings for all alternatives considered have been presented and the most conservative among the alternatives results is selected as the benchmark (required return on equity) which is appropriate.

The post-tax equity IRR yielded by the project is computed to be 7.88% against the benchmark of 15.27%, thereby indicating that the project is not a financially viable option.

All the tabulations have been verified by DNV and are found to be accurate. Information used has been independently verified and are found to be appropriate.

Sensitivity analysis

A sensitivity analysis has been carried out for the major parameters PLF, O&M, biomass price, electricity tariff and project cost which contribute to more than 20% of revenues or costs to check the robustness of the financial analysis. The level of variation assumed for the sensitivity analysis has been suitably justified with relevant documents pertaining to the presented analysis and has been verified by DNV, such as:

PLF variation:

The IRR reaches the benchmark if the base PLF (25%) increases by 49% to 37.25%.The TNERC in its tariff order dated 20 March 2009 /58/ has considered a PLF of 24.56% for Palaghat Pass which is the closest to the project site, the value has been arrived by TNERC based on the operational data of similar type of machines in the area. The PLF of 25% considered by the PP is based on third party assessment, which is site specific and meets the requirements of *Guidelines for reporting and validation of Plant Load Factors* /35/, and is higher than the TNERC stipulated indicative PLF.

Thus it is DNV's opinion that PLF of 37.25% required to reach the benchmark is unlikely to be achieved.

Investment cost variation

The IRR reaches the benchmark if the investment cost decreases by 32%. The project is commissioned and the actual cost incurred is INR 1 251.2 million /2/ to /10/ as verified from the purchase orders and certificate issued by Chartered Accountant /24/. Hence a decrease of 32% in the project cost is an unlikely scenario.

Tariff variation

The IRR reaches the benchmark if the tariff increases by 50%.The tariff used for the financial analysis (INR 3.39 / kWh) is based on the tariff specified in the TNERC order dated 20 March 2009 whose validity has been extended by order dated 15 December 2011 without any

increase in the tariff. The PPAs /12/ issued to the project WTGs have been verified; it is noted that the tariff specified in the PPA is INR 3.39 / kWh and all the PPAs are valid for 20 years.

The tariff for the project activity is governed by the PPA and tariff orders are issued by TNERC. The revisions to tariff, if and when they become applicable, will not be applicable retrospectively to projects already commissioned. So, DNV is of the opinion that any increase in tariff which would be applicable to project activity is unlikely.

O&M Rate Variation

The equity IRR for the project is likely to exceed the benchmark (post-tax required return on equity) only if the O&M charges come down by 375% which is an unlikely scenario.

From the sensitivity analysis, it is seen that the benchmark is unlikely to be reached and therefore it is concluded that the project needs CDM revenues.

4.6.4 Barrier analysis

PP has proceeded to present common practice analysis as permitted by the "Tool for the demonstration and assessment of additionality" /31/.

4.6.5 Common practice analysis

As a consequence of the enactment of Indian Electricity Act, 2003 /51/ State Electricity Regulatory Commissions (SERC) were established as per section 82, part X, of that central act. Among other things, the responsibility of the SERC consists of tariff determination for generation, supply, distribution, transmission, wheeling, purchase and procurement of power. Each state has its own Regulatory Commission in place and decides upon various issues based on its input received from the stakeholders. Thus, the regulatory regime policies differ from one state of India to another.

Similarly, each state has its Renewable Energy Development Agency, under the umbrella organization IREDA, each one of which come up with different policies for establishment, development and licensing procedures for renewable energy projects. Thus, in India, the regulatory environment for the power sector in general and renewable energy in particular is governed by the policies, regulations and tariff orders implemented at each state level. As a consequence, the investment policies and climate, tariff structure, incentive schemes, and guidelines, differ from state to state /45//54//55//56//57/ and hence the conditions prevailing across the entire host country (India) is not homogeneous.

The state of Tamil Nadu has been considered as the applicable geographic region which DNV considers as justified based on the following reasons:

1. As per paragraph 5 of the applied tool /31/, applicable geographical area may be chosen and confined to a smaller area, such as a state, than the host country for *technologies that vary* considerably from location to location depending on local conditions.
2. As per paragraph 9 of the applied tool /31/, *different technologies* are those that deliver the same output (in this case, generation of electricity from renewable sources), but differ by at least one of the five ('a' to 'e') specified parameters. The tariff determined per unit of electricity (kWh) is the sole source of revenue for an investor in renewable energy and hence it would be correct to consider the tariff applicable in various states for wind power based electricity as having a direct influence on the investment climate; following are the tariff prescribed by four states, as on the date of decision

making for this project (10 December 2010) /17/, including that of Tamil Nadu where the project activity is located.

State	Tariff order reference	Tariff (INR / kWh)	Estimated investment cost/ (INR in million / MW)
Tamil Nadu	Order no. 1 dated 20 March 2009 extended up to 30 June 2012 as per order dated 15 December 2011	3.39	53.5
Gujarat	Order no. 1 dated 30 January 2010	3.56	50.0
Karnataka	Order dated 11 December 2009	3.40	42.50
Rajasthan	Order no.11 dated 3 June 2011	4.22	52.50

The applicable tariff determines the financial flows of the project being the sole source of revenue and has a direct bearing on the investment pay-back period. Thus, considering the state of Tamil Nadu as the applicable geographic area is justified because the *technologies* differ from state to state, having met the conditions stipulated for *different technologies* as per paragraph 9 (d) and (e) of the additionality tool /31/.

The project activity comprises of establishing a wind turbine generator, a renewable source based power generating unit, in a country where the common prevailing practice is to establish a fossil fuel based power generating unit. This constitutes *switch of technology with change of energy source* and is covered under paragraph 6 of the additionality tool /31/.

Thus, the step wise approach as defined in Step 1 to Step 4 of paragraph 47 is applicable to the project activity.

Accordingly, the following details are provided:

STEP 1: Applicable output range has been calculated as 10.5 to 31.5 MW, being +/- 50% of the installed capacity of the plant, which is 21 MW.

STEP 2: In this step, PP has calculated the value of the factor N_{all} being equal to the number of non-CDM projects in the State of Tamil Nadu (applicable geographic area) that deliver the same output in the applicable range of 10.5 to 31.5 MW. Details of hydro and thermal power plants are sourced from the publicly available CEA Database, Version 6 /42/, and cross checking for CDM registration is done by referring to the UNFCCC project cycle search link. It is confirmed that there are no nuclear power projects in the applicable range. Based on the above, following data is obtained:

HYDROPOWER PROJECTS IN APPLICABLE RANGE IN TAMIL NADU			
No.	Project	Cap (MW)	TYPE
1	KUNDAH-I	20	HYDRO
2	KUNDAH-I	20	HYDRO
3	KUNDAH-I	20	HYDRO

4	KUNDAH-V	20	HYDRO
5	KUNDAH-V	20	HYDRO
6	PARSEN_S VALLE	30	HYDRO
7	SHOLAYAR-II	25	HYDRO
8	PYKARA	11	HYDRO
9	PYKARA	14	HYDRO
10	PYKARA	14	HYDRO
11	SARKARPATHY	30	HYDRO
12	MOYAR	12	HYDRO
13	MOYAR	12	HYDRO
14	MOYAR	12	HYDRO
15	SERVALAR	20	HYDRO
16	LOWER METTUR PH-1	15	HYDRO
17	LOWER METTUR PH-1	15	HYDRO
18	LOWER METTUR PH-2	15	HYDRO
19	LOWER METTUR PH-2	15	HYDRO
20	LOWER METTUR PH-3	15	HYDRO
21	LOWER METTUR PH-3	15	HYDRO
22	LOWER METTUR PH-4	15	HYDRO
23	LOWER METTUR PH-4	15	HYDRO
24	BHAWANI KATTALAI BARRAGE	15	HYDRO
25	BHAWANI KATTALAI BARRAGE	15	HYDRO
THERMAL POWER PROJECTS IN APPLICABLE RANGE IN TAMIL NADU			
1	BASIN BRIDGE GT	30	THERMAL
2	BASIN BRIDGE GT	30	THERMAL
3	BASIN BRIDGE GT	30	THERMAL
4	BASIN BRIDGE GT	30	THERMAL
5	VALANTHARVI GT	14.8	THERMAL

Details of power generating projects based on biomass (including bagasse co-generation projects) are obtained from information available on the Ministry of New and Renewable Energy /68/ and details of CDM registered bio-mass based projects are taken from CDM

project search link. Accordingly, following bio-mass based non-CDM projects in the applicable range are found in the State of Tamil Nadu:

No.	Project / PP Details	Capacity	CDM Consideration
1	Mohan Breweries & Distilleries	18	N
2	Aurobindo Agro Energy Pvt. Ltd.	15	N
3	Rajashree Sugars & ChemicalsLtd	12	N
4	Kothari Sugars & ChemicalsLtd.,	12	N
5	EID Parry (India) Ltd.	24.5	N
6	Arunachala Sugars Ltd	19	N
7	Auro Energy Ltd.,	16	N
8	Sakti Sugars Ltd.	24.5	N
9	Rajashree Sugars&Chemicals ltd	20	N
10	EID Parry India Ltd	18	N
11	Bannari Amman Sugars and Chemicals Ltd	28.8	N

Accordingly, 11 non-CDM bio-mass projects are identified in Tamil Nadu.

Details of wind power based electricity generating projects are taken from the Directory of Indian Wind Power /46//49/ and details of CDM registration for these are taken from CDM project search link. Accordingly, following wind based non-CDM power project in the applicable range is found in the State of Tamil Nadu:

No.	Project / Investor	Capacity (MW)	Type
1	DCW Limited	11.2	14 x 800 kW wind turbine generators

There is no tidal power based electricity /68/ generating unit established in the State. Thus, based on the above information, the value for N_{all} is tabulated as follows:

N_{all} = Number of non-CDM (thermal + hydro + biomass + nuclear + tidal + wind) energy Plants

= (5 + 25 + 11 + 0 + 0 + 1)

= (42)

STEP 3: The technology applied in the project activity is of converting the kinetic energy in wind to electrical energy; this is different from the technology applied in thermal (conversion

of heat content), hydro (conversion of flowing water), nuclear (conversion of energy of nuclear fission), biomass (solar energy trapped in biomass) and tidal (conversion of the mechanical energy contained in oceanic waves). Thus,

N_{diff} = (5 + 25 + 11 + 0 +0 + 0)

= (41)

STEP 4: The factor F is calculated as = $(1 – N_{diff}/N_{all})$

= (1- 41/42) = 0.024; thus, F is LOWER than 0.2

Further, $N_{all} – N_{diff}$ = 42-41 = 1; thus, $(N_{all} – N_{diff})$ is LOWER than 3.

Thus, the project activity fulfils the condition for being considered as NOT common practice.

In conclusion, this can be summarised as follows:

1. That, the PP has correctly identified all alternatives to the project activity consistent with prevailing laws and regulations,
2. That, a financial analysis of the project activity has established that the project activity is financially not attractive; that, a sensitivity analysis has further demonstrated that even with a reasonable variation of the main parameters, it is not likely to turn financially attractive, and that, the extent of variation required for the parameters to turn the project financially viable is not likely to happen, and,
3. That, the project activity is not common practice in the sector within the applicable geographic region.

Hence, the emission reductions achieved by the project activity are additional to any that would happen in absence of the project.

4.7 Monitoring

The project generates electrical power from wind energy; the applicable methodology is ACM0002, 12.3.0. The project does not involve use of fossil fuels, is neither a geothermal power plant, nor a hydropower plant, and hence according to the methodology, the project emissions are zero.

Also, leakage emissions are not considered as per the methodology. Thus, only the baseline emissions are to be monitored.

According to the methodology, quantity of net electricity generation supplied by the project plant/unit to the grid in year y, expressed in MWh, is to be measured at the project activity site by electricity meters on a continuous basis with at least monthly recording, complete with provisions for cross checking the recorded data with records for electricity sold such as the invoices raised by the PP.

The transformer yard located adjacent to the WTG steps up the generated power to 33 kV and the output of the step-up transformer is measured by an ensemble of a main and check meter. Both meters are bidirectional (capable of measuring both export and import), electronic tri-vector meters of accuracy class 0.2s. The stepped up power is evacuated into the southern grid via the nearest 110 or 230 kV sub-stations. The schematic diagram given under section B.3 of the PDD /1/ correctly describes the metering arrangements of the 14 x 1500 kW WTGs of this project as was confirmed during the site visit/72/. Each WTG is assigned a unique no. and is provided a HTSC no. both of which are clearly referenced in the commissioning certificates /21/. Details of meters installed are also provided in section B.3 of the PDD /1/, correctness of which was confirmed during site visit /72/.

The meter readings shall be recorded once in a month by the authorized representative of the State Transmission Undertaking in the presence of the project representative and the export of power to the grid ($EG_{y,export}$) and import of power from the grid ($EG_{y,import}$) are tabulated. The net power exported to the grid ($EG_{BL,y}$) from the project activity is arrived at as the difference between the two ($EG_{y,export}$ - $EG_{y,import}$). This procedure is in accordance with section 4 of the PPA /12/.

The meters shall be calibrated at least once in three years which is in line with the requirements of the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 and its amendments, 2012) /51/, which is referred in the PPA /12/.

The net electricity supplied to the grid can be cross checked from the sale invoice. Thus, cross checking the invoiced quantity serves as a tool to verify the net exported power used for emission reductions, which is sourced from the monthly meter reading statement issued by the statutory authority. In case of any difference between the two, the lower of the two shall be considered for emission reduction calculations.

The WTGs installed in the project activity generate 3-phase power at 690 V /59/, which is continuously measured by meters installed in the control panel located within the tower and are recorded by microprocessor based electronic system. Various data, including generated power, are logged continuously and monitored by a Central Monitoring Station equipped with Supervisory Control and Data Acquisition (SCADA). These meter readings are referred to as controller meter readings.

The project monitoring plan is in compliance with the monitoring methodology ACM0002 (version 12.3.0). The monitoring plan will give opportunity for real measurement of emission reductions achieved and the monitoring arrangements have been physically verified by DNV during the site visit assessment /72/. It is DNV's opinion that the project participants are able to implement the monitoring plan.

4.7.1 Parameters determined ex-ante

The project demands monitoring of total power exported to grid and the Combined Margin grid emission factor ($EF_{CM,grid}$). The former is done as per the requirements of the applied consolidated methodology ACM0002, version 12.3.0 /29/ and the latter is prescribed in the methodology to be calculated done as per the "Tool to calculate the emission factor of an electricity system", version 2.2.1 /30/.

The project activity is located in Tiruppur District of Tamil Nadu which is served by the Southern grid /42/. The power generated by the project activity is exported to the Southern grid and hence, the Southern grid is identified as the relevant project electricity system in accordance with the requirements of STEP 1 of the tool /30/.

In India, Central Electricity Authority, under the Ministry of Power, Government of India, compiles and publishes a comprehensive database containing the necessary data on CO_2 emissions /42/ for all grid-connected power stations in India. This facilitates adoption of authentic baseline emissions data and also to ensure uniformity in the calculations of CO_2 emission reductions by CDM project developers.

The PP has exercised the option available under STEP 1 and has correctly chosen to calculate OM as the simple operating margin emission rate of the exporting grid, determined as described in Step 4 (a), by demonstrating that the conditions for this method, as described in STEP 3 of the tool apply to the system grid.

Based on data provided in the CEA published CO_2 Baseline Database for Indian Power Sector, Version 6, the value of Combined Margin for the southern grid is calculated as 0.9161 tCO_2 / MWh. Details of the tabulations are shown in 4.8.

4.7.2 Parameters monitored ex-post

The project activity is a green field power generation activity. Therefore, the parameter/s to be monitored is/are:

Quantity of net electricity generation supplied by the project plant/unit to the grid in year y: Expressed in MWh, to be measured at the project activity site by electricity meters on a continuous basis with at least monthly recording, complete with provisions for cross checking the recorded data with records for electricity sold such as the invoices raised by the PP.

Thus, the details of parameters monitored ex-post are as shown in the next table:

Data / Parameter details	Procedure	Details	Remarks
$EG_{y,export}$	Expressed in kWh; this is the difference in the export reading of the previous month and the current month; main meter readings are considered except in cases where the main meter is faulty or stopped, when check meter readings shall be considered	Bi-directional electronic meters of accuracy class 0.2s; calibrated at least once in three years	Readings are taken on a periodic basis (monthly at the appointed day and hour by an authorized officer of distributor licensee
$EG_{y,import}$	Expressed in kWh; this is the difference in the import reading of the previous month and the current month; main meter readings are considered except in cases where the main meter is faulty or stopped, when check meter readings shall be considered	Bi-directional electronic meters of accuracy class 0.2s; calibrated at least once in three years	Readings are taken on a periodic basis (monthly) at the appointed day and hour by an authorized officer of distributor licensee
$EG_{BL,y}$	Expressed in kWh; net power exported to the grid; calculated as the difference between the two metered and monitored parameters, $EG_{y,export}$ and $EG_{y,import}$	The PP shall raise an invoice on a monthly basis for the net power supplied to the grid; the invoiced quantities are cross verified for determination of emission reduction eligibility of the project activity	

The PP has put in place a monitoring team and has finalized a contract for obtaining O&M services /11/, which includes extensive assistance in monitoring. The team members have clearly defined responsibilities and duties, details of which are provided in the PDD /1/.

4.7.3 Management system and quality assurance

The monitoring plan clearly indicates the responsibilities for monitoring, recording, reporting, and verification of data. The monitoring records will be kept for a period of 2 years beyond the monitoring period. Procedures for data storage, archival and preservation of records have been established.

The competence of the members of the monitoring team was confirmed during site visit /72/. The PP already has other registered CDM projects (Ref no. 1824) and has obtained repeated issuances of CERs. Thus, the PP is expected to be capable of providing the necessary training and equip the monitoring team in implementing and discharging the requirements in a satisfactory manner.

The bi-directional tri-vector energy meters of accuracy class of 0.2s shall be calibrated once in three years by the statutory authorities.

4.8 Algorithms and/or formulae used to determine emission reductions

The project activity is a wind based power generation activity and hence project emissions are zero and leakage emissions are also zero as per methodology. Thus, only baseline emissions are to be considered which comprises of CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions (BEy) are calculated as per equation (6) of the methodology ACM0002, version 12.3.0, which is as follows:

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

Out of these two parameters, $EG_{BL,y}$ is monitored ex-post as described in 4.7.2 and $EF_{CM,grid}$ is fixed ex-ante for the entire crediting period (first renewable period of 7 years). Details of tabulation of the value of $EF_{CM,grid}$ is as shown below:

Share of must-run (hydro/nuclear) for the Southern grid is as per the details given below which has been verified against the data provided in the CO_2 Baseline Database for Indian Power Sector, Version 6 /42/.

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)					
	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**
Southern Grid	27.0%	28.3%	27.1%	22.8%	20.6%

Based on the above, it can be seen that the (historical 5-year) average share of must-run in the Southern grid based on the previous 5 years' data is 25.2% which is below 50% and this fulfils the condition stated under step 3 of the Tool.

Further, the Simple OM ex-ante option is chosen, as per which the emission factor is determined once at the validation stage; thus no monitoring and recalculation of the emissions factor during the crediting period is required.

Under step 4 (a), the Simple OM is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants

serving the system, not including low-cost/must-run power plants/units. Under the ex-ante option, for grid power plants, a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation should be used.

The project was webhosted on 23 December 2011 /48/ and the CO_2 Baseline Database for Indian Power Sector, Version 6, /42/ is dated March 2011 and is thus the most recent data available at the time the project was submitted for webhosting.

The data sourced from the CO_2 Baseline Database for Indian Power Sector, Version 6 /42/ and the calculation of Simple OM as per the stated procedure is as follows:

Data for year	2007-08	2008-09	2009-10
Ex-post Simple OM (tCO_2/MWh)	0.990861	0.972925	0.941505
Net generation in OM (MWh)	114,634 (a)	121,471 (b)	134,717 (c)
Generation weightage [(a/a+b+c), (b/a+b+c), (c/a+b+c)]	0.309134	0.327572	0.363292
Generation weighted Simple OM (tCO_2/MWh) ex-ante	0.9671		

The Build Margin emission factor is calculated as in Step 5 mentioned in the tool /30/; the build margin emission factor on *ex ante* basis is calculated based on the most recent data available for sample group *m* at the time of CDM-PDD submission to the DOE for validation. CEA has calculated the build margin accordingly and has published the values.

The value of Build Margin (BM) (in tCO_2/MWh) for 2009-2010 is the most recent year for which published data is available as per CO_2 Baseline Database for Indian Power Sector, Version 6 /42/. The value for BM is: 0.7634 tCO_2/MWh.

The PP has chosen to calculate the weighted average Combined Margin (CM) which is the preferred option as per the Tool /30/. As per equation (14) give therein, we have,

$$EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}$$

Where:

$EF_{grid,CM,y}$ = Build margin CO2 emission factor in year *y* (tCO2/MWh)

$EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year *y* (tCO2/MWh)

W_{OM} = Weighting factor of operating margin emissions factor (%)

W_{BM} = Weighting factor of build margin emissions factor (%)

DNV has verified the data available in the database /42//42/ and has checked the tabulated values and accordingly can confirm that the values to be substituted for $EF_{Grid,OM,y}$ and $EF_{Grid,BM,y}$ in the above equation are as below, expressed in tCO_2/MWh:

$EF_{Grid,OM,y}$ = 0.9670

$EF_{Grid,BM,y}$ = 0.7634

Further, the Tool specifies that the default values for W_{OM} and W_{BM} for wind powered electricity generation activities shall be 0.75 and 0.25 respectively. Accordingly, the Weighted Average Combined Margin for Southern grid on ex-ante basis is 0.9161 tCO_2/MWh, which shall be used without further monitoring throughout the selected first crediting period of seven years.

The net power exported to the grid is reckoned as the power exported at the 33 kV transformer yard. It is calculated based on readings of meters of accuracy class 0.2s which fulfils the statutory requirement for metering as specified in Indian Electricity Act, 2003 and CEA Metering Rules /51/. The meter readings are recorded by statutory government appointed officials in the presence of the PP's representative.

The Southern grid Combined Emission factor is calculated based on the specified procedure of the tool /30/ and is based on values provided by the statutorily appointed body for this purpose, the CEA, which is available in the public domain. Thus, this meets all the conditions of completeness, accuracy and transparency.

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average ex-ante estimation of emission reduction conservatively calculated to be 42 131 tCO_2e per year for the selected crediting period.

All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD. All values used in the PDD are considered reasonable in the context of the proposed CDM project activity. The baseline methodology has been applied correctly to calculate baseline emissions and emission reductions. All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.

4.9 Environmental impacts

The proposed project activity contributes to generation of electricity from renewable source and the investment is expected to contribute to the economic development of the region. Thus, the project activity is expected to have only beneficial impacts and no adverse impacts are foreseen. As per the Ministry of Environment and Forests (MoEF) notification dated 14 September 2006 amended by notification dated 1 December 2009 /69/ an environmental impact assessment is required only for projects included in the schedule of the notification and wind power projects are not mentioned in the schedule, so no environmental impact assessment is required as per statute for this project and hence has not been conducted for this project.

The PP has also committed to earmark 2% of CER revenues towards sustainable development activities which fulfils the requirement of legislation in the host country (India). Details of the same are provided in Annex 5 to the PDD.

4.10 Comments by local stakeholders

The PP has conducted the local stakeholder consultation meeting as required by CDM modalities. Public notice dated 2 September 2011 /20/ inviting local stakeholders for a consultation meeting at the Central Monitoring Station (CMS) of Suzlon Infrastructure Services Limited, Kumdadam Site, Tiruppur Ditsrict, scheduled for 12 September 2011 at

12.30 PM has been submitted. Invitees included employees, community members, suppliers, statutory regulators, NGOs and local village residents.

The attendance records for the meeting conducted on 12 September 2011 at Kundadam as per the schedule and copies of minutes of consultation meeting /20/ have also been submitted for verification. A summary of the questions raised have also been presented in the PDD under section E.2 /1/.

Salient features of the project, nature of the technology employed and its environment friendliness, were explained to the gathering during introductory sessions; subsequently, questions were invited from the local stakeholders; the minutes of the meeting indicate that the questions raised by the stakeholders have been adequately and satisfactorily addressed by PP; the questions included the nature of threat posed by global warming to coastal areas such as the Kanyakumari, which is close to the project area, about Kyoto Protocol, and if installation of WTGs would affect rainfall and ground water availability. The required clarifications were provided to the gathering; there were no negative or adverse comments that needed a review of the project implementation.

DNV considers that the local stakeholder consultation carried out was adequate.

4.11 Comments by Parties, stakeholders and NGOs

The PDD, version 01 dated 19 December 2011 /1/, was made publicly available on the CDM website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 23 December 2011 to 21 January 2012. Please refer : https://cdm.unfccc.int/Projects/Validation/DB/EGN9QWSFTOTWJ68573EY07TNS8FRWD/view.html

The comment received is given (in unedited form) in the below text box, along with the response of the PP against each item of the comment and DNV's assessment of the same:

Comment by: Benjamin Franklin

☐ Accredited NGO ☐ Party ☒ Stakeholder

Inserted on:

Subject:

Comment:

 Has the PP considered the CDM revenues while envisaging the project? Without CDM the project was not viable, is it right? This project is having a debt component? Then how bankers or lenders gave the loan? Have the bankers or lenders considered the CDM revenues while agreeing to give loan to this projects? If not this project should be rejected right away by DOE by terminating the contract forthwith. If yes, where is the proof? What is the date of the evidence document from bank? Is this document printed now a days or earlier. DOE to independently check the same. If the document is available from Bank it must be checked from all angles so that it is genuine and not forged and date changed by putting back dated. This is normally done, DOE to be aware of this please. Please check the communication the PP had during that time with banks, emails and postal receipts and the weights and dates mentioned on the receipts. Do not believe in courier bills and receipts since these can be cooked up easily. Insist on government owned postal service receipts only. If the project is fully equity project then on what basis the PP has invested full equity in to the project while considering the CDM revenue? DOE to check the same in detail and bring out the facts. Is there any past record of this PP to invest or not to invest at returns what he is talking about in this project? Proper evidences must be reviewed and digged out by the DOE and take decision on the project based on established facts. Do not ask documents from PP, DOE to collect the same from different sources to do independent evaluation.

PP: Yes, the PP considered the CDM revenues while envisaging the project. The same can be checked from Board Resolution. Yes, without CDM the Project is not viable. The IRR without CDM Revenues comes out to be only 7.88%, whereas IRR with CDM Revenues which comes out to be 10.58%, thus making it more feasible .It's 100% Equity project. The basis for investing in this project was returns with CDM Revenues which comes out to be 10.58%, thus making it feasible.

DNV: DNV has verified the note for approval prepared for consideration and approval by the Board of the PP company; the note clearly states the need for CDM revenues without which the project is not feasible; This is a fully equity funded project confirmed by a certificate issued by a CA. The PP has not sought any financial assistance for funding of project; there are previous equity funded project by the PP which have obtained CDM status; Doe has verified all documents submitted by independent sources prior to accepting them as a part of their validation. The response by PP suitably addresses the concerns expressed in these comments.

 Is the project equipment purchased second hand equipment or sourced from cheap foreign sources? If yes, the issue must be probed by DOE since invoices will invariably be inflated and forged. Total project costs mentioned by PP will not be the same as originals. Hence no additionality. These facts must be probed in full by DOE by checking all documents and money transactions along with bank statements and certified accounts by a legally acceptable financial analyst.

PP: No, the project equipment neither purchased second hand equipment nor sourced from cheap foreign sources. The documents have been submitted to DOE & fully checked.

DNV: The project equipment are sourced form C-WET and MNRE approved indigenous manufacturer-suppliers who provide a two years' warranty and subsequent O&M contract. The quotations, purchase orders have been verified. The total project expenditure has been further confirmed by a CA certificate, which is a certified, legally acceptable financial analyst agency. The response by PP suitably addresses all the concerns expressed.

 From DOE side which auditor has done marketing and business development for acquiring this business of validating this project? With whom he or she was co-ordinating at PP or CER buyer? The same person who has done the marketing and business development to acquire the business do validation or participate in any manner what so ever in the validation process? One cannot do like that. It is against the accreditation rules and norms followed since ages. DOE should send auditors from different offices or countries to do this validation audit. DOE must take care of impartiality and accreditation rules. Due to the targets set by the DOE managements auditors are doing marketing and meeting clients and giving promises that the project will be taken care. Is it acceptable and fair? This must be stopped. No auditor should do marketing. Only non-auditing staff should do marketing. DOE to ensure the same please.

PP: Not applicable

DNV: As a Designated Operational Entity DNV has developed and abides by procedures which avoid all conflicts of interest and of familiarity; the role of validators and verifiers is very clearly defined; the procedures adopted by DNV ensure impartial and evidence based validation and verification opinion; the Accreditation Panel conducts periodic audits to ensure that all accredited DOEs meet the CDM requirements.

 If applicable only: Is these machines, equipment was a part of any bundle of CDM activity envisaged and developed earlier. DOE to check the same through independent sources also. Once some bundles are non-additional and getting negative validation from a DOE, PP is rolling out the same project as an individual project which is not a CDM project at all. DOE to verify the same from independent sources and also

take undertaking in the form of an affidavit from the PP's that any misrepresentation or false statement with respect this would attract strict legal action from UNFCCC and DOE. Furthermore the registered project must be de-registered in case of any future findings contradicting the submissions made by the project owner.

PP: No, these machines, equipments are not part of any bundle of CDM activity.

DNV: All necessary verifications have been completed to ensure that this project was envisaged, planned and implemented as per design; various modes of verification including information from independent sources, site visits by personnel and expert opinion have been sought.

 DOE to ensure that the PDD values are consistent and ensure that the CDM project is a genuine project

PP: The PDD values are consistent and have been checked thoroughly by DOE.

DNV: Every effort is made to verify all data and submissions made in the PDD and to ensure their consistency across all documents and in various sections of the same document.

 DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also.

PP: Relevant Documents have been validated by the DOE.

DNV: Wind projects do not need any prior approval of DPR / FSR; this is a fully equity funded project and hence verification has been completed by checking the CA certificate issued confirming project cost; it has also been compared with other registered projects; all important criteria such as PLF, tariff etc. have been sourced from third party consultants, ERC guidelines, PPA and other statutory authorities, fully meeting the EB guidelines.

 Careful study must be done so that the DPR/FR is not in different versions made and submitted with different purposes to different agencies, which is totally unacceptable, illegal and unethical.

PP: All the submitted documents have been validated by the DOE.

DNV: Wind projects do not need any prior approval of DPR / FSR; this is a fully equity funded project; all necessary verifications have been completed to check the data submitted by the PP.

 DPR/FR values must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts.

PP: All values are verified by DOE.

DNV: Wind projects do not need any prior approval of DPR / FSR; this is a fully equity funded project; all necessary verifications have been completed to check the data submitted by the PP.

 DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by PP/Consultant.

PP: All values are verified by DOE.

DNV: Wind projects do not need any prior approval of DPR / FSR; this is a fully equity funded project; all necessary verifications have been completed to check the data submitted by the PP.

 DOE must not entertain this project any more if found the DPR/FR is tamprered with at any point in time. PP can not give different DPR's and FR's. They must submit only the one given to Banks and other agencies while obtaining loans and decision making time.

PP: All values are verified by DOE.

DNV: Wind projects do not need any prior approval of DPR / FSR; this is a fully equity funded project; all necessary verifications have been completed to check the data submitted by the PP.

 How is the base line defined in this project? Is Base line hypothetically defined with no proper evidences and proper justification? In such case, DOE cannot take the base line as suggested by the PDD. Please check that there are real emission reductions beyond the real and factual base line. It may so happen that this project qualifies for no CER's. DOE cannot assume values and things as giving by this PP. Whatever values are considered throughout the project in all documents including the real DPR (not the one prepared for CDM, the one given to the banks and others), they must be validated, verified and double checked. Do not ask PP for DPR. Ask the parties who have been given DPR by the PP. Get directly from the bank and others by each page of the DPR and Feasibility report signed. Such document can be considered as a real DPR or FR. UNFCCC CDM process cannot be degraded by fabricating and misinterpreting the project base line and additionality.

PP: The Baseline is the power generation emissions in the Southern Grid which would have been occurred in the absence of project activity. It is taken from an authenticated source i.e. CEA (Central Electricity Authority).

DNV: Baseline scenario is determined as per guidelines contained in the approved consolidated baseline and monitoring methodology whose applicability for the project activity has been established and verified. The baseline emission determination is done based on monitored power exported to the grid in compliance with the methodology requirements; the ex-ante grid emission factor is tabulated as per the requirements of the applicable UNFCCC prescribed tool based on data published by the Central Electricity Authority. Every care is taken to ensure that all data used for determination of baseline emissions and estimated emission reductions are genuine, publicly available, backed by statutory authorisation and reflect the correct and true picture.

DOE to be more careful so that this is a genuine CDM project. What is the exact project cost? The project cost is covering what? Each value considered must be validated with proof. The machinery is second hand purchased or fresh and new from an OEM? In either case DOE to check all the quotations, proposals, purchase orders, invoices, way bills, transport bills, proof of payments like bank statements. DOE to check with banks by way of written confirmation the amount transacted, to whom the money is paid, when the money is paid, is the party paid is the correct party as shown in the purchase orders. It may so happen that the values, party names, dates are fabricated and misrepresented in this project. DOE should terminate their contract for this project immediately. This is the only way out to protect the value of CDM process. If the PP is purchasing second hand or second quality equipment and inflating the purchase order values and invoices, this must be probed thoroughly and real values to taken for additionality calculation. Then I'm sure the additionality is not there at all in such a situation.

PP: All details are provided in the PDD which will be validated by the DOE.

DNV: This is a fully equity funded project and hence verification has been completed by checking the CA certificate issued confirming project cost; it has also been compared with other registered projects; all important criteria such as PLF, tariff etc. have been sourced from

third party consultants, ERC guidelines, PPA and other statutory authorities, fully meeting the EB guidelines;

 Project owner should show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE at face value, but must be checked independently. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE.

PP: Project is funded by internal accruals; the PP is a public limited company open for audits and compliance with the requirements of the Company Laws.

DNV: No debt component involving a bank's participation is needed for project implementation; however, DNV assures that all data including project cost, revenues, salvage value, depreciation and IT rates, correctness of all estimates, and independent verification has been undertaken and its final validation opinion is free of any conflict of interest and bias.

How DNV has considered the comment received in its validation:

DNV considers that the responses offered by the PP adequately and satisfactorily address all the concerns expressed.

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory requirements for Clean Development Mechanism (CDM) project activities

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	~~CAR 1~~ OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	~~CAR 1~~OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	~~CAR 1~~OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	~~CAR 1~~
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	NA
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	NA
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK

Requirement	Reference	Conclusion
anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.		
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About stakeholder involvement		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	~~CAR 2~~ OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements checklist

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity					
A.1 Title of the project activity (VVM para 55-57)					
A.1.1 Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	☒ Clearly identifiable title of the project activity ☒ Version number of the PDD is included ☒ Date of the PDD is included.		OK
A.1.2 Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/ /34/	DR	☒ Yes		OK
A.2 Description of the project activity (VVM para 58-64 and VVM para 135 and 136 (a) & (c) for small-scale project activities, as applicable)					
A.2.1 How was the design of the project assessed?	/1/ /72/ /21/	DR	*What type is the project?* ☐ Project in existing facility or utilizing existing equipment(s) ☐ Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO_2e per year. In this case, a site visit must be performed. ☐ Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO_2e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical analysis.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				☐ The project is an individual small scale project activity with emission reductions not exceeding 15 000 tCO_2e per year. In this case, DOE may not conduct a physical site visit as appropriate. ☒ Greenfield project *How was the design of the project assessed?* ☒ Physical site inspection ☐ Reviewing available designs and feasibility studies Site visit was completed on 21 February 2012. All the 14 installations each of 1500 kW rating, which were commissioned and in working condition at the time of site visit were inspected.		
A.2.2	If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/ /21/ /12/ /72/	DR /I/	The SUZLON make S-82 type wind mills have been installed in Kurukkapalayam (1 x 1500 kW), Kozhumankuli (1 x 1500 kW), Kundadam (3 x 1500 kW), Nandavanampalyam (1 x 1500 kW), Nelalai (5 x1500 kW), Uthiyur (1 x 1500 kW) and Suriyanallur (2 x 1500 kW) villages of Tiruppur district in the state of Tamil Nadu. All the 14 x 1500 kW WTGs were found to have been installed and working.		OK
A.2.3	If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO_2e per year), justify the sampling through a statistical analysis:	/1/ /72/	DR	Not applicable; all project installations have been inspected; no sampling is involved.		OK
A.2.4	Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM	/1/	DR	Yes, the description is complete and covers all salient aspects of project activity.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	project activity?					
A.2.5	Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?		DR	No, this is a greenfield project		OK
A.2.6	Does the project design engineering reflect current good practices?	/1/ /59/ /44/	DR	The WTG is manufactured, supplied, installed and commissioned by Suzlon Energy Limited; installed capacity of the WTG is 1.5 MW and the model is S-82; it is type approved and is certified by the CWeT, Government of India and is listed as an approved model.		OK
A.2.7	Would the technology result in a significantly better performance than any commonly used technologies in the host country? Is any transfer of technology from any Annex-I Party involved?	/1/	DR	No transfer of technology from any Annex 1 country is involved. The installed capacity of the WTG is 1.5 MW. The project implementation would incentivise further attempts to exploit the renewable source of wind energy to generate power.		OK
A.3	**Participation requirements (VVM para 51-54, 125-127)**					
A.3.1	Do all participating Parties fulfil the participation requirements as follows:	/1/ /27/	DR	The CDM requirement of obtaining approval by the Designated National Authority of the host Party confirming voluntary participation of the PP in the project activity and its contribution to sustainable development is not fulfilled.	~~CAR 1~~	OK
		India (host)		County X / Country Y		
	a) Party has ratified the Kyoto Protocol	☒ Yes ☐ No		☐ Yes ☐ No / ☐ Yes ☐ No		
	b) Party has designated a Designated National Authority	☒ Yes ☐ No		☐ Yes ☐ No / ☐ Yes ☐ No		
	c) The assigned amount has been determined	☐ Yes ☐ No		☐ Yes ☐ No / ☐ Yes ☐ No		
A.3.2	Do the letters of approval meet the following requirements?		DR	HCA awaited	~~CAR 1~~	OK
		India (host)		County X / Country Y	~~CAR 1~~	OK
	a) LoA confirms that Party has ratified the Kyoto Protocol	☒ Yes ☐ No		☐ Yes ☐ No / ☐ Yes ☐ No		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
b) LoA confirms that participation is voluntary	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
c) The LoA confirms that the project contributes to the sustainable development of the host country?	☒ Yes ☐ No		NA NA		
d) The LoA refers to the precise project activity title in the PDD	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
e) The LoA is unconditional with respect to (a) to (d) above	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
f) The LoA is issued by the respective Party's DNA	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
g) The LoA was received directly by the DNA or the PP	☐ DNA ☒ PP		☐ DNA ☐ PP ☐ DNA ☐ PP		
h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic	No, DNV does not doubt the authenticity of the submitted document				
A.3.3 Have all private/public project participants been authorized by an involved Party?	/27/	DR	Host country approval awaited	~~CAR 1~~	OK
A.4 Technical description of the project activity (VVM para 58-64)					
A.4.1 Is the project's location clearly defined?	/1/ /52/	DR /I/	The project is located in Tiruppur district of the State of Tamil Nadu in India. The geographic coordinates of all the 14 project installations have been provided in the PDD and were verified during site visit. The installations are located in the region bounded in between the following geographical coordinates: 10^0 51' 9.5" N & 77^0 23' 57.6" E, 10^0 56' 12" N & 77^0 30' 22.5" E, and 10^0 54' 2.7" N & 77^0 30' 22.5" E		OK
A.5 Public funding of the project activity					
A.5.1 In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided an	/1/ /24/	DR /I/	No, no public funding is used for the project activity. The project is fully financed by PP from		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?			accumulated earnings; thus, it is a fully equity financed project.		
B Application of a baseline and monitoring methodology					
B.1 Methodology applied (VVM para 65-76 and VVM para 136 (b) for small-scale project activities, as applicable)					
B.1.1 Does the project apply an approved methodology and the correct and valid version thereof?	/1/ /29/	DR	The project applies "Approved consolidated baseline and monitoring methodology ACM0002" "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.1.0 The version of the methodology cited in the PDD is no longer available on the UNFCCC CDM website (http://cdm.unfccc.int)	~~CAR 3~~	OK
B.1.2 If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/	DR	EB 65, Meeting report, Clause 89, has been considered: "For all revised methodologies and tools that were approved by the Board at this meeting, the DOEs may upload not later than 25 July 2012 (24:00 GMT) for registration the project design documents (PDDs) of project activities in which the previous version of an approved methodology or an approved tool has been applied, in accordance with paragraph 36 of the "Procedure for the submission and consideration of requests for revision of approved baseline and monitoring methodologies and tools for large scale CDM project activities".		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.2	**Applicability of methodology (and tools) (VVM para 65-76)** *Insert a row for each applicability criteria of the applied methodology (and tools)*					
B.2.1	How was it validated that project complies with the following applicability criteria: The 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).?	/1/ /29/ /72/	DR	The project activity is installation of 14 x 1.5 MW WTGs for generation of power from wind energy to supply to the Southern grid and is a green field project defined by (a).		OK
B.2.2	How was it validated that project complies with the following applicability criteria: The project activity is the installation, 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;	/1/ /29/ /72/	DR	The project activity is a green field project that uses wind energy to generate electricity.		OK
B.2.3	How was it validated that project complies with the following applicability criteria: In the case of capacity additions, retrofits, replacements: 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.	/1/ /29/ /72/	DR /I/	The project activity is not one of capacity addition, retrofit or replacement. The newly installed and commissioned wind turbines were under operation at the time of site visit.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.2.4	How was it validated that project complies with the following applicability criteria: The methodology is not applicable to the following a) 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 b) Biomass fired power plants c) Hydro power plants that result in new reservoir or increase in existing reservoirs where the power density of the power plant is less than 4 W/m2	/1/ /29/	DR	The project activity does not involve fuel switch. Also it is neither a biomass fired power plant nor a hydropower plant. It involved installation and operation of wind power generators as could be confirmed during site visit.		OK
B.2.5	Is the selected baseline on of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/ /29/	DR	Project activity is installation and operation of a new grid connected renewable power generating unit and baseline chosen is appropriate for such projects as defined in section II of the methodology.		OK
B.3	**Project boundary (VVM para 78-80)**					
B.3.1	What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/	DR	The project boundary comprises of various components of the project activity such as the wind energy turbines, transformer yard, metering stations, connected sub-stations and all power plants physically connected to the Southern grid.		OK
B.3.2	Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/ /29/	DR	All 14 wind energy converters of this project along with the attendant transformers, evacuation system, sub-station, other non-project WTGs connected to the same sub-station, the system (Southern) grid and all the power plants connected to the Southern grid define the project boundary. In the baseline scenario, equivalent amount of power would have been sourced from the carbon intensive Southern grid and hence the baseline emissions consist of CO_2 emissions equivalent to		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the displaced electricity. In the project activity scenario, no emissions occur as power is generated by the conversion of renewable wind power. All these are correctly taken into account as per the selected methodology and accordingly described in the PDD.		
B.3.3 Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/ /12/ /29/	DR	No. The project activity is generation of electricity for supply to grid using wind energy and so does not involve any other emission source not foreseen by the methodology.		OK
B.4 Baseline scenario determination (VVM para 81-88, 105-107) *Ensure that the evaluation of all alternatives provided in the PDD and required by the methodology and also possible alternatives/offshoots of alternatives are discussed. Check that all alternatives required to be considered by the methodology are included in the final PDD. If baseline alternatives required to be considered by the methodology are considered not applicable, please assess the justification for this.*					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/ /29/	DR	As per the methodology, baseline for a new grid connected renewable power generating activity is clearly defined under section II. As the baseline is defined by the methodology which is applicable for the project under consideration, no alternatives need to be considered.		OK
B.4.2 How have the other baseline scenarios been eliminated in	/1/	DR	According to the methodology, there is only one		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	order to determine the baseline?	/29/		baseline scenario and this has been considered.		
B.4.3	What is the baseline scenario?	/1/ /29/ /42/	DR	The baseline applicable for a new, renewable energy based, grid connected power plant is specified by the methodology as being the "Electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system". The combined margin emission factor for the Southern grid, which is the system grid, has been sourced from CEA database version 6.		OK
B.4.4	Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/ /29/	DR	The identified baseline is as per the scenario defined by the methodology.		OK
B.4.5	Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /42/ /29/	DR	The grid considered is the regional grid comprising of grids serving the southern states of India, namely Andhra Pradesh, Tamil Nadu, Kerala, Pondicherry, Andaman & Nicobar \islands. This is in line with the EB guidance and is conservative. The baseline scenario is as per the selected methodology.		OK
B.4.6	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /57/	DR	Yes. National priority and sectoral policies encourage that renewable energy generation.		OK
B.4.7	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly	/1/ /29/	DR	The baseline determination is compatible with available data.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	referenced?	/42/				
B.4.8	Is the baseline determination adequately documented in the PDD? • All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. • All documentation is relevant as well as correctly quoted and interpreted. • Assumptions and data can be deemed reasonable • Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. • The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity	/1/ /29/ /42/	DR	The baseline determination is compatible with available data. • Assumptions used are listed in the PDD and the data are correctly referenced. • Quoted data are relevant and correct. • Assumptions are reasonable • Yes, national and sectoral circumstances are considered and listed in the PDD • The application of methodology is correct and identification of the scenario in the absence of project activity is reasonable.		OK
B.5	**Additionality determination (VVM para 94-121 and VVM para 137 for small-scale project activities, as applicable)**					
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/ /31/	DR	The "Tool for demonstration and assessment of additionality", Version 5.2, is used for assessing additionality, which is in line with the requirements of the applied methodology		OK
B.5.2	Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/ /31/	DR	The narrations given under STEP 1(a) and STEP 1(b) in the PDD are not in line with the requirements of the "Tool for the demonstration and assessment of additionality"	~~CAR 4~~	OK
B.5.3	Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /31/	DR	As in B.5.2	~~CAR 4~~	OK
B.5.4 B.5.5	What is the project additionality mainly based on	/1/ /14/	DR	The project additionality has been mainly based on investment analysis.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	(Investment analysis or barrier analysis)?	/15/ /17/				
	Prior consideration of CDM (VVM para 98-103)					
B.5.6	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/ /17/	DR	The approval note dated 6 June 2011 mentions that the project needs CDM revenues to make the project "financially viable" and to "initiate action to appoint a consultant to facilitate the CDM process---". Thus, this demonstrates that CDM revenues were seriously considered at the time of deciding to invest in the project implementation.		OK
B.5.7	If the starting date is after 2 August 2008 and before the global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?	/1/ /2/ /3/ /4/ /10/ /22/ /32/ /47/	DR	The starting date is 28 March 2011as evidenced by the copies of purchase orders submitted for verification, which is after 2 Aug 2008. The PDD was webhosted for global stakeholder consultation on 23 December 2011. The prior consideration of CDM revenues for project implementation is evidenced by the information provided by UNFCCC on its website confirming registration of such communication on 2 September 2011, which is within 6 months of the start date. Copies of information sent to the EB, UNFCCC and NCDMA in accordance with the requirements of the "Guidance on the demonstration and assessment of prior consideration of the CDM" have not been provided along with copies of acknowledgment of receipt of such information.	~~CL 1~~	OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	Investment analysis (VVM para 108-114) *The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation. All input parameters need to be assessed.*					
B.5.8	Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/ /12/	DR	Yes. The project activity generates revenue from sale of power to the grid and the same is mentioned in the PDD.		OK
B.5.9	Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/ /29/ /33/	DR	One of the alternatives to the project activity, namely continuation of status-quo, that is continuing to procure power from the grid, does not require investment.		OK
B.5.10	Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/ /33/	DR	The choice of benchmark analysis is appropriate as the baseline for the project activity does not require any investment.		OK
B.5.11	Is the benchmark/discount rate the latest available at the time of decision?	/1/ /14/ /15/ /60/	DR	Required return on equity on post-tax basis is considered as the benchmark. Please ensure that all available beta values at the time of decision making have been considered. Also review figures of risk free return rate used for investment analysis and ensure that all parameters considered for investment analysis should be for the same period. Further, the PDD states that levered beta values have been used to calculate cost of equity. Please provide justification for such use of levered beta instead of un-levering and re-levering the average unlevered beta for calculating cost of equity especially as this is an equity funded project.	~~CAR 9~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.12	What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?	/1/ /14/ /15/ /60/	DR	The post-tax equity IRR is the financial indicator. It is in correct correspondence with the benchmark chosen, that is, the required return on equity on post-tax basis.		OK
B.5.13	Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value	/1/ /14/ /15/	DR	(i) In the investment analysis spread sheet, references for the data shown is not provided; also, the value indicated against many of the parameters are without corresponding units. (ii) The table on page 15 of the PDD containing such assumptions also are not provided with corresponding references.	~~CL 2~~	OK
B.5.14	Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/ /14/ /19/ /33/ /50/ /60/ /61/	DR	Yes, the IT calculation takes into account depreciation. The period for depreciation accounting is done as per the normal accounting practice. It is seen that depreciation is charged on cost of land also and that the salvage value does not reckon the value of land at the end of life time of project. Justification and basis for claiming additional depreciation @ 20% has not been provided. Further, considering that the WTGs were commissioned on 30 Sep 2011, confirmation of correctness of charging of 50% depreciation is required. (i) Deduction under section 80IA of the IT Act is claimed for 11 years whereas the maximum number of years allowed as per the Act is only 10 Years. (ii) Income Tax calculation in year 2011-12 and 2012-2013 needs to be relooked into as only	~~CAR 8~~ ~~CAR 7~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				MAT will be payable in the event carry forward of losses are considered. The benefit of tax on business loss has been considered in one go in the year 2011-12 and not using the usual set off provisions of the IT Act. (iii) Eligibility for MAT has not been established; annual reports of the company confirming this may be provided; MAT paid can be claimed as credit in 10 subsequent years which has not been considered. (iv) Effective income tax rates MAT rates considered after 2011-2012 need to be justified by providing proper references; also, eligibility for MAT has not been established.		
B.5.15	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of operation?	/1/ /14/ /50/ /59/	DR	The investment analysis has been carried out for 20 years which is the lifetime of the project. It is seen that depreciation is charged on cost of land also and that the salvage value does not reckon the value of land at the end of life time of project.	~~CAR 8~~	OK
B.5.16	When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/	DR	Wind mills in India do not need a prior approval of the FSR. Thus, the basis for investment analysis is not derived from any FSR.		OK
B.5.17	How was the amount of output (e.g. sales of electricity) assessed? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VM paragraph 95.	/1/ /14/ /16/ /13/	DR	☐ The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval ☒ The plant load factor determined by a third		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				party contracted by the project participants (e.g. an engineering company) ☐ Other approach. The PLF is based on the wind resource assessment certificate issued by Power & Energy Consultants, a third party engineering consultant contracted by the PP. The PLF report issued by WinDForce Management Service Pvt Ltd (WFML) has been reviewed; in this regard, the following needs to be clarified : 1. The period for which the data is considered and its relevance along with the date of issuance of the report to be provided. 2. The basis for assumption of transmission loss has not been mentioned.	~~CL 4~~	
B.5.18	How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /14/ /12/ /33/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants The tariff for electricity exported to grid is based on the RERC tariff orders but the reference is incomplete. (i) In the investment analysis spread sheet, references for the data shown is not provided; also, the value indicated against many of the parameters are without corresponding units. (ii) The table on page 15 of the PDD containing such assumptions also are not provided with corresponding references.	~~CL 2~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.19	How were the investment costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95	/1/ /17/ /18/ /37/ /38/ /39/ /40/ /41/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project participants The investments cost estimate is based on the techno-commercial offer received by the PP from Suzlon Energy Limited. It has been verified and confirmed that all this data were available to the PP at the time of decision making. (i) In the investment analysis spread sheet, references for the data shown is not provided; also, the value indicated against many of the parameters are without corresponding units. (ii) The table on page 15 of the PDD containing such assumptions also are not provided with corresponding references.	~~CL 2~~	
B.5.20	How were the O&M costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /18/ /17/ /37/ /38/ /39/ /40/ /41/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants The assumed cost of O&M charges is compared with the techno-commercial offer received by the party which was available prior to the date of decision making and it was found tallying. PP has not provided and clarified the basis of	~~CAR~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				O&M charges, insurance costs, and overhead costs adopted and the annual increases considered for these.	~~6~~ ~~CL 2~~	
B.5.21	Describe the assessment of the other input parameters. Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /14/ /33/ /37/ /38/ /39/ /40/ /41/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants (i) In the investment analysis spread sheet, references for the data shown is not provided; also, the value indicated against many of the parameters are without corresponding units. (ii) The table on page 15 of the PDD containing such assumptions also are not provided with corresponding references.	~~CL 2~~	OK
B.5.22	Was the financial calculation spreadsheet verified and found to be correct?	/1/ /2/ /10/ /13/ /14/ /15/ /17/ /18/ /24/ /19/ /33/ /37/ /38/ /39/	DR	Various CL and CAR issues	~~CAR 6~~ ~~CAR 7~~ ~~CAR 8~~ ~~CAR 9~~ ~~CL 2~~ ~~CL 4~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
		/40/ /41/ /50/ /60/ /61/ /62/ /63/ /64/ /66/ /67/ /69/ /70/				
B.5.23	Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/ /2/ /3/ /4/ /5/ /6/ /7/ /8/ /9/ /10/ /11/ /12/ /14/ /15/ /17/ /18/	DR	Sensitivity analysis has been carried out by altering the following parameters in a range of ±10%: 1. PLF 2. Tariff 3. Investment costs 4. O&M Costs Sensitivity analysis has not been carried out to determine at what percentage of change of selected parameters does change in results occur and the probability of such an occurrence.	~~CAR 10~~	OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
		/13/				
B.5.24	Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/ /14/ /33/	DR	The range considered is in compliance with the "Guidelines on investment analysis"		OK
B.5.25	Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/ /2/ /3/ /4/ /5/ /6/ /7/ /8/ /9/ /10/ /11/ /12/ /14/ /15/ /17/ /18/ /13/	DR	Sensitivity analysis has not been carried out to determine at what percentage of change of selected parameters does change in results occur and the probability of such an occurrence.	~~CAR 10~~	OK
	Barrier analysis (VVM para 115-118)					
B.5.26	Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.	/1/ /14/ /33/	DR	Investment barrier is the sole barrier considered for demonstration of additionality.		OK
B.5.27	How were the investment barriers assessed to be real? Are the investment barriers substantiated by a source independent of the project participants?	/1/ /14/	DR	Insufficient returns on investment is presented as the investment barrier.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
		/33/				
B.5.28	How does CDM alleviate the investment barriers?	/1/ /14/ /33/	DR	The investment barrier is due to inadequate returns on the investment; the CER revenues will considerably mitigate the low returns.		OK
B.5.29	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/ /14/ /33/	DR	The alternative to project activity is baseline scenario and it can continue to prevail in the absence of project activity. The implementation of project activity is likely to remain unrealized without CDM incentives.		OK
B.5.30	How were the technological barriers assessed to be real? Are the technological barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable		OK
B.5.31	How were the barriers due to prevailing practise assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants?	/1/	DR	Not applicable		OK
B.5.32	How were the other barriers assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable		OK
Common practice analysis (VVM para 119-121)						
B.5.33	What is the geographical scope of the common practice analysis? Is this justified?	/1/ /31/ /45/ /46/ /53/ /54/ /57/ /71/	DR	The State of Tamil Nadu is the geographical scope considered. Regarding Common Practice analysis presented in the PDD, following needs to be completed: 1. PP to provide copy of Indian Wind Power Directory (or the relevant pages) from which the data has been sourced. 2. PP to confirm that all the web-links provided in the table are working. 3. PP to provide justification for having considered only the State of Tamil Nadu for	~~CL 3~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				carrying out the analysis. 4. PP to justify the cut-off date considered. 5. PP to justify the cut-off capacity (11-31 MW) proposed for consideration.		
B.5.34	What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has this been justified?	/1/ /31/	DR	Wind power projects in Tamil Nadu of 11-31 MW have been considered. This choice needs to be justified.	~~CL 3~~	OK
B.5.35	What is the data source(s) used for the common practice analysis?	/1/ /31/ /68/ /49/ /46/	DR	The Indian Power Directory and UNFCCC website are the data sources considered. Copy of the Indian Power Directory needs to be provided.	~~CL 4~~	OK
B.5.36	How many similar non-CDM-projects exist in the region within the scope?	/1/ /31/ /46/ /68/	DR	There are no other similar non-CDM projects.		OK
B.5.37	How were possible essential distinctions between the project activity and similar activities assessed?	/1/ /31/ /68/ /46/	DR	Please see B.5.32	~~CL 4~~	OK
B.5.38	What is the conclusion of the common practice analysis?	/1/ /46/ /68/	DR	That investing in non-CDM large scale wind projects is not a common practice in the State of Tamil Nadu.	~~CL 4~~	OK
Conclusion						
B.5.39	What is the conclusion with regard to the additionality of the project activity?	/1/ /31/ /33/	DR	Awaiting corrective actions and clarifications and can be concluded only after perusal of the same.	~~CAR 6~~ ~~CAR~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/14/ /46/ /68/			~~7~~ ~~CAR 8~~ ~~CAR 9~~ ~~CAR 10~~ ~~CL 2~~ ~~CL 4~~	
B.6 Calculations of GHG emission reductions					
Data and parameters that are available at validation and that are not monitored (VVM para 199-203)					
B.6.1 How was the EF $_{Grid,OM,y}$ (Operating Margin Emission Factor of Southern grid) available at validation verified?	/1/ /30/ /42/ /16/	DR	As per the procedure specified in the "Tool to calculate the emission factor for an electricity system", generation based weighted average for the three most recent years has been calculated to arrive at the Simple OM on ex-ante basis. The CEA CO_2baseline database, version 6, has been used for obtaining the OM for the Southern grid.		OK
B.6.2 How was the EF $_{Grid, BM,y}$ (Build Margin Emission Factor) available at validation verified?	/1/ /30/ /42/ /16/	DR	The CEA CO_2baseline database, version 6, has been used for obtaining the BM for the Southern grid. The BM emission factor calculation approach is in accordance with "Tool to calculate the emission factor for an electricity system". Option 1 of STEP 5 of the referred tool has been applied to calculate the BM for the first crediting period ex-ante. Accordingly, the value for the most recent information available is for 2009-2010 and the value indicated for the Southern grid in the database is 0.7634 tCO_2/MWh.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.6.3	How was the $EF_{Grid,y}$ (Combined Emission Factor for the Southern grid of India) available at validation verified?	/1/ /30/ /42/ /16/	DR	The CM has been calculated as the weighted average as per STEP 6 (a) of the "Tool to calculate the emission factor for an electricity system". Owing to its intermittent and non-despatchable nature, wind based power generation activities are allowed to use weightage factors of 0.75 for OM and 0.25 for BM throughout their crediting periods. These directions have been complied with and the CM has been calculated accordingly.		OK
Baseline emissions (VVM para 89-93)						
B.6.4	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /30/ /42/ /16/ /29/	DR	Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. Accordingly, baseline emissions have been estimated as the product of net electricity supplied to the Southern grid by the project activity per year and grid emission factor of the Southern grid; this is in accordance with equation (6) of the selected methodology. The CM for the system grid Southern grid has been calculated as a combination of Simple OM and BM by applying permitted weightage factors for wind power generation. The values for OM and BM are calculated and sourced based on data available from the official website of the Central Electricity authority (CEA) CO_2 Baseline Database - Version 6.0. Baseline emissions are equal to the product of power exported to the grid multiplied by the CM emission actor. The power likely to be exported to the grid is estimated on the basis of the Plant	~~CL 4~~	OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				Load Factor (PLF) certificate issued by a third party. The baseline emission calculations are in accordance with equation 6 of the selected baseline methodology and have been documented appropriately.		
B.6.5	Have conservative assumptions been used when calculating the baseline emissions?	/1/ /13/ /30/ /42/ /16/	DR	The emission factor has been sourced from the CEA database version 6; the User Guide to the database provides a detailed approach adopted for arriving at the various values in the published database. Section 4.5 of the User Guide lists out the various measures taken to ensure conservativeness. The other factor contributing to the calculation of baseline emissions is power exported to the grid which is estimated based on the PLF certifiate issued by a third party.	~~CL 4~~	OK
B.6.6	Are uncertainties in the baseline emission estimates properly addressed?	/16/ /30/ /42/	DR	Yes.		OK
	Project emissions (VVM para 89-93)					
B.6.7	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /29/	DR	Since the project activity is electricity generation from wind energy there is no project GHG emission and this complies with the methodology with respect to project emission computation.		OK
	Leakage (VVM para 89-93)					
B.6.8	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /29/	DR	This is not applicable as the project activity is electricity generation from wind energy. This is in compliance with the requirements of the methodology in this regard.		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
Emission Reductions (VVM para 89-93)					
B.6.9 Algorithms and/or formulae used to determine emission reductions: • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.	/1/ /29/ /16/ /30/	DR	All assumptions and data used are listed in the PDD and are properly referenced. Documents are correctly interpreted, values are reasonable, and the methodology has been correctly applied as detailed in above paragraphs. The estimate of emission reductions is presented in an MS Excel sheet with proper interlinking, algorithms and formula.		OK
B.7 Monitoring plan (VVM para 122-124)					
Data and parameters monitored					
B.7.1 Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/ /21/ /12/	DR	A schematic metering diagram /details clearly indicating the WTG, feeder to which connected, and details of meters installed, has not been included in the PDD. A table containing complete details giving the unique ID of the WTG, and connected meter details should be provided for proper understanding of the monitoring plan. Procedure adopted to calculate net amount of power exported based on above meter readings has not been provided. It is observed that the monitoring practices adopted at the site are not fully covered under the monitoring plan provided in the webhosted PDD which needs to be revised to be in line with methodology requirements and the actual site practices.	~~CAR 11~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.7.2	Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/ /12/ /21/ /29/ /30/ /42/ /51/	DR /I	The monitoring plan consists of measuring and / or measuring and calculating the following parameters: 1. $EG_{BL,Y}$ – Net electricity exported to the state electricity board by the project activity (calculated) 2. $EG_{EXPORT,Y}$ - Electricity exported to the state electricity board by the project activity (measured) 3. $EG_{IMPORT,Y}$ - Total electricity imported from the state electricity grid by the project activity (measured) The Combined Margin emission factor of the system electricity grid, the Southern grid, is calculated ex-ante and is fixed for the entire length of the crediting period. Thus, the monitoring plan contains all necessary parameters, method of measuring / calculating and is clearly described.		OK
B.7.3	In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/ /12/ /21/ /29/ /30/ /42/ /51/	DR /I	The project WTGs are connected to transformers and the output of the transformer is connected to the grid via metering equipment; all the meters are electronic tri-vector, bi-directional type, capable of measuring both export to the grid and import form the grid.		OK
B.7.4	In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/ /12/ /21/	DR /I	All meters installed for monitoring of the project activity are of 0.2s accuracy class.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
		/29/ /42/ /51/				
B.7.5	In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/ /12/ /21/ /29/ /42/ /51/	DR / I	The meters shall be tested for accuracy and calibrated once in three years with reference to a portable standard meter. The meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. Suzlon Infrastructure Limited is appointed as the operation and maintenance contractor for all the WTGs; the work description includes monitoring as per the plan described in the PDD. The O&M personnel are qualified engineers and are trained by Suzlon Infrastructure Limited. This was confirmed by DNV during site visit.		OK
B.7.6	Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/ /12/ /21/ /29/ /42/ /51/	DR / I	Power exported and imported to and from the grid are measured continuously and recorded on a monthly basis. Based on these readings, the net power exported to the grid by the project activity is calculated on a monthly basis and a report is provided by the regulatory authority to the PP. The power generated is measured continuously, recorded hourly and a monthly generation report is prepared.		OK
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/ /12/	DR / I	The recording frequency as described above is adequate, meets the methodology		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
		/21/ /29/ /42/ /51/		requirements, and permits accurate calculation of GHG emission reductions due to the project activity. The PP raises an invoice for the net exported quantity of power on a monthly basis which is used for counter checking the quantity of net power exported used for calculating GHG emission reductions. All the data are preserved for 2 years beyond the last verification period as stipulated by the methodology.		
	Ability of project participants to implement monitoring plan					
B.7.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/ /12/ /29/ /11/	DR	The PP is a listed company with a history of good management practices. The organization for monitoring is well defined and roles and responsibilities have been clearly stated. SISL is entrusted with the task of day-to-day monitoring activities as part of their O&M contract; SISL is already managing many such facilities and it can be expected that the monitoring plan as envisaged will be implemented and adhered to.		OK
B.7.9	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/ /12/ /29/ /11/	DR	Monthly generation data are provided by the O&M contractor in soft format to the PP which is stored. Monthly meter readings and statement of share of exported power issued by TNEB DISCOM is also archived by PP.		OK
B.7.10	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/ /12/ /29/	DR	The monitoring plan requires power exported to be monitored and the procedures established are adequate to cover this aspect.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
		/11/				
B.7.11	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/ /29/	DR	Yes, all records of data generation, net power exported, and corresponding invoices raised will be preserved for a minimum period of two years after the end of crediting period.		OK
	Monitoring of sustainable development indicators/ environmental impacts					
B.7.12	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	No, host Party (India) does not mandate monitoring of sustainable development indicators. Legislation in India does not mandate environmental impact studies to be conducted for wind based projects.		OK
B.7.13	Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	The Indian DNA requires developers of large scale projects to spend at least 2% of CER revenues for Sustainable Development including society/community development. A monitorable action plan has to be included in the PDD.	~~CL 5~~	OK
B.7.14	Are the sustainable development indicators in line with stated national priorities in the host country?	/1/ /27/	DR	No sustainable indicator has been defined by India. However, the contribution by the project activity to contribute to environmental, economic, technological, and social development is assessed by the Indian DNA prior to issuance of Host Country Approval as required under CDM modalities.	~~CAR 1~~	OK
C Duration of the project activity / crediting period						
C.1.1	**Start date of project activity (VVM para 99-100, 104)**					
C.1.2	How has the starting date of the project activity been determined? What are the dates of the first contracts for the	/1/ /3/	DR	The start ate of the project activity is indicated as 28 March 2011.	~~CL 6~~	OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	project activity? When was the first construction activity?	/6/ /10/		The basis for the reckoned start date of project activity is not clear. No documentary proof to establish the same has been provided.		
C.1.3	Is the stated expected operational lifetime of the project activity reasonable?	/1/ /18/ /59/	DR	The expected operational lifetime of the project is considered as 20 years. This is considered reasonable as TNERC also has considered 20 years as the life time of the wind power project activity in its tariff order. The offer for supply of equipment from Suzlon Electric Limited also mentions the life of equipment supplied by it as 20 years.	~~CL 2~~	OK
C.1.4	Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	The PP has chosen renewable crediting period of 7 years with the crediting period starting from 1 October 2012; it is also stated that crediting period shall not start before the date of registration. This is appropriate and reasonable.		OK
D Environmental Impacts (VVM para 131-133 and VVM para 136 (d) for small-scale project activities, as applicable))						
D.1.1	Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions that need monitoring?	/1/ /43/	DR	As per the Ministry of Environment and Forests (MoEF), Government of India, Environment Impact Notification S.O. 1533 dated 14 September 2006, read together with notification number S.O.695 (E) dated 4 April 2011, wind power projects are not covered under any schedule and thus environmental impact assessment is not required for the project activity.		OK
D.1.2	Does the project comply with environmental legislation in the host country?	/1/ /43/ /21/	DR	As per the present statutes no specific environmental clearances are required for wind energy based power generation projects in India.	~~CL 5~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				However, as a renewable energy project which is aspiring for CDM registration, the project is expected to abide by the requirements of the Indian DNA. Copies of clearance for the project installations from the State Electrical inspectorate and letters of commissioning have not been provided.	~~CAR 5~~	
D.1.3	Will the project create any adverse environmental effects?	/1/	DR	The project is one of wind energy based power energy generation and is not expected to create any adverse environmental effects.		OK
D.1.4	Have identified environmental impacts been addressed in the project design?		DR	Not applicable		OK
D.1.5	Has an analysis of the environmental impacts of the project activity been sufficiently described?		DR	Not applicable		OK
D.1.6	Are transboundary environmental impacts considered in the analysis?			Not applicable		OK
E Stakeholder Comments (VVM para 128-130)						
E.1.1	Have relevant stakeholders been consulted?	/1/ /20/	DR	Documents in respect of local stakeholder consultation meeting have not been submitted; following documents are required: 1. Copy of notice informing the stakeholders about the proposed meeting 2. Copy of attendance sheet at the meeting 3. Copy of minutes of meeting 4. List of concerns expressed and proposed action	~~CAR 12~~	OK
E.1.2	Have appropriate media been used to invite comments by local stakeholders?	/1/ /20/	DR	Pl see E.1.1	~~CAR 12~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
E.1.3	If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/ /20/	DR / I	There is no India specific requirement to carry out a local stakeholder consultation process for wind powered projects. The PP has conducted a local stakeholder consultation meeting.		OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/ /20/	DR	A summary of the local stakeholder comments is provided in the PDD.	~~CAR 12~~	OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/ /20/	DR	Pl see E.1.1	~~CAR 12~~	OK

Table 3 Resolution of corrective action requests and clarification request

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 1 The CDM requirement of obtaining approval by the Designated National Authority of the host Party confirming voluntary participation of the PP in the project activity and its contribution to sustainable development is not fulfilled.	A.3.1 A.3.2 A.3.3 A.7.14	The project proponent expects to receive the HCA shortly, and would forward the same once received from the DNA. The meeting with NCDMA was held on March 30th, 2012.	HCA reference no. 4/16/2012-CCC dated 14 September 2012 has been received; project title and PP's name is consistent with PDD; voluntary participation and contribution to sustainable development confirmed; CAR 1 is closed.
CAR 2 PP to provide response to the global stake holder comments received.	4.11 of this report	Comments received in global stakeholder process have been addressed in the following replies.	PP's responses to global stakeholder comments reviewed and found satisfactory. CAR 2 is closed.
CAR 3 The version of the methodology cited in the PDD is no longer available on the UNFCCC CDM website (http://cdm.unfccc.int)	B.1.1.	The version of the methodology has been revised to ACM0002 Version 12.3.0 and corresponding changes have been incorporated in the revised PDD.	Noted; ACM0002, version 12.3.0 is valid till 11 January 2013; CAR 3 is closed.
CAR 4 The narrations given under STEP 1(a) and STEP 1(b) in the PDD are not in line with the requirements of the "Tool for the demonstration and assessment of additionality".	B.5.2 B.5.3	The narrations given under STEP 1(a) and STEP 1(b) have been revised in line with the requirements of "Tool for the demonstration and assessment of additionality"	The revised submissions have been reviewed and found acceptable; CAR 4 is closed.
CAR 5 Copies of clearance for the project installations from the State Electrical inspectorate and letters of commissioning have not been provided.	D.1.2	State clearance and letters of commissioning are enclosed.	Letters of clearance and commissioning issued by the Tamil Nadu Generation and Distribution Corporation Limited have been received and verified /21/. CAR 5 is closed.
CAR 6 (i) PP has not provided and clarified	B.5.19 B.5.21	1. The O&M costs are considered based on the offer letter from Suzlon dated	The PP has removed administrative charges in the revised financial analysis;

	the basis of O&M charges, insurance costs, overhead costs adopted and the annual increases considered for these.	B.5.38	04/12/2010 (enclosed). Further the O&M agreement with Suzlon is enclosed. The O&M agreement does not cover insurance charges and administrative expenses which are paid separately by the project proponent 2. The insurance and overhead costs are assumed based on PP's past experience in implementing wind power projects. The evidence of insurance cost (costs incurred for previous projects) is enclosed. The overhead costs for the project are not being considered in the revised financial analysis	basis for insurance charges has been provided /25/ and verified; offer letter dated 4 December 2010 from Suzlon Energy Limited (SEL) /18/ has been verified and the offer for O&M charges has been noted; SEL has provided free O&M service for 2 years after commissioning and proposes to charge INR 1.425 million /WTG from 3rd year onwards; service taxes extra as applicable, rates of which have been confirmed /63/. CAR 6 is closed.
CAR 7 (i) (ii)	Deduction under section 80IA of the IT Act is claimed for 11 years whereas the maximum number of years allowed as per the Act is only 10 Years. Income Tax calculation in year 2011-12 and 2012-2013 needs to be relooked into as only MAT will be payable in the event carry forward of losses are considered. The benefit of tax on business loss has been considered in one go in the year 2011-12 and not using the usual set off provisions of the IT Act.	B.5.13 B.5.21 B.5.38	Deduction under section 80IA of the IT act has been claimed for 10 years in the revised IRR Income tax calculation for the year 2011-12 and 2012-13 has been revised accordingly The PP would like to clarify that the wind power project is owned by HZL and is not under SPV. Hence, MAT credit is not available for the project and the same has not been considered for financial analysis. Further, the IT and MAT rates considered for the year 2011-12 in financial analysis has been referred from source http://www.incometaxindiapr.gov.in/inc	(i) Verified and confirmed that IT holiday has been claimed from 2012-2013 to 2021-22 for a period of ten years which is line with the statutory requirements. (ii) The rates and rules for regular IT and MAT have been reviewed and confirmed (iii) Eligibility for MAT has been confirmed by verifying the certificate issued by Mahendra Pokhtrana & Co, Chartered Accountants /19/ (iv) Proper reference have ben provided for the sourced data regarding regular IT and

(iii) Eligibility for MAT has not been established; annual reports of the company confirming this may be provided; MAT paid can be claimed as credit in 10 subsequent years which has not been considered. (iv) Effective income tax rates MAT rates considered after 2011-2012 need to be justified by providing proper references; also, eligibility for MAT has not been established.		ometaxindiacr/contents/forms2010/pamphets/COMPANIES_2012_13.htm The effective tax rate paid by the company in FY 2011 was 13.75% , which is closer to the MAT rate and hence MAT is applicable for the company. The annual report is being provided as a proof of the effective tax rate.	MAT rates applied in the financial analysis. CAR 7 is closed.

CAR 8 It is seen that depreciation is charged on cost of land also and that the salvage value does not reckon the value of land at the end of life time of project. Justification and basis for claiming additional depreciation @ 20% has not been provided. Further, considering that the WTGs were commissioned on 30 Sep 2011, confirmation of correctness of charging of 50% depreciation is required.	B.5.13 B.5.14	1. Depreciation on cost of land is ignored and cost of land has been reckoned at the end of lifetime of project and is added in salvage value. 2. The additional depreciation is not being considered and the same has been revised in the financial analysis. 3. Considering that the WTGs are commissioned on 30 Sep 2011, rate of depreciation has been revised to 100%.	1. Revised IRR Excel sheet is verified to confirm that depreciation is not charged on land value. 2. Additional depreciation claimed earlier has been removed. 3. Rate of depreciation charged for the WTGs commissioned before September 2011 has been verified. 4. Salvage value arrived at has been verified to confirm that it includes residual value of equipment plus original value of land. CAR 8 is closed.
CAR 9 Please ensure that all available beta values at the time of decision making have been considered. Also review figures of risk free return rate used for investment analysis and ensure that all parameters considered for investment analysis are for the same period. Further, the PDD states that levered beta values have been used to calculate cost of equity. Please provide justification for such use of levered beta instead of un-levering and re-levering the average unlevered beta for calculating cost of equity especially as this is a equity funded project.	B.5.10 B.5.38	1. All available beta values of all the power sector listed companies have been considered for beta calculation at the time of decision making and the same has been incorporated in the revised benchmark analysis. 2. The risk free return rate has been revised and the source for the same has been mentioned 3. The beta values have been un-levered and the benchmark has been revised based on un-levered beta values. The screenshots from Capital Line Plus database for values used for the revised benchmark calculation are enclosed.	1. Beta values for 8 companies have been considered which has been verified; this has been considered for tabulating the benchmark and is found acceptable. 2. Returns on Government security for a period of 20 years has been correctly considered based on information available at the time of taking the investment decision. The reference of the same has been provided. 3. Unlevered beta values have been used for tabulating the benchmark of required return on equity; this is considered acceptable as this is a equity based project.

			CAR 9 is closed.

CAR 10 Sensitivity analysis has not been carried out to determine at what percentage of change of selected parameters does change in results occur and the probability of such an occurrence.	B.5.20 B.5.22 B.5.24 B.5.38	The extent of variation of key parameters which results in IRR reaching the benchmark has been included in section B.5 of the revised PDD	The variation required for hanging the results of investment analysis has been computed and the probability of occurrence of such an event has been incorporated into the revised PDD; CAR 10 is closed.
CAR 11 A schematic metering diagram /details clearly indicating the WTG and details of meters installed has not been included in the PDD. A table containing complete details giving the unique ID of the WTG, and connected meter details should be provided for proper understanding of the monitoring plan. Procedure adopted to calculate net amount of power exported based on above meter readings has not been provided. It is observed that the monitoring practices adopted at the site are not fully covered under the monitoring plan provided in the webhosted PDD which needs to be revised to be in line with methodology requirements and the actual site practices.	B.7.1	A schematic diagram and details of meters are included in the revised PDD. Details of unique ID of WTG and also the formulas used for calculation are updated in the revised PDD. Monitoring plan has been updated accordingly.	A schematic metering diagram is included in B.3 of the PDD. The correctness of the same has been verified against information collected during site visit /72/. Unique ID and HTSC numbers as mentioned in the commissioning certificate /21/ for each WTG has been incorporated in the revised PDD. Monitoring procedures in the revised PDD have been verified to confirm that they reflect the site practices accepted observed during site visit/72/. These are also found to meet the requirements of the methodology /29/. CAR 11 is closed.
CAR 12 Documents in respect of local stakeholder consultation meeting have not been submitted; following documents are required: 1. Copy of notice informing the stakeholders about the proposed meeting 2. Copy of attendance sheet at the	E.1.1 E.1.2 E.1.5	The stakeholder documents are enclosed.	1. Copy of advertisements appearing in local English and Tamil (local language) newspapers have been received and verified. 2. Copy of attendance sheet confirming the presence of members in the local stakeholder consultation meeting has been

meeting 3. Copy of minutes of meeting 4. List of concerns expressed and proposed action			received and verified. 3. Copy of minutes of meeting of the local stakeholder consultation is received; a list of concerns expressed has been reported in a summary given in the PDD. CAR 12 is closed.
CL 1 Copies of information sent to the EB, UNFCCC and NCDMA in accordance with the requirements of the "Guidance on the demonstration and assessment of prior consideration of the CDM" have not been provided along with copies of acknowledgment of receipt of such information.	B.5.6	Copies of information sent to the EB, UNFCCC and NCDMA in accordance with the requirements of the "Guidance on the demonstration and assessment of prior consideration of the CDM" are being provided along with copies of acknowledgment of receipt of such information	Copies of emails dated 2 September 2011 sent to EB, UNFCCC and NCDMA /22/ regarding the PP's plans to initiate the project activity have been received and verified; registration of prior consideration of CDM by the project activity on the UNFCCC CDM website has also been verified /47/. CL 1 is closed.
CL 2 (i) In the investment analysis spread sheet, references for the data shown is not provided; also, the value indicated against many of the parameters are without corresponding units. (ii) The table on page 15 of the PDD containing such assumptions also are not provided with corresponding references.	B.5.12 B.5.17 B.5.18 B.5.19 B.5.20 B.5.38	References for assumptions in the financial analysis have been incorporated and units of each of the parameters have been provided. Corresponding references are also added in the assumptions table in the revised PDD.	Proper and complete references have been provided both in the IRR MS Excel sheet and in the PDD; these also have been verified and found acceptable; CL 2 is closed.
CL 3 Regarding Common Practice analysis presented in the PDD, following needs to be completed: 1. Please provide copy of Indian Wind	B.5.32 B.5.33 B.5.34 B.5.35 B.5.36	1. The copy of the Indian Wind Power Directory is enclosed. 2. The web links provide in the table have been corrected 3. Every state has a different	1. Copy of Indian Wind Power Directory used by PP has been received; data sourced from this for proving that the project is not common practice has been

Power Directory (or the relevant pages) from which the data has been sourced. 2. Please confirm that all the web-links provided in the table are working. 3. Please provide justification for having considered only the State of Tamil Nadu for carrying out the analysis. 4. Please justify the cut-off date considered. 5. Please justify the cut-off capacity (11-31 MW) proposed for consideration.	B.5.37 B.6.5 B.6.6	regulatory regime, tariff structure, and investment climate for Wind power projects. Since the project activity is located in Tamil Nadu, common practice analysis is conducted considering wind power projects of similar capacity in the state of Tamil Nadu. 4. The data considered for the common practice analysis includes all projects commissioned up to March 2010. This is the latest data available to the project proponent at the time of investment decision. 5. The capacity variation of +/- 50% (i.e. from 10.5 MW to 31.5 MW) considered for common practice analysis is in accordance with the "Tool for the demonstration and assessment of additionality", Version 06.0.0	verified 2. Web-links which were not working have been suitably changed. 3. Justification for the cut-off date and for having considered Tamil Nadu as the applicable geographic region has been provided and is found acceptable. 4. With the change in the version of methodology, the applicable version of the tool /31/ has been changed to 6.0.0. Necessary changes to accommodate this change have been incorporated in the revised PDD which has been verified. CL 3 is closed.
CL 4 The PLF report issued by WindForce	B.5.16 B.6.4	The PLF report from Power & Energy Consultants applied for the investment	PP has submitted the PLF report from Power and Energy, third party

Management Services Pvt Ltd (WFML) has been reviewed; in this regard, the following needs to be attended: 1. The date on which the report was issued is not indicated and the relevance of the period for which the data is considered needs to be justified. 2. The basis for assumption of transmission loss has not been mentioned.	B.6.5	analysis is enclosed.	consultants for assessment of wind power potential at a given site. Power & Energy Consultants have considered 2% as "Losses on account of evacuation" under no. 10 table 7 of the wind resource assessment report. TNERC has permitted wheeling and transmission losses including line losses at 5% and hence consideration of 2% transmission loss is considered appropriate and acceptable. CL 4 is closed.
CL 5 The Indian DNA requires developers of large scale projects to spend at least 2% of CER revenues for Sustainable Development including society/community development. A monitorable action plan has to be included in the PDD.	B.7.13 D.1.2	The action plan for spending at least 2% of CER revenue for Sustainable Development is provided as Annexure.	The action plan by the management to earmark 5% of CER revues for sustainable development activities has been included in Annex 5 of the revised PDD. This is found acceptable. CL 5 is closed
CL 6 The basis for the reckoned start date of project activity is not clear. No documentary proof to establish the same has been provided.	C.1.1	The date of signing purchase order is considered as the start date of project activity. The date of signing of purchase order is 28th March 2011, as per the contract and the same has been considered as start date for the project activity. The purchase orders for the project activity are enclosed.	The basis for consideration of the start date of project activity has been stated in the revised PDD and documentary proof for the same has been submitted; these have been verified and it is confirmed that the first commitment to project activity was made on 28 March 2011 which has been correctly considered as the start date. CL 6 is closed.

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
No FAR is raised during this validation.		

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Seshan Ranganathan

Seshan Ranganathan, holds a Bachelor's Degree in Chemical Engineering and has done diploma course in Management and completed the graduate ship course in Industrial Engineering and has an overall working experience of around twenty six years. Prior to joining DNV has around twenty four years experience in Chemical process industry (fertilizer & petrochemical manufacturing) covering production, technical services including energy audits and efficiency studies, waste heat recovery, efficiency studies of boilers ,power plants , safety audits and pollution control activities including waste water treatment, project management, corporate planning, sales, logistics in fertilizer & petrochemical industry . With respect to the thermal power plant the job assignment included the monitoring of flue gas exit temperatures, excess air used efficiency of fuel additives, condition of boiler refractory, insulation of steam lines etc. The experience also includes 5 years in process design & engineering for chemical process industry.

He is qualified validator and verifier for CDM projects. He has completed the EMS lead auditor course. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in areas of (a) 1.1 Thermal energy generation from fossil fuels and Biomass including thermal electricity from solar (b) 1.2 Energy generation from renewable energy sources (c) 2.2 Heat distribution (d) 5.1/11.1/12.1 Chemical Processes Industries and (e) 13.1 Waste handling and disposal.

Komaranapura Venkatachar Sudarshan

K.V. Sudarshan holds a bachelors' degree in Chemical Engineering and has nearly 35 years industrial experience in manufacture of aromatic chemicals, use and recovery of solvents, bulk drugs and pharmaceuticals, agro chemicals and plasticizers. This vast experience gave him the unique opportunity to be conversant with process selection, efficiency, and optimum utilization of all inputs including utilities. During his working in industries, he has had exposure to all facets of industrial chemical production, including handling of hazardous chemicals, solid and liquid effluents, waste and waste water treatment. A certified EMS auditor, he has worked as a consultant to design, establish, implement and operate Environmental and Occupational Health and Safety management systems at large industrial houses such as Raymond Textiles, Reliance Energy Industries, Saint Gobain Crystals and Detectors and at State Government undertakings.

He has been associated with CDM since 2005 and has worked as a validator and verifier for various CDM and VCS project activities, both in India and abroad. The project activities assessed by him include renewable energy generation projects, waste handling including community bio-gas projects, and energy efficiency projects in process industries. He is a qualified CDM Verifier and his qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in areas of (a) 1.2 Energy generation from renewable energy sources and (b) 5.1/11.1/12.1 Chemical Processes Industries and (e) 13.1 Waste handling and disposal.

M.V.Srinivasan

M.V.Srinivasan is a Fellow Member of the Institute of Chartered Accountants of India and also a Management Accountant from Chartered Institute of Management Accountants (UK). He has over 18 years of professional experience in Industry in areas of finance, accounting and systems and 5 years of professional experience in areas of internal and systems audit. He has also completed training on "carbon Market Fundamentals" administered by Decatur Professional Development, LLC. His qualification, training and experience demonstrate his sufficient sectoral competence as Financial Expert.

Govindarajulu, Murali

Holds a Bachelor's Degree in Chemical Engineering and has done a Short term diploma course in Management. Having an overall experience of around twelve years. Prior to joining DNV having around seven years' experience in Chemical process industry covering production, energy efficiency improvement and equipment design erection and commissioning. His experience also covers the fields of environmental management and resource conservation including identification of alternative fuels. He has also been actively involved in implementation of Management Systems such as ISO 140001 and OHSAS 18001 standards in chemical process industry for more than three years.

He has experience of around 5 years in validation and verification of numerous CDM projects in DNV, both in India & abroad. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable energy sources.