

VALIDATION OF “RENEWABLE ENERGY PROJECT BY LNB GROUP”

Document Prepared By



EPIC Sustainability Services Private Limited

Project Title	Renewable Energy Project by LNB Group
Version	01
Report ID	ESSPL/VCS/2015/014

Report Title	Renewable Energy Project by LNB Group
Client	EKI Energy Services Limited
Pages	53
Date of Issue	<i>29-March 2015</i>
Prepared By	EPIC Sustainability Services Pvt. Ltd.
Contact	41, Anugraha, 1 st Cross, Sundarnagar, Near BEL Circle, Bangalore-560054, Karnataka, India
Approved By	Mr. K. Sudheendra (Head-Operations)
Work Carried Out By	Mr. A. Prabu Das (Lead Auditor) Mr. R Vijayaraghavan (Auditor) Dr. R. Madhukar (Technical Reviewer)

Summary:

EPIC Sustainability Services has been contracted by M/s. **EKI Energy Services Limited**, the project proponent, to carry out the validation of the project - “Renewable Energy Project by LNB Group”, with regard to the relevant requirements of VCS programme guidelines and standard (VCS standard version 3.5, VCS Validation and Verification Manual version 3.1 & VCS program guide version 3.5). Relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting has been applied for validation.

The baseline and monitoring methodology ACM0002, version 16.0: “**Grid-connected electricity generation from renewable sources**”, an approved methodology of UNFCCC CDM program is applied. The proposed project activity involves the installation of Wind and Solar Power Projects. The total installed capacity of the project is 27.20 MW; which involves installation and operation of 18 Wind Turbine Generators (WTGs) with total capacity of 22.20 MW & 1 Solar power plants with total capacity of 5.00 MW located at different states; Rajasthan and Maharashtra in India. Thus the project activity displaces equivalent amount of electricity that would otherwise be generated in the fossil fuel dominated grid and leads to an estimated annual GHG emission reductions of 47,055 tCO₂e and a total of 470550 tCO₂e during the crediting period of 10 years.

A risk based approach has been followed to perform this validation. In the course of validation, 04 Corrective Action request (CAR) and 07 Clarification Requests (CLs) were raised and successfully closed. The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and stakeholders have provided EPIC Sustainability Services with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (India) and all relevant VCS and UNFCCC requirements for CDM
- The project additionality is sufficiently justified in the PD.
- The monitoring plan is transparent and adequate.
- The calculation of the emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 470550 tCO₂e are most likely to be achieved within the 10 years crediting period.

The conclusions of this report shows that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation. This validation is based on the information made available to EPIC and the engagement conditions are detailed in this report. Hence, EPIC cannot be held liable by any party for decisions made or not made based on this report.

Table of Contents

CONTENTS

1	Introduction	5
1.1	Objective	5
1.2	Scope and Criteria	5
1.3	Level of Assurance.....	5
1.4	Summary Description of the Project	6
2	Validation Process	6
2.1	Method and Criteria.....	6
2.2	Document Review	7
2.3	Interviews	7
2.4	Site Inspections	8
2.5	Resolution of Findings.....	8
2.6	Forward Action Requests.....	8
3	Validation Findings.....	9
3.1	Project Details	9
3.2	Application of Methodology	15
3.2.1	Title and Reference	15
3.2.2	Applicability	16
3.2.3	Project Boundary.....	21
3.2.4	Baseline Scenario	22
3.2.5	Additionality	22
3.2.6	Quantification of GHG Emission Reductions and Removals	37
3.2.7	Methodology Deviations.....	39
3.2.8	Monitoring Plan	39

3.3	Non-Permanence Risk Analysis.....	42
3.4	Environmental Impact	42
3.5	Comments by Stakeholders	42
4	Validation conclusion	43
APPENDIX A: Resolution of findings		45
APPENDIX B: References.....		52

1 INTRODUCTION

1.1 Objective

EPIC Sustainability Services has been contracted by EKI Energy Services Limited, the project proponent (PP), to undertake the validation of the renewable energy project comprising wind and solar power projects titled “**Renewable Energy Project by LNB Group**”.

The purpose of this validation is to have an independent third party assessment of whether the project activity conforms to the qualification criteria set out in the VCS Version 3.5 standard to attain real, measurable, additional and permanent emission reductions.

The validation statement/opinion is a written assurance that the project complies with all the applicable VCS requirements and has the ability to generate the emission reductions stated over the project’s crediting period.

The validation followed the requirements of the current version of the VCS Standard Version 3.5 and VCS program guide 3.5 to ensure the quality and consistency of the validation work and the report.

1.2 Scope and Criteria

The scope of validation was an independent and objective review of the project’s VCS PD. In particular, the specific objectives of the validation work involve:

- To verify that the project activity meets the requirements of VCS Standard Version 3.5, VCS Validation and Verification Manual version 3.1 and VCS program guide 3.5 including additionality, proof of title and compliance with local laws
- To assess whether the baseline and monitoring plan are in conformance with the applied methodology from the VCS approved GHG program
- To certify that the information presented are completed, consistent, transparent and free of omission or material error

The information in the PD is reviewed against the criteria of VCS Standard 3.5, the VCS program guide 3.5 and the applied consolidated baseline and monitoring CDM methodology ACM002, version 16.0. EPIC has performed validation based on a risk based approach focusing mainly on the significant risks to meet the qualification criteria and the ability to generate Verified Carbon Units (VCUs).

The work carried out by EPIC is free from any conflict of interest.

1.3 Level of Assurance

In line with VCS standard requirements and as per ISO 14064-3:2006 paragraph A.2.3.2, a “reasonable level of assurance” is defined for the validation of the project. This implies that, based on the process and procedures conducted, review of the VCS-PD and supporting evidences made available to the verifier and information collected through performing interviews and during the on-site assessment, EPIC confirms that the information in the Project document.

- is materially correct and is a fair representation of the project information, and
- is prepared in accordance with VCS requirements,
- is prepared based on the approved methodology

The validation work is carried out as per this requirement and details are presented in the Validation statement in section 2 below.

1.4 Summary Description of the Project

The proposed project activity involves the installation of Wind and Solar Power Projects. The total installed capacity of the project is 27.20 MW; which involves the new installation and operation of 18 Wind Turbine Generators (WTGs) with total capacity of 22.20 MW in the states of Rajasthan and Maharashtra & 1 Solar power plant with a capacity of 5.00 MW in the state of Rajasthan, in India. The project is a Green field project which results in an estimated annual average GHG emission reduction of 47,055 tonnes of CO₂.

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation process consists of the following phases:

- i) a document review of the project design documents, supporting documents and preparation of validation protocol;
- ii) on-site visit to the project activity and interviews with project developer and project consultant; and
- iii) resolution of outstanding issues and the issuance of final validation report and opinion

In order to ensure transparency, a validation protocol was prepared for the project according to the VVS version 7.0 verification requirements and VCS Standard version 3.5. The protocol serves the following purposes:

- it organizes, details and clarifies the requirements that a CDM or VCS 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 completed validation protocol is enclosed in Appendix of this report.

During the validation, non-fulfilment of the verification protocol criteria or identified risks to the fulfilment of project objectives were raised as either CAR or CR. Corrective Action Requests (CAR) were issued, where:

- i) mistakes had been made that directly impacted on the project results; or
- ii) CDM and VCS requirements had not been met; or
- iii) there was a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The Clarification Requests (CR) were issued where additional information was needed to clarify issues, and Forward Action Requests (FAR) for issues relating to project implementation that required review during the first verification of the project activity.

The following team members were involved in identifying the following:

Name	Qualification	Role	Components reviewed
Mr. A. Prabu Das	TA 1.2	Lead Auditor	Completeness check, desk review, onsite inspection, Interview with project representatives, issuance of findings, report preparation
Mr. R. Vijayaraghavan	TA 1.2	Auditor	Completeness check, desk

			review
Dr. R. Madhukar	TA 1.2	Technical Reviewer	Technical review

2.2 Document Review

During the document review, EPIC has applied standard auditing techniques to assess the quality of information provided. On receipt of the project description from the PP, the completeness check of information made available as per VCS Version 3.5 requirements was reviewed. A desk review was further carried out to assess the following:

- The project details as per VCS PD template
- Appropriateness of methodology applied
- Compliance with relevant laws and regulations
- Correctness of application of baseline and monitoring methodology
- Demonstration of additionality
- Monitoring plan
- Stakeholder comments
- Proof of title
- Other external documents like grid emission factor, etc. where applicable.

The VCS PD^{01/} version 01 dated 11th March 2015 was initially reviewed and EPIC requested the PP to present the supporting information and documents and such additional information and documents that were also reviewed by EPIC. The documents reviewed by EPIC are listed below. Through the process of the verification, the revised VCS PD^{01/} and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by EPIC. EPIC reviewed the final version of the VCS PD^{01/} version 03 dated 24th March 2015 to confirm that all changes agreed have been incorporated.

Further, prior to the onsite visit, it was verified by the validation team that the project was listed on March 11, 2015 in the VCS pipeline in line with the requirements.

http://www.vcsprojectdatabase.org/#/pipeline_details/PL1418

The appendix B contains the details of the documentation reviewed during the verification

2.3 Interviews

The details of the on-site assessment conducted on 13th and 14th March 2015 are as follows:

Name	Organization	Topic
Mr. Praveen Kumar Kodali (Assistant Manager – Projects)	M/s. LN Bangur Group of Companies	• Project implementation and management • Site tour • Confirmation of technical specifications of the WTG and Solar panels • Baseline discussion • Additionality discussion • Data management and reporting systems • Data verification • QA/QC, management systems, calibration, training
Mr. Rohan Jhawar (Principal Executive)		

		• Data archiving • Environmental and social issues • Local stakeholder consultation process and discussion
Mr Deepak Jain	M/s EKI Energy Services Limited	• Confirmation of the project activity design • Baseline discussion

2.4 Site Inspections

EPIC has conducted on-site inspection in order to confirm all physical features of the project activity proposed in the VCS PD are in place.

An on-site assessment was conducted on 13th and 14th March 2015 as a part of validation activity which involved:

- Implementation of project activity
- Technical detail of project activity
- Statutory clearances
- Sustainability criteria
- Local stakeholders meeting process
- Baseline determination and additionality
- Monitoring plan.

2.5 Resolution of Findings

Based on the site inspection and review of documents and records including the monitoring plan, issues that need to be further elaborated upon, researched or added in order that the project activity meets the VCS Version 3 requirements and can achieve credible emission reductions is identified, discussed and to be resolved by the project proponent.

A Corrective Action Request (CAR) is raised if the VVB identifies a material discrepancy or non-conformance that the project proponent must address.

A Clarification request (CL) is raised if the project reporting lacks transparency and further information is needed to determine if a material discrepancy is present.

On receipt of response and revised PD from the project proponent, the adequacy of compliance with VCS and the methodology requirements is checked. Closure of comments raised occurs only if the response provided and corrections made fully comply with the stated requirements of the VCS Version 3 standard and the methodology applied.

During the course of validation, 04 CARs and 07 CLs were raised and closed successfully. The list of CARs/CLs/FARs raised and the response provided, the mean of validation, reasons for their closure and references to correction in the PD are provided in Appendix A of this report.

2.6 Forward Action Requests

A Forward Action Request (FAR) is issued when certain issues related to project implementation should be reviewed during the first verification. This, however, has no impact upon the completion of the current validation activity.

No FAR has been raised during the validation of the project activity.

3 VALIDATION FINDINGS

3.1 Project Details

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

According to the VCS version 3.5 Guidelines and the list of Sectoral Scopes of the UNFCCC, the project is applicable under the following activity categories:

According to Annex A of the Kyoto Protocol, the project is applicable under the sectoral scope 1 - Energy Industries (renewable/ non-renewable sources).

The proposed project activity involves the installation of Wind and Solar Power Projects. The total installed capacity of the project is 27.20 MW; which involves the new installation and operation of 18 Wind Turbine Generators (WTGs) with total capacity of 22.20 MW in the states of Rajasthan and Maharashtra & 1 Solar power plant with a capacity of 5.00 MW in the state of Rajasthan, in India. The project is a Green field project which results in an estimated annual average GHG emission reduction of 47,055 tonnes of CO₂e.

Wind Power Project Technology Details –

The technology employed, converts wind energy to electrical energy. In wind power generation, energy of wind is converted into mechanical energy and subsequently into electrical energy. The technology is an environment friendly technology since there are no GHG emissions associated with the electricity generation.

The project activity comprises a total of 18 WTG's of Inox Wind Limited & Gamesa India Limited. The project activity has been commissioned^{106/}.

Technical details for WT 2000 DF¹, 2000 kW Machine

Particulars	Details
Model	INOX DF 93.3
Rated power	2000 kW
Cut-in wind speed	3 m/s
Cut-out wind speed	20 m/s
Rated wind speed	≤11.5 m/s
Survival wind speed	52.5 m/s

¹ <http://www.inoxwind.com/products/>

Hub height	80 m
Rotor Speed	15.9 rpm
Diameter	93.3 m
Swept area	6,795 m ²
Design Lifetime	20 years

Technical details for Gamesa G-58², 850 KW Machine

Particulars	Details
Model	Gamesa G58 850kW
Rated power	850kW
Cut-in wind speed	3 m/s
Cut-out wind speed	23 m/s
Rated wind speed	From 14.6 rpm to 30,8 rpm
Diameter	58 m
Swept area	2642 m ²
Design Lifetime	20 years

Solar Power Project Technology Details –

The technology employed by the solar power plant involves, converting solar energy into electrical energy. The technology is an environment friendly technology since there are no GHG emissions associated with the electricity generation.

The proposed PV project utilises crystalline silicon based solar PV modules. The project activity is a Greenfield installation and there was no electricity generation at the project site prior to its implementation. The entire solar installation package will have a 25 years design life as certified by the manufacturers. Technical specifications of typical modules will be as follows:

² http://www.vgenergy.co.uk/files/9913/6119/7835/Gamesa_Brochure.pdf

Technical specifications of typical modules will be as follows:

1. Solar Panels: IBC PolySol 245 (Ecoline)³

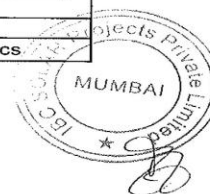
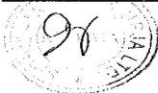
No. Of Panels installed of each type = 245 Wp - 22440 nos.

2. Inverters: M/s Sungrow Power Supply Co. Ltd.⁴

No. of Inverter Installed = 156 Nos.

Details of equipment installed are provided below:

Pos.	Description – List of Equipment IMPORTED for Transportation	Quantity	Unit
	SOLAR GENERATOR AND DC-SYSTEM		
1	IBC PolySol 245 (Ecoline)	22440	Pcs
2	IBC PolySol 245 (Ecoline)	20	Pcs
3	IBC FlexiSun 1x4mm ² PV1-F	139500	M
4	MC-plug KST 4/6II	1970	Pcs
5	MC-socket PV-KBT 4/6II	1970	Pcs
	INVERTERS AND AC-SYSTEM		
6	Sungrow SG 30KTL	156	Pcs
7	Sealing Cap PV-SVK4	650	Pcs
8	Sealing Cap PV-BVK4	650	Pcs
	Note: Evacuation to be provided by customer!		
	POTENTIAL EQUALIZATION AND LIGHTNING PROTECTION		
9	Passive lightning protection system	1	Pcs
	COMMUNICATION AND MONITORING		
10	Patch cable UV-resistant, 2m	156	Pcs
11	CAT 7 Outdoor cable 4x2x0.56(AWG23)	3500	M
12	Featured communication cabinet	1	Pcs
13	SolControl Pro DSL / Ethernet	7	Pcs
14	Sungrow driver for SolControl	7	Pcs
15	Meteo compact weather station	1	Pcs
16	Irradiation sensor 10V	2	Pcs
17	Module temperature sensor	3	Pcs
18	Pyranometer CMP11, 10m wire	3	Pcs
19	Amplifier f. Pyranometer CMP11	3	Pcs
20	Service setup fee from 1MWp	1	Pcs
21	IBC SolPortal, from 1500KWp	5497.8	KWp
	Note: DSL telephone line to be provided by customer!		
	OTHERS		
22	International Transport fees	1	Pcs



³ <http://karl-meyer-energie.de/files/2013/06/Datenblatt-Solarmodule-poly-IBC-PolySol-240-DS.pdf>

⁴ <http://www.sungrowpower.com/sungrow-english/product.php?page=2&cate=12&product=103&menu=1>

The purpose of the project activity is to generate energy electricity by the utilization of wind velocity and solar power as applicable and selling the generated energy to the respective Grid. The project activity will generate greenhouse gas (GHG) emission reductions by avoiding CO₂e emissions which otherwise would have been generated by the operation of grid connected power plants and by the addition of new sources. Hence the project is anticipated to fulfil VCS conditions.

Project proponent and other entities involved in the project:

Project proponent for this project activity is M/s. EKI Energy Services Limited.

Project start date:

The earliest date of commissioning^{/06/} amongst the sub-projects (WTG and Solar power plant) is 31/03/2013 and hence this is the start date of the project activity.

Project crediting period:

The crediting period of the project activity is for 10 years and this may be renewed at most twice. The 01st crediting period is from 31/03/2013 to 30/03/2023.

Project scale and estimated GHG emission reductions or removals:

The estimated annual emission reductions for the project activity are 47055 tCO₂e which is less than 300,000 tCO₂e. Hence the category is applicable under "Project".

Project Location and identification details:

Investor	Capacity (MW)	Machine ID	Location	Latitude			Longitude		
				Deg	Min	Sec	Deg	Min	Sec
Manifold Agricrops Pvt. Ltd.	2.00	DAN-T-12	Malusar, Dangri Area, Jaisalmer, Rajasthan	26	33	38.2	71	21	1.5
	2.00	DAN-T-59		26	31	23.4	71	25	55.0
	2.00	DAN-T-60		26	31	6.8	71	25	58.3
	2.00	DAN-T-61		26	31	36.2	71	25	44.3
	2.00	DAN-T-88		26	31	17.6	71	27	0.6
Parmarth Wind Energy Pvt. Ltd.	0.85	GAL-03	Bhendawade, Shahuwadi, Kolhapur, Maharashtra	17	0	13	73	55	16
	0.85	GAL-06	Altur, Shahuwadi, Kolhapur,	16	59	59	73	55	15
	0.85	GAL-07		16	59	51	73	55	19

	0.85	GAL-08	Maharashtra	16	59	45	73	55	18
	0.85	GAL-09		16	59	56	73	54	59
	0.85	GAL-10		16	59	50	73	54	59
	0.85	GAL-18		17	0	12	73	55	36
	0.85	GAL-22		17	0	7	73	55	38
	0.85	GAL-23		17	0	2	73	55	45
	0.85	GAL-24		16	58	53	73	54	52
	0.85	GAL-26	Karungale, Shahuwadi, Kolhapur, Maharashtra	16	58	48	73	54	49
	0.85	GAL-33	Kotoli, Shahuwadi, Kolhapur, Maharashtra	16	58	24	73	55	55
Sidhidata Power LLP	2.00	MVT-83	Jath, Jath, Sangli, Maharashtra	17	04	8.1	75	15	17.3
Sidhidata Solar Urja Ltd.	5.00	-	Bhadla, Phalodi, Jodhpur, Rajasthan	27	30	0	71	54	0

Project Investors	Capacity (MW)	Technology	Purpose	Regional Grid	State
Manifold Agricorps Pvt. Ltd.	5 x 2.00	Wind	Sale to EB	NEWNE	Rajasthan
Parmarth Wind Energy Pvt. Ltd.	12 x 0.85	Wind	Sale to EB	NEWNE	Maharashtra
Sidhidata Power LLP	1 x 2.00	Wind	Sale to EB	NEWNE	Maharashtra
Sidhidata Solar Urja Ltd.	5.00	Solar	Sale to EB	NEWNE	Rajasthan
Total Capacity of the Project	27.20 MW				

Conditions prior to project initiation:

The project is a green field project. The same was confirmed during the on-site visits and through review of purchase orders, commissioning certificates and power purchase agreements.

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

There is no such compliance requirement with an emission trading program or any binding limits on GHG emissions for the project activity in India (host country) as it is a non annex 1 country. The project is a voluntary initiative by the PP and has not been implemented to meet any local / national laws or regulatory compliances.

The project has obtained valid consents for the installation and operation from the state nodal agencies and is in compliance with local laws and regulations.

Ownership and other programs:

Right of use:

The project activity is a bundled project involving four individual sub-projects who are the owners of the project activity, however for the purpose of availing VCS benefits the individual sub-projects have authorised EKI Energy Services Limited to act as the project participant on their behalf. The ownership^{/03/} of the project activity and documents showing proof of title and ownership of the emission reductions are as follows:

- Certificate of Incorporation^{/05/}
- ODA letter which details the relationship of the individual sub-projects with EKI Energy Services Limited^{/12/}
- Purchase order of WTGs and Solar panels^{/07/}
- Commissioning certificate of the WTGs and Solar power plant^{/06/}
- Power Purchase Agreement with respective State Electricity Board^{/09/}

Emissions trading programs and other binding limits:

PP has given a declaration^{/12/} that the net GHG emission reductions generated by the project activity will not be used for compliance with any other emissions trading program or to meet binding limits on GHG emissions.

Participation under other GHG programs:

PP has given a declaration^{/12/} that the project activity has not been registered and is not seeking registration under any other GHG emission program to avail carbon benefits during the crediting period of the project activity. Validation team has cross checked the same with CDM pipeline and gold standard project listing and found project is not listed in any of other GHG programs.

Other forms of environmental credit sought or received:

PP has given a declaration^{/12/} that the project proponent hereby corroborates that the project activity has not created or sought or received any other form of environmental credit.

Rejection by other GHG programs:

PP has given a declaration^{/12/} that the project proponent hereby corroborates that the project activity has not been rejected by any other GHG program

Eligibility criteria for grouped projects:

The project activity is not a grouped project.

Commercially sensitive information:

PP has stated in the VCS PD^{/01/} section 1.13 that there is no such commercially sensitive information.

Any further information:

The description contained in the VCS PD^{/01/} of the project activity provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation. The project description was verified by EPIC by assessment of the PD and the on site visit and review of the supporting documents listed in section Appendix B. As a result, EPIC confirms that the project description of the project contained in the VCS PD^{/01/} to be complete and accurate. The VCS PD^{/01/} complies with the relevant forms and guidance for completing the VCS PD.

3.2 Application of Methodology

3.2.1 Title and Reference

CDM approved methodology has been applied for the project activity.

Title: Grid-connected electricity generation from renewable sources

Type: I – Renewable energy project

Category ACM0002: Grid-connected electricity generation from renewable sources - Version 16.0

Sectoral Scope: 01 Energy industries (renewable / non renewable sources)

Tools referenced in the applied methodology:

1. Tool for the demonstration and assessment of additionality - Version 07.0.0, EB 70, Annex 8

<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf>

2. Tool to calculate the emission factor for an electricity system - Version 04.0, EB 75, Annex 15

<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v4.0.pdf>

3.2.2 Applicability

Applicability of the applied methodology ACM002, version 16⁵ is discussed below:

Applicability condition	Justification of the project activity	Conclusion
1. This methodology is applicable to grid-connected renewable energy power generation project activities that: a. Install a Greenfield power plant; b. Involve a capacity addition to (an) existing plant(s); c. Involve a retrofit of (an) existing operating plants/units; d. Involve a rehabilitation of (an) existing plant(s)/unit(s); or e. Involve a replacement of (an) existing plant(s)/unit(s).	The project activity is installation of a new grid connected wind/solar power plant⁶ at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant) and hence this criterion is applicable.	The proposed activity is a, Greenfield project, which involves the installation of a new Grid - connected renewable power generation facility comprising of Wind and solar. From the on-site visit to the project sites and review of the commissioning certificates^{/06/} and Power Purchase Agreements^{/09/}, it was confirmed that the project activity is a new wind and solar energy unit supplying electricity to the NEWNE grid (greenfield). Therefore, the project activity complies with condition 1 (a).
2. The methodology is applicable under the following conditions: a. The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or	a. The proposed project activity is an installation of a new grid connected wind power plant⁷ and solar project. Hence this condition is met. b. The project does not involve any capacity	The proposed activity is a, Greenfield project, which involves the installation of a new Grid - connected renewable power generation facility comprising of Wind and solar. From the on-site visit to the project sites and review of the purchase orders^{/07/}, commissioning certificates^{/06/} and Power Purchase Agreements^{/09/}, it

⁵ <https://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHLAR6MJ6VEU83>

⁶ The same can be referred to from the commissioning certificates

⁷ The same can be referred to from the commissioning certificates

without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; b. In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	additions, retrofits or replacements and therefore this condition is not applicable⁷.	was confirmed that the project activity is a new wind and solar energy unit supplying electricity to the NEWNE grid (greenfield) and does not involve any capacity addition / retrofit / replacement of an existing plant. Therefore, the project activity complies with condition 2(a).
3. In case of hydro power plants, one of the following conditions shall apply: a. The project activity is implemented in existing single or	The project activity is a grid connected wind/solar power project⁷ and not a hydro power plant. Therefore, these criteria are not relevant for the project activity.	It was confirmed from the onsite visit and through review of purchase orders^{107/} and commissioning certificates^{106/} that the project activity is a wind and solar power plant and not a hydro power plant.

multiple reservoirs, with no change in the volume of any of the reservoirs; or b. The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m²; or c. The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or d. The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is		Therefore, this criterion is not relevant to the project activity.
--	--	---

greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.		
4. In the case of integrated hydro power projects, project proponent shall: Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power	The project activity is a grid connected wind/solar power project⁷ and not a hydro power plant. Therefore, these criteria are not relevant for the project activity.	It was confirmed from the onsite visit and through review of purchase orders^{107/} and commissioning certificates^{106/} that the project activity is a wind and solar power plant and not a hydro power plant. Therefore, this criterion is not relevant to the project activity.

project; or • Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.		
--	--	--

5. The methodology is not applicable to: • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • Biomass fired power plants/units.	• The project activity is installation of a new grid connected wind/solar power project⁷ and does not involve switching from fossil fuel to renewable energy and hence this criterion is not relevant to the project activity. • This is a wind/solar power plant⁷ and not a biomass fired plant and hence this criterion is not applicable to the project activity.	The proposed project activity is not fuel switch project from fossil fuels to renewable energy sources, biomass fired power plants and the hydro power plant that result in new reservoir. From the on-site visit to the project sites and the commissioning certificates^{/06/} it was confirmed that the project activity is a new installation of a wind energy and solar project
6. In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.	The project activity is a new grid connected wind/solar power plant⁷ and not a retrofits, replacement or capacity additions and therefore this criterion is not applicable to the project activity.	It is confirmed that the project activity is a Greenfield plant and did not involve any retrofits, replacements or capacity additions, Therefore, this criterion is not applicable to the project activity.

Therefore, all the validation team concludes that all the applicability criteria of the methodology have been fulfilled by the project.

3.2.3 Project Boundary

According to the approved baseline and monitoring methodology “ACM0002”, “Grid-connected electricity generation from renewable sources”, version 16 the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to. The generated electricity will be delivered to the NEWNE grid through the connected sub-station. The project activity falls under NEWNE and the baseline for this project activity is a function of generation mix of the NEWNE

grid. The selection of NEWNE grid as the grid system boundary for the project activity is in line with the methodology.

The project activity is a renewable energy project and hence there are no emissions like CO₂ and CH₄ as such due to the implementation of the project activity (project emissions). The CO₂e emissions from electricity generation in fossil fuel fired power plants installed under southern grid that are displaced due to the project activity is considered as baseline emissions. The project boundary was found to be in accordance with the requirements of the applied methodology which was confirmed during the on-site visit.

Thus, the validation team concludes that the PD^{/01/} correctly describes the project boundary, including the physical delineation of the proposed CDM project activity and the information on each GHG source, sink and reservoir thereby complying with VVS requirement.

3.2.4 **Baseline Scenario**

According to the approved baseline and monitoring methodology “ACM0002”, “Grid-connected electricity generation from renewable sources”, version 16, the following is the baseline scenario for a new grid-connected renewable power plant/units: “the baseline scenario is 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 activity involves generation of electricity using WTGs and solar power plant and is in the process to sell it to NEWNE grid as confirmed through the application for the execution of Power Purchase Agreements^{/09/} between the sub-projects and the discom and commissioning certificates^{/06/}. In the absence of this project activity, same amount of electricity would have been generated by the operation of existing/proposed grid connected fossil fuel based power plants. The same was cross checked and confirmed by referring the CO₂ Baseline Database for the Indian Power Sector, User Guide (Version 10.0, December 2014) issued by Central Electricity Authority. The CEA data base used by the PP is accepted by the team as this is the latest version available at the time of submission of PD to DOE as per the “tool to calculate the emission factor for an electricity system”.

3.2.5 **Additionality**

According to the approved baseline and monitoring methodology “ACM0002”, the additionality of the project has been established applying the tool “Tool for the demonstration and assessment of additionality”, version 07. The project proponent has stated the start date of the project activity as 31st March 2013 and submitted the commissioning certificate^{/06/} which is checked by the assessment team and found to be in order. The same is in line with VCS guideline and thus accepted by the assessment team.

As per the requirement of VCS the project needs to be intimated to the VCS board before the start of the validation process. The project entitled “Renewable Energy Project by LNB Group” is listed in the link http://www.vcsprojectdatabase.org/#/pipeline_details/PL1418 in VCS Project pipeline.

Identification of Alternatives:

According to the approved baseline methodology ACM0002 “Grid-connected electricity generation from renewable sources”, version 16 the baseline scenario is “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” and since it is prescribed in the approved methodology no further analysis is required as per CDM-VVS. The project proponent has justified the selection of the baseline scenario in line with the applied methodology and the same is deemed reasonable.

Solar project - Sidhidata Solar Urja Ltd.

The grid connected solar project falls under the positive list of additionality as per Para 29 of the applied methodology ACM0002, Version 16.0. Hence the application of simplified procedure to demonstrate additionality is accepted.

Further, with reference to Para 30 of ACM0002 Version 16.0

A specific technology in the positive list is defined as automatically additional if at the time of PDD submission any of the following conditions is met

(a) The percentage share of total installed capacity of the specific technology in the total installed grid connected power generation capacity in the host country is equal to or less than two per cent; or (b) The total installed capacity of the technology in the host country is less than or equal to 50 MW.

Total installed capacity of the specific technology (Solar) in the host country = 3002.668 MW

Total installed grid connected power generation capacity in the host country (India) = 258701.45⁹ MW

Therefore the Percentage share of the project technology in the host country is 1.16%.

This percentage share is less than 2% of the total installed grid connected power generation capacity in the host country

Hence, the project activity satisfies the condition (a) of para 30 and the solar project is automatically additional.

Wind projects

Investment analysis

Choice of approach

The PP has chosen to apply investment analysis to demonstrate the additionality of the project activity using the benchmark analysis method. PP has identified post tax equity IRR as the most suitable financial indicator. The project cannot apply simple cost analysis since the project brings revenue from the sale of electricity; also investment comparison analysis cannot be applied as the

⁸ <http://mnre.gov.in/file-manager/UserFiles/State-wise-Installed-Capacity-of-Solar-PV-Projects-under-various-Scheme.pdf>

⁹ http://www.cea.nic.in/reports/monthly/inst_capacity/jan15.pdf

alternative to the project activity is the electricity generated by new and existing grid connected power plants. Therefore, referring paragraph 19 of the investment analysis guideline “if the alternative to the project activity is the supply of electricity from grid this is not to be considered an investment and a benchmark approach is considered appropriate”. Since the project proponent is demonstrating the financial unattractiveness of the project and the project cost involves both equity and debt, equity IRR is considered appropriate indicator and accepted by the validation team.

Benchmark selection

As per paragraph 12 of the Guidelines on investment analysis, required/expected returns on equity are appropriate benchmarks for an equity IRR.

Following is stated in para 15 of Guidelines on the Assessment of Investment Analysis, version 05, *‘If the benchmark is based on parameters that are standard in the market, the cost of equity should be determined either by: (a) selecting the values provided in Appendix A; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors. The values in the table in Appendix A may also be used, as a simple default option, if a company internal benchmark is used.’*

In line with above, required/expected return on equity is an appropriate benchmark for equity IRR. Accordingly, project participant considered default values for the expected return on equity of 11.75% as given in para 1 and para 6 of Appendix A of Guidelines on the Assessment of Investment Analysis, version 05, which is expressed in real terms. It was also noted that these default values were available to the PP at the time of this investment decision. The equity IRR calculated is nominal equity IRR as escalation is considered in O&M cost. Accordingly PP converted the default benchmark which is in real terms into nominal terms by using the following equation

$$\text{Nominal Benchmark} = (1 + \text{Benchmark real}) \times (1 + \text{Inflation rate}) - 1$$

The validation team referred the source ‘Professional Management Education website /53/, the same equation is mentioned for converting real into nominal values. Hence the validation team considers the above equation as appropriate for converting real benchmark into nominal benchmark.

$$\text{Nominal Benchmark estimated} = (1 + 11.75\%) \times (1 + 5.90\%) - 1 = 18.34\%$$

As per the para 7 of Appendix A of Guidelines on the Assessment of Investment Analysis, version 05, states that “the inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period. If this information is not available, the target inflation rate of the central bank shall be used. If this information is also not available, then the average forecasted inflation rate for the host country published by the IMF (International Monetary Fund World Economic Outlook) or the World Bank for the next five years after the start of the project activity shall be used.” Reserve Bank of India (RBI) is Central Bank of host country (India) and it is India’s monetary authority.

The RBI is supervisor of financial system, issuer of currency and manages foreign exchange reserves of the country. Thus the inflation forecast by RBI can be considered as reliable and authentic. The WPI inflation forecasted by RBI for next 5 years and 10 years is given in below table:-

Wind Project Investor	Capacity (MW)	WPI-Mean Inflation forecast by RBI		Default value using Inflation Forecast		Default Value Benchmark
		5 Yrs.	10 Yrs.	For 5 Yrs.	For 10 Yrs.	
Manifold Agricorps Pvt. Ltd.	5 x 2.00	6.50%	5.90%	19.01%	18.34%	18.34%
Parmarth Wind Energy Pvt. Ltd.	12 x 0.85	5.90%	5.60%	18.434%	18.01%	18.01%
Sidhidata Power LLP	1 x 2.00	6.00%	5.60%	18.46%	18.01%	18.01%

So PP has used the forecasted inflation rate for 10 years published by the Reserve Bank of India (RBI) for the conservative estimation of the benchmark. Thus the validation team considers that RBI inflation forecast for 10 years as appropriate for the project activity. EPIC verified all the above said documents and confirmed that the benchmark identified to compare the financial attractiveness of the project activity is appropriate.

Choice of financial Indicator

PP has chosen post-tax equity IRR as the financial indicator for proving the additionality. The validation team assessed the timing of availability of the input values such as capacity, number of machines, project cost, O&M cost and its escalation, tariff, Tax Depreciation rate, Book depreciation rate and Income tax rate, and found that the values were readily available to the investors during the investment decision meeting in which the investor took the investment decision. Table below provides the explanation and justification for the applied values for the project activity.

For sub-project 1: Manifold Agricorps Pvt. Ltd.

Parameter	Unit	Value	Validation assessment
Capacity of each WTG	kW	2000	Verified against offer letter ^{/04/} and cross verified against the purchase order ^{/07/} placed by the PP to the technology supplier.
No of WTGs	NA	5	Verified against offer letter ^{/04/} and cross verified against the purchase order ^{/07/} placed by the PP to the technology supplier. The same has been confirmed during onsite visit.
Total capacity	MW	10	Verified against offer letter ^{/04/} and cross verified against the purchase order ^{/07/} placed by the PP to the technology supplier. The same has been confirmed

			during onsite visit.
Plant Load Factor	%	20.00	The annual PLF applied is considered from the third party assessment certificate ^{/13/} . The validation team verified the document and found to be in line with the requirements of paragraph 3b of “Guidelines on Reporting and Validation of Plant Load Factors” EB 48 Annex 11.
Period of assessment	Years	20	The technical life of the WTG is 20 years and this has been confirmed from the project life mentioned in the by the declaration provided by technology supplier. Therefore, financial analysis carried for 20 years is acceptable
Deration from 6th, 10th, 14th, 18th year	%	1.25	The validation team has reviewed the RERC tariff orders ^{/10/} and found that the applied rate was found to be correct which is in accordance with paragraph 6 of EB 62 Annex 5. The validation team also assessed the equity IRR with zero deration rates and found that the resultant equity IRR does not cross the benchmark.
Tariff	INR/k Wh	5.18	The values used based on the RERC tariff order ^{/10/} available at the time of investment decision. The tariff order is the document through which the State (Rajasthan) Electricity Regulatory Commission determines the tariff rate applicable for wind power projects. The tariff order ^{/10/} is a publicly available document and available at the time of investment decision. The validation team also crosschecked the tariff with corresponding power purchase agreements and found that the value is exactly matching. The value used for the financial analysis is acceptable to the validation team. Further, an increase in 10% of the tariff has been covered under sensitivity analysis.
Operation and maintenance	INR million	8.71	It is verified against offer letter ^{/04/} from the technology provider to the PP. The validation team has cross verified against the operation and maintenance agreement signed between the PP and the service provider ^{/14/} , and found that the value of O&M cost considered for project is appropriate. PP has also subjected the O&M cost to sensitivity; and the validation team observed that even with 100% variation in O & M cost in the sensitivity analysis the equity IRR is below the benchmark. Therefore, the O & M cost as per offer letter is acceptable by the validation team. However, the value is accepted as per Guidance of the ‘guidelines on the assessment of investment analysis’.

Escalation in O&M cost	%	5.00	It is verified against offer letter ^{/04/} from the technology provider to the PP. The validation team has cross verified against the operation and maintenance agreement signed between the PP and the service provider ^{/14/} , and found that the value of escalation in O&M cost considered for project is appropriate. PP has also subjected the O&M cost to sensitivity; and the validation team observed that even with 100% variation in O & M cost in the sensitivity analysis the equity IRR is below the benchmark. Therefore, the O & M cost as per offer letter ^{/04/} is acceptable by the validation team.
Project cost	INR million	580	The offer letter ^{/04/} from technology supplier was available at the time of investment decision. The project cost includes, supply of WTG, erection and commissioning of the WTG, power evacuation and land cost. Further, an increase in 10% of the project cost has been covered under sensitivity analysis. Therefore, project cost was found acceptable as per the offer letter.
Insurance cost	% on project cost	0.15	During the time of investment decision PP has considered 0.15% of the total project cost as insurance cost. The value was based on General Rules and Regulation of Tariff advisory committee. Further the validation team has ensured that insurance has been calculated as per the TAC order.
Book depreciation	INR million	26.10	PP has calculated book depreciation based on the residual value of machinery as 10% and calculating it by Straight Line Method (SLM) as per RERC tariff order ^{/10/} . The validation team has cross checked the same and found to be correct and hence accepted.
Salvage value	%	10	PP has sourced the value as mentioned in the RERC tariff order ^{/10/} . As per the tariff order the depreciation is allowed up to a maximum of 90% of the capital cost; and hence, salvage value considered (10%) at the time of investment decision is appropriate. The validation team has cross checked the same and found to be correct and hence accepted.
Debt: Equity	%	70:30	The validation team has reviewed the RERC tariff orders ^{/10/} and found that the applied rate was found to be correct which is in accordance with paragraph 6 of EB 62 Annex 5. However, a sensitivity analysis has been performed covering the mentioned value. Hence, the debt equity ratio considered in the investment analysis is acceptable to the validation
Interest rate	%	12.3	The interest rate 12.30% has been considered for the investment analysis base on the RERC tariff order ^{/10/} available at the investment decision. The validation team has cross verified the same with the loan

			sanction letter. As per the loan sanction letter an interest rate of 11% fixed for the first three years and thereafter fully floating is applicable. Further, the validation team has checked the value by applying the actual value and found to be additional.
Corporate tax rate	%	33.99	The tax rate is sourced from Income Tax Act and it is cross checked and found to be correct which was applicable at the time of investment decision.
MAT	%	20.96	The tax rate is sourced from Income Tax Act and it is cross checked and found to be correct which was applicable at the time of investment decision.
Service tax	%	12.36	The tax rate is sourced from Income Tax Act and it is cross checked and found to be correct which was applicable at the time of investment decision.
GBI	INR/kWh	0.5	GBI benefits (as per MNRE scheme) were not available at the time investment decision, however the validation team cross checked the impact on additionality by considering the GBI benefits and found that the resulting IRR is well within the benchmark.

For sub-project 2: Parmarth Wind Energy Pvt. Ltd.

Parameter	Unit	Value	Validation assessment
Capacity of each WTG	kW	850	Verified against offer letter ^{/04/} and cross verified against the purchase order ^{/07/} placed by the PP to the technology supplier.
No of WTGs	NA	12	Verified against offer letter ^{/04/} and cross verified against the purchase order ^{/07/} placed by the PP to the technology supplier. The project activity was initially conceived as 12.75 MW wind power project (15 X 850 kW); however, later the project capacity was revised to 10.20 MW (12X850 kW) as per the PP's internal decision. The revised capacity has been cross checked with the amended purchase order and the commissioning certificates ^{/06/} . The same has been confirmed during onsite visit.
Total capacity	MW	10.20	
Plant Load Factor	%	20.15	The annual PLF applied is considered from the third party assessment certificate ^{/13/} . The validation team verified the document and found to be in line with the requirements of paragraph 3b of "Guidelines on

			Reporting and Validation of Plant Load Factors” EB 48 Annex 11.
Period of assessment	Years	20	The technical life of the WTG is 20 years and this has been confirmed from the project life mentioned in the by the declaration provided by technology supplier. Therefore, financial analysis carried for 20 years is acceptable.
Deration after 10th year	%	5.00	Verified against the TERI report ^{/15/} . As per the report, “The efficiency of any rotating machine reduces due to ageing. A simplified norm of one time de-ration by 5% after 10 years can be considered to estimate net saleable energy”. The justification for considering 5% de-ration factor after 10 th year is accepted by the DOE. However, an increase in 10% of generation has been covered under sensitivity analysis.
Tariff	INR/k Wh	5.81	The values used based on the MERC tariff order ^{/11/} available at the time of investment decision. The tariff order is the document through which the State (Maharashtra) Electricity Regulatory Commission determines the tariff rate applicable for wind power projects. The tariff order is a publicly available document and available at the time of investment decision. The validation team also crosschecked the tariff with corresponding power purchase agreements and found that the value is exactly matching. The value used for the financial analysis is acceptable to the validation team. Further, an increase in 10% of the tariff has been covered under sensitivity analysis.
Operation and maintenance	INR million	10.79	It is verified against offer letter ^{/04/} from the technology provider to the PP. The validation team has cross verified against the operation and maintenance agreement signed between the PP and the service provider ^{/14/} , and found that the value of O&M cost considered for project is appropriate. PP has also subjected the O&M cost to sensitivity; and the validation team observed that even with 100% variation in O & M cost in the sensitivity analysis the equity IRR is below the benchmark. Therefore, the O & M cost as per offer letter is acceptable by the validation team. However, the value is accepted as per Guidance of the ‘guidelines on the assessment of investment analysis’.
Escalation in O&M cost	%	5.00	It is verified against offer letter ^{/04/} from the technology provider to the PP. The validation team has cross verified against the operation and maintenance agreement signed between the PP and the service provider ^{/14/} , and found that the value of escalation in O&M cost considered for project is and appropriate. PP has also subjected the O&M cost to sensitivity; and the validation team observed that even with

			100% variation in O & M cost in the sensitivity analysis the equity IRR is below the benchmark. Therefore, the O & M cost as per offer letter is acceptable by the validation team.
Project cost	INR million	650.40	The offer letter ^{/04/} from technology supplier was available at the time of investment decision. The project cost includes, supply of WTG, erection and commissioning of the WTG, power evacuation and land cost. Further, an increase in 10% of the project cost has been covered under sensitivity analysis. Therefore, project cost was found acceptable as per the offer letter.
Insurance cost	% on project cost	0.98	During the time of investment decision PP has considered 0.15% of the total project cost as insurance cost. The value was based on General Rules and Regulation of Tariff advisory committee. Further the validation team has ensured that insurance has been calculated as per the TAC order.
Book depreciation	INR million	29.27	PP has calculated book depreciation based on the residual value of machinery as 10% and calculating it by Straight Line Method (SLM) as per MERC tariff order ^{/11/} . The validation team has cross checked the same and found to be correct and hence accepted.
Salvage value	%	10	PP has sourced the value as mentioned in the MERC tariff order ^{/11/} . As per the tariff order the depreciation is allowed up to a maximum of 90% of the capital cost; and hence, salvage value considered (10%) at the time of investment decision is appropriate. The validation team has cross checked the same and found to be correct and hence accepted.
Debt: Equity	%	70:30	The validation team has reviewed the MERC tariff orders ^{/11/} and found that the applied rate was found to be correct which is in accordance with paragraph 6 of EB 62 Annex 5. However, a sensitivity analysis has been performed covering the mentioned value. Hence, the debt equity ratio considered in the investment analysis is acceptable to the validation.
Interest rate	%	12.87	The interest rate 12.87% has been considered for the investment analysis base on the MERC tariff order ^{/11/} available at the investment decision. The validation team has cross verified the same with the loan sanction letter. As per the loan sanction letter an interest rate of 11% fixed for the first three years and thereafter fully floating is applicable. Further, the validation team has checked the value by applying the actual value and found to be additional.

Corporate tax rate	%	33.99	The tax rate is sourced from Income Tax Act and it is cross checked and found to be correct which was applicable at the time of investment decision
MAT	%	20.96	The tax rate is sourced from Income Tax Act and it is cross checked and found to be correct which was applicable at the time of investment decision
Service tax	%	12.36	The tax rate is sourced from Income Tax Act and it is cross checked and found to be correct which was applicable at the time of investment decision
GBI	INR/kWh	0.5	GBI benefits (as per MNRE scheme) availed by the sub-project which is over and above the tariff considered. Hence the value considered is acceptable to the validation team

For sub-project 3 – Sidhidata Power LLP.

Parameter	Unit	Value	Validation assessment
Capacity of each WTG	kW	2000	Verified against offer letter ^{/04/} and cross verified against the purchase order ^{/07/} placed by the PP to the technology supplier.
No of WTGs		1	Verified against offer letter ^{/04/} and cross verified against the purchase order ^{/07/} placed by the PP to the technology supplier. The same has been confirmed during onsite visit.
Total capacity	MW	2.00	
Plant Load Factor	%	21.50	The annual PLF applied is considered from the third party assessment certificate ^{/13/} . The validation team verified the document and found to be in line with the requirements of paragraph 3b of “Guidelines on Reporting and Validation of Plant Load Factors” EB 48 Annex 11.
Period of assessment	Years	20	The technical life of the WTG is 20 years and this has been confirmed from the project life mentioned in the by the declaration provided by technology supplier. Therefore, financial analysis carried for 20 years is acceptable.
Deration after 10th year	%	5.00	Verified against the TERI report ^{/15/} . As per the report, “The efficiency of any rotating machine reduces due to ageing. A simplified norm of one time de-ration by 5% after 10 years can be considered to estimate net saleable energy”. The justification for considering 5% de-ration factor after 10 th year is accepted by the

			DOE. However, an increase in 10% of generation has been covered under sensitivity analysis.
Tariff	INR/kWh	5.81	The values used based on the MERC tariff order ^{/11/} available at the time of investment decision. The tariff order is the document through which the State (Maharashtra) Electricity Regulatory Commission determines the tariff rate applicable for wind power projects. The tariff order is a publicly available document and available at the time of investment decision. The validation team also crosschecked the tariff with corresponding power purchase agreements and found that the value is exactly matching. The value used for the financial analysis is acceptable to the validation team. Further, an increase in 10% of the tariff has been covered under sensitivity analysis.
Operation and maintenance	INR million	1.80	It is verified against offer letter from the technology provider to the PP. The validation team has cross verified against the operation and maintenance agreement signed between the PP and the service provider ^{/14/} , and found that the value of O&M cost considered for project is appropriate. PP has also subjected the O&M cost to sensitivity; and the validation team observed that even with 100% variation in O & M cost in the sensitivity analysis the equity IRR is below the benchmark. Therefore, the O & M cost as per offer letter ^{/04/} is acceptable by the validation team. However, the value is accepted as per Guidance of the 'guidelines on the assessment of investment analysis'.
Escalation in O&M cost	%	5.00	It is verified against offer letter ^{/04/} from the technology provider to the PP. The validation team has cross verified against the operation and maintenance agreement signed between the PP and the service provider ^{/14/} , and found that the value of escalation in O&M cost considered for project is and appropriate. PP has also subjected the O&M cost to sensitivity; and the validation team observed that even with 100% variation in O & M cost in the sensitivity analysis the equity IRR is below the benchmark. Therefore, the O & M cost as per offer letter is acceptable by the validation team.
Project cost	INR million	130.00	The offer letter ^{/04/} from technology supplier was available at the time of investment decision. The project cost includes, supply of WTG, erection and commissioning of the WTG, power evacuation and land cost. Further, an increase in 10% of the project cost has been covered under sensitivity analysis. Therefore, project cost was found acceptable as per the offer letter.

Insurance cost	% on project cost	0.20	During the time of investment decision PP has considered 0.15% of the total project cost as insurance cost. The value was based on General Rules and Regulation of Tariff advisory committee. Further the validation team has ensured that insurance has been calculated as per the TAC order.
Book depreciation	INR million	5.85	PP has calculated book depreciation based on the residual value of machinery as 10% and calculating it by Straight Line Method (SLM) as per MERC tariff order ^{/11/} . The validation team has cross checked the same and found to be correct and hence accepted.
Salvage value	%	10	PP has sourced the value as mentioned in the MERC tariff order ^{/11/} . As per the tariff order the depreciation is allowed up to a maximum of 90% of the capital cost; and hence, salvage value considered (10%) at the time of investment decision is appropriate. The validation team has cross checked the same and found to be correct and hence accepted.
Debt: Equity	%	100% equity	The entire project cost is funded through equity and no loan is availed by the project activity. Hence, the debt equity ratio considered in the investment analysis is acceptable to the validation.
Corporate tax rate	%	33.99	The tax rate is sourced from Income Tax Act and it is cross checked and found to be correct which was applicable at the time of investment decision.
Service tax	%	12.36	The tax rate is sourced from Income Tax Act and it is cross checked and found to be correct which was applicable at the time of investment decision.
GBI	INR/k Wh	0.5	GBI benefits (as per MNRE scheme) availed by the sub-project which is over and above the tariff considered. Hence the value considered is acceptable to the validation team.

Based on the information verified, the validation team was able to confirm that the input parameters used in the investment analysis are reasonable and adequately represent the economic situation of the project activity at the time of the investment decision.

Wind Project Investor	Capacity (MW)	Equity IRR without CDM	Default Value Benchmark
Manifold Agricorps Pvt. Ltd.	5 x 2.00	12.88%	18.34%
Parmarth Wind Energy Pvt. Ltd.	12 x 0.85	12.54%	18.01%

Sidhidata Power LLP	1 x 2.00	14.70%	18.01%
---------------------	----------	--------	--------

Sensitivity analysis

To substantiate the robustness of the results obtained above, the sensitivity analysis has been conducted. In accordance with para 20 of the investment guidance in EB 62, Annex 5, the PP has conducted a sensitivity analysis on the financials by varying the parameters which have a bearing of 20% or more on either the project costs or the project revenues and has tabulated the results. The scenarios considered for the purpose of sensitivity analysis are +10% increase and -10% decrease in annual generation, project cost, tariff and O & M cost.

The results of sensitivity analysis clearly demonstrate that in all probable scenarios, the project activity is lower than the benchmark. (i.e. the project is unable to acquire returns equal to that of benchmark). These results of sensitivity analysis were evaluated and were found to be correct; they indicate robustness of the parameters used for the investment analysis. The revenues of project activity would be insufficient to justify the required investment and it is observed that with the benefits of VCS the project is favorable option to invest.

The results of sensitivity analysis are as follows:

Manifold Agricrops Pvt. Ltd.

Variation %	-10%	Normal	10%	Variation required to reach benchmark
PLF	10.06%	12.88%	15.82%	18.61%
O&M Cost	13.13%	12.88%	12.66%	-278.00%
Project Cost	15.90%	12.88%	10.57%	-16.63%
Tariff Rate	10.06%	12.88%	15.82%	18.61%

Parmarth Wind Energy Pvt. Ltd.

Variation %	-10%	Normal	10%	Variation required to reach benchmark
PLF	9.77%	12.54%	16.00%	15.70%
O&M Cost	12.87%	12.54%	12.30%	-181.50%
Project Cost	16.04%	12.54%	10.34%	-14.64%

Tariff Rate	9.95%	12.54%	15.76%	16.79%
-------------	-------	--------	--------	--------

Sidhidata Power LLP

Variation %	-10%	Normal	10%	Variation required to reach benchmark
PLF	12.50%	14.70%	16.81%	15.83%
O&M Cost	14.85%	14.70%	14.54%	-236.50%
Project Cost	16.92%	14.70%	12.85%	-14.25%
Tariff Rate	12.65%	14.70%	16.69%	16.73%

All the input parameters applied in the IRR calculations in the financial spread sheet^{/02/} were found to be suitable and accurate; these were crosschecked with the supporting documents and publically available sources. Thus the financial returns of the proposed VCS project activity would be insufficient to justify the required investment and it is observed that only with the benefits of VCS the project is a favourable option. Hence, the project is concluded to be strongly additional and VCS revenue is considered imperative to bridge the gap between the equity IRR and the benchmark. Based on the evaluation it was evidenced that the returns from the project without the revenue from VCS are less than the benchmark. Hence, it is confirmed that revenue from VCS was considered essential for the project activity. In this context, the project activity is considered additional and all the requirements of VCS is satisfied.

Common practice analysis

The PP has conducted the common practice analysis as per the requirements of “Tool for the demonstration and assessment of additionality Version 07 and the latest “Guidelines on Common Practice, Version 02.0” has been followed for the project activity. In line with the guidance, the PP has selected the India (host country) as the default applicable geographical area for the assessment of common practice. Further, the PP has selected the step-wise approach given in the Guidelines on Common Practice, Version 02.0; to carry out the common practice analysis.

As per the Step 1 of the guidelines, the applicable output range as $\pm 50\%$ of the design output range (22.2 MW) is 11.1 MW to 33.3 MW.

In the step 2, PP has identified the plants that deliver the output in the range of 11.1 MW to 33.3 MW in the host country India. The geographical scope has been identified as host country India. This is the default option which is in accordance with paragraph 1 of the Guidelines on Common Practice, Version 02.0. In accordance with the guidelines, the wind power plants that have started commercial operation before the start date, i.e. 31/03/2013, were identified. A total of 181 power projects of comparable output were identified by the PP. The similar power projects were identified from the Directory - Indian Wind Power published by CECL, Bhopal /34/. The PP has correctly excluded the power plants that are registered or are under validation. Validation team confirms from its host country expertise that the comprehensive list of all power plants used for Nall is correct and valid. The PP has not considered other type of power plants that are different from

wind power plants owing to its different energy/fuel source. Not considering other power plants results in conservative F factor due to lower denominator (N_{all}) and does not impact $N_{all} - N_{diff}$, as all the projects considered except wind power plants, are considered as plants with different technologies and included under N_{diff} .

In step 3, the PP has identified those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation and differentiated with the total projects identified in the above step 2. That is the identified number for $N_{all} = 32 / 34$. In step 4, the PP has identified those that apply technologies that are different to the technology applied in the proposed project activity. The different projects were identified as 103. The PP has followed paragraph 4 (d) of the "Guidelines on common practice", version 02. The paragraph 4 states that "Different technologies are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed VCS project activity and applicable geographical area):

(d) Investment climate on the date of the investment decision, inter alia:

- (i) Access to technology;
- (ii) Subsidies or other financial flows;
- (iii) Promotional policies;
- (iv) Legal regulations;"

The policies/tariff for each state is regulated by the State Electricity Regulatory Commission of the respective states. The project activity is located in the state of Maharashtra and Rajasthan of India and the policy applicable for the wind projects is regulated by Maharashtra Electricity Regulatory Commission and Rajasthan Electricity Regulatory Commission respectively. Therefore, it can be assumed that the policies and tariff are different in different states and hence projects installed in other states have been considered in N_{diff} . The identified projects in N_{all} (step 3) located in states other than Maharashtra and are regulated by the respective State Electricity Regulatory Commissions (SERCs). Therefore, these projects come under different investment climate and have been considered under N_{diff} .

That is the identified number for $N_{diff} = 27$

In step 5, the PP has calculated F factor as 0.156 and $N_{all} - N_{diff} = 5$. The project is not a common practice in India as F factor is less than 0.2. Thus, in view of the guidance given in the Tool for the demonstration and assessment of additionality Version 07, the validation team confirms that the analysis has been performed as per the step 4 of the "Tool for the demonstration and assessment of additionality" Version 7 and in line with the "Guidelines on Common Practice, Version 02.0".

The team based on the assessment has been able to confirm that the project activity can be regarded as not a common practice in the host country India.

Conclusion

EPIC can confirm that all data, rationales, assumptions, justifications and documentation provided by the project participants to support demonstration of additionality are credible and reliable.

By assessing the evidences presented and cross-checking the information contained in, the validation team considers the reasonings for the proposed project additionality demonstration is credible and reasonable i.e. the proposed project has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the registered CDM project activity.

3.2.6 Quantification of GHG Emission Reductions and Removals

Baseline emissions (BE_y):

As per ACM0002 Version 16, equation 7, baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity and are calculated as follows:

$$BE = EG \cdot EF_{\text{grid,CM},y}$$

Where:

BE_y = Baseline emissions in year y (tCO₂)

EG_{PJ,y} = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

EF_{grid,CM,y} = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂/MWh)

Calculation of EG_{PJ,y}

The project activity being the Greenfield plant, the calculation of EG_{PJ,y} is carried out using the approach (a) as mentioned in ACM0002 Version 16, equation 8 as below:

$$EG_{PJ,y} = EG_{\text{facility},y}$$

Where:

EG_{PJ,y} = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

EG_{facility,y} = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)

Determination of EG_{facility,y}: For ex-ante estimation, the amount of electricity delivered to grid is estimated to be 48,164 MWh/year. This value is calculated based on the estimated PLF for the individual sub-projects. For ex-post, the value shall be monitored in calibrated energy meter and as recorded in monthly generation report issued by state utility/service provider. The same can be cross checked from the invoice copy raised to DISCOM.

Determination of EF_{grid,CM,y}: CM (combined margin) emission factor for NEWNE grid of India has been calculated on the basis of sum of 75% of OM (operating margin) and 25% of BM (build margin).

$$EF_{\text{grid,CM},y} = 0.75 \cdot EF_{\text{grid,OM},y} + 0.25 \cdot EF_{\text{grid,BM},y}$$

The CM emission factor is calculated as 0.9770 tCO₂e/MWh as per the "Tool to calculate the emission factor for an electricity system", Version 4 and has been sourced from the Central Electricity Authority (CEA) CO₂ Baseline database.

Calculation of EF_{OM}: The simple OM emission factor have been calculated using the Simple OM method as the low-cost/must run resources constitute less than 50% (for year 2011-2012, 2012-2013 & 2013-2014)/10%. The ex-ante vintage data has been used for the OM calculation of the project. The latest available data vintage at the time of PD submission to DoE is taken for the EF calculations. EF_{OM} for the most recent three years (2011-2012, 2012-2013 & 2013-2014) and the weighted average is calculated to be 0.9862 tCO₂e/MWh. The calculated EF_{OM} is fixed ex-ante and will not be reviewed in the crediting period of the project activity.

Calculation of EF_{BM}: BM is calculated ex-ante based on the average emission intensity of 20% most recent capacity additions in the grid based on the net generation for the year 2013-2014. Consequently, the Build Margin emission factor is calculated to be 0.9495 tCO₂e/MWh. This is as

per the “Tool to calculate the emission factor for an electricity system”, Version 4. The validation team accepted the same as this follows the latest version of the database available to the project participant at the time of submission of PDD for validation. So, the validation team is of the opinion that all the assumptions and data used by the PP discussed in the PD are appropriate and conservative and same has been cross checked with the references and the sources provided by the PP in the PD. The baseline emission estimated is 47,055 tCO₂/yr.

Project emissions

As per ACM0002, for most renewable power generation project activities, PE_y = 0. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for, by using the following equation:

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

Where,

PE_y = Project emissions in year y (tCO₂e)

PE_{FF,y} = Project emissions from fossil fuel consumption in year y (tCO₂)

PE_{GP,y} = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO₂e)

PE_{HP,y} = Project emissions from reservoirs of hydro power plants in year y (tCO₂e)

As the project activity is a wind energy and solar based power generation, the project emissions are not applicable to the project activity. Hence, PE_y = 0

Leakage

As per ACM0002, no leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected. Therefore, LE_y = 0.

Emission Reductions

As per equation 13 of ACM0002 Version 16, the emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

$$ER_y = 47055 - 0 = 47,055 \text{ tCO}_2\text{e}$$

PP has calculated the emission reductions using the above equation and is estimated to be 47,055 tCO₂e per annum. The calculation of the emission reductions has been ensured by the validation team based on the latest ER calculation sheet^{02/}.

The validation team did not find any additional uncertainty associated with the calculation of emission reductions other than those inherent with the applied methodology and default emission factors used.

Validation team confirms that:

- All relevant assumptions and data are listed in the project description, including their references and sources.
- All data and parameter values used in the project description are considered reasonable in the context of the project.
- All estimates of the baseline emissions can be replicated using the data and parameter values provided in the project description.

Validation team is able to confirm that the methodology and relevant tools have been applied correctly to calculate baseline emissions, project emissions, leakage and net GHG emission reductions and removals.

3.2.7 Methodology Deviations

The project does not seek any methodology deviations.

3.2.8 Monitoring Plan

The approved baseline and monitoring methodology “ACM0002” has been applied. The monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions. The monitoring plan provides detailed information related to the collection and archiving of all relevant data needed to:

- Estimate or measure emissions occurring from GHG sources, sinks and reservoirs
- Determine the baseline emissions
- Determine the project emissions

The monitoring plan as per ACM002, version 16 has been clearly described in section 4 of the VCS PD.

EPIC confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.

Parameters Determined at validation (Ex-ante)

The following parameters are determined ex-ante and mentioned in section 4.1 of the PD:

Data / Parameter	Unit	Value	Assessment
EF _y (Combined Margin of the NEWNE Grid)	tCO ₂ /MWh	0.9770	Project participant has used the official published data on operating and build margin emission factors. The version of the data used is as it is the latest version available on Dec 2014 the date of submitting the PD to DoE (viz start of validation). This data is published by Central Electricity Authority, CEA (version 10) who is the sole authority for the publication of such data in India. CEA has published a database of carbon dioxide emission factors for the power sector in India based on detailed authenticated information obtained from CEA on all operating power stations in the country. Project participant has applied weightage factors for the OM and BM [75% & 25% respectively] as specified in the tool to arrive at the emission factor for the combined margin. Validation team has checked the emission factor calculations from CEA database version 10 and the value of EF_y, is found to be correct. The validation team agrees to this emission factor since it is based on the official background data published by CEA.

			EPIC confirms that the database is an official publication of Ministry of Power, Government of India. The calculation and assumptions were verified by the validation team and found to be correct and appropriate.
EF _{grid,BM,y} (Build Margin of the NEWNE Grid)	tCO ₂ /MWh	0.9495	Project participant has used the official published data on operating and build margin emission factors. The version of the data used is as it is the latest version available on Dec 2014 the date of submission of the PD to DoE (viz start of validation). This data is published by Central Electricity Authority, CEA (version 10) who is the sole authority for the publication of such data in India. CEA has published a database of carbon dioxide emission factors for the power sector in India based on detailed authenticated information obtained from CEA on all operating power stations in the country. Validation team has checked the emission factor calculations from CEA database version 10 and the value of EF_{BM} is found to be correct. The validation team agrees to this emission factor since it is based on the official background data published by CEA.
EF _{grid,OM,y} (Generation Weighted Operational Margin of the NEWNE Grid)	tCO ₂ /MWh	0.9862	EPIC confirms that the database is an official publication of Ministry of Power, Government of India. The calculation and assumptions were verified by the validation team and found to be correct and appropriate.

Parameters to be monitored (ex-post)

Monitoring of the project activity involves all the parameters necessary for calculation of GHG emission reduction by the proposed project activity. These parameters are mentioned in section 4.2 of the PD. The parameters, which are to be monitored include:

Parameter	Assessment
Quantity of net electricity generation supplied by the project plant/unit to the grid in year <i>y</i> EG_{facility,y} (MWh/year)	The electricity generated will be evacuated to NEWNE grid at substation / project site and it will be measured by a main energy meter and check meter which are installed at the grid interconnection point. The main meter readings will be the basis for the estimation of emission reduction calculations and; the check meter readings will be used for cross checking. Monthly (JMR) readings are taken jointly by the representative of State Electricity Supply Company

	Limited and site in charge of O&M contractor or representative of PP and a statement is prepared and signed by the representatives of both the parties for total electricity exported to grid, total electricity imported from the grid and the net electricity supplied. The meters installed are capable of measuring export and import. The net electricity exported will be calculated as difference of export and import meter reading. For WTGs Based on the JMR reading and LCS data of individual WTGs, a credit statement/share certificate is prepared which forms the basis for net electricity supplied to the grid. For Solar JMR reading forms the basis for net electricity supplied to the grid. The same has been cross checked with the monitoring plan provided in final PD and interview with PP/O&M service provider during the site visit. The net electricity exported to the NEWNE grid will be the basis of emission reduction calculations. This reading can be cross verified with the actual invoices presented to State Utility. Project participant has chosen renewal crediting period of 10 years. Continuous monitoring will be carried out by energy meters. Continuous measurements and monthly recording will be carried out.
--	--

Electricity meter of accuracy class not inferior to 0.5s shall be used. Main electricity meters at sub-station will be calibrated as per the norms of the state utility; and the calibration will be in compliance with the national standards/regulation. The accuracy class of the energy meter is as per the CEA notification and hence complies with the International Standards. Calibration records shall be maintained by state utility/01/, which is in compliance with clause 14 (3) of the national regulations. The O & M of the project activity will be done by the technology supplier who has dedicated trained personnel to carry out the day to day operation and maintenance of the project activity so as to monitor the quantity of electricity supplied to the grid.

The operational and management structure implemented together by PP and the technology supplier is summarized below:

- The O & M team under the shift in-charge monitors continuous electricity generation from individual WTGs / Solar power plant and compile so as to calculate the monthly electricity generation.
- The Plant-in-Charge maintains the data records received from shift in-charge and forward to the head of the PP.
- Final data management and invoicing against net electricity generation will be done by the individual sub-projects
- The data will be archived for 2 years after the end of the crediting period by the PP

EPIC confirms that the monitoring plan mentioned in the PD is in accordance with the requirements mentioned in the monitoring methodology and the local regulatory requirements of the state utility, as well the monitoring arrangements described in the monitoring plan are feasible

within the project design. EPIC is of the opinion that the monitoring plan will give opportunity for real measurement of achieved emissions reductions for 2 years after the crediting period.

The validation team based on local and sectoral expertise deemed acceptable the relevant monitoring equipment along with their accuracy class and calibration frequency. Detailed responsibilities and authorities for project management, monitoring procedures, calibration procedures and QA/QC procedures have been presented and were verified during follow up interviews. The detailed monitoring practice is considered appropriate and the implementation of these will enable subsequent verification of the project's emission reductions.

3.3 Non-Permanence Risk Analysis

The Project is not an AFOLU (Agriculture, Forestry and Other Land Use) project and therefore no surveys are required. Hence this is not applicable.

3.4 Environmental Impact

No significant adverse environmental impact is expected due to project activity, since the project is a renewable energy (wind energy and solar) project with no project emissions. Further, as per the Schedule 1 of the EIA notification dated 1/12/2009¹⁰ and latest notification dated 24/12/2013¹¹, given by the Ministry of Environment and Forests under the Environment (Protection) Act 1986, the proposed Project activity does not fall under the list of activities requiring EIA as the environmental impacts for such project are not considered as significant by the host Party. The validation has verified all the statutory clearances and commissioning certificates^{106/}. The validation team concludes that all the clearances obtained are in accordance with the procedures required by the host party and no significant environmental impacts are expected from the project activity.

3.5 Comments by Stakeholders

The project proponent organized the local stakeholder consultation to get their comments / feedbacks and suggestions of the project activity. Details of Stakeholders' consultation meeting^{108/} and invitation by the individual sub-projects are detailed below :-

Project Promoters' Name	Invitation Date	Meeting Date	Location of the LSM
Manifold Agricorps Pvt. Ltd.	11-Feb-2015	25-Feb-2015	Jaisalmer, Rajasthan
Parmarth Wind Energy Pvt. Ltd.	11-Feb-2015	28-Feb-2015	Kolhapur, Maharashtra
Sidhidata Power LLP	11-Feb-2015	27-Feb-2015	Sangli. Maharashtra

¹⁰ <http://moef.nic.in/downloads/rules-and-regulations/3067.pdf>

¹¹ <http://envfor.nic.in/sites/default/files/ia-24122013.pdf>

Sidhidata Solar Urja Ltd	11-Feb-2015	26-Feb-2015	Bhadla, Bap Tehsil, Jodhpur D.T, Rajasthan
--------------------------	-------------	-------------	---

Local community, local village administration, local vendors, representatives of the technology supplier, representatives of project participant, and representatives of individual sub-projects were present at the meeting. The validation team has cross checked the attendance list of stakeholders and also interviewed some of the local stakeholders during site visit to confirm the consistency of the information provided in the PD.

A summary of comments has been provided by PP and it is found that no adverse comment was received for the project activity. This has also been verified by the validation team during site visit at the WTGs and Solar site. Further, the interviews confirmed that there was no adverse comment about the project and this project will lead to employment generation and better environmental conditions. EPIC considers the local stakeholder consultation carried out adequately and can confirm that the process is credible.

4 VALIDATION CONCLUSION

M/s. EKI Energy Services Ltd. has commissioned the Epic Sustainability Services (EPIC) to validate the project: “**Renewable Energy Project by LNB Group**” with regard to VCS Version 3 requirements and the information provided by the project proponent related to the project design, operation, monitoring and reporting.

EPIC has reviewed the project description documents and subsequently carried out site visit interviews to confirm the fulfilment of stated criteria. The project intends to reduce GHG emissions by displacing fossil fuels (for the heat generated to meet captive requirements). A risk based approach has been followed to perform this validation. In the course of the draft validation 07 Clarification Requests (CLs) and 04 CARs (Corrective Action Requests) were raised and successfully closed.

The project activity has applied the baseline and monitoring methodology, ACM0002: Grid-connected electricity generation from renewable sources - Version 16.0, which is an approved methodology under the CDM programme and is acceptable under VCS Version 3. The baseline has been determined in accordance with the stated approved baseline methodology.

Analysis of the proposed project activity reveals that the emission reductions resulting from the project activity are real, measurable and give long term benefits and are additional to what would have occurred in the absence of the project activity. The total emission reductions from the project activity are estimated to be 470550 tCO₂e over the 10 years crediting period. The emission reductions forecast has been checked and is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been addressed. Based on the information provided by the project developer, it is EPIC’s opinion that the “**Renewable Energy Project by LNB Group**” in India as described in the VCS PD, Version 03 dated 24/03/2015, meets all relevant VCS Version 03 requirement and correctly applied CDM simplified baseline and monitoring methodology ACM002, version 16.0.

EPIC Sustainability Service’s validation opinion is purely based on the information made available to us by the project proponent during the course of validation and hence cannot guarantee the

accuracy or correctness of the information. Keeping this in mind, no party can hold EPIC liable for any decisions made or not made in this report.

Prepared by	Approved by :
	
Mr. A. Prabu Das	Mr. K. Sudheendra
(Lead Auditor)	(Head Operations)

APPENDIX A: RESOLUTION OF FINDINGS

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Verification team conclusion
<u>CAR 01</u> Project boundary identified in section 2.3 of the VCS PD is not as per the project activity and the applied methodology ACM0002, version 16.0. The emissions sources and the grid connectivity are wrong.	Project boundary, emissions sources and the grid connectivity has been updated in the revised PD kindly refer the same.	Project boundary, emission sources are correctly identified in the revised PD. The project activity is connected to NEWNE grid and the information is correctly presented in the revised PD. CAR 01 Closed
<u>CAR 02</u> Additionality for the solar component of the project activity is not demonstrated as per para 5.3.1 of the applied methodology ACM0002, version 16.0.	Additionality for the solar component has been updated as per ACM0002, ver. 16.0 in the revised PD kindly refer the same	Applied methodology defines positive list of projects that qualifies automatic additionality. Solar component of the project falls under the positive list and the information is updated in the revised PD. CAR 02 Closed
<u>CAR 03</u> Justify, the choice of the financial indicator chosen to assess the financial attractiveness of the sub-projects involving wind technology.	Choice of Financial Indicator & appropriate analysis method has been revised in the PD. Kindly refer the same.	The PP has chosen to apply investment analysis to demonstrate the additionality of the project activity using the benchmark analysis method. PP has identified post tax equity IRR as the most suitable financial indicator. The project cannot apply simple cost analysis since the project brings

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Verification team conclusion
		revenue from the sale of electricity; also investment comparison analysis cannot be applied as the alternative to the project activity is the electricity generated by new and existing grid connected power plants. Therefore, referring paragraph 19 of the investment analysis guideline /19/ “if the alternative to the project activity is the supply of electricity from grid this is not to be considered an investment and a benchmark approach is considered appropriate”. Since the project proponent is demonstrating the financial unattractiveness of the project and the project cost involves both equity and debt, equity IRR is considered appropriate indicator and accepted by the validation team. CAR 03 Closed
<u>CAR 04</u> Source document/link considered in the common practice analysis is not submitted for assessment	Source document/link considered in the common practice analysis provided in the CPA sheet already submitted to the DOE.	Input parameters in the common practice analysis are justified by referring to supporting links, that are accessible and valid. The validation team verified the links and found to be acceptable meeting the requirement CAR 04 Closed

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Verification team conclusion
<u>CL 01</u> Section 4.1 of the VCS PD is not inclusive of all the 'data and parameters' available at the validation, clarify	$EF_{grid,CM,y}$ is now included in the section 4.1 of the revised PD kindly refer the same	The parameter $EF_{grid,CM,y}$, which is applicable to the project activity and available during validation is included in section 4.1 of the revised PD. CL 01 Closed
<u>CL 02</u> The entity responsible for apportioning and arriving the net electricity generation in the case of Rajasthan WTGs is not clear. (Refer Pg 38 of VCS PD)	Entity responsible for apportioning and arriving the net electricity generation is now updated in the revised PD kindly refer the same	The Monthly break-up sheet/credit note after apportioning for Rajasthan WTGs is prepared by the O&M service provider and this information is clearly presented in the revised PD CL 02 Closed
<u>CL 03</u> Local stakeholder meeting dates indicated in the VCS PD is not matching with the evidence provided, clarify.	Dates have been corrected as per LSHM documents in the PD kindly refer the same	PD is revised to reflect the correct Local stakeholder meeting dates for all the sub-projects and the information is consistent with the supporting evidence provided. CL 03 Closed
<u>CL 04</u> As all the sub-projects are commissioned and in operation, single line diagram clearly depicting the generation voltage levels, step –up/down levels, grid inter-connection points, sub-station details shall be provided for all the sub-projects to conform the	single line diagram for all PPs is being provided along with this submission.	Individual single line diagram for all the sub-projects depicting the generation levels, step-up levels and interconnecting points are provided – this information is found to be consistent with the on-site

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Verification team conclusion
implementation of the monitoring plan for the project activity.		observations. CL 04 Closed
CL 05 Following documents are not submitted for assessment for all the sub-projects:- - Investment decision - Offer letters for the WTGs cost, O&M cost and its escalation - Third party PLF report as per EB guidance - Electricity bills/credit notes and invoice raised to respective DISCOM - Revised O&M contract for 12 no of WTGs for the sub-project M/s Paramarth wind energy pvt ltd - O&M contract for the sub project M/s Siddidata Power LLP	- BR is being submitted along with this submission - Offer Letter for wind investors is being submitted along with this submission - Third party PLF report for all PPs is being submitted along with this submission - Invoice & credit notes for MAPL, PWEPL & SSUL is provide whereas for SPLLP is in ideal state from date of commissioning kindly refer the e-mail for Invoice along with the attachment from client - Revised O&M contract for PWPL is being submitted along with this submission - O&M for Siddidata Power LLP is not yet structured.	- Board resolution copy as proof of investment decision is submitted. - Offer letter of the WTGs detailing the number of WTGs, its cost break-up, O&M and escalation is verified. - Third party PLF report which estimates the wind potential of the WTG site is submitted and verified to be as per the EB guidance - Invoice and credit notes for the sub-projects MAPL and PWEPL are received – the data aggregation, apportioning, billing and cross-check is verified. However the data of SPLLP is not available as the project is in ideal state. - Revised O&M contract for the 12 no of WTGs is verified - O&M contract for the sub-project SPLLP is not available as the project is currently in free period – this information is verified from the purchase order which confirm the free O&M period CL 05 closed

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Verification team conclusion
CL 06 Clarify the following:- <u>For MAPL</u> - Whether GBI is availed by the sub-project, documents submitted show that MAPL is in pursuit of GBI. - Link for the insurance cost considered (cellC25) not accessible - Debt:equity considered 65:35, different from the source referred - Whether working capital is considered - The relevance of date 28 Jan 13 in the financial sheet (Default value) <u>For PWEPL</u> 'Deration' considered is not supported with document - Link for the insurance cost considered (cellC24) not accessible - Debt:equity considered 65:35, different from	<u>For MAPL</u> - GBI is availed by the PP - Kindly refer the below link https://iib.gov.in/IIB/tac/tariffs/AIF_T2001.pdf - Debt:equity is now updated 70:30 as per the source - Working Capital not Considered - Inflation forecast figures has been considered from the RBI website & the inflation data on Date 28-Jan-13 available at the time of Investment Decision date i.e. 25-Feb-13 is considered, kindly refer the weblink in the respective financial sheet <u>For PWEPL</u> - TERI report is being provided along with this submission - Kindly refer the below link https://iib.gov.in/IIB/tac/tariffs/AIF_T2001.pdf	<u>MAPL</u> - GBI is availed by the PP, however the information on GBI was not available at the time of investment decision. The validation team cross-checked the impact of the additionality considering the GBI benefits and found to be additional - Updated link in support of the insurance cost considered is accessible - In the financial sheets the Debt:equity is revised to uniformly consider 70:30 which is as per the RERC. - Not considering working capital and associated interest is accepted as it is conservative - The date refers to the investment decision and the input data in the financials sheets are cross-checked to be valid as on this date. <u>PWEPL</u> - Submitted TERI report details the deration applicable during the lifetime of the WTGs and is accepted. - Updated link in support of the

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Verification team conclusion
the source referred - Whether working capital is considered - The relevance of date 28 Oct 13 in the financial sheet (Default value) <u>For Siddidata Power LLP</u> 'Deration' considered is not supported with document - Link for the insurance cost considered (cellC24) not accessible - Whether working capital is considered - The relevance of date 28 Jan 14 in the financial sheet (Default value)	T2001.pdf - Debt:equity is now updated 70:30 as per the source - Working Capital not Considered - Inflation forecast figures has been considered from the RBI website & the inflation data on Date 28-Oct-13 available at the time of Investment Decision date i.e. 27-Dec-13 is considered, kindly refer the weblink in the respective financial sheet <u>For Siddidata Power LLP</u> - TERI report is being provided along with this submission - Kindly refer the below link https://iib.gov.in/IIB/tac/tariffs/AIF_T2001.pdf - Working Capital not Considered - Inflation forecast figures has been considered from the RBI website & the inflation data on Date 28-Jan-14 available at the time of Investment Decision date i.e. 18-Feb-14 is considered, kindly refer the weblink in the respective financial sheet	insurance cost considered is accessible, hence accepted - In the financial sheets the Debt:equity is revised to uniformly consider 70:30 which is as per the state regulatory commission order. - Not considering working capital and associated interest is accepted as it is conservative - The date refers to the investment decision and the input data in the financials sheets are cross-checked to be valid as on this date. <u>Siddidata Power LLP</u> - Submitted TERI report details the deration applicable during the lifetime of the WTGs and is accepted. - Updated link in support of the insurance cost considered is accessible, hence accepted - In the financial sheets the Debt:equity is revised to uniformly consider 70:30 which is as per the state regulatory commission order. - Not considering working capital and associated interest is accepted as it is conservative - The date refers to the investment decision and the input data in the financials sheets are cross-checked to be valid as on this

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Verification team conclusion
		date. CL 06 Closed
<u>CL 07</u> Clarify, Location of the WTG with Machine ID GAL-03 in PD is indicated as Bhendawade, whereas the commissioning certificate refers to Altur.	Location of the WTG with Machine ID GAL-03 has been updated as per the Commissioning Certificate in the PD, Kindly refer the same	Location details of GAL-03 is updated in the revised PD CL 07 Closed

APPENDIX B: The following table outlines the documentation reviewed during the verification:

Category A documents (documents submitted by the PP)

Sl. no.	Reference	Details of supporting documents
1	/PD/	VCS PD, version 01, dated 11/03/2015; version 03, dated 24/03/2015
2	/ER/	ER and Financial Spread Sheet
3	/TITLE/	Proof of Title
4	/OL/	Offer letter for the sub-projects
5	/CERT/	Certificate of Incorporation for the sub-projects and Partnership Deed for Sidhidata Power LLP
6	/COM/	Commissioning certificates for the WTGs and the Solar power plant
7	/PO/	Purchase orders for the WTGs and the Solar power plant
8	/LSC/	Local stakeholder documents
9	/PPA/	PPA agreement between the DISCOM and the sub-projects
10	/RERC/	Rajasthan Energy Regulatory Commission Tariff order
11	/MERC/	Maharashtra Energy Regulatory Commission Tariff order
12	/DEC/	Declaration letter from the individual sub-projects
13	/PLF/	Third party PLF for all the sub-projects
14	/O&M/	Operation and Maintenance Contract for all the sub-projects
15	/TERI/	TERI report

Category B documents

1.	Approved CDM monitoring methodology ACM0002, version 16.0, Grid-connected electricity generation from renewable sources
2.	VCS Version 3; Program Guidelines; VCSA Rules; and VCS Guidance Document issued on 08/10/2013
3.	CDM Validation and Verification Standard, version 07.0
4.	Guidance on the Assessment of Investment Analysis, Version 05
5.	CEA Database version 10