



VALIDATION REPORT

“25.5 MW WIND ENERGY FARM AT NANDURBAR MAHARASHTRA BY HZL” IN INDIA

REPORT NO. 2012-0265

REVISION NO. 5

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 2012-04-17	ConCert Project No.: PRJC-340177-2011-CCS-IND
Approved by: Ole A. Flagstad	Organisational unit: DNV KEMA Energy & Sustainability Accredited Climate Change Services
Client: Hindustan Zinc Limited	Client ref.: Mr. Mr. B.L.Ahuja AGM(CDM Projects)

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Summary:

Project Name: 25.5 MW Wind Energy Farm at Nandurbar Maharashtra by HZL

Country: India

Methodology: ACM0002

Version: 12.3.0

GHG reducing Measure/Technology: Grid Connected renewable electrical energy generation-Wind power based (TA 1.2)

ER estimate: 42 912 tCO₂e 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 "25.5 MW Wind Energy Farm at Nandurbar Maharashtra by HZL" in India, as described in the PDD, version 04 of 12 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.: 2012-0265		Subject Group: Environment	
Report title: 25.5 MW Wind Energy Farm at Nandurbar Maharashtra by HZL in India			
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Work verified by: Murali Govindarajulu			
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<i>Table of Content</i>	<i>Page</i>
1 EXECUTIVE SUMMARY – VALIDATION OPINION	1
2 INTRODUCTION	
2.1 Objective	2
2.2 Scope	2
3 METHODOLOGY	
3.1 Desk review of the project design documentation	3
3.2 Follow-up interviews with project stakeholders	9
3.3 Resolution of outstanding issues	10
3.4 Internal quality control	12
3.5 Validation team	12
4 VALIDATION FINDINGS	
4.1 Participation requirements	13
4.2 Project design	13
4.3 Application of selected baseline and monitoring methodology	14
4.4 Project boundary	15
4.5 Baseline identification	15
4.6 Additionality	16
4.7 Monitoring	33
4.8 Algorithms and/or formulae used to determine emission reductions	37
4.9 Environmental impacts	38
4.10 Comments by local stakeholders	38
4.11 Comments by Parties, stakeholders and NGOs	39
Appendix A Validation Protocol	
Appendix B Curricula vitae of the validation team members	



Abbreviations

BM	Build Margin
BSE	Bombay Stock Exchange
CA	Chartered Accountant
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction(s)
CL	Clarification request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CUF	Capacity Utilization Factor
CWET	Centre for Wind Energy and Technology
DISCOM	Distribution Company
EB	CDM Executive Board
EAI	Energy Alternative India
EIA	Environmental Impact Assessment
FAR	Forward Action Request
DNA	Designated National Authority
DNV	DNV Climate Change Services AS
GBI	Generation Based Incentive
GHG	Greenhouse gas(es)
H	Hour
HZL	Hindustan Zinc Limited
INR	Indian Rupee
IPCC	Intergovernmental Panel on Climate Change
IREDA	Indian Renewable Energy Development Agency
IT	Income Tax
kWh	Kilo-watt hour
LoA	Letter of approval
MAT	Minimum Alternate Tax
MEDA	Maharashtra Energy Development Agency
MERC	Maharashtra Electricity Regulatory Commission
MNRE	Ministry of New & Renewable Energy
MoEF	Ministry of Environment and Forests
MSEDCL	Maharashtra state electricity Distribution Company
MW	Mega Watt
NCDMA	National CDM Authority
NEWNE	North East West North East
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
PLF	Plant Load Factor
PP	Project Participant

VALIDATION REPORT



SISL	Suzlon Infrastructure Service Limited
SPV	Special Purpose Vehicle
tCO ₂ e	Tonnes of CO ₂ equivalents
UNFCCC	United Nations Framework Convention on Climate Change
WTG	Wind Turbine Generator



1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed a validation of the project activity “25.5 MW Wind Energy Farm at Nandurbar Maharashtra 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 no Annex I Party is proposed. The Host Party fulfil the participation criteria and have approved the project and authorized the project participants M/s 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 involves generation of renewable energy by installing wind energy generators (WTGs), which will displace the electricity generation in the fossil fuel dominated NEWNE regional grid of India, thereby resulting in the reduction of GHG emissions(CO₂ 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 total emission reductions from the project are estimated to be on the average 42 912 tCO₂e per year over the selected 7 year 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.

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 “25.5 MW Wind Energy Farm at Nandurbar Maharashtra by HZL” in India, as described in the PDD, version 04, dated 12 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, 2012-12-26

Indrajit Rana
CDM Validator
DNV Bangalore, India

Ole A. Flagstad
Approver,
DNV Climate Change Services AS



2 INTRODUCTION

Hindustan Zinc Limited (HZL) has commissioned DNV Climate Change Services AS (DNV) to perform a validation of the 25.5 MW Wind Energy Farm at Nandurbar Maharashtra 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) /51/. The validation was based on the recommendations in the Validation and Verification Manual /50/

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 review 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 “25.5 MW Wind Energy Farm at Nandurbar Maharashtra by HZL” in India, Version 01 dated 06 January 2012 and the latest revised version 04, dated 12 September 2012
/2/	HZL: Chakala IRR_06-Jan-2012.xls, Version01, 6 January 2012 and the latest version Chakala IRR_12-September-2012.xls, version 4
/3/	HZL: HZL_benchmark.xlsx, Version01, 6 January 2012 and version 03 dated 19 July 2012
/4/	HZL: Communication with UNFCCC regarding prior consideration of CDM project activity dated 16 May 2011
/5/	UNFCCC: Acknowledgement from UNFCCC regarding prior consideration of CDM project activity dated 15 June 2011
/6/	HZL: Communication with NCDMA regarding prior consideration of CDM project activity dated 16 May 2011
/7/	NCDMA: Acknowledgement from NCDMA regarding prior consideration of CDM project activity dated 18 May 2011
/8/	Suzlon: Techno Commercial Offer for installation of 150 MW Wind Farm project in India SEL/DEL/HZL/MKT/2010-11, dated 4 December 2010 (inclusive of offer for operation and maintenance contract)
/9/	Suzlon : Technical data sheet for Suzlon S 82 Wind Turbine Generator which is included with the techno commercial offer dated 4 December 2010
/10/	HZL: Note for Approval for award of wind power project of 150 MW, dated 10 December 2010
/11/	MEDA: Infrastructure clearance for setting up 16.50 MW wind power Project ,village-Thanepada, District Nandurbar, ref –PGN-I/IC/Hindustan Zinc /16.50MW/2011-12/2899, dated 16 July 2011
/12/	MEDA: Infrastructure clearance for setting up 9 MW wind power Project ,village-Mandal, District Nandurbar, ref –PGN-I/IC/Hindustan Zinc /9MW/2011-12/3267, dated 17 August 2011
/13/	HZL & MSEDCL: Power Purchase Agreement between HZL and MSEDCL dated 7 October 2011



/14/	HZL: Contract for supply of Nacelle cover Gear Box, Asynchronous Generator, Control Cabinet, Hub, Rotor Blades for 17 nos. of Suzlon make S 82 WTGs, 1500 KW rating, between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/MAHARASTRA/001, dated 28 March 2011
/15/	HZL: Contract for supply of Tower for 17 nos. of Suzlon make S 82 WTGs, 1500 KW rating, between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/MAHARASTRA/002, dated 28 March 2011
/16/	HZL: Contract for supply of Transformer for 17 nos. of Suzlon make S 82 WTGs, 1500 kW rating, between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/MAHARASTRA/003, dated 28 March 2011
/17/	HZL: Contract for Unloading, Storage, Erection and Commissioning Service 7 nos. of Suzlon make S 82 WTGs, 1500 KW rating, between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/MAHARASTRA/004,dated 28 March 2011
/18/	HZL: Contract for supply of Electrical Items and Electrical Works for 17 nos. of Suzlon make S 82 WTGs, 1500 KW rating, between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/MAHARASTRA/005, dated 28 March 2011
/19/	HZL: Contract for Power Evacuation Works for 17 nos. of Suzlon make S 82 WTGs, 1500 KW rating, between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/MAHARASTRA/006, Dated 28 March 2011
/20/	HZL: Contract for Acquisition of Land and procuring necessary permission from the concerned statutory or Nodal agency for 17 nos. of Suzlon make S 82 WTGs, 1500 KW rating, between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/MAHARASTRA/007, dated 28 March 2011
/21/	HZL: Contract for Civil Works for 17 nos. of Suzlon make S 82 WTGs, 1500 KW rating, between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/MAHARASTRA/008, dated 28 March 2011
/22/	HZL: Contract for Operation and Maintenance Service for 25.50 MW(17 nos. of Suzlon make S 82 WTGs, 1500 KW rating), between HZL and Suzlon Energy Limited, Ref- HZL/PROJ/ORDER/2011-12/WPP/O&M/MAHARASTRA/001, dated 28 March 2011
/23/	MSEDCL :Permission Regarding commissioning of WTG (Sale Of Power), Ref. Comm/CP/Wind/ 26548, dated 30 August 2011
/24/	MSEDCL: Commissioning Certificate of New 1x1500 KW Suzlon make Wind Turbine Generetor of M/S Hindustan Zinc Limited at Location No. C-67, at Village Thanepada,Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-3937,dated 16 September 2011
/25/	MSEDCL: Commissioning Certificate of New 1x1500 KW Suzlon make Wind Turbine Generetor of M/S Hindustan Zinc Limited at Location No. C-37, at Village Mandal,Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-3936,dated 16 September 2011
/26/	MSEDCL: Commissioning Certificate of New 2x1500 KW Suzlon make Wind Turbine Generetor of M/S Hindustan Zinc Limited at Location No. C-26&C-27, at Village Vasdare,Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-04052,dated 30 September 2011
/27/	MSEDCL: Commissioning Certificate of New 1x1500 KW Suzlon make Wind Turbine Generetor of M/S Hindustan Zinc Limited at Location No. C-19, at Village



VALIDATION REPORT

	<i>Akhatwade, Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-04014, dated 22 September 2011</i>
/28/	<i>MSEDCL: Commissioning Certificate of New 1x1500 KW Suzlon make Wind Turbine Generator of M/S Hindustan Zinc Limited at Location No. C-18, at Village Akhatwade, Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-3935, dated 16 September 2011</i>
/29/	<i>MSEDCL: Commissioning Certificate of New 1x1500 KW Suzlon make Wind Turbine Generator of M/S Hindustan Zinc Limited at Location No. C-04, at Village Akhatwade, Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-3934, dated 16 September 2011</i>
/30/	<i>MSEDCL: Commissioning Certificate of New 1x1500 KW Suzlon make Wind Turbine Generator of M/S Hindustan Zinc Limited at Location No. C-03, at Village Akhatwade, Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-04013, dated 22 September 2011</i>
/31/	<i>MSEDCL: Commissioning Certificate of New 3x1500 KW Suzlon make Wind Turbine Generator of M/S Hindustan Zinc Limited at Location No. C-28, C-29, C-30 at Village Gangapur, Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-3761, dated 13 September 2011</i>
/32/	<i>MSEDCL: Commissioning Certificate of New 1x1500 KW Suzlon make Wind Turbine Generator of M/S Hindustan Zinc Limited at Location No. C-20, at Village Akhatwade, Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-3765, dated 13 September 2011</i>
/33/	<i>MSEDCL: Commissioning Certificate of New 1x1500 KW Suzlon make Wind Turbine Generator of M/S Hindustan Zinc Limited at Location No. C-05, at Village Akhatwade, Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-3764, dated 13 September 2011</i>
/34/	<i>MSEDCL: Commissioning Certificate of New 3x1500 KW Suzlon make Wind Turbine Generator of M/S Hindustan Zinc Limited at Location No. C-02, C-06, C-07, at Village Akhatwade, Taluk and District – Nandurbar, Ref –SE/NDBR/Tech No.-3760, dated 13 September 2011</i>
/35/	<i>HZL: Minutes of CDM Stake Holder Meeting and photographs of Local stakeholders meeting at Suzlon CMS Shanimandal, Chakla site, dated 20 October 2011</i>
/36/	<i>HZL: Attendance sheet CDM Stake Holder Meeting at Suzlon CMS Shanimandal, Chakla site, dated 20 October 2011</i>
/37/	<i>SUZLON : Public notice for Local Stake holder consultation, dated 8 October 2011</i>
/38/	<i>HZL : Invitation letter to local stake holder for stakeholder consultation meeting</i>
/39/	<i>MSEDCL : Sample Joint Meter Reading (JMR) for the month of March 2012</i>
/40/	<i>MSEDCL : Sample Credit Note for the month of March 2012</i>
/41/	<i>POWER AND ENERGY CONSULTANTS: Wind resource assessment of proposed 25.5 MW Wind Power Project at Chakala, District Nandurbar, Maharashtra for Hindustan Zinc Limited, Report No.-PEC/WRA/HZL/05, dated 26 December 2011 (Third Party PLF Report)</i>
/42/	<i>Nyati Mundra and Company, Chartered Accountant: CA certificate towards cost incurred in the project activity dated 30 May 2012</i>



/43/	HZL: <i>Insurance Document available at the time of decision making for other projects of HZL- Policy schedule from the Oriental Insurance Company for the period 17/08/2010 to 16/08/2011</i>
/44/	IREDA: <i>Letter from IREDA to HZL , regarding Registration of Wind Farm project for availing Generation based incentive (GBI) – Allotment to unique identification numbers to WTGs (For 25.5 MW capacity project at Nandurbar district), Dated 21 November 2011</i>
/45/	HZL: <i>Communication with MOEF regarding monitorable action plan for expenditure of 2% CER Revenue towards sustainable development</i>
/46/	HZL: <i>Emission Reduction spread sheet :Chakala ER calculations19-July 2012</i>
/47/	HZL: <i>Common practice analysis spread sheet : Common practice analysis chakala 3-August 2012</i>
/48/	HZL: <i>Emission factor calculation spread sheet: Emission factor calculation (CEA version 7) 19-July 2012</i>

3.1.2 Letters of approval

/49/	MoEF (DNA of India): <i>Host Country Approval to “25.5 MW Wind Energy Farm at Nandurbar Maharashtra by HZL”, ref- No.4/6/2012-CCC, dated 11 October 2012.</i>
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3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

/50/	CDM Executive Board: <i>Validation and Verification Manual, version 1.2</i>
/51/	CDM Executive Board: <i>Baseline and monitoring methodology “Approved consolidated baseline and monitoring methodology”, ACM0002, Version 12.3.0</i>
/52/	CDM Executive Board: <i>Tool to calculate the emission factor for an electricity system, Version 2.2.1</i>
/53/	CDM Executive Board: <i>Tool for the demonstration and assessment of additionality, Version 6.0.0</i>
/54/	CDM Executive Board: <i>Guidelines on the demonstration and assessment of prior consideration of the CDM, version 04 and registration of prior CDM consideration for this project activity on 2 September 2011 available at http://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html</i>
/55/	CDM Executive Board: <i>Guidelines on the assessment of investment analysis, Version 05: Annex 5 of EB 62</i>
/56/	CDM Executive Board: <i>Glossary of CDM terms, version 05</i>
/57/	CDM Executive Board: <i>Guidelines for completing the Project Design Document(CDM-PDD), version 07</i>
/58/	CDM Executive Board: <i>Guidelines for reporting and validation of Plant Load Factors, version 01</i>
/59/	CDM Executive Board: <i>Webhosting of project PDD for global stakeholder consultation from 10 February 2012 to 10 March 2012 https://cdm.unfccc.int/Projects/Validation/DB/BN70H0KER9GB6Y0BPJB3Q4IBIXK7C/view.html</i>



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

/60/	CEA: CO ₂ Baseline Database for the Indian Power Sector. Version 7, Date: January 2012 http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm (last assessed on 8 August 2012)
/61/	MoEF: Requirement of Environment Impact Assessment (EIA) studies, dated 14 September 2006, http://envfor.nic.in/legis/eia/so1533.pdf (last assessed on 8 August 2012) Government gazette notification no. S.O. 3067 (E) dated 1 December 2009, http://moef.nic.in/downloads/rules-and-regulations/3067.pdf (last assessed on 8 August 2012)
/62/	Centre for Wind Energy Technology: List of models and manufacturers of wind turbines, possessing valid type approval and certificate, Ref. No.C-WET/S&C/RLMM/2011-12/23, dated 22 June 2011 http://www.indianwindpower.com/pdf/rlmm_list2011.pdf (last assessed on 8 August 2012)
/63/	MNRE: "Policies for development of renewable energy in India", Ministry of New & Renewable Energy, Government of India, http://www.indiaenergyportal.org/viewPolicies.php?id=PO1&theme (last assessed on 8 August 2012) MNRE : Renewable Energy Regulatory Framework http://mnre.gov.in/information/renewable-energy-regulatory-framework
/64/	Indian Electricity Act, 2003 and its amendments, http://www.powermin.nic.in/acts_notification/electricity_act2003/pdf/The%20Electricity%20Act_2003.pdf (last assessed on 8 August 2012) Central Electricity Authority: Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006. http://www.powermin.nic.in/whats_new/pdf/Metering_Regulations.pdf (last assessed on 8 August 2012)
/65/	MERC:Determination of Generic Tariff under Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2010, dated 14 July 2010
/66/	Bombay Stock Exchange: Vintage Data for Market return and beta calculation (Data for all the indices of BSE used in benchmark calculation, viz. BSE Sensex, BSE 100 and BSE 200 can be found from the BSE website, under indices tab and the historic data for each index) http://www.bseindia.com/index_op.htm (last assessed on 8 August 2012)
/67/	Money Control : Publicly available source for calculation of beta value http://www.moneycontrol.com (last assessed on 8 August 2012)
/68/	Reserve Bank of India : Interest Rate for Government security Bond "Month-end Yield to Maturity of SGL Transaction in Central Government Dated Securities for Various Residual Maturities" , dated 9 December 2010 http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=11808 (last assessed on 8 August 2012)



/69/	Wind Power Directory :Wind power Directory 2010
/70/	MEDA web-site: <i>Data on site wise wind power installation in Maharashtra</i> http://www.mahaurja.com/PG_WE_Overview.html (last assessed on 8 August 2012)
/71/	MNRE : <i>Data on Installed biomass power plant in Maharashtra</i> http://www.mahaurja.com/PDF/PG2_bagase_Projcomm.pdf (last assessed on 8 August 2012) http://www.mahaurja.com/PDF/Biomass_Proj_StatusC.pdf (last assessed on 8 August 2012)
/72/	MNRE : Information on installed solar projects in Maharashtra http://mnre.gov.in/file-manager/UserFiles/powerplants_241111.pdf (last assessed on 8 August 2012)
/73/	Energy Alternatives India.: Data on Tidal energy and geo thermal energy project in India http://www.eai.in/ref/ae/oce/oce.html http://www.eai.in/ref/ae/geo/geo.html (last assessed on 8 August 2012)
/74/	Indian Income Tax Act 1961: <i>Depreciation as per Indian Income Tax Act</i> http://law.incometaxindia.gov.in/DIT/File_opener.aspx?page=ITRU&schT=rul&csId=2f13c0bd-dec4-4df6-a273-431e3b91a01b&rNo=&sch=&title=Taxmann%20-%20Direct%20Tax%20Laws (last assessed on 8 August 2012)
/75/	Indian Income Tax Act 1961: <i>Applicable Income tax and MAT rate</i> http://www.incometaxindiapr.gov.in/incometaxindiapr/contents/forms2010/pamphlets/COMPANIES_2012_13.htm (last assessed on 8 August 2012)
/76/	Indian Companies Act 1956 : <i>Depreciation as per Indian Companies Act</i> http://asa-india.com/asa/Depreciation%20Rates%20Companies%20Act.pdf (last assessed on 8 August 2012)
/77/	MNRE: <i>Documents related to Generation Based Incentive for wind power project</i> http://mnre.gov.in/file-manager/UserFiles/faq_wind.pdf (last assessed on 8 August 2012)
/78/	Tariff Advisory Committee: General rules and regulation for Insurance of equipment's against fire dated 31 March 2001: http://iib.gov.in/IRDA/tac/tariffs/AIFT2001.pdf (last assessed on 26 September 2012)
/79/	CRISIL: CRISIL advisory service report to CERC on "Cost of Capital for Central Sector Utilities", dated April 2000 http://www.cercind.gov.in/rep1304.pdf
/80/	CDM Meth Panel :AM_CLA_0170 on "GUIDELINES FOR THE REPORTING AND VALIDATION OF PLANT LOAD FACTORS"

Main changes between the version of the PDD published for the 30 days stakeholder commenting period and the final version of the PDD submitted for registration:

- The version of the methodology has been updated to ACM0002, version 12.3.0, which is latest available one during webhosting of the PDD.
- Tool for the demonstration and assessment of additionality, Version 6.0 has been applied, which was available in the UNFCCC CDM website during webhosting of the PDD and applied as per provision of paragraph 88 of EB 65 Meeting Report.



- Tool to calculate the emission factor for an electricity system, Version 2.2.1 has been applied and updated in the revised PDD.
- CEA database version 7 has been used in the revised PDD for Emission factor calculation, which was latest available at the time of commencement of validation (webhosting of the PDD).
- CER calculation has been revised as per the revised emission factor.
- Details on of benchmark calculation has been done in line with EB 62, Annex 5 and updated in the revised PDD.
- Revision in sensitivity analysis in line with the requirement of Tool for the demonstration and assessment of additionality, version 6.0.
- Provision for monitoring the net electricity generation in order to calculate baseline emission has been formalized.
- Detailed chronology for CDM consideration in line with the requirement of Guidelines on the demonstration and assessment of prior consideration of the CDM version 04.
- The Start date of crediting period has been reasonably revised from 1 June 2012 to 1 December 2012
- Other changes related to the CAR's and CL's identified in the DNV's draft validation report.

3.2 Follow-up interviews with project stakeholders

On 20 March 2012 DNV visited the wind farms located at Nandubar district of Maharashtra, and performed interviews with project stakeholders.

/81/	Date	Name	Organization	Topic
	2012-03-20	Aditya Bharadwaj	E&Y, Consultant	• Project baseline • CDM prior consideration. • Applicability criteria • Additionality issues • Project design, IRR analysis, • Monitoring and verification procedure • Review of the stakeholder consultation process. • Common practice analysis
		Vishnu Khandelwal	Electrical. Engineer, HZL	
		Prakash Sonar	OMS, Section-in-charge	
		Ravindra Choudhari	Project Manager -OMS	
		Rout V.A	Engineer-, OMS	
		Hiralal Vibhandik	Engineer (OMS)	• Documentation review
		Mohon Thakre	Senior Engineer (OMS) Station Superintendent (MSEDCL)	



	Rane Rahul V	OMS :SS	
	Jitendra Gujrathi	Local Stakeholder	
	Dhires	Local Stakeholder	
	Kailash Kapade	Local Stakeholder	
	Bapa Pakil	Local Stakeholder	

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 "25.5 MW Wind Energy Farm at Nandurbar Maharashtra 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 applicable 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. FARs shall not relate to the CDM requirements for registration.

The validation identified 11(eleven) CARs, 7 (seven) CLs. No FARs has been raised in this validation. All the CARs and CLs were satisfactorily addressed by the project participants by among other revising the PDD (please refer to Appendix A for further details).



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



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

Role	Last Name	First Name	Country	Type of involvement						
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.2 competence	Financial expertise
Team leader (Validator)	Rana	Indrajit	India	✓	✓	✓	✓		✓	
Assessor under training	Prabir	Sarkar	India	✓	✓	✓			✓	
Expert	Parasuraman	A	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 04 dated 12 September 2012.

4.1 Participation requirements

The project participants are Hindustan Zinc Limited of host Party of India meet all relevant participation requirements. No project participant from an Annex I Party has yet been identified. The host Party India meets all the requirements for participating in a CDM project. A letter of approval (LoA) was issued by Ministry of Environment and Forests (DNA of India) on 11 October 2012 (Ref.No.04/6/2012-CCC) /49/authorizing M/s Hindustan Zinc Limited 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 letter of approval and DNV considers the letter is in accordance with paragraphs 45- 48 of the VVM /50/

No public funding from an Annex I Party is involved in the project 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

4.2 Project design

The project activity involves installation of 25.5 MW wind power project consisting of 17 Wind Turbine Generators (WTGs) of individual capacity of 1.5 MW at Akhatwade, Gangapur, Vasdara, Mandal, Thanepada villages in Nandurbar District of Maharashtra in India. All the 17 WTGs have been commissioned in between 2 September 2011 and 29 September 2011 /24/-/34/. All the WTGs in the project have been supplied by Suzlon Energy Limited, who is also responsible for the operation, maintenance and management of the project. The technology used in the project activity is indigenously available in India and there is no transfer of technology envisaged.

The geographical coordinates of project extends between latitude 21°15'06"N and 21°18'10"N and longitude 74°16'10"E and 74°19'33"E.

The electricity generated from the wind farm will be exported to the NEWNE grid and sold to the state electricity utility thereby marginally contributing to reducing the energy demand supply gap in the state of Maharashtra. The project activity generates electricity using wind energy, which does not result in any greenhouse gas (GHG) emissions. Thus, this project activity will lead to a reduction in GHG emissions that would otherwise have occurred when using electricity generated from conventional fossil fuel dominated sources in the NEWNE Grid. The proposed project is expected to generate 45 033 MWh electricity per annum, which will displace equivalent electricity generation in grid connected power plants (as discussed in section 4.8

DNV validated the accuracy of the project description through a combination of steps consisting of review of documents, site visit and interview of the project participant and their



representatives' /81/. The start date of the project activity has been identified as 28 March 2011, which is the date of purchase orders /14/-/22/ related to the project activity. All purchase orders related to the project activity were issued on 28 March 2011 and thus confirmed to be the first real action towards the project activity. Hence DNV could confirm that the selected start date of 28 March 2011 to be appropriate. Infrastructure clearances from Maharashtra Energy Development Agency (MEDA) /11//12/ and commissioning certificates for all the WTGs /24/-/34/ confirm that the project activity is a Greenfield project in the state of Maharashtra. The electricity generated from the project activity will only be exported to the state grid in line with the PPA /13/. The lifetime of the project activity is 20 years, which is verified from the technical specification provided by Suzlon /9/. As Suzlon is the manufacturer and technology supplier of WTGs, the lifetime of project provided by them is reasonable and accepted by DNV. The project has selected a renewable crediting period with a length of first crediting period of 7 years. The selected start date of the crediting period is 1 December 2012 or on the date of registration of the CDM project activity, whichever is later. The project is expected to result in 42 912 tCO₂e emission reductions per annum over the crediting period /1/.

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.

4.3 Application of selected baseline and monitoring methodology

The project activity correctly applies the approved baseline methodology ACM0002 version 12.3.0 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"/51/. The applicability of this methodology is justified as:

- The purchase orders /14/-/22/ for the WTGs and physical verification at site /81/ indicate that the project activity involves installation of WTGs and therefore is a renewable energy project. The purchase orders also indicate that the WTGs are new and are not transferred. Further the proposed project activity is the installation of a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity, which are evident from infrastructure clearances from MEDA /11//12/ and commissioning certificates provided by MSEDCL /24/-/34/ for the project activity. Thus it could be checked that the project is a Greenfield project.
- The grid connectivity was verified through PPA /13/, samples of monthly generation record (also known as the Joint Meter Reading) /39/, generation break-up sheets (Credit note provided by MSEDCL) /40/ and physical connection to the grid at site. As per CEA database /60/ Maharashtra falls under the NEWNE grid, the geographic and system boundaries of which are clearly identified and information on the characteristics of the grid is available.
- Physical verification at site and interview with project participants and local stakeholders /81/ indicate that it is not an add up of a renewable and non-renewable component and only WTGs are involved in the project activity and the capacity is 25.5 MW, which falls above the threshold limit of 15 MW and hence classifies as large scale. The project falls under Type I Renewable energy projects, Electricity generation for a system.



The project activity being a renewable wind energy generation project, the rest of the applicability conditions as mentioned in the applied methodology ACM0002 version 12.3.0 do not apply to this project activity.

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 the revised PDD /1/ and Table 2 of the validation protocol in Appendix A to this report.

4.4 Project boundary

The project activity supplies electricity to the Maharashtra state electricity grid which forms a part of the NEWNE region electricity grid, and the baseline for this project activity is a function of the generation mix of the NEWNE region grid. The selection of the NEWNE region grid as the grid system boundary for the project activity is in line with the EB guidance for large countries such as India. The spatial extent of the project boundary is assessed through the description in the PDD and the grid structure in India as known from the official data available from the Central Electricity Authority (CEA) /60/. The project activity boundary therefore includes the project activity WTGs and all power plants connected physically to the North East West North East (NEWNE) electricity grid of India that the CDM project power plant is connected to.

	<i>GHGs involved</i>	<i>Description</i>
Baseline emissions	CO ₂	The major emission source. The GHG emission reduction is achieved by displacing the electricity generated by fossil fuel based power plants in the north east west and north- eastern regional grid of India.
Project emissions	No project emissions	NA
Leakage	No leakage	NA

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

DNV assessed the baseline identified by the project participant using the provisions of the applied methodology. As per the applied methodology ACM0002, version 12.3.0, the baseline for a new grid connected renewable power plant /unit (Greenfield project) which describe the project activity is defined as *'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"'*.



Project participant has used the official published data; CEA database for calculating operating and build margin emission factors /60/. The version of the data used is Version 7, which was the latest version available on the commencement of validation (webhosting date of the PDD). This data is published by Central Electricity Authority (CEA), who is the sole authority for the publication of such data in India. This data is based on Version 2.2.1 of the 'Tool to calculate the emission factor for an electricity system'; which is the latest version of the tool at the time of commencement of validation. Hence the CEA database can be used for the calculations of emission factor in line with the requirement of the applied methodology. The project participant has applied weight factors for the OM and BM [75% & 25% respectively] as specified in the tool to arrive at the emission factor for the combined margin. As the project activity falls under the boundary of NEWNE grid /60/, data for NEWNE grid has been considered. The years considered for OM are 2008-09, 2009-10 and 2010-11 and for the BM it is 2010-11. Accordingly, the combined margin emission factor for the NEWNE grid has been calculated as 0.9529 tCO₂/MWh.

DNV Confirms that the combined margin (CM) emission factor has been calculated in line with the 'Tool to calculate the emission factor for an electricity system' which states "*For grid power plants, use 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*" /52/. DNV also confirms that the combined margin emission factor for NEWNE grid of India is fixed *ex-ante* for the entire crediting period of the project activity.

DNV confirms that the approved baseline methodology ACM0002, version 12.3.0 has been correctly applied to identify a complete list of realistic and credible baseline scenarios, 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 revised PDD /1/. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.

4.6 Additionality

The project activity is a large scale activity and additionality of the project has been established using the "Tool for the demonstration and assessment of additionality", version 06.0 /53/. The additionality is demonstrated by carrying out investment analysis

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

DNV's assessment on the selected start date of the project activity:

Project participant provided copies of all the purchase orders /14/-/22/ for the project activity.. All the purchase orders for the project activity were issued on the same day, on 28 March 2011. Any civil work or transmission network can only be started after the placement of purchase order for the wind turbines. Accordingly 28 March 2011 has been accepted as the start date of the project activity.



Since the start date of the project activity is after 02 August 2008, the serious consideration of CDM for the project activity was assessed in line with “*Guidelines on the demonstration and assessment of prior consideration of the CDM*,” version 04 /54/;

DNV verified the communications made by the project participant to the Indian DNA and UNFCCC secretariat on 16 May 2011 /6//4/. Since the intimation to both the entities was done within 6 months from the project activity start date, DNV concluded that CDM was seriously considered in the decision to implement the project activity. DNV further reviewed the confirmation mail from the UNFCCC vide email dated 15 June 2011 /5/ and from the Indian DNA vide email dated 18 May 2011 /7/. DNV also verified the communication made by the project participant to the UNFCCC as available on the CDM website <https://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html> and observed that the communication was made on 16 May 2011.

Additionally, the validation team also verified the copy of the Note for Approval by HZL for award of wind power project of 150 MW, dated 10 December 2010 /10/ which describes the discussion of investing in the wind power projects across various states of India, including the proposed project activity (25.5 MW at Chakala site, Maharashtra) and further discusses the financial non-viability of the project activity without CDM revenues. Based on the above, the validation team confirms that revenue from CDM was a decisive factor in the decision to proceed with the project activity. DNV verified the evidences for all the events listed in the chronology under Section B.5 of the revised PDD. It is seen the project participant had initiated real action in parallel to the implementation of the project activity. All the activities from the start date of the project activity, viz; placement of the purchase order for the Wind Turbine Generator (WTG) dated 28 March 2011 /14/-/22/ until the date of webhosting of the PDD for global stakeholder comments dated 10 February 2012 have been completed within a period of one year. Hence adequately meets the requirements as mandated by the “*Guidelines on the demonstration and assessment of prior consideration of the CDM*”, Version 04, EB 62, Annex 13 /54/. DNV verified the originals of all the documents as mentioned in the chronology of events in Section B.5 of the PDD and observed them to be correct.

It is DNV’s opinion that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM /54/.

4.6.2 Identification of alternatives to the project activity

Two alternatives to the project activity have been identified and discussed:

- i) The project activity without CDM benefits and
- ii) Continuation of current scenario, in this case that an equivalent amount of electricity would have been generated by the operation of grid connected power plants and by the addition of new generation sources in the absence of the project activity. Both alternatives are in compliance with the laws and regulations of India and might be considered as baseline scenarios.

Both the identified alternatives are consistent with current laws and regulations /64/ as potential alternatives and thus will be discussed at the next steps. DNV considers the listed alternatives to be credible and complete.

4.6.3 Investment analysis

Choice of approach

The project participant has chosen benchmark analysis for demonstrating the additionality of the project and the post-tax equity IRR of the project activity has been selected as financial indicator. The alternative of continuation of the current scenario does not involve any



investment and the project generates revenues by selling the power to the grid apart from revenues from CDM and hence the choice of benchmark analysis to demonstrate additionality is considered appropriate /55/.

Benchmark selection

The project participant has chosen benchmark analysis to demonstrate additionality of the project and post-tax equity IRR has been selected as the financial indicator. As the project activity is 100% equity financed, hence equity IRR is deemed suitable financial indicator. As per “Guidelines on the assessment of investment analysis” Annex 5 of EB 62 “In cases where benchmark approach is used, the applied benchmark shall be appropriate to the type of IRR calculated. Required/expected returns on equity are appropriate benchmarks for equity IRR” /55/. Since equity IRR has been selected as the financial indicator, Return on Equity (ROE) or Cost Of Equity (COE) has been chosen as the benchmark for the project activity. Therefore the benchmark selected is appropriate to financial indicator chosen and is also in conformity with the EB guidance provided. Return on equity is calculated as per Capital Asset Pricing Model (CAPM). Each of the parameters used in calculation of CAPM was verified for their appropriateness.

- Risk free rate has been sourced from Interest rate of government security Bond: “Month-end Yield to Maturity of SGL Transaction in Central Government Dated Securities for Various Residual Maturities”, published by Reserve Bank of India /68/ which was available at the time of investment decision and hence acceptable. Average risk free rate of 8.43% is taken as per interest rate on Central Government securities from Reserve Bank of India for a term of maturity of 20 years, which is comparable with the project life time.
- The market return is been arrived based on compounded annual growth rate (CAGR) during the period January 1991 to November 2010 of the stock index of Bombay Stock Exchange (BSE) /66/. DNV confirms that for calculation of CAGR for all the index a historic data vintage of 20 years has been used to make it comparable with the project life time. BSE-500 index was not considered, as the data vintage available (This index was incepted in the year 1999) for this index is not comparable with the lifetime of the project activity. For calculation of market return BSE 200 index is selected. The market return based on BSE 200 data is 15.87% and the market risk premium is 7.44% (15.87% – 8.43%) DNV confirms that the market return considered, based on BSE 200 data (15.87%) is conservative as market return values derived from other BSE index, namely BSE Sensex (16.19%), BSE-100 (16.37%) are higher /66/. Hence DNV accepted the value of 15.87% for market return from the BSE 200 data as conservative and appropriate.
- Market risk premium is calculated as the difference between the market return and the risk free rate. The value arrived as 7.44% (15.87% – 8.43%) /3/
- As explained in the PDD, the beta value for the project type is based on beta values of power generating companies in India and listed on the stock exchange at the time of investment decision for a minimum period of 5 years. In this regard DNV verified the CRISIL advisory service report to CERC on “Cost of Capital for Central Sector



Utilities” /79/ which indicates that, a complete CAPM formula based review of the cost of equity is suggested to be undertaken every five years. In view of this, beta value and debt: equity ratio value of the listed power companies for the period of 5 years has been accepted by DNV. The data for calculating beta values has been sourced from the BSE website /66/. DNV has verified the same and found to be correct. DNV confirms that the selection of the company for calculating beta have been appropriately done, taking only power generating company listed in the index for more than 5 year. The value of the average equity beta (levered beta) has been arrived as 1.3670 for BSE 200 index. The validation team along with financial expert involved in the team confirms that the calculations of average equity beta (levered beta) are correct.

- Data of debt and equity and effective tax rates has been sourced from audited financial statements of respective companies available on www.moneycontrol.com which is a publicly available source. The links for each company have been provided in the benchmark analysis spread sheet. DNV has verified the same and found to be correct.
- The average unlevered beta (asset beta) of the power sector companies has been calculated as per the following formula:
- Asset beta = Equity beta / [1+ (1- Tax) x (debt / equity)] /3/. The value of average asset beta of power sector companies is 0.9211 as per BSE 200 /3/. The value of average asset beta of 0.9211 was found conservative it was also compared with the average asset beta derived from the BSE Sensex data (0.9703), BSE-100 data (0.9304).
- The ROE has been calculated as per the following formulae /1/:

$$ROE = R_f + \text{Beta} \times (R_m - R_f)$$
 Where,
 ROE – Required return on equity
 R_f – Risk free rate
 R_m – Market returns in power sector
 Beta – Asset Beta
- The Return on equity calculated as per above formula and the value comes 15.29% as per BSE 200 index. Again the value of ROE considering BSE 200 index is conservative as it was also compared with ROE derived from BSE Sensex data (15.96%) and BSE 100 data (15.82%).

The validation team, along-with the financial expert engaged in the team also verified the correctness and authenticity of the data used for the benchmark calculation and found them to be correct and publicly available. This is also in line with the guidelines for benchmark selection stipulated in the “Guidance on the Assessment of Investment Analysis”, version 5 EB 62 Annex 5 /55/. Hence DNV has accepted the same.



Input parameters

DNV has validated each input parameters used for IRR calculation against respective sources. The table below provides a detailed assessment of validation for the same.

The decision to proceed with the project activity was based on the offer from Suzlon /8/ which was used for the note for approval for implementation of the project activity /10/. DNV witnessed the Note for Approval /10/, which indicates that HZL initially sought offer from various suppliers. Suzlon only provided the techno commercial offer for the proposed project activity and due to capacity constraints of others suppliers in supplying the desired capacity wind mill in financial year 2010-11, no techno commercial offer was submitted. Thus only Suzlon's offer was considered for note for approval and in the financial analysis /8/. Finally purchase order and work orders for the project activity were issued on 28 March 2011 /14/ - /22/. Hence all the input parameters used for IRR calculation presented in the PDD have been sourced from the supplier's quotation for the project activity. DNV has cross checked the all the input parameters with the purchase orders and work orders issued by the PP for the project activity. PLF value has been sourced from third party wind assessment report. The electricity tariff is sourced from MERC order dated 14 July 2010. DNV is of the opinion that the input values used in the investment analysis are appropriate. The detail assessment is mentioned in the following table:

Parameter,	Value	Source of information	Validation justification
Project Capacity,	25.5 MW	Note for approval for Wind power project of 150 MW /10/.	The project capacity is as per the discussion in the Note for Approval and cross verified from the purchase order raised for the project activity /14/-/22/. In the note for approval HZL decided to implement 6 wind farms in different location of India. The project is one of the wind farms among the 6 wind farms.
Number of machines,	17	Techno Commercial Offer from M/s Suzlon India Limited dated 4 December 2010 /8/.	The number of machines is cross verified from site visit /81/, purchase orders /14/-/22/ and also from infrastructure clearances /11/-/12/ and commissioning certificates /24/-/34/.

VALIDATION REPORT



Parameter,	Value	Source of information	Validation justification
Total project cost (inclusive of land cost)	INR 1558.70 million	Techno Commercial Offer from M/s Suzlon India Limited dated 4 December 2010 /8/.	The project cost is taken from proposal from supplier M/s Suzlon India Limited /8/ which reflects the project cost applicable at the time of decision making. The cost is indicated to be INR 91.687 million per Wind Turbine Generator. Therefore cost for 17 machines is INR 1558.70 million. This is as per paragraph 6 of “<i>Guidelines on the Assessment of Investment Analysis</i>” version 05 (EB 62 Annex 5) /55/. This was cross verified from the actual purchase order raised towards the project activity /14-/22/. Again the total cost incurred towards the project activity is verified from the certificate provided by independent Chartered accountant /42/. DNV confirms that the values found in both documents are matching with the assumption taken for this parameter.
PLF(CUF),	24.67%	Techno Commercial Offer from M/s Suzlon India Limited dated 4 December 2010 (24.67%) /8/ Third party PLF Study report prepared by M/s Power and Energy Consultants, dated 26 December 2011(20.16%) /41/.	At the time of decision making the Equity IRR was calculated based on guaranteed generation estimate given in the offer letter /8/. This works out to a PLF value of 24.67%, which is evident in the Note for Approval of HZL /10/ to proceed with the project activity. This is in conformance with paragraph 6 of “<i>Guidelines on the Assessment of Investment Analysis</i>” version 05 (EB 62 Annex 5) DNV further noted that PP has contracted an independent third party to determine PLF value, which is determined in line with the requirements specified in



Parameter,	Value	Source of information	Validation justification
			<i>“Guidelines for reporting and validation of Plant Load Factors,”</i> version 01 in EB 48, Annex 11 /58/. The third party PLF has been determined on 26 December 2011 (post decision making date) /41/. In this regard DNV has referred the subsequent clarification given by meth panel (AM_CLA_0170) on “GUIDELINES FOR THE REPORTING AND VALIDATION OF PLANT LOAD FACTORS” Annex 11, EB 48, /80/ for similar type of project, which indicates “It is with this background that the project activities are required to determine the PLF in a credible manner. Therefore, all CDM project activities that require determination of the PLF, for renewable energy power plants, should follow the guidelines provided by the EB on this matter using either of the options available in the document, i.e. (3a) or (3b).” Again As the project activity under consideration is a 100 % equity financed project, thus identical with the project activity considered in AM_CLA-170, hence option 3(a) is not applicable. In this regard Meth panel has also clarified that <i>“In the particular case presented by the project proponents, there seems to be no evidence of a constraint for project proponents to use option 3(b). It is considered that project proponents would have mandated a feasibility study before starting the project, and</i>



Parameter,	Value	Source of information	Validation justification
			<i>this feasibility study would have formed the basis for the investment decision together with the CDM consideration. In the case that such feasibility study uses a PLF that was not provided by an independent third party, the project proponents are required to document the PLF used for the investment decision, and obtain the PLF again provided by an independent third party. Project proponents can contract an independent third party to determine the PLF even after the start of the operations of the renewable energy project under consideration.”.</i> In line with above clarification PLF study report has been prepared by an independent third party M/s Power and Energy Consultants /41/ for the project and the PLF is stated to be 20.16%. Thus based on the two PLF values: • Techno Commercial Offer from M/s Suzlon India Limited dated 4 December 2010 /8/. The value is 24.67% • Third party PLF Study report prepared by M/s Power and Energy Consultants, dated 26 December 2011 /41/. The value is 20.16% Higher value 24.67% has been considered as conservative one. DNV has accepted the value of PLF as input parameter derived from the offer letter for computation of the post-tax equity IRR.



Parameter,	Value	Source of information	Validation justification
Insurance charges	INR 0.10 Million	Insurance costs incurred in previously commissioned wind power projects (Policy schedule from the Oriental Insurance Company for the period 17 August 2010 to 16 August 2011) /43/.	The insurance charges considered from the previously paid premium on similar type project by HZL, at premium rate of 0.11% of total capital cost based on policy document Oriental Insurance Company for the period 17 August 2010 to 16 August 2011), /43/, PP has used the same percentage of premium rate on total asset value of WTG and which comes around INR 0.10 Million/ WTG. DNV found these reasonable and valid at the time of investment decision, thus accepted by DNV. DNV has cross checked the insurance charges considered for investment analysis against the charges prescribed by Tariff Advisory Committee “guidance on general rules and regulations for insurance”/78/ and found the value prescribed by Tariff Advisory Committee is 0.15% of capital cost; hence the insurance charge considered by project proponent for investment analysis is reasonable

VALIDATION REPORT



Parameter,	Value	Source of information	Validation justification
O&M Cost from 2nd year onwards (excluding service tax of 10.3%)	INR 1.425 Million per WTG	The O&M cost is based on the offer letter from M/s Suzlon Energy limited limited/8/	The O&M cost indicated in the offer letter of M/s Suzlon Energy Limited dated 4 December 2010 /8/ is INR 1.425 million per Wind Turbine Generator (WTG) per annum from the 2nd year onwards with an annual escalation of 5% over the previous year's up to the 10th year. The O&M cost therefore deduces to 1.55% of the capital cost. The value reflects the O&M cost applicable at the time of decision making. This is as per paragraph 6 of "<i>Guidelines on the Assessment of Investment Analysis</i>" (EB 62 Annex 5) and hence accepted by DNV. Again it is cross checked with the actual O&M agreement signed between HZL & Suzlon Infrastructure and service Limited (SISL) /22/, dated 28 March 2011 and found all the values in line with the assumption taken. Hence accepted by DNV

VALIDATION REPORT



Parameter,	Value	Source of information	Validation justification
Escalation in O&M cost,	5% from the 3rd year onwards	Offer letter from M/s Suzlon Energy Limited dated 04 December 2012 /8/.	The Escalation in O&M cost indicated in the offer letter of M/s Suzlon Energy Limited dated 4 December 2010 /8/ is 5% over the previous year's up to the 10th year. The value reflects the Escalation rate in O&M cost applicable at the time of decision making. This is as per Paragraph 6 of <i>"Guidelines on the Assessment of Investment Analysis"</i> (EB 62 Annex 5) and hence accepted by the validation team. Again it is cross verified with the actual O&M agreement signed between HZL & Suzlon Infrastructure and service Limited (SISL) /22/, dated 28 March 2011 and found all the values in line with the assumption taken. Hence accepted by DNV



Parameter,	Value	Source of information	Validation justification
Power Tariff	INR 4.41/kWh	MERC Tariff Regulation dated 14 July 2010 /65/	This is the applicable tariff order for the state of Maharashtra at the time of the investment decision. Paragraph 3 of the tariff order indicates the power tariff for wind zone 2 as INR 4.41/kWh. This was valid at the time of investment decision. The mentioned tariffs order was available and valid at the time of decision making, hence accepted by DNV. Again DNV cross checked the tariff from actual power purchase agreement signed between HZL and MSEDCL, dated 7 October 2011 /13/. The PPA indicates the tariff of INR 4.67 per kWh and fixed for 13 years. PP has subjected the tariff to sensitivity analysis and DNV confirms that the tariff indicated in the PPA falls within the range of +10% and the IRR comes out with that tariff is much below the benchmark (i.e.-13.57%). As the tariff is fixed for 13 years there is no possibility of increase of tariff. DNV further noted that the an increase in tariff of 20% with respect to input value, taken from MERC tariff order (INR4.41/ kWh) will cross the benchmark, which is very unlikely to happen for the remaining 7 years of life time of the project activity, as MERC has calculated the tariff on the basis of levelized cost for the lifetime of the project activity, which is unlikely to increase to the extent of 20%.



VALIDATION REPORT

Parameter,	Value	Source of information	Validation justification
Generation based incentive (in INR/kWh), applicable to wind power projects with cap of 6.2 Million INR/MW	0.5 INR/kWh	Incentive provided by Ministry of new and renewable energy sources for wind energy projects /77/.	Ministry of new and renewable energy sources, government of India offers two types of incentives for wind power projects, project activity can claim any one out of these two: a) 80% accelerated depreciation under the Income Tax Act b) Generation based incentives (GBI) of 0.5 INR/kWh with cap of 6.2 Million INR/MW of installed capacity. This 6.2 Million INR/MW can be claimed in a period not less than 4 years and a maximum period of 10 years. The project activity has applied for generation based incentives and it has been verified by DNV that project proponent can avail only under one scheme as project proponent have to intimate first to Ministry about the option opted and ministry have procedure in place to track that project can avail benefit under one scheme only. DNV further confirmed PP's registration to GBI scheme from the letter from IREDA to HZL regarding registration of wind farm project dated 21 November 2011 /44/.



Parameter,	Value	Source of information	Validation justification
Debt to Equity ratio; 0:100		Note for Approval for award of wind power project of 150 MW /10/.	The Note for approval indicates that the project activity would be funded by equity alone. Further DNV has cross verified this from the certificate given by independent chartered accountant /42/, where it is stated that the project activity is entirely financed from the internal accruals of Hindustan Zinc Limited. In the note for approval HZL decided to implement 6 wind farms in different location of India. The project is one of the wind farms among the 6 wind farms.
Income tax depreciation rate on WEGs	7.69%	The depreciation rate considered was based on the Income Tax act /74/.	DNV has verified from the income tax act that the depreciation rate applied is in line with Income Tax Act 1961 of India.
Book depreciation rate (as per straight line method) on all assets	5.28%	As per the Companies Act 1956 /76/.	As per the Companies Act 1956.
Corporate Tax	33.39%	As per Indian Income Tax Act 1961 /75/.	As per Indian Income Tax Act 1961.
Minimum Alternative Tax	19.93%	As per Indian Income Tax Act 1961 /75/.	As per Indian Income Tax Act 1961.

Calculation and conclusion

The IRR calculations and assumptions provided in a spreadsheet /2/ are consistent with source of the data verified and the calculations were checked and found to be in line with EB's guidance on investment analysis /55/. DNV hereby confirms that project participant has applied all the statutory levies and taxes as per the then valid tax rules. In the IRR calculation 10% salvage value have been considered at the end year of IRR analysis exclusive of land cost, which DNV confirms in line with the *Guidelines on the assessment of investment analysis*, Version 05: EB 62, Annex 5. The assumptions used in the calculations were deemed to be correct and have been verified by DNV. The post-tax equity IRR of the project over 20 years is 11.75% which is less than the benchmark ROE of 15.39%.



Sensitivity analysis

A sensitivity analysis has been carried out for parameters contributing to more than 20% to revenues or costs to check the robustness of the financial analysis. Reasonable variations of the capital cost, plant load factor, operation & maintenance costs and electricity tariff were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen.

Decrease in capital cost: The total project cost considered for sensitivity analysis was based on Techno commercial offer provided by Suzlon Energy Limited, dated 4 December 2012 /8/. With a decrease in investment cost by 16% (from the cost considered in the techno commercial offer provided by Suzlon Energy Limited available at the time of decision making) the equity IRR exceeds the benchmark value of 15.29%. However in DNV's opinion a decrease of 16.0% in capital cost is unrealistic as the purchase order is already placed and the actual cost of the project is evident from the independent chartered accountant's certificate /42/, which is matching with the assumption value. Hence any decrease in capital cost is not realistic.

Increase in electricity tariff: The electricity tariff considered for sensitivity analysis was based on the MERC "*Determination of Generic Tariff under Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2010*", dated 14 July 2010" /65/ applicable at the time of investment decision, where tariff is indicated for wind zone 2 as 4.41 INR/kWh. However, DNV has verified from the actual power purchase agreement signed dated 7 October 2011 with Maharashtra State Electricity distribution Company limited (MSEDCL), that the applicable tariff rate for the project activity is 4.67 INR/kWh without any escalation and is fixed for 13 years /13/, while putting the value indicated in PPA the IRR works out to 10.82%, which is much below the applied benchmark value (15.39%). The IRR value remains below the benchmark by an increase of tariff of 20%. With an increase of 20.2% in electricity tariff the equity IRR exceeds the benchmark value of 15.39%. However, in DNV's opinion an increase of 20.2% in electricity tariff is highly unlikely as the power purchase agreement for the project activity is already signed for the project and the tariff is fixed for 13 years without any escalation. For the remaining 7 years also the increase is very unlikely as the MERC tariff is calculated based on levelised cost for the lifetime of the project activity.

Increase in plant load factor: With an increase in PLF by 20% with respect to assumption value, (i.e- 24.46%, based on Techno Commercial Offer provided by M/s Suzlon India Limited dated 4 December 2010) the equity IRR exceeds the benchmark value of 15.39% (at 29.60% PLF). More over the PLF value calculated in line with "*Guidelines for reporting and validation of Plant Load Factors*," version 01 in EB 48, Annex 11 /58/ by third party comes out to 20.16%, which is below the value taken in input parameter for investment analysis (viz 24.46% derived from techno commercial offer from supplier. Hence an increase of 20% in PLF with respect to assumption value to achieve a PLF of 29.60% is highly unlikely.

Decrease in O&M Cost: Even with no O&M costs the equity IRR for the project activity is 13.71%, which is lower than the benchmark return. Hence this parameter is not sensitive for the project activity.



4.6.4 Barrier analysis

No other barriers have been discussed as the project is financially not attractive...

4.6.5 Common practice analysis

In India different states has different Regulatory commissions and different tariff structure for the power sector /63/. Hence it can be stated that in India different states are having different investment climate. Project participant has selected the state of Maharastra as a geographical boundary. DNV is also in the opinion that this is justifiable and in line with the guideline laid in *“Tool for the demonstration and assessment of additionality”* (Version 06.0.0)/53/. In paragraph 5 of the guideline it is stated that *“Project participants may provide justification that the applicable geographical area is smaller than the host country for technologies that vary considerably from location to location depending on local condition”*. Again in Paragraph 9 it is mentioned *“Different technologies in the context of common practice are technologies that deliver the same output and differ by at least one of the following”*, wherein investment climate is one of the criteria.

Hence DNV accepts the geographical boundary identified by the project participant as appropriate.

The Project participant has provided the following key information for common practice analysis

- The applicable output range has been identified as 12.75 MW to 38.25 MW. It is calculated based on +/- 50% of the proposed project activity capacity (i.e.- 25.5%)
- PP has identified all type of power plants (including renewable and non-renewable) that deliver the same output or capacity, within the applicable output range as mentioned above and have started commercial operation before the start date of the project. Again calculated their number and represented as N_{all} . Registered CDM project activities shall not be included in this calculation
- The value of N_{all} computed as 37
- Further N_{diff} is calculated by considering technologies different that the technology applied in the proposed project activity, which is identified in N_{all} calculation (as per guidance provided in paragraph 9 of the additionality tools). And the value comes as 37
- Thus $N_{all} - N_{diff} = 0$
- Next PP has Calculated factor $F=1- N_{diff} / N_{all}$, representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity. The factor comes as 0.

In this regard PP has sourced the data from CEA data base version 7/60/, Wind power Directory 2010/69/, MNRE web site/71//72/ web site of MEDA/70/, Energy Alternative India (EAI)/73/ database

DNV confirms that the common practice analysis is carried out in line with the requirement laid in Paragraph 47 of the additionality tool Version 06.0.0. DNV has validated the common practice as follows:



- Data on installed capacity of thermal, hydro, nuclear power plant are sourced from CEA data base version 7 /60/, for biomass based power plant and solar plant it is sourced from the website of MNRE /71//72/. The installed capacity of wind power project was sourced from Wind power directory 2010 /69/ and web site of MEDA /70/. The tidal energy project data is sourced from EAI /73/. DNV has verified all the data and confirms that data sources are authentic in Indian context, publicly available and covers all the information applicable till the date project start date. Again DNV confirms that PP has correctly identified the power plants of applicable output range from these sources. Thus $N_{all} = 37$
- While analysing the similar projects using similar technology PP has considered only power plants installed by single private investors. DNV found it justified as the project participant is an individual private investor in wind power project and the investment climate faced by them would be similar to any other single private investors for power projects. DNV has verified the data from wind power directory 2010/69/ and website of MEDA/70/, which provides detailed list of wind projects installed by private sector investor.
- During the calculation it was found that within the identified geographical area and applicable output range, there are four wind power projects which are not registered as CDM projects / under validation. However project participant has considered that these wind power projects apply different technology from the project activity in the context of common practice based on the guidance provided in paragraph 9 (Investment climate in the date of the investment decision) of the additionality tool/53/

The details of the wind power projects excluded are given below :

(1) **Bharat Forge Limited:** Bharat Forge Limited has a cumulative installation of 15.93 MW installed in the state of Maharashtra with the following commissioning dates:/69/

- September 1998 (2.07 MW)
- March 2000 (6.9 MW)
- March 2002 (4.2 MW)
- March 2001 (2.76 MW)

The entire capacity of 15.93 MW was commissioned before June 2003 (enactment of the Electricity Act 2003). /64/

(2) **GI Windfarms Limited:** GI Windfarms Limited has a cumulative installation of 21 MW commissioned on March 2001 in Maharashtra./69/ The entire capacity of 21 MW was commissioned prior to June 2003 (enactment of the Electricity Act 2003).

(3) **Nishkalp Investment and Trading:** Nishkalp Investment and Trading has a cumulative installation of 20.95 MW in Maharashtra with the following commissioning dates:/69/

- March 2000 (3.5 MW)
- September 2000 (11.2 MW)
- March 2001 (5.25 MW)
- March 2002 (1.0 MW)



The entire capacity of 20.95 MW was commissioned prior to June 2003 (enactment of the Electricity Act 2003).

(4) **Tata Finance Limited:** Tata Finance has a cumulative installation of 21.95 MW in Maharashtra with the following commissioning dates:/69/

- March 2000 (7.35 MW)
- September 2000 (3.5 MW)
- March 2001 (10.1 MW – consisting of 9.1 MW in Satara Dist. and 1 MW in Ahmednagar Dist.)
- March 2002 (1 MW)

The entire capacity of 21.95 MW was commissioned prior to June 2003 (enactment of the Electricity Act 2003).

In DNV's opinion consideration of this project as different technologies in the context of common practice is appropriate as all the above mentioned wind power projects in the applicable geographical area commissioned prior to enactment of Electricity Act 2003 (came in force on 10 June 2003)/64/. The investment climate in the period prior to Electricity Act 2003 was different from the period of installation for the project activity. The development of grid interactive renewable power underwent a new phase following the Electricity Act 2003 (EA 2003), which provides for regulatory interventions for promotion of renewable energy (RE) sources, including determination of tariff for renewable energy./63/ State governments developed new renewable energy policies and/or issued new tariff regulations after the enactment of the Electricity Act 2003. Therefore, DNV confirmed that wind power project installed before 2003 are different with the proposed project activity which has been implemented post Electricity Act 2003 (EA 2003). Hence exclusion is justified. Apart from the 4 wind power projects, 3 thermal power projects, 17 hydro projects and 13 biomass projects in the applicable output range and geography (projects excluding CDM projects) have been identified as different from the project activity as they apply a different energy source /fuel. Thus $N_{diff} = 4 + 3 + 17 + 13 = 37$.

- DNV has verified all the web link of UNFCCC, provided in section B.5 of the revised PDD in support of project activity in the CDM pipeline and found to be correct. Thus DNV confirms that the exclusion of the project in CDM pipeline, considered in the common practice analysis is correct.

In conclusion, it is DNV's opinion that it has been correctly demonstrated that the project activity does not represent a common practice and thus the emission reductions achieved by the project are additional to any that would have happened in absence of the project

4.7 Monitoring

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. Since the project is a wind energy generation activity, no project emission is envisaged. Leakage accounting has not been considered for the project since the renewable energy technology equipment used is new and not transferred from another



activity. It is DNV's opinion, that the project participant is able to implement the monitoring plan.

As required by the DNA of India, the project proponent has committed to spend 2% of the CERs revenue every year for Sustainable Development including society/community development. The monitor-able action plan for the same has been included as Appendix 1 in the PDD. Again Project participant has communicated to MOEF regarding the same, DNV witnessed the same found to be in line with the requirement of Indian DNA /45/.

4.7.1 Parameters determined ex-ante.

The combined margin emission coefficient for the north east west north eastern grid of India has been calculated at 0.9529 tCO₂e/MWh (considering OM and BM at a weight of 75:25), and is fixed *ex-ante* for the entire crediting period. The CM emission factor value has been sourced from the data by the Central Electricity Authority (CEA) of the Ministry of Power, Government of India/60/ CEA has published a database of carbon dioxide emission factors for the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This CO₂ baseline database provides information about the OM and BM factors of electricity grids in India, which has been established as per the “Tool to calculate the emission factor for an electricity system”. DNV confirms that the database is an official publication of the Government of India for the purpose of CDM baselines and the OM in the CEA database version 7 /60/ is calculated *ex-ante* using the simple OM approach based on the generation-weighted average emissions per electricity unit over a three year period of 2008-09, 2009-10 and 2010-11. BM is calculated *ex-ante* based on the 20% most recent capacity additions in the grid based on net generation for the year 2010-11. The operating margin has been determined to be 0.9842 tCO₂e/MWh and the build margin to be 0.8588 tCO₂e/MWh. DNV confirms that the CO₂ baseline database for the Indian power sector 7 /60/ used to calculate the combined margin emission factor was the latest database available at the time of start of validation and the combined margin emission factor for the north east west north eastern grid of India is fixed *ex-ante* for the entire crediting period.

4.7.2 Parameters monitored ex-post

- According to the methodology, there is only one variable that a wind project needs to monitor, i.e., $EG_{\text{facility},y}$, the net electricity supplied to the grid by the proposed project activity. The source of data is credit notes to be provided by MSEDCL to the project participant
- The monitoring frequency for $EG_{\text{facility}, y}$ matches with that of the applied methodology, viz. continuous measurement and monthly recording. The cross checking will be carried out with sales receipts (invoices) raised by project participant to, MSEDCL, based on which payment is made to the project participant for the net electricity delivered by the project activity to the grid.
- EG_{export} and EG_{import} : These parameters provide the details of the electricity exported and electricity imported by the project activity. These parameters are measured continuously but recorded monthly by the representatives of the MSEDCL. MSEDCL further prepares Credit Notes to make the data of EG_{export} & EG_{import} available to the project Participant. The Value of $EG_{\text{facility}, y}$ is calculated as a difference between EG_{export} & EG_{import} , which is also provided in the credit note.



- Total electricity exported to the grid measured at the feeder (parameter A): The individual feeders are connected with WTG of project activity as well as non-Project activity. Each feeder is equipped with a main meter and a check meter in substation, where project activity is delivering electricity to the grid. These parameters are measured continuously and recorded monthly by the representatives of the MSEDCL in presence of representative of project participant and a Joint Meter reading (JMR) is recorded. This value is used for apportioning to arrive the value of EG_{export}
- Total electricity imported from the grid measured at the feeder (parameter B): The individual feeders are connected with WTG of project activity as well as non-Project activity. Each feeder is equipped with a main meter and a check meter in substation, where project activity is delivering electricity to the GRID. These parameters are measured continuously and recorded monthly by the representatives of the MSEDCL in presence of representative of project participant and a Joint Meter reading (JMR) is recorded. This value is used for apportioning to arrive the value of EG_{import}
- Gross electricity generation of all WEGs connected to the feeder measured at the LCS of the individual WTGs (parameter X): The gross electricity generation value by the project as well as non-project activity connected to the feeder at substation, as recorded at the LCS of the individual WEG's.
- Gross electricity generation of project WEGs connected to the feeder measured at the LCS of the individual WTGs (parameter Y): The gross electricity generation value by the project WEGs connected to the feeder at substation as recorded at the LCS of the individual WTG's.
- There are 2 apportioning approaches described in the revised monitoring plan viz; one is the apportioning approach taken by the Maharashtra State Electricity Distribution Company Limited (MSEDCL) to calculate the share of net electricity supplied to the grid by the individual WTG's and the second one is the apportioning approach taken by the project participant in cases wherein the dates of the billing cycle do not match with the dates of the monitoring period.

The first apportioning approach, as detailed in Section B.7.2 of the monitoring plan, is conducted by the MSEDCL authorities. The monthly joint meter readings (JMR) at all individual feeders in the sub-station is taken and signed by the representatives of the project participant and MSEDCL. This joint meter readings (JMR) shows total electricity exported and imported by all WTGs connected to the sub-station (i.e. WTGs installed as part of the project activity and non-project WTG's)., SISL, the O&M contractors maintain records of the electricity generation from individual WTGs which is monitored in LCS and recorded through the SCADA system. This data is used for the bifurcation of electricity export and import to individual WTGs. The procedure for preparation of generation bifurcation statement based on the JMR readings and the LCS controller readings of the individual WTG's (both project as well as non-project WTG's) are shown below:

- Total Electricity exported by Project activity = $(\text{Total gross electricity generated by the project proponent's WTGs monitored in LCS and recorded through the SCADA system} / \text{Total gross electricity generated by all WTGs connected to the same feeder monitored through SCADA system}) * (\text{Total electricity exported from the feeder at the sub-station})$
- Total Electricity imported by Project activity = $(\text{Total gross electricity generated by the project proponent's WTGs monitored in LCS and recorded through the SCADA system} / \text{Total gross electricity generated by all WTGs connected to the same feeder monitored through SCADA system}) * (\text{Total electricity imported from the feeder at the sub-station})$



system / Total gross electricity generated by all WTGs connected to the same feeder monitored through SCADA system)*(Total electricity imported by the feeder at the sub-station)

- Net Electricity exported by Project Activity = Total electricity exported by project activity - Total electricity imported by project activity

.SISL would be involved in preparation and submission of all the generation bifurcation statements, for the project activity as well as non-project WTG's to MSEDCL. The algorithm used by SISL (project participant's representative) provided in the monitoring plan, is approved by MSEDCL. Based on this generation bifurcation statement provided by the project participant representative, the MSEDCL authorities at the circle office conducts an audit of the JMR and the generation bifurcation statements and only if the values are found to be correct, issues a monthly credit report to the individual investors. The credit report authorized by the MSEDCL indicates the net electricity supplied by the individual WEG's connected to the respective feeder of the sub-station. DNV confirms that the algorithm used by SISL for this apportioning approach is authorized by MSEDCL and MSEDCL further conducts a detailed cross verification of the data submitted by SISL, based on which the authorized Credit notes are released. Hence the validation team does not doubt the reliability of the monitoring system since all the documents gets audited and authorized by MSEDCL. Further the DNV confirms that the above procedure for apportioning is controlled and conducted under the supervision of MSEDCL and the project participant does not have any role in the same

- a. The second apportioning approach, as detailed in section B.7.2 of the revised monitoring plan, is conducted by the project participant for the purpose of CDM verification, when the dates of the billing cycle do not match with the dates of the monitoring period. This apportioning procedure utilizes the electricity generation data from the project activity WEG's only, which is monitored from the wind turbine generator controller (LCS controller reading) Hence in this apportioning approach, the project participant only utilizes the LCS controller readings of the WEG's owned by them and under the CDM. DNV confirms that the LCS controller readings would be used only for deriving the apportioning ratio which would then be applied to the primary monitored data as reflected in the MSEDCL credit notes, which is duly authorized by the State Electricity Utility i.e. MSEDCL. The validation team verified the algorithm utilized in the apportioning and confirms that the method of apportioning used by the project participant is correct and reliable and would result in conservative estimate of emission reduction calculations.

4.7.3 Management system and quality assurance

The responsibilities and authorities for project management, procedures for monitoring and reporting, and QA/QC procedures have been systematically established and formalized as mentioned in the PDD /1/. Data will be saved and archived until two years after the end of the crediting period. All the substation meters are under the purview of MSEDCL and will be calibrated by MSEDCL on a regular basis as mentioned in the power purchase agreement. The frequency of calibration will be once every year. The accuracy of the substation meters are mentioned as 0.2, which is in compliance with the CEA metering regulation, applicable in India. DNV further confirms that the WTG Controller meter used to measure individual WTG gross generation is the microprocessor relay which displays the electricity generated values of



the individual WTG and in case of malfunctioning of the WTG controller; the WTG is programmed for automatic shut-down. Hence probability of error in WTG controller's generation data is negligible. The net electricity exported can be cross checked with the sales receipts.

4.8 Algorithms and/or formulae used to determine emission reductions

As per ACM0002, version 12.3.0, the baseline for a new grid connected renewable power plant /unit (green-field project) is defined as 'Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the *"Tool to calculate the emission factor for an electricity system"*. The project participant has calculated the baseline emissions by multiplication of the net electricity supplied by the project activity to the grid and the grid emission factor. The detailed algorithms are transparently described under sections B.6.3 of the revised PDD /1/.

As required under ACM0002, equation 6, the baseline emissions are calculated by the algorithm

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

where,

BE_y = baseline emissions

$EG_{PJ,y}$ = quantity of net electricity supplied to the grid by the project activity

$EF_{grid,CM,y}$ = combined margin CO₂ emission factor of the grid

The algorithm to calculate the emission reductions from the project activity are described as

$$ER_y = BE_y - PE_y - LE_y \text{ where,}$$

ER_y = emission reductions from the project activity

PE_y = project emissions from the project activity

LE_y = leakage emissions from the project activity

As described in ACM0002, the leakage emissions are not to be considered. Hence leakage emissions are considered as zero.

DNV assessed the calculations of estimated CERs as provided by project participant in a spread sheet /46/. The assumptions in this spread sheet were validated as follows :

Parameter, Value	Source of information	Validation justification
Project Capacity, 25.5 MW	Purchase Order & PPA /13/	The project capacity is as per the documents verified and observation at site.
Number of machines, 17 of 1500 kW each	Purchase Order/14/ to /22/, commissioning certificates/24/-/34/	The number of machines is as per the documents provided and seen at site.



PLF, 20.16%	As per the PLF estimated by a third party /41/.	PLF is considered as per the third party study report which states that the PLF is 20.16%. The validation team accepts this PLF value since it meets the requirements as specified in <i>Guidelines for reporting and validation of Plant Load Factors</i> EB 48, Annex 11 /58/. Refer section 4.6.3 of this report for a detailed explanation.
Baseline EF, 0.9529 for NEWNE grid	CEA database ver. 7 /60/.	CEA database is an official source of data and Version 7 was the version available at the start of validation viz; webhosting of the PDD for global stakeholder comments and hence accepted. DNV also confirms that CEA Data base version 7 have been calculated based on “ <i>Tool to calculate the emission factor for an electricity system,</i> ” Version 2.2.1, which is latest available in UNFCCC website and thus satisfy the requirement of the methodology.

Based on the above assumption the The proposed project is expected to generate 45 033 MWh electricity per annum, which will displace equivalent electricity generation in grid connected power plants. On the basis of 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 42 912 tCO₂e 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 project emissions, baseline emissions, and leakage and emission reductions. All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.

4.9 Environmental impacts

As per the Schedule of the EIA notification given by the Ministry of Environment and Forests (Government of India) /61/ EIA is not a regulatory requirement in India for wind energy projects. Thus the project activity doesn't require EIA. The project activity does not involve any negative environmental impacts, as the Wind Turbine Generators are installed for generation of power using wind which is a clean source of energy.

4.10 Comments by local stakeholders

Local stakeholder consultation meeting to discuss stakeholder concerns on the project activity was conducted by the project participant in collaboration with technology supplier and O&M contractor Suzlon Energy Limited on 20 October 2011 at Suzlon Central Monitoring station at village Shanimandal, District Nandurbar, Maharashtra. Local Stake holders were invited



through public notice, dated 8 October 2011/37/ and also through personal invitation /38/. The validation team feels that the time provided [12 days] to the local stakeholders for providing comments on the project activity is adequate. The same was verified by the validation team during the personal interaction with some of the local stakeholders during the validation site visit /68/. The list of participants, copy of the public notice, personal invitation letter, and minutes of the stakeholder meeting proceedings, including photographs maintained by the project participants /35//36//37//38/ were verified by the DNV. The stakeholders viewed this project as contributing to local environmental benefits and socio-economy. Overall, there was agreement that the project activity was a beneficial project from the local sustainable development. During the validation site visit, the validation team also interviewed few of the local stakeholders for their views about the project activity /68/. The villagers confirmed that the stakeholder consultation meeting was held at shanimandal village on 20 October 2011. The villagers expressed satisfaction over the windmill project activity in the region and confirmed that the project activity gives employment opportunity to the local public and thus contributes to the economic growth of the region. A detailed description of stakeholder consultation has been provided in section E of PDD.

DNV considers the local stakeholder consultation carried out adequately.

4.11 Comments by Parties, stakeholders and NGOs

The PDD, version 01 dated 06 January 2012, 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 10 February 2012 to 10 March 2012.

<http://cdm.unfccc.int/Projects/Validation/DB/BN70H0KER9GB6Y0BPJB3Q4IBIXK7C/view.html>

One comment was received and is given (in unedited form) in the below text box.

Comment by:		
☐ Accredited NGO	☐ Party	☒ Stakeholder
Inserted on:		
Subject:		
Comment:		
1) DOE to ensure that the PDD values are consistent and ensure that the CDM project is a genuine project.		
2) 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.		
3) 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.		
4) 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.

5) 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.

6) 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.

7) DOE must not entertain this project any more if found the DPR/FR is tampered with at any point in time. PP cannot 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.

8) 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 project? 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.

9) 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.

10) 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.

11) 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.

12) 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.

13) 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.

Submitted by: Krystopher

PP Response to Global Stakeholder comments

1) PP response: The PP has submitted evidences with respect to CDM consideration, investment analysis, and other requirements as per CDM modalities and procedures to the DOE.



- 2) PP response: Inputs for investment analysis have been submitted to the DOE along with the actual project costs based on CA certificate and POs. There is no debt component in the project activity and hence no feasibility report submitted to a bank.
- 3) PP response: Inputs for investment analysis have been submitted to the DOE along with the actual project costs based on CA certificate and POs. There is no debt component and hence no feasibility report submitted to a bank.
- 4) PP response: The said project is a 100% equity project, so there is no bank element involved in the project. Hence, there was no DPR/FR for submission to bank or other agencies. Inputs for investment analysis have been submitted to the DOE along with the actual project costs based on CA certificate and POs.
- 5) PP response: The said project is a 100% equity project, so there is no bank element involved in the project. Hence, there was no DPR/FR for submission to bank or other agencies. Inputs for investment analysis have been submitted to the DOE along with the actual project costs based on CA certificate and POs.
- 6) PP response: The said project is a 100% equity project, so there is no bank element involved in the project. Hence, there was no DPR/FR for submission to bank or other agencies. Inputs for investment analysis have been submitted to the DOE along with the actual project costs based on CA certificate and POs.
- 7) PP response: The said project is a 100% equity project, so there is no bank element involved in the project. Hence, there was no DPR/FR for submission to bank or other agencies. Inputs for investment analysis have been submitted to the DOE along with the actual project costs based on CA certificate and POs.
- 8) PP response: Evidence of CDM consideration has been submitted to the DOE (Note for Approval and communication with MoEF / UNFCCC for submission of prior CDM consideration form). The date submission of Prior CDM Consideration form is also available on the UNFCCC web-site.
- 9) PP response: The project equipment is not second hand equipment and fully procured from Suzlon. The said project is a 100% equity project, so there is no bank element involved in the project. CA certified actual project costs have been submitted for validation.
- 10) PP response: PP would like to clarify that this comment is not relevant to the project activity or the project proponent.
- 11) PP response: PP would like to clarify that this comment is not applicable to the project activity as this project is not a bundle of any other project and is a large scale project activity.
- 12) PP response: The project equipment is not second hand equipment and fully procured from Suzlon. The said project is a 100% equity project, so there is no bank element involved in the project. Further, DOE has checked and validated the inputs for investment analysis and the actual project costs based on CA certificate and POs.
- 13) PP response: Baseline is defined in accordance with the ACM0002 methodology and the same is documented in the PDD. The said project is a 100% equity project, so there is no debt component involved in the project. Hence, there was no DPR/FR for submission to bank or other agencies. Inputs for investment analysis have been submitted to the DOE along with the actual project costs based on CA certificate and POs.

***How DNV has considered the comment received in its validation:***

- 1) DNV has validated all the assumption values considered in the revised PDD version 03 dated 6 August 2012 and found consistent. The details of validation of all assumption values are indicated in proper sections of the validation report above.
- 2) The input values for financial analysis has been taken from suppliers quotation /8/ DNV has verified the same and found in line with. Again DNV has cross verified all the assumption values from the purchase orders/14/-/22/ and actual cost incurred towards project activity was verified from the certificate provided by independent chartered accountant /42/ and found consistent. DNV also confirms that the project activity is 100% equity financed, hence no DPR or FSR have been submitted to bank or any financial institution. DNV further states the this explanation is valid for all the comments made under point no. 2 to point No. 7.
- 8) DNV has validated the serious consideration of CDM for the proposed project activity from the Note for approval for award of wind power project /10/ of HZL, where it is clearly mentioned that CDM is the decisive factor for implementation of the project activity. The Purchase order of the project activity was raised subsequent to the Note for approval. DNV has also confirms that PP has sent communication to UNFCCC and NCDMA within 6 months from the start date of the project activity. The project activity financed from internal accruals of HZL, as discussed above. Thus lending from bank is not the case in this project activity.
- 9) DNV has verified all the purchase order placed to Suzlon Energy Limited, Infrastructure clearances from MEDA /11//12/ and commissioning certificates provided by MSEDCL /24/ - /34/. DNV confirms that the project activity is a new greenfield project and all the equipment purchased are new, not second hand one. Further DNV has validated the actual project cost incurred from the certificate provided by independent chartered accountant /42/.
- 10) This comment is not relevant to this project activity.
- 11) The project activity is a large scale one. Hence debundling is not relevant in this project activity.
- 12) These issues were already discussed under point no.2 and point no. 9 in this section.
- 13) The baseline is identified in the PDD as depicted in the methodology ACM0002 version 12.3.0 and DNV found the same is appropriate. DNV has validated the emission reduction indicated in the PDD in line with the applied methodology and found real and appropriate. Other part of the comment is already discussed under point no. 2 above.

oOo

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~~ OK
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	~~CAR-1~~ OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	~~CAR-1~~ 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	~~CAR-6~~ ~~CAR-7~~

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.		~~CAR-8~~ ~~CAR-9~~ ~~CL-1~~ ~~CL-2~~ ~~CL-3~~ ~~CL-4~~ OK
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	~~CAR-5, CL-5~~ 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	~~CL-7~~ 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

Requirement	Reference	Conclusion
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	~~CL-5~~ 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/	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/ /10/ /14/ to /22/ /11/ /12/ /24/ to /34/	DR	<i>What type is the project?</i> ☐ 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 ₂ e 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 ₂ e 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

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

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 ₂ e per year. In this case, DOE may not conduct a physical site visit as appropriate. ☒ Greenfield project <i>How was the design of the project assessed?</i> ☒ Physical site inspection ☐ Reviewing available designs and feasibility studies Site visit was completed on 20 March 2012. All the 17 installations each of 1500 kW rating, manufactured, supplied, erected and commissioned as mentioned in the webhosted PDD were visited and found in line with the PDD.		
A.2.2 If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/ /24/ to /34/	DR	All the 17 x 1500 kW rated WTGs were installed and working at the time of commencement of validation.		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 ₂ e per year), justify the sampling through a statistical analysis:	/1/	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 project activity?	/1/	DR	Yes, the description is complete and covers all salient aspects of project activity.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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, the project activity is a greenfield one		OK
A.2.6	Does the project design engineering reflect current good practices?	/1/ /9/ /62/	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. This wind turbine model type is approved and 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?		DR	No transfer of technology is involved.		OK
A.3 Participation requirements (VVM para 51-54, 125-127)						
A.3.1	Do all participating Parties fulfil the participation requirements as follows: a) Party has ratified the Kyoto Protocol b) Party has designated a Designated National Authority c) The assigned amount has been determined	/1/	DR	Project Participant has not provided the Host Country Approval confirming the voluntary Participation of all parties in the project activity and its contribution toward sustainable development. India (host) ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	CAR-1	OK
A.3.2	Do the letters of approval meet the following requirements? a) LoA confirms that Party has ratified the Kyoto Protocol b) LoA confirms that participation is voluntary		DR	HCA awaited India (host) ☐ Yes ☐ No ☐ Yes ☐ No	CAR-1	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
c) The LoA confirms that the project contributes to the sustainable development of the host country? d) The LoA refers to the precise project activity title in the PDD e) The LoA is unconditional with respect to (a) to (d) above f) The LoA is issued by the respective Party's DNA g) The LoA was received directly by the DNA or the 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	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ DNA ☐ PP				
A.3.3 Have all private/public project participants been authorized by an involved Party?	/1/	DR	Project Participant has not provided the Host Country Approval confirming the voluntary Participation of all parties in the project activity and its contribution toward sustainable development.	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/	DR /I/	The 17 WTGs of Suzlon make, model S-82 with rated output of 1500 kW have been installed at Chakla site at Akhatwade, Gangapur and Shanimandal vilage of Nandurbar district in Maharashtra. However, 1. The Name of the village identified in section A.4.1.3 is not in line with the Infrastructure clearances and commissioning certificate provided by the PP. The same was also found during the site Visit. Moreover PP has not provided the details about the location of the project activity mentioning nearest airport	CAR-2	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			railway station etc in the web hosted PDD. 2. Section A.4.1.4 is exceeding the page limit of one page, as depicted in the Guideline for completing PDD version 07. The Notation of Geo- coordinate mentioned in section are missing the symbol of Degree, Minute and second. PP has not provided references in support of the geo coordinate.		
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 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?	/1/	DR /I/	No, no public funding is used for the project activity. The project is fully financed by PP from accumulated earnings; thus, it is fully equity financed project.		OK
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/	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 applied in the web hosted PDD (ACM0002, version 12.1.0 is not the latest available one in the UNFCCC website(i.e.-version 12.3.0).	~~CAR-3~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.1.2 If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/	DR	Not applicable		OK
B.2 Applicability of methodology (and tools) (VVM para 65-76) <i>Insert a row for each applicability criteria of the applied methodology (and tools)</i>					
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/	DR	The project activity is installation of 17 x 1.5 MW WTGs for generation of power from wind energy to supply to the North East West North-East (NEWNE) grid and is a green field project.		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/ /10/ /11/ /12/ /14/ to /22/ /24/ To /34/	DR	The project activity is a green field project that uses wind energy to generate electricity and involves installation of 17 x 1.25 MW Capacity WTG.		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	/1/	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

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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.					
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/m ²	/1/	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 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/ /13/	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 Description of the project Boundary is not clearly defined in webhosted PDD in line with the applied methodology. In section B.3 of the web hosted PDD the project boundary diagram are not in line with the guideline for completing CDM PDD, version 07.	CAR-4	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	/1/	DR	CO ₂ is the sole GHG indicator for the project activity. This is in line with the applied		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
arrive at this conclusion.			methodology All 17 wind energy generators of this project along with the attendant transformers, evacuation system, sub-station, other non-project WECs connected to the same sub-station, the system (NEWNE) grid and all the power plants connected to the NEWNE grid define the project boundary. In the baseline scenario, equivalent amount of power would have been sourced from the carbon intensive NEWNE grid and hence the baseline emissions consist of CO₂ emissions equivalent to 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/	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

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.4 Baseline scenario determination (VVM para 81-88, 105-107) <i>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.</i>					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/ /51/	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 order to determine the baseline?	/1/ /51/	DR	According to the methodology, there is only one baseline scenario and that has been considered.		OK
B.4.3 What is the baseline scenario?	/1/ /51/	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	~~CAR-5~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			system". The combined margin emission factor for the NEWNE grid, which is the system grid, has been sourced from CEA database version 06 CEA Database version used in the web hosted PDD (version 06) is not the latest available one (i.e.-version 07) during the web hosting of the PDD		
B.4.4 Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/ /51/	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/	DR	The grid considered is the regional grid comprising of grids serving the states in the North, East, West and North East regions of India. 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/	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 referenced?	/1/	DR	The baseline determination is compatible with available data.		OK
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	/1/	DR	Please refer CAR 5 in section B.4.3 above	CAR 5	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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					
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/	DR	The “Tool for demonstration and assessment of additionality”, Version 5.2, is used for assessing additionality, .which is not the latest available one (i.e- version 06)at UNFCCC website during web hosting of the PDD.	~~CAR-6~~	OK
B.5.2 Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/	DR	Please refer CAR 6 mentioned in section B.5.1 of Table 2 above.	~~CAR-6~~	OK
B.5.3 Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	Please refer CAR 6 mentioned in section B.5.1 of Table 2 above.	~~CAR-6~~	~~OK~~
B.5.4 What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR	The project additionality has been mainly based on investment analysis.		OK
Prior consideration of CDM (VVM para 98-103)					
B.5.5 What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/	DR	In section B.5 of the webhosted PDD, PP has not mentioned the date of investment decision and other chronology of events. PP has not provide all the relevant information along with documentary evidence	~~CAR-7~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.6 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/	DR	The starting date is 28 March 2011 as evidenced by the copies of purchase orders submitted for verification, which is after 2 Aug 2008. 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 16 May 2011, which is within 6 months of the start date. This has been verified from copy of Mailer communication by the PP to UNFCCC and NCDMA dated 16 May 2011 and acknowledgement mail for the same from UNFCCC and NCDMA dated 15 June 2011 and 18 May 2011 respectively.		OK
Investment analysis (VVM para 108-114) <i>The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation. <u>All</u> input parameters need to be assessed.</i>					
B.5.7 Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/	DR	Yes. The project activity generates revenue from sale of power to the grid and the same is mentioned in the PDD.		OK
B.5.8 Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR	One of the alternatives to the project activity, namely is continuation of the current scenario, which does not require investment.		OK
B.5.9 Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR	The choice of benchmark analysis is appropriate as the baseline for the project activity does not require any investment.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.10 Is the benchmark/discount rate the latest available at the time of decision?	/1/	DR	Required return on equity on post-tax basis is considered as the benchmark. The required return on equity has been calculated as follows following the CAPM method, $ROE = R_f + \text{Beta} \times (R_m - R_f)$ Where, ROE – Required return on equity R_f – Risk free rate R_m – Market returns Project Participant needs to clarify the following with documentary evidences : 1. the beta value , risk free return rate and risk premium used for calculation of benchmark were suitable and valid at the time of decision making, considering operational life time of the project activity (in line with the Guideline for Investment analysis version 05). 2. conservativeness of Market Return calculation using BSE Sensex 3. 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.	~~CL-1~~	OK
B.5.11 What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence	/1/	DR	The post-tax equity IRR is the financial indicator. It is in correct correspondence with the		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
with the benchmark?			benchmark chosen, that is, the required return on equity on post-tax basis.		
B.5.12 Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value	/1/	DR	1. The project participant has not mentioned precise reference of source of the assumptions for the investment analysis in the PDD and financial analysis spread sheet. Needs to provide same with documentary evidences to substantiate the same. In doing so, the project proponent is requested to provide evidences to justify that the input values were suitable and valid at the time of decision making. 2. The Unit of the parameters used as assumption for investment analysis are not consistently mentioned in the PDD and financial analysis spread sheet. 3. In the provided Note for approval for award of Wind power Project dated 10 December 2010 IRR for the said project activity is presented as 11.21%, whereas in the web hosted PDD it is calculated and presented as 8.24%. PP is requested to clarify the same. 4. Project Participant have considered Generation Based Incentive (GBI) in	~~CL-2~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			cash flow. PP needs to provide all relevant documents related to application of GBI in the project activity.		
B.5.13 Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/	DR	Yes, the IT calculation takes into account depreciation. The period for depreciation accounting is done as per the normal accounting practice. PP is claiming GBI in the project activity, thus did not considered 80% accelerated depreciation applicable for wind mills as per IT act. 1. The Income Tax holiday has been considered for the investment analysis as per 80 I A of Income tax act, but in the provided IRR spread sheet it is shown that income tax is payable in the year 2011-2012.- Clarification requested. 2. Applicability of MAT for entire life of the project Activity and non-consideration of MAT credits available after income tax holiday period needs to be justified.. 3. The rates of IT and MAT used up to 2011-2012 and post 2011-12 needs to be substantiated. 4. Justification and basis for claiming additional depreciation @ 20% has not been provided (as evident in the	~~CL-3~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			assumption sheet of IRR spread sheet version 1). 5. Overhead expenses are undertaken under separate head of expenditure, not as a part of O&M expenses. Please clarify;		
B.5.14 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/	DR	The investment analysis has been carried out for 20 years which is the lifetime of the project. Salvage value is taken into account.		OK
B.5.15 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	The basis for investment analysis is not derived from any FSR approved by the Government. Wind mills in India do not need a prior approval of the FSR from Government of India.		OK
B.5.16 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/	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 party contracted by the project participants (e.g. an engineering company) ☐ Other approach. It is mentioned in the web hosted PDD that PLF have been estimated by independent Third party. PP has not provided documentary evidence in support of PLF in line with EB 48 Annex 11	CL-4	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.17 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/	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 Please Refer B.5.12	~~CL-2~~	OK
B.5.18 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/	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 Please Refer B.5.12	~~CL-2~~	OK
B.5.19 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/	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 Please Refer B.5.12	~~CL-2~~	OK
B.5.20 Describe the assessment of the other input parameters. Were	/1/	DR	☒ Cross-check against third-party or publicly	~~CL-2~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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.			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 Please Refer B.5.12		
B.5.21 Was the financial calculation spreadsheet verified and found to be correct?	/1/	DR	Please Refer B.5.13 above	~~CL-3~~	OK
B.5.22 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/	DR	Sensitivity analysis has been carried out by altering the following parameters in a range of $\pm 10\%$: 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 of Equity IRR to cross the applied bench mark and the probability of such an occurrence. Again actual cost incurred needs to be subjected to sensitivity analysis as the project activity already started commercial production.	~~CAR-8~~	OK
B.5.23 Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/	DR	The range considered is in compliance with the "Guidelines on investment analysis"		OK
B.5.24 Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/	DR	Sensitivity analysis has not been carried out to determine at what percentage of change of selected parameters does change in results of	~~CAR-8~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			Equity IRR to cross the applied bench mark and the probability of such an occurrence. Again actual cost incurred needs to be subjected to sensitivity analysis as the project activity already started commercial production.		
Barrier analysis (VVM para 115-118)					
B.5.25 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/	DR	PP has not used Barrier analysis. to demonstrate Additionality		OK
B.5.26 How were the <u>investment barriers</u> assessed to be real? Are the investment barriers substantiated by a source independent of the project participants?	/1/	DR	Please Refer B.5.25		OK
B.5.27 How does CDM alleviate the investment barriers?	/1/	DR	Please Refer B.5.25		OK
B.5.28 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/	DR	Please Refer B.5.25 .		OK
B.5.29 How were the <u>technological barriers</u> assessed to be real? Are the technological barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable		OK
B.5.30 How were the <u>barriers due to prevailing practise</u> 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.5.31 How were the <u>other barriers</u> assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
Common practice analysis (VVM para 119-121)					
B.5.32 What is the geographical scope of the common practice analysis? Is this justified?	/1/	DR	Common Practice analysis is not carried out as per the guidance provided in Tool for Demonstration of Additionality, Version 06 PP to provide justification , why entire host country is not considered as the geographical boundary for common practice analysis and also to justify for selection of installed capacity installed capacity between 12.75 MW – 51 MW for addressing Common practice	~~CAR-9~~	OK
B.5.33 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/	DR	Please Refer B.5.32	~~CAR-9~~	OK
B.5.34 What is the data source(s) used for the common practice analysis?	/1/	DR	Please Refer B.5.32	~~CAR-9~~	OK
B.5.35 How many similar non-CDM-projects exist in the region within the scope?	/1/	DR	Please Refer B.5.32	~~CAR-9~~	OK
B.5.36 How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	Please see B.5.32	~~CAR-9~~	OK
B.5.37 What is the conclusion of the common practice analysis?	/1/	DR	Please Refer B.5.32	~~CAR-9~~	OK
Conclusion					
B.5.38 What is the conclusion with regard to the additionality of the project activity?	/1/	DR	Awaiting corrective actions and clarifications and can be concluded only after perusal of the same.	~~CAR-6~~ ~~CAR-7~~ ~~CAR-8~~ ~~CAR-9~~ ~~CL-1~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				CL-2 CL-3 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 NEWNE Grid) available at validation verified?	/1/	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 ₂ baseline database, version 6, has been used for obtaining the OM for the NEWNE grid. However, CEA Database version used in the web hosted PDD are not the latest available one (i.e.-version 07) during the commencement of validation	~~CAR-5~~	OK
B.6.2 How was the $EF_{Grid, BM,y}$ (Build Margin Emission Factor) available at validation verified?	/1/	DR	Please refer B.6.1	~~CAR-5~~	OK
B.6.3 How was the $EF_{Grid,y}$ (Combined Emission Factor for the NEWNE grid of India) available at validation verified?	/1/	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		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			has been calculated accordingly.		
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/	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 NEWNE grid by the project activity per year and grid emission factor of the NEWNE grid; this is in accordance with equation (6) of the selected methodology. The CM for the system grid (NEWNE) 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. However, CEA Database version used in the web hosted PDD are not the latest available one (i.e.-version 07) during the commencement of validation.	CAR-5	OK
B.6.5 Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	Please refer B.6.1 above	CAR-5	OK
B.6.6 Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Please Refer B.6.1	CAR-5	OK
Project emissions (VVM para 89-93)					
B.6.7 Are the calculations documented according to the approved	/1/	DR	Since the project activity is electricity generation		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
methodology and in a complete and transparent manner?			from wind energy there is no project GHG emission and this complies with the methodology with respect to project emission computation.		
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/	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
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/	DR	The Emission Reduction calculation needs to be revisited based on applicable Emission Factor of NEWNE Grid as per CEA Data base version 07	CAR-5	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/	DR	i. The PP is requested to list all the data and parameters to be monitored in line with applied methodology, monitoring frequency needs to be included in line with the Applied methodology. The applied methodology requires "Continuous measurement" of "Quantity	CL-5	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			of net electricity generation supplied by the project plant/unit to the grid". However, the PP in the web hosted PDD, states that the total electricity imported by the project activity will be calculated based on the electricity imported read by the main meter multiplied by the proportion of electricity exported by the project activity (instead of imported) ii. It is found during site visit that the Project activity WTG s are connected to the substation feeders along with the other non-project activity. Project Participant needs to justify how net electricity generation by the project activity is measured iii. A schematic metering diagram clearly indicating the unique ID of the WTG, feeder to which connected, and details of meters installed, has not been included in the PDD. PP is requested to provide details in a table containing actual monitoring practice iv. PP needs to provide sample copy of JMR and Credit Notes provided bt MSEDCL as indicated in the PDD		
B.7.2 Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/ /81/	DR /I	Please Refer B.7.1		OK
B.7.3 In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/ /81/	DR /I	Please refer B.7.1		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.7.4 In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/ /81/	DR /I	All meters installed for monitoring of the project activity are of 0.2s accuracy class and also in line with the MSEDCL requirement. This fulfils the relevant regulatory requirements prevalent in India in respect of metering of power and hence is considered appropriate.		OK
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/ /81/	DR / I	The main and check meters shall be tested for accuracy and calibrated once in a two year The meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. Suzlon Infrastructure Services 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 services 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/ /81/	DR / I	Please refer B.7.1	~~CL-5~~	OK
B.7.7 Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/ /81/	DR / I	Please Refer B.7.1		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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/	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/	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 the 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/	DR	The monitoring plan requires power exported to be monitored and the procedures established are adequate to cover this aspect.		OK
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/	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		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			wind based projects.		
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 monitor able action plan has to be included in the PDD.	CAR 10	OK
B.7.14 Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	Yes		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 project activity? When was the first construction activity?	/1/	DR	The start date has been mentioned as 28 March 2011. However description of how this start date has been determined, and a description of the evidence available to support this start date is not contained in the web hosted PDD in line with guideline for completing project design documents (CDM PDD) version 07.	CAR 11	OK
C.1.3 Is the stated expected operational lifetime of the project activity reasonable?	/1/	DR	The expected operational life is mentioned as 20 years , which is reasonable and can be substantiated with the techno commercial offer provided by Suzlon Energy limited		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 June 2012; it is also stated that crediting period shall not start before the date of registration		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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/	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/	DR	As per the present statutes no specific environmental clearances are required for wind energy based power generation projects in India.		OK
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?	/1/	DR	Not applicable		OK
D.1.6 Are transboundary environmental impacts considered in the analysis?	/1/		Not applicable		OK
E Stakeholder Comments (VVM para 128-130)					
E.1.1 Have relevant stakeholders been consulted?	/1/	DR	A local stake holder consultation procedure was conducted on on 20 October 2011 at Shanimandal village,Nandurbar district, Maharashtra.	CL-6	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			1. PP needs to provide documentary evidence in support of invitation of local stake holder for the consultation process. 2. The stake holder who made comments needs to be identified in section E.2 as per the guideline for completing CDM PDD version 07		
E.1.2 Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Pl refer E.1.1	~~CL-6~~	OK
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/	DR	There is no host country specific requirement in India to carry out a local stakeholder consultation process for wind powered projects. However, the PP has conducted a local stakeholder consultation meeting.		OK
E.1.4 Is a summary of the stakeholder comments received provided?	/1/	DR	Pl refer E.1.1	~~CL-6~~	OK
E.1.5 Has due account been taken of any stakeholder comments received?	/1/	DR	PP is requested to address all the comments received from Global Stakeholders during web hosting of the PDD in section 4.11	~~CL-7~~	OK

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 1 Project Participant has not provided the Host Country Approval confirming the voluntary Participation of all parties in the project activity and its contribution toward sustainable development.	A.3.1 A.3.2 A.3.3	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, and the PP has been in continuous touch with the DNA.	The Project Proponent has not yet provided the LoA to DNV. Hence CAR 1 is not Closed <u>2nd Round</u> Project participant has provided the Letter of Approval (LOA) from the DNA of India (host), vide letter no. 4/6/2012-CCC, dated 11 October 2012, confirming the voluntary Participation of project participant in the project activity and its contribution toward sustainable development for the project title “25.5 MW Wind Energy Farm at Nandurbar Maharashtra by HZL” OK Accepted. Hence, CAR 1 is closed.
CAR 2 The 17 WTGs of Suzlon make, model S-82 with rated output of 1500 kW have been installed at Chakla, Akhatwade, Gangapur Vasara, Thanepada and Shanimandal vilage of Nandurbar district in Maharashtra. However, 1. The Name of the village identified in section A.4.1.3 is not in line with the Infrastructure clearances and commissioning certificate provided by the PP The same was also found during	A.4.1	1. PP would like to clarify that the WTG’s are installed at villages of Akhatwade, Gangapur, Vasdara, Mandal, Thanepada as per commissioning certificates and Infrastructure clearances. The PDD has been made consistent with the commissioning certificates and infrastructure clearances now and information of nearest airport/railway station has been added as well.	1. PP has properly identified the name of the village in the revised PDD in section A.4.1.3 and it is now consistent with the infrastructure clearances and Commissioning certificates provided by MEDA and MSEDCL respectively and the same is also in line with the observation of DNV during site visit. The revised PDD also includes the information of nearest Airport and Railway station.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
the site Visit. Moreover PP has not provided the details about the location of the project activity mentioning nearest airport railway station etc in the webhosted PDD. 2. Section A.4.1.4 is exceeding the page limit of one page, as depicted in the Guideline for completing PDD version 07. The Notation of Geo- coordinate mentioned in section are missing the symbol of Degree, Minute and second. PP has not provided references in support of the geo coordinate.		2. The coordinates of WTGs are added as Appendix 2 at the end of PDD now to restrict the length of section A.4.1.4. The notations of the Geo-coordinates has been changed as well and the document provided by Suzlon in the support of coordinates is now being provided to the DOE as Annexure 1.	Hence this point of CAR 2 is closed 2. In the revised PDD section A.4.1.4 is corrected in line with the guideline for completing PDD version 07 and the geo coordinates are properly mentioned in the appendix 2 of the revised PDD. PP has provided the references in support of Geo coordinate, which are provided by Suzlon Energy Limited, who is the technology provider and erection commissioning service provider for the project activity. Hence accepted by DNV and this point of CAR 2 is closed. As all the point of CAR 2 is closed, CAR 2 is considered as closed
CAR 3 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 applied in the web hosted PDD (ACM0002, version 12.1.0 is not the latest available one in the UNFCCC website(i.e.-version12.3.0)	B.1.1	The PDD has now been revised as per the latest available version i.e. Ver 12.3.0 of applied methodology ACM0002	In the revised PDD the latest available version (i.e.- version 12.3.0) of the applied methodology has been used properly and consistently. It is verified by DNV and found ok. Hence CAR 3 is closed
CAR 4 The Description of the project Boundary is	B.3.1	The project boundary has been suitably modified to comply with the methodology and the guidelines for	The project Boundary has been clearly defined in the revised PDD in line with the applied methodology and guideline

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
not clearly defined in webhosted PDD in line with the applied methodology. In section B.3 of the web hosted PDD the project boundary diagram are not in line with the guideline for completing CDM PDD, version 07.		completing the PDD.	for completing CDM PDD version 07. DNV has verified the same and found satisfactory. Hence CAR 4 is closed
CAR 5 CEA Database version used in the web hosted PDD (version 06) is not the latest available one (i.e.-version 07) during the web hosting of the PDD.	B.4.3 B.4.8 B.6.1 B.6.4 B.6.5 B.6.6	The combined margin emission factor has been determined in accordance with CEA database version 7, and the PDD has been updated accordingly. The revised emission factor calculation spread sheet and emission reduction spread sheet are enclosed.	Project participant has used CEA Database version 07, for combined margin Emission factor calculation in the revised PDD. DNV confirms that the CEA Database version 07 is calculated based on “Tool to calculate the emission factor for an electricity system” version 2.2.1 and was available during the commencement of the validation of this project activity. This is consistent with applicable CDM requirement. Hence CAR 5 is closed
CAR 6 The “Tool for demonstration and assessment of additionality”, Version 5.2, is used for assessing additionality, .which is not the latest available one (i.e- version 06)at UNFCCC website during web hosting of the PDD.	B.5.1 B.5.2 B.5.3	PP would like to clarify that the tool for assessing additionality has been revised to the latest available version (version 6).	Project proponent has used “Tool for demonstration and assessment of additionality” version 06 /53/ for assessing additionality in the revised PDD. DNV confirms that the latest tool is properly applied in the revised PDD , Hence CAR 6 is closed
CAR 7 In section B.5 of the webhosted PDD, PP has not mentioned the date of investment decision	B.5.5	The chronology of events has now been added in the section B.5. The investment decision has been specified	In section B.5 of the revised PDD PP has mentioned the date of date of investment decision (Note for approval

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
and other chronology of events. PP has not provide all the relevant information along with documentary evidence		(date of note for approval for the project activity – 10th December, 2010) in the chronology. The following documentary evidences have been submitted: • Offer letter from Suzlon • Note for Approval • Purchase Orders • Commission Certificates • Email communications from UNFCCC and MoEF (acknowledgement for receipt of Prior CDM Consideration Form)	for project activity, dated 10 December 2010), also PP has added the other chronology of events related to the implementation of project activity. PP has also provided the supporting documents. DNV has verified the same and found OK Hence CAR 7 is closed.
CAR 8 Sensitivity analysis has not been carried out to determine at what percentage of change of selected parameters does change in results of Equity IRR to cross the applied bench mark and the probability of such occurrence. Again actual cost incurred needs to be subjected to sensitivity analysis as the project activity already started commercial production.	B.5.22 B.5.24	Section B.5 of the PDD has been updated with the analysis of variation of selected parameters required for the equity IRR to reach the benchmark, and the analysis of the probability of the occurrence. The costs mentioned in the offer letters is the same as the actual costs incurred for the project activity. The CA certificate on actual costs incurred for the project activity has been submitted as evidence to the same.	In the revised PDD Project proponent has carried out sensitivity analysis to find out the percentage change , where the equity IRR crosses the applied Benchmark. Also justification of probability of occurrence are provided in the revised PDD. DNV has cross checked the same and found the analysis provided in the revised PDD as correct. The actual project cost incurred for the project activity is supported by CA certificate provided to DNV. DNV has verified the same and found consistent with the revised PDD.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			Hence CAR 8 is closed
CAR 9 Common Practice analysis is not carried out as per the guidance provided in Tool for Demonstration of Additionality, Version 06. PP to provide justification, why entire host country is not considered as the geographical boundary for common practice analysis and also to justify for selection of installed capacity between 12.75 MW – 51 MW for addressing Common practice	B.5.32 B.5.33 B.5.34 B.5.35 B.5.36 B.5.37	The common practice analysis has been modified as per paragraph 47 of the Tool for Demonstration of Additionality, Version 06. As stated in paragraph 5 of the Additionality Tool, Project participants may provide justification that the applicable geographical area is smaller than the host country for technologies that vary considerably from location to location depending on local conditions. Also as stated in Paragraph 9, technologies are considered different if they are implemented different investment climates. PP would like to clarify that in India every state has a different regulatory regime, tariff structure, and investment climate for Wind power projects, as determined by individual state electricity regulatory commissions. Since the project activity is located in Rajasthan, common practice analysis is conducted considering wind power projects of similar capacity in the state of Rajasthan. This is also in accordance with paragraph 44 of the Additionality Tool which states:	The common Practice Analysis has been carried out in line with the Additionality Tool Version 06.0. DNV has verified all the assumption taken for this analysis and found to be correct. Hence CAR 9 is closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		“Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.” Therefore, limiting the analysis to the state of Rajasthan is appropriate in the context of the project activity. The range of projects considered in the analysis has been modified to comply with the additionality tool version 6. The range of capacity is taken as +/-50% of project capacity i.e. 12.75 to 38.25 MW (in line with paragraph 47 step 1).	
CAR 10 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 monitor able action plan has to be included in the PDD.	B.7.13	The plan for spending 2% of CER revenues for sustainable development of the society has been added as Appendix 2 in the PDD. Supporting for the same is being provided to the DOE as annexure 2 and same has been shared with Indian DNA as well.	Project participant has included a monitor able action plan for spending 2% of CER revenues for sustainable development of the society. In this regard PP has communicated to the Indian DNA, describing the details of the plan and copy of that letter was made available to the validation team. DNV has verified the same and found satisfactory. Hence CAR 10 is closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 11 The start date has been mentioned as 28 March 2011. However description of how this start date has been determined, and a description of the evidence available to support this start date is not contained in the web hosted PDD in line with guideline for completing project design documents (CDM PDD) version 07.	C.1.2	PP would like to clarify that the start date of the project activity is taken as the earliest date of placement of purchase orders for the project activity (purchase orders with Suzlon Infrastructure Services Ltd and Suzlon Energy Ltd.) This explanation has been included in the PDD and purchase orders are being provided to the DOE as Annexure 3.	In the revised PDD Project participant has mentioned the explanation for considering the start date of the project activity. PP has taken the start date of the project activity as the earliest date of placement of purchase order towards the project activity. The first purchase order was awarded to Suzlon energy Limited and Suzlon Infrastructure Services Limited (SISL) on 28 March 2011. PP has also provided copy of all purchase order to DNV. DNV verified the same and found OK Hence CAR 11 is closed
CL 1 Project Participant needs to clarify the following with documentary evidences : 1. the beta value , risk free return rate and risk premium used for calculation of benchmark were suitable and valid at the time of decision making, considering operational life time of the project activity (in line with the Guideline for Investment analysis version 05). 2. conservativeness of Market Return calculation using BSE Sensex 3. The PDD states that levered beta values have been used to calculate cost of equity. Please provide justification for such use of	B.5.10	1. Available beta values of 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. The risk free return rate and risk premium has also been evaluated at the time of investment decision, considering the operational lifetime (20 year) of the project activity. The revised benchmark calculation sheet is enclosed with relevant links for the data sources (BSE and moneycontrol.com for beta values, BSE for market rate of return, and RBI for risk free rate of return). The	1. In the revised PDD Project proponent has revised the benchmark calculation. • For calculation of beta values PP has considered the companies listed in power sector for a period of 5 years at the time of decision making. All the relevant data were sourced from BSE and money control. DNV has verified the same and found reasonable. • For risk free return rate taken from Month-end Yield to Maturity of

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
levered beta instead of un-levering and re-levering the average unlevered beta for calculating cost of equity.		detailed explanation of the choice of parameters for the benchmark evaluation has been included in section B.5 of the PDD. 2. The most conservative market rate or return based on three market indices has been selected as the market rate of return for the evaluation of the required rate of return on equity. The market rate of return for BSE 100, BSE 200, and BSE Sensex have been evaluated from January 1991 onwards, thus providing the market returns for 19.92 years which is comparable with the operational lifetime of the project activity (20 years). Further, the use of data from 1991 is appropriate as the economic liberalization of the Indian economy started in 1991.¹ The economic growth path of India changed from 1991 and the use of data from this year provides a realistic representation of the market returns used to estimate the benchmark. BSE 500 is not considered in the analysis since the index was launched in the year 1999 and BSE 500 data is	SGL Transaction in Central Government Dated Securities for Various Residual Maturities, published by Reserve Bank of India, dated 09 December 2010. PP has taken the 20 years maturity value, which is in conformance with the project lifetime. DNV has verified the same and found satisfactory and relevant. Hence Point 1 of CL 1 is Closed 2. In the revised PDD and revised Benchmark Calculation sheet PP has calculated the Required Rate of return on equity (selected as benchmark) based on three market indices India. The Market Return are calculated for BSE Sensex , BSE 100 and BSE 200 for a vintage year of 20 years taking data from January 1991, which is commensurate with the project life time of 20 years. PP Has not considered the index BSE 500 as the data vintage available for this index

¹ Reference: http://www.indiainbusiness.nic.in/economy/economic_reforms.htm

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		available for only 10 years which is not comparable to the project life time of 20 years. Similarly, other market indices listed are not considered as the available data is not comparable to the project lifetime and/or because they are sectoral indices and not representative of the market. The market rate of return was evaluated as the compounded annual growth rate of the respective market index from January 1991 to November 2010 (prior to investment decision). The historical market index was taken from the BSE web-site (http://www.bseindia.com/index_op.htm), and the market rate or return for the three indices was determined to be: BSE 100: 16.37% BSE 200: 15.87% BSE Sensex: 16.19% On a conservative basis, the market returns are applied in accordance with BSE 200. 3. The beta values have been un-levered and the benchmark has been revised	are less than 20 years and not comparable with the project life time The market rate of return was evaluated as the compounded annual growth rate of the respective market index from January 1991 to November 2010 (prior to investment decision). The historical market index was taken from the BSE web-site (http://www.bseindia.com/index_op.htm), and the market rate or return for the three indices was determined to be: BSE 100: 16.37% BSE 200: 15.87% BSE Sensex: 16.19% PP has used the BSE 200 Data for calculation of ROE as a conservative approach DNV verified the same and found to be correct and reasonable. Hence Point 2 of CL 1 is closed. 3. In the revised Benchmark calculation PP has used unlevered beta, sourcing data from publicly available sources (Money Control)

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		based on un-levered beta values. As the project is 100% equity, there is no impact of re-levering the average un-levered beta value (does not result in any change in the beta value).	for all the companies selected for beta calculation. DNV found this as correct and reasonable Hence point 3 of CL1 is closed As all the point of CL1 is closed CL1 is considered as closed.
CL 2 1. The project participant has not mentioned precise reference of source of the assumptions for the investment analysis in the PDD and financial analysis spread sheet. Needs to provide same with documentary evidences to substantiate the same. In doing so, the project proponent is requested to provide evidences to justify that the input values were suitable and valid at the time of decision making. 2. The Unit of the parameters used as assumption for investment analysis are not consistently mentioned in the PDD and Financial analysis spread sheet. 3. In the provided Note for approval for award of Wind power Project dated 10 December 2012 The IRR for the said	B.5.12 B.5.17 B.5.18 B.5.19 B.5.20	1. PP would like to clarify that the source of assumptions have been included in the financial analysis sheet as well as PDD with précised references. All the input values considered were available at the time of investment decision. The documentary evidence to support the same are being enclosed as annexure 5. 2. The units have been consistent in PDD and financial analysis sheet. All the costs have been converted in INR millions. 3.. PP would like to clarify that the IRR calculation in the Note for approval (NFA) has been done on a higher PLF than the actual PLF estimated by the third party. The PLF assumed in NFA is based on the	1. In the revised PDD and financial analysis spread sheet, PP has provided the precise references for all the assumption. PP has also provided the documentary evidences for the same. DNV has verified the same and found all the input values were suitable and valid at the time of investment decision. Hence point 1 of CL 2 is closed 2. In the revised PDD and revised financial analysis spread sheet PP has consistently applied the unit for all the parameters used as assumption. DNV has verified the same Hence point no.2 of CL2 is closed 3. Project participant has clarified

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
project activity is presented as 11.21%, whereas in the web hosted PDD it is calculated and presented as 8.24%. PP is requested to clarify the same. 4. Project Participant have considered Generation Based Incentive (GBI) in cash flow. PP needs to provide all relevant documents related to application of GBI in the project activity.		energy generation given in the Offer letter (33.77 Lac units/WTG). Calculating the PLF at 96% machine availability (specified in the offer letter) gives a PLF of 24.67%. Applying the PLF of 24.67% in the present IRR calculation spreadsheet yields an IRR of 11.75% which is similar (slightly more) to that mentioned in the NFA. The Note for approval also mentions that the PLF estimated by the equipment supplier may be higher than the actual generation, and that a third party evaluation of PLF is necessary. The third party PLF report was received on 26/12/2011 (after investment decision), and has been submitted to the DOE. PP would also like to clarify that based on the clarification from Meth Panle, ref no: AM_CLA_0170, the third party assessment of PLF may be carried out after the investment decision Therefore, the project activity is in compliance with EB 48 Annex 11. However, as the PLF based on the offer letter (24.67%) is more conservative than the PLF based on the third party assessment (20.16%), the offer letter has now been taken as the basis of the PLF applied for computation of the post tax equity IRR. This PLF is applicable at the time of investment decision and is in compliance	that the IRR calculation reflected in the note for approval was done, by taking PLF value derived from generation guarantee of energy figure given in the techno commercial offer given by suzlon, dated 4 December 2010. DNV found the same in the NFA of HZL for installation of wind power project.. DNV further witnessed the the techno commercial offer given by suzlon and found that the PLF value derived from it comes out to be 24.67%.The note for approval also specifies that “The actual generation may be lower and it is therefore proposed to obtain third party evaluation of PLF for all sites”. Subsequently Project participant has awarded the job to Third party M/s Power and Energy Consultants, Delhi to carry out site specific PLF study. The third party PLF study report was made available to the validation team. DNV found that the PLF estimation is in line with Guidelines for reporting and

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		with with EB 62 Annex 5, Paragraph 6 For the computation of emission reductions, PLF based on the third party assessment report is applied in accordance with EB 48 Annex 11. 4. The documents related to GBI are being made available to the DOE as annexure 7	validation of plant load factors, version 1 (EB 48, Annex11). For financial analysis of the project activity PP has used the value of PLF from the third party report, which DNV finds as realistic and in conformance with the CDM requirement EB 48 , annex 11, and subsequent clarification given by meth panel, AM_CLA_0170 for similar kind of project. However, as the PLF based on the offer letter (24.67%) is more conservative than the PLF based on the third party assessment (20.16%), PP has taken value of PLF as input parameter derived from the offer letter for computation of the post-tax equity IRR in the revised IRR calculation spread sheet and revised PDD. This PLF is applicable at the time of investment decision and is in compliance with with EB 62 Annex 5, Paragraph 6 DNV accepted the PLF value derived from offer letter (24.67%) only in investment analysis due to conservativeness. Thus point 3 of CL 2 is closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			4. Project participant has provided relevant documents regarding GBI to DNV. DNV also confirms that Project participant has correctly applied the GBI revenue in financial analysis. Hence point 4 of CL 2 is closed As all the points of CL2 is closed, CL2 is considered as closed.
CL 3 1. The Income Tax holiday has been considered for the investment analysis as per 80 I A of Income tax act, but in the provided IRR spread sheet it is shown that income tax is payable in the year 2011-2012.- Clarification requested. 2. Applicability of MAT for entire life of the project Activity and non-consideration of MAT credits available after income tax holiday period needs to be justified.. 3. The rates of IT and MAT used up to 2011-2012 and post 2011-12 needs to be substantiated. 4. Justification and basis for claiming	B.5.13 B.5.21	1. The calculations have been revised and the revised IRR is being provided to the DOE for reference. 2. 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. 3. The IT and MAT rate are now being consistently applied for the total period of financial	1. In the revised financial analysis spread sheet PP has corrected the calculation and DNV finds it correct as per the accounting principle. Hence Point 1 of CL3 is closed 2. PP has clarified that the proposed project activity is owned by Hindustan Zinc Limited, which is a listed company. As the project is not under a SPV, MAT credit is not available for the project and not considered in the financial analysis. DNV also confirms the same and accepted. Hence point 2 of CL3 is closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
additional depreciation @ 20% has not been provided (as evident in the assumption sheet of IRR spread sheet version 1). 5. Overhead expenses are undertaken under separate head of expenditure, not as a part of O& M expenses. Please clarify		analysis. Same are sourced from: http://www.incometaxindiapr.gov.in/incometaxindiapr/contents/forms2010/pamphlets/COMPANIES_2012_13.htm 4. The calculation have been revised and PP is not claiming the additional depreciation of 20% in the revised IRR sheet. 5. PP would like to clarify that the O & M expenses consist of expenses related to operations and maintenance only. However, to be on a conservative side the overhead costs have been removed from the revised IRR calculation.	3. In the revised Financial analysis and revised PDD PP has correctly applied the income tax and MAT rates. DNV has verified the same and found OK. Hence point 3 of CL 3 is closed 4. In the revised Financial analysis and revised PDD , PP is not claiming the additional depreciation of 20%. It is reasonable as PP is taking GBI benefit for the project activity. Hence accepted by DNV. Thus point no. 4 of CL3 is closed 5. In the revised Financial analysis and revised PDD , PP has removed the overhead expenses , which was initially taken as a separate head out of O&M cost. DNV confirms that this is a conservative approach . Hence accepted by DNV and point 5 of CL3 is closed As all the points of CL3 are closed , CL3 is considered as closed
CL 4 It is mentioned in the web hosted PDD that PLF have been estimated by independent Third party.	B.5.16	The third party PLF report is being provided to the DOE as annexure 6.	Project proponent has provided the third party PLF estimation report prepared by Power and Energy Consultants ,Delhi. This is in line with

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
PP has not provided documentary evidence in support of PLF in line with EB 48 Annex 11			the requirement laid in Guidelines for reporting and validation of plant load factors, version 1 (EB 48, Annex11). Hence CL 4 is closed.
CL 5 i. The PP is requested to list all the data and parameters to be monitored in line with applied methodology, monitoring frequency needs to be included in line with the Applied methodology. The applied methodology requires "Continuous measurement" of "Quantity of net electricity generation supplied by the project plant/unit to the grid". However, the PP in the web hosted PDD, states that the total electricity imported by the project activity will be calculated based on the electricity imported read by the main meter multiplied by the proportion of electricity exported by the project activity (instead of imported) ii. It is found during site visit that the Project activity WTG s are connected to the substation feeders along with the other non-project activity. Project Participant needs to justify how net electricity generation by the project activity is measured iii. A schematic metering diagram clearly	B.7.1	i. The monitoring plan has been revised and the monitoring frequencies are included in the revised monitoring plan. PP would like to clarify that the net electricity supplied to the grid would be calculated based on the continuously measured values of electricity export, electricity import, and electricity generation at WTG controller. Therefore, all apportioning would be based on continuously measured parameters. ii. The equations for carrying out the apportioning are clearly described in sections B.7.1 and B.7.2 of the revised PDD. As mentioned above, the calculations are based on continuously measured parameters. iii. The single line diagram (including WTG unique IDs) has been included in section B.3 of the revised PDD. Section B.7.1 has been revised to include further details of the actual monitoring practice.	i. In the revised PDD PP has listed all the parameters to be monitored , in line with applied methodology, also in the monitoring plan PP has provide clarity on continuous measurement of "Quantity of net electricity generation supplied by the project plant or unit to the grid" in line with the applied methodology. Hence point 1 of CL 5 is closed ii. In the revised PDD PP has listed the Non project activity WTGS, which are also connected to the same substation feeder in the monitoring parameter. Again PP has provided clarity on apportioning procedure to calculate "Quantity of net electricity generation supplied by the project plant or unit to the grid" in conformance with the applied methodology. Hence point 2 of CL 5 is closed iii. In the revised PDD PP has

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
indicating the unique ID of the WTG, feeder to which connected, and details of meters installed, has not been included in the PDD. PP is requested to provide details in a table containing actual monitoring practice iv. PP needs to provide sample copy of JMR and Credit Notes provided by MSEDCL as indicated in the PDD		iv The sample copy of JMR and Credit notes is being provided to the DOE as annexure 8	provided a schematic metering diagram, indicating unique ID of all project activity WTG in line with the actual monitoring practice. DNV also confirm the same, as found during site visit . Hence point 3 of CL5 is closed iv. PP has provided the sample copy of JMR and credit notes provided by MSEDCL in actual monitoring practice to DNV. Hence point 4 of CL5 is closed As all the point of CL 5 are closed, CL 5 is considered as closed
CL 6 1. ; PP needs to provide documentary evidence in support of invitation of local stake holder for the consultation process. 2. The stake holder who made comments needs to be identified in section E.2 as per the guideline for completing CDM PDD version 07	E.1.1	1. The stakeholder documents are being provided to the DOE as annexure 9. 2. The names of stakeholders who have made comments/asked queries have been included in section E.2 of the PDD.	1. Project participant has provided the documentary evidence to DNV in support of invitation of Local stake holders for local stake holder meeting. PP has made available the copy of public notice and copy of personal invitation letters to local stake holder to DNV. DNV has verified the same and point 1 of CL 6 is closed 2. In the revised PDD PP has provided the name of stakeholder, who made comment in the meeting, in line with guideline for completing CDM

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			PDD version 07. Hence point no.2 of CL 6 is closed As all the point of CL6 are closed, CL6 is considered as closed
CL 7 PP is requested to address all the comments received from Global Stakeholders during web hosting of the PDD in section 4.11	E.1.5	The Global stakeholder concerns have been addressed in the CARs/CLs above. However, the detailed response to each of the queries raised in the GSCP are attached.	Project participant has addressed all the comments received from Global stakeholders during webhosting of the PDD. Hence CL7 is closed

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
<i>No Forward Action Request is there in the validation</i>	NA	NA

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Indrajit Rana

Mr. Indrajit Rana holds double Bachelor Degree, in Chemical engineering and in Chemistry and is a certified energy auditor from Bureau of Energy Efficiency (BEE) of Government of India. Having an overall experience of ten years. Prior to joining DNV having around six years' experience in Chemical process industry namely Petrochemical industry covering production, day to day production planning, energy efficiency improvement, safety, and capacity expansion of existing unit. His experience also covers the fields of environmental management and resource conservation including optimisation of steam consumption. Being shift in charge of HDPE unit he has acquired the knowledge of utility services like, nitrogen, hydrogen, plant air and water, steam, power and flare system. He is adequately experienced in handling many types of energy intensive rotating equipment like brine refrigerator (screw compressor), centrifugal and reciprocating compressor, blower, vertical mounted centrifugal pump, extruder, etc. and also experienced in handling DCS and advanced process control systems. He has knowledge in material balance and energy balance of HDPE plant. He has also experience in integrated offsite plant (IOP) mainly waste water treatment plant, cooling tower operation and flare operation. He has experience of around 4 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 TA 1.1, TA 1.2, TA 3.1, TA 3.2 and TA5.1, TA 11.1, TA12.1

Prabir Sarkar

Mr. Prabir Sarkar is a Post Graduate in Environmental Science with over 8 years of Industry experience in the field of Environmental Management. He has worked in Iron and Steel Industries in Environmental Management System with special emphasis on Energy Management and CDM Project Development. He was also responsible for energy management in different section of the integrated steel plant including captive power plant. He is having experience in solid waste management projects, Environmental Monitoring, Management and consultancy jobs in different industries including Environmental Impact Assessment. He had successfully completed IRCA approved EMS Lead Auditor Training Course. He has undergone intensive training on Clean Development Mechanism and involved in Validation and Verification of CDM Project Activities in last assignment with Bureau Veritas Certification in India and abroad prior to joining DNV.

A. Parasuraman

A. Parasuraman is a fellow member of the Institute of Chartered Accountants of India (FCA) and Partner of, Sundar Srini & Sridhar, Chartered Accountants. He has 28 years of experience consisting of associating as Partner in M/s Shri Kamakoti Associates, Chartered Accountants, Chennai and Senior Manager (Finance) FACT, Udyogamandal covering costing, taxation, project appraise etc. He is presently involved in statutory audits, bank audits – internal and concurrent, internal audits, direct and indirect taxation, company formation and related activities, preparation of cash flow/ fund flow statements on behalf of customers for availing loan from banks etc.

Murali Govindarajulu

Murali Govindarajulu holds a Bachelor's Degree in Chemical Engineering and has done a Short term diploma course in Management. Having an overall experience of around eleven 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 4 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.