

Wind Power Project by HZL in Gujarat



Document Prepared By (SUKANTA DAS- LEAD AUDITOR/ TECHNICAL EXPERT)

LGAI Technological Center S.A.

Ctra. Acceso a la facultad de Medicina, s/n, Campus UAB

E – 08193 Bellaterra (Barcelona) – Spain

Tel: +34 935 672 008

Fax: +34 935 672 001

www.appluscertification.com

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Prepared By	LGAI Technological Center S.A. (Applus+ Certification) Ctra. Acceso a la facultad de Medicina, s/n, Campus UAB E – 08193 Bellaterra (Barcelona) – Spain Tel.:+34 935 672 008 Fax.+34 935 672 001 www.appluscertification.com
Contact	Tel.:+34 935 672 008

	Fax.+34 935 672 001 www.appluscertification.com
Approved By	Juan Sendin Caballero, BU Managing Director (Applus+ Certification)
Work Carried Out By	Mr. Sukanta Das-Lead Auditor/Technical expert

Summary:

Verification purpose: The project activity envisages implementation of an 88.8 MW wind power project consisting of 111 WTGs of individual capacity 0.8 MW at Samana Site in Gujarat, India. The project activity is in line with the sustainable development priority of the country. The electricity generated from the wind farm will be exported to the regional electricity grid and sold to the state electricity utility thereby marginally contributing to reducing the energy demand supply gap in the state of Gujarat.

Enercon India Limited has supplied the wind energy technology to HZL. WTG is ingeniously devised to convert kinetic energy from the “air in motion” directly into electricity without using conventional sources like coal, oil or natural gas for power generation. The project activity implements gearless Enercon E-48 and E48SL WTGs with synchronous generator, pitch regulation, low cut-in speed and aerodynamic braking system.

Wind turbines produce electricity by using the natural power of wind to drive a generator. Wind has considerable amount of kinetic energy when blowing at high speeds. When this kinetic energy passes through the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. The Project activity envisages installation of 111 WTGs of E-48 and E-48 SL Enercon make (800 kW WTGs). The WTGs generate 3-phase power at 400V, which is stepped up to 33 KV. The project can operate in the frequency range of 46–54 Hz and in the voltage range of 400 V ± 20%.

The technology employed by the project activity converts kinetic energy in wind to mechanical energy and mechanical energy to electrical energy using wind turbine generators (WTGs). In this process, there are no greenhouse gas emissions or burning of any fossil fuels. The electricity is generated through sustainable means without causing any negative effect to the environment and therefore the technology is environmentally safe and sound.

The project activity helps to reduce the supply demand gap in the state and also helps in

contributing to the sustainable development by using Wind energy as the source of power generation and reduction of GHG Emissions.

The project uses Enercon technology. The total emission reductions for the current monitoring period i.e. 01-Nov-2013 to 31-Dec-2016 (inclusive of both days) are 404,826 tCO₂e.

This is the second monitoring under VCS and covers the activity from 01-Nov-2013 to 31-Dec-2016 (inclusive of both dates). Project activity has Renewable crediting period of 21 years for the CDM project.

Thus VCS crediting period should be maximum of 10 years and renewed twice till end date of CDM crediting period.

Start date of crediting period for VCS verification: 13/03/2007 (Date of commissioning of first WTG)

The GHG credits from 01-Nov-2013 to 31-Dec-2016 will be claimed under VCS only. An undertaking dated 15/10/2018 from the project participant confirms that project will not claim any other scheme benefits for the concerned monitoring period.

A risk based approach has been followed to perform this verification activity. In the course of verification, 07 Corrective Action requests (CAR), 00 Clarification Requests (CLs) and 00 Forward action requests (FARs) were raised and successfully closed. The review of the Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and PP have provided DOE with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

LGAI Technological Center S.A. (Applus+ Certification) (Hereafter referred as Applus+ Certification) has been appointed by "Hindustan Zinc Limited" to perform the 2nd periodic verification of the "Wind Power Project by HZL in Gujarat" under VCS standard and guideline version 3.7. The objective of this verification activity is to have an independent third party for the assessment of the project design, Monitoring report and Final Verification report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "ACM0002, Version 6.0"
- the project's monitoring plan is assessed against "ACM0002, Version 6.0"
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country

legislation and sustainability criteria along with VCS guideline and standard version 3.7

- CDM Validation and Verification Standard version 01 for the project activity
- CDM Project Standard version 01 for the project activity
- CDM Project Cycle Procedure version 01 for the project activity
- VCS standard v3.7
- VCS program guideline v3.7

Verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of verified emission reductions (VERs).

The scope of the verification is the independent and objective review of the Monitoring report (MR). The MR is reviewed against the relevant criteria (see above) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM Validation and Verification Standard version 01 for the project activity, review against registered PD and Final Validation report, CDM Project Standard version 01 for the project activity, CDM Project Cycle Procedure version 01 for the project activity and VCS program guideline and standard version 3.7.

The assessment team has employed a risk based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of VERs. The verification 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 monitoring report combined.

The only purpose of the verification is its usage during the issuance process as part of the VCS project cycle. Therefore, LGAI Technological Center S.A. (Applus+ Certification) can't be held liable by any party for decisions made or not made based on the verification opinion, which will go beyond that purpose.

The verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for site visit or document verifications. The entire documents checked/WTGs verification conducted to arrive at positive verification conclusions.

Table of Contents

CONTENTS

Table of Contents.....	5
1 Introduction	7
1.1 Objective	7
1.2 Scope and Criteria	7
1.3 Level of Assurance	8
1.4 Summary Description of the Project	8
2 Verification Process	11
2.1 Method and Criteria	11
2.2 Document Review.....	13
2.3 Interviews	14
2.4 Site Inspections	15
2.5 Resolution of Findings	15
2.5.1 Forward Action Requests.....	16
2.6 Eligibility for Validation Activities	16
3 Validation Findings	16
3.1 Participation under Other GHG Programs	16
3.2 Methodology Deviations.....	16
3.3 Project Description Deviations	16
3.4 Grouped Project	17
4 Verification Findings	17
4.1 Project Implementation Status	17
4.2 Accuracy of GHG Emission Reduction and Removal Calculations.....	25

4.3	Quality of Evidence to Determine GHG Emission Reductions and Removals.....	28
4.4	Non-Permanence Risk Analysis	29
5	safeguards	29
5.1	No Net Harm.....	29
5.2	Local Stakeholder Consultation.....	31
6	Verification conclusion	33
APPENDIX 1: Documents reviewed or referenced (Verificaton)		34
APPENDIX 2: CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS (CAR/CL/FAR)		37
APPENDIX 3: Competence of team members and technical reviewers		43
APPENDIX 4: Abbreviations		44
APPENDIX 5: Calibration details of the meters		45

1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Applus+ Certification) (Hereafter referred as Applus+ Certification) has been appointed by “Hindustan Zinc Limited” to perform the 2nd periodic verification of the “Wind Power Project by HZL in Gujarat” under VCS standard and guideline version 3.7. The objective of this verification activity is to have an independent third party for the assessment of the project design, Monitoring report and Final Verification report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against “ACM0002, Version 6.0”
- the project's monitoring plan is assessed against “ACM0002, Version 6.0”
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM Validation and Verification Standard version 01 for the project activity
- CDM Project Standard version 01 for the project activity
- CDM Project Cycle Procedure version 01 for the project activity
- VCS standard v3.7
- VCS program guideline v3.7

Verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of verified emission reductions (VERs).

1.2 Scope and Criteria

The scope of the verification is the independent and objective review of the Monitoring report (MR). The MR is reviewed against the relevant criteria (see 1.1) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM Validation and Verification Standard version 01 for the project activity, review against registered PD and Final Validation report, CDM Project Standard version 01 for the project activity, CDM Project Cycle Procedure version 01 for the project activity and VCS program guideline and standard version 3.7.

The assessment team has employed a risk based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of VERs. The

verification 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 monitoring report combined.

The only purpose of the verification is its usage during the issuance process as part of the VCS project cycle. Therefore, LGAI Technological Center S.A. (Applus+ Certification) can't be held liable by any party for decisions made or not made based on the verification opinion, which will go beyond that purpose.

1.3 Level of Assurance

The verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for site visit or document verifications. The entire documents checked/WTGs verification conducted to arrive at positive verification conclusions.

1.4 Summary Description of the Project

The project activity envisages implementation of an 88.8 MW wind power project consisting of 111 WTGs of individual capacity 0.8 MW at Samana Site in Gujarat, India. The project activity is in line with the sustainable development priority of the country. The electricity generated from the wind farm will be exported to the regional electricity grid and sold to the state electricity utility thereby marginally contributing to reducing the energy demand supply gap in the state of Gujarat.

The timeline for Commission of the project activity is also checked by the assessment team. Assessment team checked the Commission of all the WTGs via the commissioning Certificates and found correct. The project is implemented as per the description in the registered PD. No event observed during the current monitoring period which can alter or deviate from the methodology requirement. The details are as below:

LOCATION	Date of commissioning	Connected Load (MW)	Phase
Sadodar-I	13/03/2007	3.2	Ph I
Sadodar-II	21/03/2007	0.8	Ph I
Fulnath	13/03/2007	7.2	Ph I
Methan-1	24/03/2007	4	Ph I
Methan-2(A)	24/03/2007	6.4	Ph I
Methan-2(B)	24/03/2007	9.6	Ph I
Mevasa	21/03/2007	7.2	Ph I
Sadodar-I	13/09/2007	2.4	Ph II
Sadodar-II	01/09/2007	0.8	Ph II

Sadodar-III	01/09/2007	4.8	Ph II
Fulnath-I	28/09/2007	2.4	Ph II
Methan-2(A)	01/09/2007	4.8	Ph II
Dhun-Dhoraji	28/09/2007	6.4	Ph II
Narmana	30/09/2007	12	Ph II
Jamwadi-01	16/02/2008	2.4	Ph III
Jamwadi-02	16/02/2008	1.6	Ph III
Jamwadi-03	16/02/2008	4.8	Ph III
Narmana-02	16/02/2008	4	Ph III
Laloi	29/03/2008	4	Ph III

There was no activity at the site prior to implementation of the project activity (Greenfield). The electricity generated by the project is exported to the Indian grid. The project activity will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. Since Wind power is Greenhouse Gas (GHG) emissions free, the power generated will prevent the anthropogenic gas emissions generated by fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas.

Assessment team confirms following during the verification site visit:

1. Start date of the project activity is 13/03/2007 as mentioned in the registered VCS PD
2. An undertaking letter dated 15/10/2018 has been submitted by PP for double counting with any other GHG program. PP also has given a written declaration that project has not claimed other form of GHG credit for the concerned monitoring period. Assessment team also checked that the projects are not registered under the REC mechanism of India and the same can be cross-checked at <https://recregistryindia.nic.in>. PP has given a written declaration that the credit claimed under VCS for the current monitoring period is not claimed under any other GHG mechanism.

3. Assessment team confirms that this is the second monitoring under VCS and covers the activity from 01-Nov-2013 to 31-Dec-2016 (inclusive of both dates). Project activity has Renewable crediting period of 21 years for the CDM project.

Thus VCS crediting period should be maximum of 10 years and renewed twice till end date of CDM crediting period.

Start date of crediting period for VCS verification: 13/03/2007 (Date of commissioning of first WTG).

The GHG credits from 01-Nov-2013 to 31-Dec-2016 will be claimed under VCS only. At any point of time during the crediting period, the project proponent will abide by the "Double Counting".

4. Assessment team checked and found that the Project proponent of the project activity is as below for the current monitoring period:

Organization name	Hindustan Zinc Limited
Contact person	Mr. V. Jayaraman
Title	VP & Head (EOHS)
Address	CPP-CLZS Chanderiya Lead Zinc Smelter, Putholi Chittorgarh-312021, Rajasthan INDIA
Telephone	91-1472-257950
Email	v.jayaraman@vedanta.co.in

5. Assessment team also checked the details of other entity and found correct. The details are as below:

Organization name	EKI Energy Services Limited
Role in the project	Project Consultant
Contact person	Mr. Manish Dabkara
Title	MD & CEO
Address	Office No. 201, EnKing Embassy, Plot No. 48, Scheme No. 78, Part II, Vijay Nagar INDORE – 452010, India.
Telephone	-
Email	manish@enkingint.org

6. The quantified emission reduction calculation for the monitoring period is correct and conservative. Assessment team also compared actual VER with the estimated VER and found that the actual VER is 19% lower than the estimated emission reduction which is due to low PLF attained by the WTGs for the current monitoring period.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification Scope: The scope is defined as an independent and objective review of the Monitoring report (MR) prepared as per the registered PD and registered approved methodology ACM0002 version 6.0. The MR 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 and VCS standard and guideline version 3.7, including the approved baseline and monitoring methodology ACM0002 version 6.0. The verification was based on the requirements in the CDM Validation and Verification Standard (VVS version 01 for the project activity), CDM project standard version 01 for the project activity, CDM project cycle procedure version 01 for the project activity and VCS program guideline and standard version 3.7

The verification 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 Monitoring report. In line with Guidelines for Application of materiality in verifications, the verification team has conducted a complete verification of all the information presented in the monitoring report and data monitored as presented in the emission reduction calculation spread sheet. It invoices follows the paper trail back to the raw data such as meter reading records and invoices. There are no material errors, overestimation of ER, omission or misstatement. No sampling is used as the verification team has visited Wind site along with the substations. The verification team has reviewed all the documents like commissioning certificates, JMR, invoices etc. **Verification Process:** The project assessment is based on the “Clean Development Mechanism Validation and Verification Standard” version 01 for the project activity and “VCS standard and program guideline version 3.7” and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

Once the project is received by the assessment team, the members of the assessment team carried out:

1. A desk review of the Monitoring report against the registered PD and final validation report;
2. Follow-up interviews with project participant;
3. The resolution of outstanding issues and the issuance of the final verification report and opinion.

The prepared verification report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the VCS executive board.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. Applus+ Certification has developed a specific checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating the identified criteria.

Appointment of the assessment team

According to the sectoral scope / technical area and experience in the sectoral or national business environment, Applus+Certification has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of Applus+ Certification.

The composition of audit team shall be approved by the Applus+Certification ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT).
- Technical Expert (TE).
- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be Covered by the assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Mr. Sukanta Das	LA/TE	YES	YES	NA	YES
Mr. Simon Shen	TR	YES	YES	NA	NA

The detail regarding the assessment team is provided below in this report as Appendix 3

Document review

The Monitoring report version 1 submitted by the PP was reviewed against the approved methodology, registered PD, final validation report and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report below in appendix 1.

Follow-up interviews

A site visit is conducted by Applus+ Certification. Audit team performed interviews, telephone conferences, and physical site inspection with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR Version 02 submitted by PP on 19/10/2018 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a verification of the final documentation including the verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the PP the positive verification opinion and relevant documents are submitted to the VCS board through the VCS web-platform

2.2 Document Review

The details of the document observed during the verification process are listed below in Appendix 1 of this report.

2.3 Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Jayaraman	Mr. V	PP Representative	12/10/2018	Implementation of the project and monitoring. Baseline emission calculation, achieved emission reduction for the monitoring period, monitoring process followed onsite	Mr. Sukanta Das
2	-	Rohan	Villager	12/10/2018	Local Stakeholder Consultations	Mr. Sukanta Das
2	Kulkarni	Ritesh	Villager	12/10/2018	Local Stakeholder Consultations	Mr. Sukanta Das

2.4 Site Inspections

Duration of on-site inspection: 12/10/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring. Assessment team also checked that whether the monitoring plan as described in the VCS PD is actually practised onsite. Also assessment team checked any change in host country criteria which may affect the baseline of the project activity. Assessment team also had a discussion with Local stakeholders and checked grievance register placed onsite as per the continuous improvement measure of PP for the Local villagers.	The detail address of the power plant is as below: The project is located at Village Methan, DhunDhoraji, Sadodar, Laloi, Narmana, Hariparmevasa, Bagadhara and Jamwadhi in the State of Gujarat The nearest airport and railway station is at Jamnagar city which is located at a distance of approximately 60kms from the project activity site	12/10/2018	Mr. Sukanta Das

2.5 Resolution of Findings

The objective of this phase of the Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues from validation which need to be clarified for Applus+ Certification's positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR Version 2 submitted by PP on 19/10/2018 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	00	00
Description of project activity	00	01	00
Application of selected baseline and monitoring methodology and selected standardized baseline			

Applicability of methodology and standardized baseline	00	00	00
Deviation from methodology	00	00	00
Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
Project boundary	00	00	00
Establishment and description of baseline scenario	00	00	00
Demonstration of additionality	00	00	00
Emission reductions	00	01	00
Calibration details	00	01	
Monitoring plan	00	00	00
No Net harm assessment	00	01	
Local stakeholder consultation	00	01	
Others (please specify)-Matter related to breakdown details	00	02	00
PP declaration – Related to participation in other GHG program for the monitoring period			
Total	00	07	00

The list of findings and there resolution is presented in Appendix 2 of this report.

2.5.1 Forward Action Requests

This is 2nd periodic verification of the project activity and no FAR raised from previous 1st verification.

2.6 Eligibility for Validation Activities

This section is not applicable for present verification.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

This section is not applicable for present verification.

3.2 Methodology Deviations

This section is not applicable for present verification.

3.3 Project Description Deviations

As per Para 3.6.1, sub para (2) of VCS standard version 3.7, project has undergone deviation in the monitoring plan from the registered CDM PDD. The CDM registered PDD mention 5 Monitoring parameters viz. $EG_{y,Export}$, $EG_{y,Import}$, EG_{WEG} and EG_{VCB} and EG_y . As per the requirement of the state of Gujarat, the share certificate directly mentions the value of EG_y (Net electricity supplied) to the grid by individual PP connected to the sub-station meters, thus PP do not have the values of $EG_{y,Export}$, $EG_{y,Import}$, EG_{WEG} and EG_{VCB} . Since PP have only one parameter data available i.e. data of net electricity supplied to grid through share certificate issued by state electricity board and thus the same is retained for the present verification. The share certificate is directly issued by third party state authority to individual PP mentioning net electricity supplied to grid for the particular month thus the deviation is acceptable to the assessment team. Moreover, as per the registered PDD the emission reduction is calculated based on EG_y (ex-post) and EF_y (ex-ante fixed). As the value of EG_y is directly obtained from the Share certificates issued by state authority the estimation of emission reduction is thus conservative, correct and accurate.

Moreover, the change of the monitoring practice onsite from the registered PDD do not have any impact on methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology and VCS requirements. Thus the deviation is acceptable to the assessment team.

Also as per the State electricity guideline in the state of Gujarat, the Meter calibration frequency should be once in a 3 Year and not annually. As per registered PDD, the Calibration frequency is once in a year which is not followed onsite. The practice followed onsite is once in a 3 year¹. As the frequency is not in the hand of PP and it depends on state electricity board regulation and guideline thus change in frequency is acceptable to the assessment team. Moreover, the change of the monitoring practice onsite from the registered PDD do not have any impact on methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology and VCS requirements. Thus the deviation is acceptable to the assessment team.

3.4 Grouped Project

This is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

During the verification site visit it was concluded that the project is implemented as per the requirement of the registered PD and Final Validation report. During the current monitoring period it was observed that no unforeseen incident/event evolved which can impact the operation of the project activity. The project undergone continuous operation and only scheduled maintenance is observed as per the manufactures specification which is acceptable to the assessment team.

CAR 01 is however raised regarding details of the Feeder location of the individual project location and CAR 02 is raised for the details of downtime/breakdown records.

Feeder details are provided which is confirmed by the assessment team during the verification site visit and also from the individual joint meter statement by state electricity board (third party, Govt source) in where the feeder details are mentioned. The Feeder details are included in the MR and thus the CAR is closed.

Breakdown log sheets for individual power project i.e. WTGs breakdown log sheets is submitted by PP. There was no breakdown during the monitoring period. Scheduled maintenance was carried out as per the instruction of the manufacturer and the same is acceptable to the assessment team. CAR 02 is thus closed.

Project location is confirmed by the assessment team during the site visit. Assessment team also checked with the GPS meter regarding the latitude and longitude of the project site and confirm that the details as mentioned in the registered PD are correct. The detail is as below:

¹ vide Ref no. GUVNL/Com/CFM(IPP)/GETCO:290 dated 10/02/2010

S.N o.	Loc.	Latitude (N)	Longitude (E)	Taluka	Village	Land Survey	Control Cabinet Nos.
1	160	22°01'59.9"	70°14'36.2"	Jam-Jodhpur	Sadodar	410	1773
2	161	22°02'06.9"	70°14'33.5"			410	1797
3	162	22°02'13.1"	70°14'31.3"			410	1749
4	163	22°02'18.9"	70°14'28.5"			410	1794
5	164	22°03'08.8"	70°13'51.2"			410	1821
6	165	22°03'02.1"	70°13'55.7"			410	1747
7	166	22°02'57.1"	70°13'58.5"			410	1757
8	167	22°02'49.9"	70°14'01.3"			410	1774
9	174	22°02'01.5"	70°14'15.7"			410	1739
10	175	22°01'56.4"	70°14'11.8"			410	1763
11	176	22°01'50.6"	70°14'06.3"			410	1787
12	205	22°03'03.0"	70°13'02.6"			410	1884
13	209	22°02'17.3"	70°12'24.8"			410	1916
14	210	22°02'09.6"	70°12'28.3"			410	1718
15	216	22°01'11.4"	70°12'44.7"	Jam-Jodhpur	Methan	284	2050
16	217	22°01'04.8"	70°12'42.7"			284	1894
17	218	22°00'58.2"	70°12'43.5"			284	1809
18	219	22°00'25.3"	70°12'36.8"			284	1717
19	220	22°00'19.2"	70°12'41.0"			284	1706
20	177	22°01'44.3"	70°14'05.8"			284	1827
21	178	22°01'37.5"	70°14'04.2"			284	1826
22	181	21°59'59.8"	70°13'49.8"			284	1832
23	182	22°00'06.1"	70°13'41.2"			284	1813

24	183	22°00'13.0"	70°13'34.0"			284	1803
25	185	22°00'19.5"	70°13'27.9"			284	1792
26	190	22°00'51.6"	70°13'16.8"			284	1780
27	191	22°00'58.0"	70°13'11.6"			284	1788
28	230	22°00'51.4"	70°11'26.4"			284	1991
29	231	22°00'55.7"	70°11'25.5"			284	1708
30	232	22°01'04.3"	70°11'26.9"			284	1790
31	233	22°01'11.3"	70°11'29.7"			284	1804
32	234	22°01'25.2"	70°11'32.4"			284	1786
33	179	21°59'40.8"	70°14'06.7"	Jam-Jodhpur	Baghdara	441	1811
34	180	21°59'46.5"	70°14'01.3"			441	1791
35	184	22°00'06.3"	70°13'17.6"			441	1807
36	186	22°00'25.2"	70°13'21.7"			441	1801
37	187	22°00'32.9"	70°13'16.5"			441	1765
38	188	22°00'37.7"	70°13'12.2"			441	1685
39	901	22°00'14.5"	70°12'45.8"			441	1727
40	142	22°01'01.5"	70°15'32.5"	Kalawad	Mevasa	137	1972
41	143	22°00'56.2"	70°15'38.0"			137	1963
42	144	22°00'49.7"	70°15'39.1"			137	1969
43	145	22°0'43.0"	70°15'41.5"			137	1994
44	147	22°00'40.1"	70°15'20.5"			137	1985
45	149	22°00'59.1"	70°15'19.1"			137	1964
46	150	22°00'48.5"	70°15'05.9"			137	1987
47	151	22°00'56.5"	70°15'03.6"			137	1770

48	902	22°01'01.3"	70°14'57.5"			137	1874
49	133	22°03'55.8"	70°14'54.0"	Kalawad	Dhun-Dhoraji	220	2185
50	134	22°04'03.7"	70°14'53.9"			220	2190
51	135	22°04'09.5"	70°14'46.2"			220	2194
52	136	22°04'15.9"	70°14'42.6"			220	2210
53	137	22°04'23.2"	70°14'35.6"			220	2201
54	139	22°04'13.6"	70°14'25.4"			220	2196
55	140	22°04'07.3"	70°14'30.0"			220	2207
56	141	22°04'01.3"	70°14'36.4"			220	2204
57	157	22°01'27.8"	70°14'20.5"	Jam-Jodhpur	Methan	284	2179
58	158	22°01'34.0"	70°14'24.3"			284	2192
59	159	22°01'38.7"	70°14'24.7"			284	2195
60	192	22°01'35.4"	70°13'18.1"			284	2041
61	193	22°01'43.7"	70°13'17.4"			284	2127
62	194	22°01'50.5"	70°13'16.6"			284	2130
63	212	22°01'39.2"	70°12'18.3"			284	2188
64	213	22°01'32.4"	70°12'20.2"			284	2356
65	214	22°01'24.1"	70°12'25.3"			284	2174
66	215	22°01'17.9"	70°12'28.4"			284	2169
67	168	22°02'41.8"	70°14'04.3"	Jam-Jodhpur	Sadodar	410	2193
68	169	22°02'35.2"	70°14'03.5"			410	2186
69	170	22°02'29.8"	70°14'06.2"			410	2200
70	195	22°01'57.7"	70°13'21.5"			410	2139
71	196	22°02'04.6"	70°13'20.5"			410	2129

72	197	22°02'12.1"	70°13'18.0"			410	2172
73	206	22°03'10.3"	70°13'06.1"			410	2121
74	207	22°02'30.2"	70°12'20.4"			410	2171
75	208	22°02'23.7"	70°12'21.4"			410	2136
76	235	22°04'10.1"	70°11'28.4"			410	2155
77	236	22°04'17.3"	70°11'24.2"			410	2161
78	237	22°04'23.1"	70°11'18.4"			410	2154
79	238	22°04'27.5"	70°11'12.8"			410	2161
80	240	22°04'33.1"	70°10'25.9"	Jam- Jodhpur	Narmana	20 and 190	2257
81	241	22°04'27.3"	70°10'27.4"			20 and 190	2213
82	243	22°04'14.1"	70°10'21.2"			20 and 190	2249
83	244	22°04'06.2"	70°10'14.7"			20 and 190	2316
84	245	22°04'28.8"	70°10'11.2"			20 and 190	2247
85	246	22°04'39.0"	70°10'13.0"			20 and 190	2225
86	247	22°04'33.7"	70°09'53.9"			20 and 190	2282
87	248	22°04'26.9"	70°09'38.4"			20 and 190	2220
88	249	22°04'20.6"	70°09'37.0"			20 and 190	2222
89	250	22°04'13.9"	70°09'35.6"			20 and 190	2208
90	251	22°04'07.5"	70°09'35.6"			20 and 190	2223
91	257	22°04'41.4"	70°08'44.9"			20 and 190	2288
92	258	22°04'47.1"	70°08'47.8"			20 and 190	2304
93	259	22°04'53.7"	70°08'45.6"			20 and 190	2352
94	260	22°05'05.0"	70°08'48.0"			20 and 190	2365
95	261	22°05'09.4"	70°08'46.0"			20 and 190	2344

96	266	22°04'58.3"	70°06'06.6"	Jam-Jodhpur	Laloi	139	2348
97	268	22°05'18.7"	70°05'55.0"			139	2376
98	269	22°05'14.6"	70°06'10.7"			139	2390
99	270	22°05'22.4"	70°06'07.9"			139	2399
100	271	22°05'41.6"	70°06'01.4"			139	2353
101	32	22°08'29.2"	70°18'55.7"	Kalawad	Jamwadi	164	2285
102	33	22°08'37.1"	70°18'56.9"			164	2224
103	34	22°08'43.5"	70°18'54.3"			164	2273
104	41	22°08'21.4"	70°17'53.3"			164	2277
105	42	22°08'15.2"	70°18'04.0"			164	2281
106	44	22°07'37.9"	70°17'56.1"			164	2227
107	45	22°07'32.0"	70°17'55.6"			164	2340
108	46	22°07'27.4"	70°17'56.9"			164	2357
109	47	22°07'52.7"	70°17'40.7"			164	2231
110	48	22°07'58.2"	70°17'34.6"			164	2221
111	49	22°08'04.0"	70°17'23.5"			164	2252

Assessment team also checked the Technical details of the WTGs installed onsite. The same is checked during the onsite visit from the number plate capacity of each WTGs and also cross checked from the technical manual of the Manufactures. The detail is as below:

E-48 and E-48 SL TECHNICAL DATA

Rated capacity: 800 kW

Rotor diameter: E-48 - 48 m

E-48SL – 52.9 m

Hub height: E-48 - 56.85m

E-48 SL – 75 m

Rotor with Pitch Control

Type: Upwind rotor with active pitch control

Direction of rotation: Clockwise

Number of blades: 3

Swept area: E-48 - 1810 m²

E-48 SL – 2198 m²

Blade material: Fiberglass (reinforced epoxy) with integral lightning protection

Rotor speed: Variable, 16-31.5 rpm

Tip speed: E-48 - 41 - 78 m/s

E-48 SL – 33-80 m/s

Pitch control: Continuous variable pitching mechanism

Generator: Synchronous - Type

This is a multi-pole variable speed generator. Due to this and Power electronics the Gear Box which steps up the speed to meet the speed of Induction Generator is eliminated resulting in reduced transmission losses, and elimination of wear and tear of the Gear Box and oil leakage associated with it.

Hub: Casted Steel

Bearings: Tapered roller bearings

Grid Feeding: AC-DC-AC through Convertor - Invertor

Braking System: 3 independent Aero Brakes with power back up supply.

Yaw Control: Active through adjustment gears, friction damping

Cut-in Wind Speed: 3 m/s

Rated Wind Speed: 12 m/s

Tower: E-48 - Steel Tubular, 56 m height

E-48 SL – Concrete, 74 m height

Assessment team checked the commissioning certificate and confirmed that the dates of Commission for the WTGs are correct.

The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period. The project design as mentioned in the registered PD is implemented and thus the

same is acceptable to the assessment team. All required monitoring equipment's and procedures as mentioned in the registered PD are available and implemented in an appropriate manner.

The organisational role and responsibility as mentioned in the registered PD is followed onsite. All the monitoring equipment was calibrated as per the specified interval in the registered PD. However, the delay is observed in Calibration for the current monitoring period. The error factor is applied appropriately to calculate the emission reduction conservatively. All the emergency preparedness as mentioned in the registered PD is followed onsite and no discrepancies were found regarding the same.

It was also observed during the verification process that project is not rejected by any other GHG program around the world. CAR 05 however is raised for the same. Please refer Appendix 2 of this report for the detail closure of the CAR.

Assessment team would like to clarify that the project is registered under CDM number 1856². The present monitoring period is 01-Nov-2013 to 31-Dec-2016 (inclusive of both days) and no credit is claimed from other mechanism in the present monitoring period except from VCS therefore avoiding any double counting. A written declaration is also checked by the assessment team which confirms that PP will not claim any GHG emission for the present monitoring period from any other mechanism.

It was also observed during the verification process is that project is not rejected by any other GHG program around the world. The project is registered by VCS board number PL 344 and the registered PD and registered FVR is used to assess the present 2nd periodic verification. The following web sites were checked to confirm the same:

1. www.v-c-s.org

Assessment team hereby also confirms from the declaration made by PP the projects are not registered under the REC mechanism of India and the same is cross-checked at <https://recregistryindia.nic.in>. Moreover as per state tariff policy the project is not eligible to receive REC benefits as it is selling power to State electricity grid.

The assessment team observed that the project is in line with the registered PD, FVR and approved methodology and thus no clarification/deviation is sought.

Sustainable development indicators

The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GOI) under the Ministry of Environment and Forests (MoEF), has mentioned four indicators for the sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM/VCS) projects from India³. Thus the project's contribution towards sustainable development has been addressed based on the following sustainable development aspects:

²<http://cdm.unfccc.int/Projects/DB/BVQI1211956663.14/view>

³ http://www.cdmindia.gov.in/approval_process.php

Social well-being

The project activity provided / provides job opportunity to local people during erection, commissioning and maintenance of the Wind project. Frequency of visiting villages and nearby areas by skilled, technical and industrialist increase due to installation /site visit/operation and maintenance work related to solar plant. This directly and indirectly positively effects the economy of villages and nearby area. PP built the community hall as well as facilities at nearby temple for public use

Environmental well-being

Wind power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions. The impact on land, water, air and soil is negligible. Thus the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.

Economic well-being

The VCS project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.

Technological well-being

The project activity is step forward in harnessing the untapped wind potential and further diffusion of the wind technology in the region. The project activity leads to the promotion and demonstrates the success of wind projects in the region which further motivate more investors to invest in wind power projects. Hence, the project activity leads to technological well-being.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the VCS PD. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the VCS PD
Findings	CAR 03 was raised during the verification process and closed successfully. Please refer Appendix 2 of this report for the detail closure of the CAR
Conclusion	The baseline Emissions for a given year is calculated by multiplying the energy baseline (EB) with the regional grid emission factor. Formula Used:- $BE_y = EF_y \times EG_y$ Where, BE_y baseline emissions, tCO₂e EG_y Net Quantity of Electricity exported to SEB facility EF_y= Combined margin emission factor <u>Ex ante Parameters:</u>

	EF_y, $EF_{BM,y}$, $EF_{OM,y}$ were mentioned as ex-ante fixed parameter. Assessment team checked the values, source of data, choice of data, purpose of the data mentioned in the MR from the registered PDD and confirms that the similar approach was considered for the current monitoring period also. The values for $EF_y = 0.9011$ tCO₂/MWh- Assessment team Confirmed that the value is as per the registered PD $EF_{BM,y} = 0.59$ tCO₂/MWh- Assessment team Confirmed that the value is as per the registered PD $EF_{OM,y} = 1.003$ tCO₂/MWh- Assessment team Confirmed that the value is as per the registered PD 1. $EF_{OM,y}$: Operating Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system. $EF_{OM,y}$ is computed using the Simple Operating margin CO₂ emission factor. Simple Operating margin CO₂ emission factor is calculated from the weighted average CO₂ emissions per unit net electricity generation of all power plants serving the system, not including low-cost / must-run. This is in agreement with the guidance provided in the Tool to calculate the emission factor for an electricity system. The value is considered from CEA version 03 and registered PD. Assessment team checked the registered PD and found that value considered for emission reduction calculation in this present monitoring period is sourced from the registered PD. Thus assessment team conclude that the emission reduction calculation for the present monitoring period is conservative and correct. 2. $EF_{BM,y}$: Build Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor". Build margin emission factor is the generation-weighted average emission factor of all power plants m during the most recent year y for which generation data is available. The value is considered from CEA version 03 and registered PD. Assessment team checked the registered PD and found that value considered for emission reduction calculation in this present monitoring period is sourced from the registered PD. Thus assessment team conclude that the emission reduction calculation for the present monitoring period is conservative and correct. 3. EF_y: Combined Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system. Combined Margin is computed using the official data sources and is in-line with the guidance provided in the tool. The value is considered from CEA version 03 and registered PD. Assessment team checked the registered PD and found that value considered for emission reduction calculation in this
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	present monitoring period is sourced from the registered PD. Thus assessment team conclude that the emission reduction calculation for the present monitoring period is conservative and correct. The value for EF_y, $EF_{BM,y}$, $EF_{OM,y}$ were considered from the CO₂ baseline database (Version '03) published by Central Electricity Authority (CEA). The default value as mentioned in the registered PD and MR are same. The value of combined margin in India is being given by CEA and thus assessment team conclude that the value is correct and appropriate. The default value in turn is used for baseline calculation as per the formula given in the registered PD for the current monitoring period. <u>Ex-post parameter:</u> As per the registered monitoring plan and requirement of the registered methodology following parameters needs to be monitored: (a) Net electricity supplied to the grid (EGy) – The parameter is a sourced from primary source i.e. Certificate for share of electricity generated by Wind Farm. The Certificate for share of electricity provides the Values of Net electricity supplied by individual WTGs. The Net electricity value from the individual WTGs is publically available at GETCO web site and assessment team checked the same and found correct. The practice is as per the requirement of State regulatory authority and approved methodology. The ABT meter reading reflects the net electricity supplied by the wind farm (both export and import), including the project activity. The net electricity supplied by individual wind turbines is determined by a process of sharing the net electricity recorded at the ABT meter in proportion of the electricity generation recorded by the energy meters at the individual wind turbines. The Sharing of energy is done as per PPA by GETCO and PP has no control over it. Based on the Net electricity supplied by individual project as mentioned in the Share Certificate, Invoices is raised by PP for its WTGs. The invoices are used for cross check mechanism and is as per the requirement of registered PDD and approved methodology. The meter reading is taken during a fixed billing cycle of every month and representative of electricity board and Operation and maintenance personal onsite present during the process. Assessment team checked all the values of the Net electricity exported for the month from the Share Certificate during the current monitoring period. The electricity meters are under the custody of the electricity board and calibrated by electricity board as per their standard procedures. The meters are calibrated in line with State Indian grid code regulations for such installations. Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors. BE_y baseline emissions, tCO₂e EG_y Net Quantity of Electricity exported to State grid facility EF_y grid emission factor, i.e. 0.9011 t CO₂/MWh (it has been fixed ex-ante)
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	Thus BEy = 449,258.61 * 0.9011 = 404,826 tCO₂e (Rounded down) The project activity involves in harnessing Wind power. So the emissions from the project are zero. Leakage emission is zero as per the registered PD. As per the applied methodology, emission reductions are calculated as follows: ERy = BEy – PEy- Ly = 404,826 tCO₂e -0-0= 404,826 tCO₂e (rounded down) Where: ERy = Emission reductions in year y (tCO₂e/yr) BEy = Baseline emissions in year y (tCO₂e/yr) PEy = Project emissions in year y (tCO₂e/yr)=0 Ly= Leakage emission in year y (tCO₂e/yr)=0 Hence, ERy= BEy
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4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the Calibration details of the monitoring meters with the calibration certificates.
Findings	CAR 04 was raised during the verification process. The description of the CAR and its closure is described below in Appendix 2 of this report
Conclusion	The metering arrangement is bi-directional energy meters (main and check) at the State Electricity Board (SEB) substation. These meters record several parameters including electricity exported & imported. These electricity meters are being used by state electricity board for Share certificate statements. Assessment team found that Since metering arrangement, monitoring practice, accuracy class, calibration interval is under control of state electricity board, the PP does not have all calibration certificates available with them. However as per the State electricity guideline in the state of Gujarat, the Meter calibration frequency should be once in a 3 Year and not annually. As per registered PD, the Calibration frequency is once in a year which is not followed onsite. The practice followed onsite is once in a 3 year. As the frequency is not in the hand of PP and it depends on state electricity board regulation and guideline thus change in frequency is acceptable to the assessment team. Moreover, the change of the monitoring practice onsite from the registered PD do not have any impact on methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology and VCS

	requirements. Thus the deviation is acceptable to the assessment team. The details of the Calibration is presented in Appendix 5 Assessment team confirms that all the energy meters (both main and check meter) installed at the substation are of accuracy class of 0.2s are calibrated as per the national standards followed by the electricity board, but they are calibrated at least once in a 3 year as per the deviation requested and accepted by the assessment team as per the requirement of state electricity board guideline. There were delay in calibration and appropriate error factor is applied for the same for the concerned month. The calibration of the energy meters installed at HT side of the transformer were carried out by Meter and testing division of the electricity board which is 3rd party organization and the same is acceptable to the assessment team. The Meter and testing division of the electricity board is accredited by NABL (National Accreditation Board for Laboratory, Govt of India) to carry out the testing of the meters which is as per the national regulation and thus traceability of the Calibration is also confirmed by the assessment team.
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4.4 Non-Permanence Risk Analysis

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
NA	NA	NA	NA	NA

5 SAFEGUARDS

5.1 No Net Harm

No potential environment or socio-economic matter was found during the site visit. The project is renewable energy project and thus no negative impact observed onsite. CAR 06 is raised during the process and please refer Appendix 2 for the closure of the CAR.

The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation. The report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013. This report clearly mentioned that Wind power project activity operations do not result in direct air pollution, noise pollution. Moreover, also as per the Central Pollution Control Board of India notification⁴ wind project falls under White Category and are practically non-polluting.

However, assessment team still conducted the No net harm assessment for some of the parameters and the result is described below.

SL.NO	Indicator	Assessment team opinion
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⁴ http://envfor.nic.in/sites/default/files/Latest_118_Final_Directions.pdf

1	Air quality	The project generates clean energy which replaces the fossil fuel intensive electricity generation. Also report on “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013. This report clearly mentioned that Wind plant operations do not result in direct air pollution. Adequate measures were taken to mitigate the envisaged impacts like spraying water on the road side to reduce dust level, etc. This was confirmed by the local stakeholders. Therefore, it is validated that mitigation measures were robustly implemented on ground for air quality issues project will have a positive impact on air quality.
3	Soil condition	There are negligible impacts envisaged during operation of the project activity. For mitigating the impacts during construction, various mitigation measures were taken which is validated from the plant records of PP and the interview with local villagers. The top soil excavated during construction, was stockpiled and used for compaction. The roads were not paved and soling was done with excavated earth & rock material, so land disturbance could be minimized. It was also confirmed that, the vegetation done at site helps for soil erosion. The same is confirmed during the stakeholder meetings during onsite visit. Therefore, it can be concluded that the project has no effect on soil conditions during its operation

		because it has no waste coming out.
4	Biodiversity	During the validation site visit it was observed that the condition of ground vegetation will be gradually improved; No rare species has been found in the around area. The project site is not on the migration route of migratory bird. As Such Wind plant do not have any obstruction in the path of migratory birds. With the implementation of Project, the greening water will be increased significantly; the biodiversity in the vicinity will be improved with the vegetation improvement. No negative impact envisaged.
5	Employment Generation	The project activity employed local population as skilled workers as well as security guards which were envisaged during the validation site visit. The personnel employed by the project activity are also provided trainings and exposed to various awareness programs therefore a positive indicator has been accepted.
6	Livelihood of the poor	The project is associated with infrastructure development like roads in the nearby areas and promoting economic activities like grants to local school and communities temples etc. Also, project employed local villagers as guards for the security of power project. Positive impact envisaged. .

5.2 Local Stakeholder Consultation

All the stakeholders are happy with the implementation and operation of the project activity and no negative comments envisaged for the project activity. There was no change in technical project description from the registered VCS PD. Assessment team confirmed the same during the verification site visit. However CAR 07 is raised during the verification process. Please refer Appendix 2 for the detail

closure of the CAR. Also, as best practice method PP also placed a grievance register onsite to record any grievance from the stakeholders during and after the implementation of the project activity. Assessment team checked the grievance register maintained onsite and no negative comments were observed for the project activity. Local people are happy as the project generated employment opportunities and thus the living standards in and around the vicinity of the project is increased and thus assessment team confirms that local stakeholders have no issue with this project activity after implementation and continuous operation.

The interaction with some of the stakeholders during the site visit are presented below:

Name of the stakeholder	Rohan
Occupation	Villager
DOE QUESTION: Did PP promised employment opportunity? Answer: Yes, PP told us that employment will be generated and the locals will be given priority. DOE also like to conclude that during the site visit it was observed that local people were employed for security and operation related work like water spraying, vegetation improvement and other unskilled work. DOE also found that skilled local persons were also employed by the organization for the operation and maintenance of the power plant.	

Name of the stakeholder	Ritesh Kulkarni
Occupation	Villager
DOE questions: Did the power plant discharge any harmful pollutants? Answer: NO the plant does not discharge any harmful pollutants. DOE questions: Did the power plant destroy any crop fields? Answer: The plant is implemented in barren land and there were no any fertile land or crop which is damaged.	

6 VERIFICATION CONCLUSION

Applus+ Certification has been engaged by Hindustan Zinc Limited to perform the 2nd periodical verification of the “Wind Power Project by HZL in Gujarat”

The management of Hindustan Zinc Limited is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project’s Monitoring Plan in the registered VCS PD and the applied methodology ACM0002 version 6.0

Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification team can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the monitoring process in Monitoring Report is as per the PD
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.

Verification period: 01-Nov-2013 to 31-Dec-2016 (inclusive of both days)

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2013	17,905	0	0	17,905
2014	126,821	0	0	126,821
2015	133,381	0	0	133,381
2016	126,719	0	0	126,719
Total	404,826	0	0	404,826

APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED (VERIFICATION)

No.	Author	Title	References to the document	Provider
1	NA	Commissioning certificates of the WTGs implemented in the project site.	NA	Project participant
2	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
3	NA	Technical specifications of WTGs generators from manufacturers	Manufacturer technical specifications	Project participant
4	NA	Registered PD dated 02/12/2008 version 03 https://www.vcsprojectdatabase.org/#/project_details/344	NA	Project participant
5	NA	Registered Final Validation report dated 23/05/2008 version 01 Final Verification report (1st periodic)- dated 10/11/2009 version 02 https://www.vcsprojectdatabase.org/#/project_details/344 CDM documents having UN number 1856 ⁵	NA	Project participant
6	NA	Emission Calculation sheet version 01 Emission Calculation sheet version 02	ER sheet Dated 25/09/2018 ER sheet Dated 19/10/2018	Project participant

⁵<http://cdm.unfccc.int/Projects/DB/BVQI1211956663.14/view>

7	NA	The operational lifetime of the project activity from the manufacturer=(Technical specifications)	Manufacturer technical specifications	Project participant
8	NA	RBI: Reserve Bank of India www.rbi.org.in Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in Income tax act 1961 http://law.incometaxindia.gov.in/DIT/ VCS: Verified Carbon Standard www.v-c-s.org	Reference link is provided.	Independent Search
09	NA	Tools/ guidelines used in the project activity • Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50 • Tool for the demonstration and assessment of additionality (Version 04.0.0) • Glossary of CDM terms version 07 • VCS verification report template version 03	UNFCCC CDM/VCS web site	UNFCCC
10	NA	Share reports/Monthly statement for the complete monitoring period	Share reports/Monthly statement for the complete monitoring period	PP

11	NA	MR version 01	25/09/2018	PP
		MR version 02	19/10/2018	
12	NA	Invoices for the complete monitoring period	Invoice	PP
13	NA	Break down details of the complete monitoring period	Log sheet	PP
14	NA	Declaration regarding no participation in other GHG program for the concerned monitoring period	Declaration dated 15/10/2018	PP

APPENDIX 2: CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS (CAR/CL/FAR)

CAR ID	01	Date: 13/10/2018
Description of CAR		
During the site visit and subsequent document review it was observed that the details of feeder wise location of the Wind turbines is missing in the MR. Corrective action is sought in the respective section of the MR. The implementation details of the project activity timeline is missing in the MR. Supporting documents such as Commissioning certificates, Power purchase agreement and O&M agreements are missing. The technical details supporting documents are not submitted to the assessment team. Corrective action is sought for the same.		
Project participant response		Date: 19/10/2018
Feeder wise location of the WTG is mentioned in MR Version 02. The detailed information of the project implementation timeline is mentioned in the MR Version 02. The technical specifications of the project activity has been submitted and the same has been submitted to the Verification team.		
Documentation provided by project participant		
MR Version 02 Commissioning Certificate of project		
DOE assessment		Date: 20/10/2018
Following are the Observation of the DOE: 1. Feeder number details are now added in the revised MR Version 02. CAR is thus closed. 2. The detailed information of the timeline is now incorporated in the MR. CAR is thus closed. 3. The technical information is now submitted to the DOE for cross check. The same is checked and found correct. CAR is thus closed.		
CAR ID	02	Date: 13/10/2018

Description of CAR	
The breakdown details of the Wind turbines are missing in the MR. However, the supporting document regarding the breakdown details are not provided to the assessment team. Corrective action is sought in this regard.	
Project participant response	Date: 19/10/2018
The breakdown details of the Wind project is mentioned in MR Version 02	
Documentation provided by project participant	
MR Version 02	
Breakdown details	
DOE assessment	Date: 20/10/18
The breakdown log details are checked and found correct. Power Plant undergone scheduled maintenance as per the manufacturers specification and no unforeseen incident found for the monitoring period. CAR is thus closed.	

CAR ID	03	Date: 13/10/2018
Description of CAR		
The JMR sheets and Invoice for the complete monitoring period is missing. Emission reduction value is thus reserved and will further be analysis on the submission of the documents.		
The comparison of actual VER and estimated VER is also missing in the MR.		
Also, the cross check mechanism between Invoice and JMR in the ER sheet is missing.		
Corrective action is sought.		
Project participant response		Date: 19/10/2018
The JMR and Invoice for the complete monitoring period has been submitted with MR version 02		
The comparison of Actual vs Estimated VER is presented in MR Version 02		
Documentation provided by project participant		
1. JMR and Invoice for complete Monitoring Period		

2. MR Version 02	
3. ER Sheet Version 02	
DOE assessment	Date: 20/10/2018
Following are the observation of the DOE:	
1. The JMR and invoice for the complete monitoring period is checked and found correct. ER calculation is thus found correct. 2. The actual vs estimated comparison is now presented in the revised MR Version 02. CAR is thus closed. 3. Cross check mechanism is not introduced in the ER sheet. CAR is thus closed.	

CAR ID	04	Date: 13/10/2018
Description of CAR		
The calibration certificates for the complete monitoring period are missing. The Calibration details are also missing in the MR. Corrective action sought for the same		
Project participant response		Date: 19/10/2018
Calibration Certificates of the entire Monitoring Period is submitted with MR Version 02 and details has been updated in revised MR Version 02.		
Documentation provided by project participant		
1. Calibration Certificates 2. MR Version 02		
DOE assessment		Date: 20/10/2018
The calibration Certificate for the entire monitoring period is checked and found correct. As per the state board norms the calibration is done once in a 3 year ⁶ however the calibration needs to be done once in a Year as per the registered PD. The deviation from frequency is thus acceptable to the assessment team as the change is not in the hand of PP and depends on State board and their regulation and guideline. However, there was delay observed in following once in a 3 Year frequency and appropriate error factor		

⁶ vide Ref no. GUVNL/Com/CFM(IPP)/GETCO:290 dated 10/02/2010

is applied. CAR is thus closed.

CAR ID	05	Date: 13/10/2018
Description of CAR		
As per section 1.9 of the VCS MR, the project is not participated in other GHG program and has not intended to pursue credits from other GHG program for the concerned monitoring period. Supporting documents and details regarding the same is missing in the MR. Also, PP needs to justify whether REC benefits is taken for the present Monitoring period covered under VCS. Corrective action is sought for the same.		
Project participant response		Date: 19/10/2018
The project has been registered with UNFCCC however for the same Monitoring Period, PP is not going to claim Emission Reduction other than VCS and a declaration dated 15th Oct 2018 has been submitted for the same. Also it can be crosschecked that PP is not claiming REC benefits, the same can be verified with the REC accreditation body of India⁷.		
Documentation provided by project participant		
1. Declaration by the PP 2. MR Version 02		
DOE assessment		Date: 20/10/2018
The project is registered with UN having number 1856⁸ however PP is not claiming any CERs for the VCS monitoring period applied. The same is checked by the assessment team during the interview with PP and also with the declaration dated 15/10/2018. PP is also not claiming any REC benefits for the concerned monitoring period. The same is also checked by the assessment team from the official web site of REC. CAR is thus closed.		

CAR ID	06	Date: 13/10/2018
Description of CAR		
During the document review it is observed that "No net Harm" details are missing in the MR. Moreover,		

⁷ https://recregistryindia.nic.in/index.php/general/publics/accredited_regens_pdf

⁸ <http://cdm.unfccc.int/Projects/DB/BVQI1211956663.14/view>

supporting documents are not shared with DOE. Corrective action is sought in this regard in the respective section of the MR.

Project participant response
Date: 19/10/2018

The project activity does not cause any harm to the local ecology. It primarily requires the installation of the wind turbines, interfacing the generators with the State Electricity Board by setting up HT transmission lines and installation of other accessories. However, there are no negative impacts on air, water, soil quality and ambience are envisaged due to the project activity.

Also as per the Central Pollution Control Board of India notification⁹ wind projects falls under White Category and are practically non-polluting.

Documentation provided by project participant

MR Version 02

DOE assessment
Date: 20/10/2018

As per the Central Pollution Control Board of India notification¹⁰ wind projects falls under White Category and are practically non-polluting. However, DOE still done the assessment and the result is presented in the concerned section of the FVR. Assessment team found being a renewable project the project has positive impact on environment and also have positive social impact like it helped people getting job in the nearby area. CAR is thus closed.

CAR ID

07

Date: 13/10/2018

Description of CAR

During the document review it is observed that "Local Stakeholder" consultation details are missing in the MR. Moreover, supporting documents are not shared with DOE. Corrective action is sought in this regard in the respective section of the MR.

Project participant response
Date: 19/10/2018

The project proponents organized stakeholders meeting in order to take into account the concerns of the nearby villagers regarding the project implementation, at the time of validation of the project activity. As a part of continuous feedback from stakeholders, there were no major comments or protest raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region. The PP also placed a grievance register onsite in where the stakeholder can put down his/her complain and the same if found genuine will be addressed immediately.

⁹ http://envfor.nic.in/sites/default/files/Latest_118_Final_Directions.pdf

¹⁰ http://envfor.nic.in/sites/default/files/Latest_118_Final_Directions.pdf

Documentation provided by project participant	
MR Version 02	
DOE assessment	Date: 20/10/2018
The project is now undergoing 2nd Verification and the stakeholders meeting was done at the time of validation. However, as a Continuous measure to improve stakeholder's wellbeing in the nearby area PP has place grievance register onsite to collect any negative or positive feedback from them. Assessment team checked the register and found that no such negative instances were recorded on the contrary local people are happy with the implementation of the project as it has improved their standard of Living and also impacted their livelihood in a positive manner. Local people were also getting Job from the implementation of the project activity which otherwise was not available and basically people were involved in labour work in the agricultural field. The result of the agricultural job is that people are not getting continuous financial support as agriculture here in India is whether specific. However the income is now continuous after getting placement in the projects and people are happy because of the same. CAR is thus closed.	

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Lead Auditor/Technical Expert	OR	Das	Sukanta	TQC-Outsourced entity	Yes	Yes	Yes	Yes

Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR)	EI	Shen	Simon	Applus+ Certification
2.	Approver	IR	Sendin	Juan	Applus+ Certification B.U. Managing Director

Short CVs of the Team:

- Mr. Sukanta DAS, has done M. SC in (Electronics and Photonics) and M. Tech in (Energy technology) from Tezpur Central University/ Indian Institute of technology Bombay in India. He is a certified lead auditor for ISO 14001 EMS LA and ISO 9001 QMS LA from International registry for Certified Auditors (IRCA) and Certified Lean Management practitioner from Quality Council of India (QCI). He has more than Nine (9) years of working experience at TUV NoRD/ Reconsult/CRA/APPLUS certifications under various categories of projects stating from Renewable to waste to supercritical projects. He was JI/ CDM Lead Assessor in TUV NoRD and was involved in more than 100 CDM validation and verifications activities in Gold Standard, VCS, CDM projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1, 13 technical areas 1.2/1.1/13.1. Currently he is associated with True Quality Certifications Private Limited and is empanelled with APPLUS certification to carry out GHG audit.
- Meng (Simon) Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ LGAI for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ LGAI, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for 3.5 years

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CM	Combined Margin
CMS	Central Monitoring system
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming potential
RBI	Reserve Bank Of India
PP	Project Participant

APPENDIX 5: CALIBRATION DETAILS OF THE METERS

	Meter 1	Meter 2	Meter 3	Meter 4	Meter 5
Serial No.	GJU 04175	GJU 04176	GJU 01470	KAB 11082	GJU 67589
Type	E3M021	E3M021	E3M021	E3M021	E3M021
Make	Secure	Secure	Secure	Secure	Secure
Accuracy Class	0.2 s	0.2 s	0.2 s	0.2 s	0.2 s
Calibration Date	06/09/2013	06/09/2013	06/09/2013	06/09/2013	06/09/2013
Validity	05/09/2016	05/09/2016	05/09/2016	05/09/2016	05/09/2016
Calibration Date	30/09/2016	30/09/2016	30/09/2016	30/09/2016	30/09/2016
Validity	29/09/2019	29/09/2019	29/09/2019	29/09/2019	29/09/2019

Assessment team found that since metering arrangement, monitoring practice, accuracy class, calibration interval is under control of state electricity board, the PP does not have all calibration certificates available with them. It is to be noted here that due to delay in calibration, error factor has been applied on net electricity values to retain conservativeness for the month of Sep 2016.