

Bundled Wind Power Project in Rajasthan by Orange Renewable Power Private Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The project activity is a 59.4 MW (39.9MW in Bhesada & 19.5 MW in Dolat) bundled wind power project consisting of 32 Wind Turbine Generators (WTGs). The project is promoted by Orange Renewable Power Private Limited & Orange Jaisalmer Wind Energy Private Limited of which the “Orange Renewable Power Private Limited” is the representative of promoter of this bundled project. The purpose of the project activity is to generate clean electricity with utilization of wind energy.

The first project in the current bundle project is a 39.9 MW Wind power project near village Bhesada, close to the city of Jaisalmer in state of Rajasthan, hereafter call “Project 1”. It is developed by “Orange Jaisalmer Wind Energy Private Limited” (OJWEPL). It consists of 19 machines of 2.1 MW class Suzlon S88 make.

The other project in the bundle is 19.5 MW wind Power Project located near village Dalot, close to the city of Pratapgarh in state of Rajasthan, here after called “Project 2”. It is developed by “Orange Renewable Power Private Limited” (ORPPL). It consists of 13 machines of 1.5 MW class ReGen V82 make.

The electricity generated by the project is exported to the NEWNE electricity grid. The project activity will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. Since wind power is Greenhouse Gas (GHG) emissions free, the power generated will prevent the anthropogenic gas emissions generated by fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas.

There was no activity at the site prior to implementation of the project activity. Hence the scenario existing prior to the project activity is same as baseline scenario which is continual use of highly carbon intensive electricity in the regional grid.

The estimation of GHG reductions by this project is limited to carbon dioxide (CO₂) only. Thus the project activity leads to an emission reduction of 1,028,700 tCO₂ for the chosen crediting period of 10 years.

1.2 Sectoral Scope and Project Type

Sectoral Scope: 1 Energy Industries (Renewable/Non-Renewable Sources)

Methodology applied is ACM 0002 of version 16.0

The Project is a bundled project activity.

1.3 Project Proponent

Organization name	Orange Renewable Power Private Limited
Contact person	Mr. Pavan Kumar Gupta
Title	Asst. Manager
Address	301B, 3RD FLOOR, D-21 CORPORATE PARK, SECTOR-21, DWARKA, NEW DELHI-110077
Telephone	011- 30501110-03
Email	info@orangepowergen.com

1.4 Other Entities Involved in the Project

Not Applicable.

1.5 Project Start Date

The project start date for this project is said to be 31st March 2013. This is the day on which the first machine was commissioned.

1.6 Project Crediting Period

31st March 2013 to 30th March 2023 for a period of 20 Years (10 years, renewable twice)

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	√ (Yes)
Large project	--

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	102,870

Year 2	102,870
Year 3	102,870
Year 4	102,870
Year 5	102,870
Year 6	102,870
Year 7	102,870
Year 8	102,870
Year 9	102,870
Year 10	102,870
Total estimated ERs	1,028,700
Total number of crediting years	10
Average annual ERs	102,870

1.8 Description of the Project Activity

The project activity envisages implementation of a 59.4 MW wind power project consisting of 32 Wind Electric Generators (WTGs) of individual capacity 2.1 MW & 1.5 MW.

The electricity generated by the project will be exported to the NEWNE electricity grid. The project activity will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The project proponent plans to avail VERs benefits for the project.

The project activity is in line with the sustainable development priorities of the country. The electricity generated from the wind farm will be exported to the NEWNE grid and sold to the state electricity utility, thereby marginally contributing to reducing the energy demand supply gap in the state of Rajasthan.

The life time of a Wind Electric Generator is 20 years.

Technology

The project activity uses:

- 1) Project 1: Suzlon's wind energy technology by implementing S88 model 2100kW WTGs.

OPERATING DATA	
Rated power	2.1 MW
Cut-in wind speed	4m/s
Rated wind speed	14m/s
Cut-out wind speed	25m/s
50 years gust wind speed	59.5m/s
Hub height	80m & 100 m

Wind Class	IIA
Rotational Speed	15.1 - 17.7 rpm
ROTOR	
Pitch system	Electric drive with electric brake, gearbox, frequency converter & batteries.
Diameter	88m
Swept area	6,082m
Blade material type	Fiberglass / Epoxy
GENERATOR	
Type	Induction generator with slip rings, variable rotor resistance with Suzlon Flexi slip control system
Rated power	2,100 kW
Rated voltage	690 / 600V
Frequency	50 / 60Hz
Protection	IP54 & IP23 (for slip rings)
Cooling system	Air cooled (IC6A1A6)
Insulation	Class H
Slip control	Flexi-Slip providing slip up to 16.7%
BRAKING SYSTEM	
Aerodynamic brake	3 independent systems with blade pitching
Mechanical brake	Hydraulic disc brake, activated by hydraulic pressure
GEARBOX	
Type	3 stages (1 planetary & 2 helical)
Ratio	1:98.8 (±0.5%)
Nominal load	2,310 kW
YAW SYSTEM	
Type	Electric motors with brake, gearbox & pinion
Bearings	Friction bearing with gear rim
CERTIFICATIONS	
Design standards	GL 2003 with supplement 2004
Quality	ISO 9001:2008
TOWER	
Type	Tubular in 4 sections

- 2) "Project 2": ReGen's wind energy technology by implementing V82model 1500kW WTGs.

POWER	
Rated power	1500 kW
Cut-in wind speed (10 min. mean)	3 m/s
Rated Wind Speed (10 min. mean)	approx 12.5 m/s

Cut-out wind speed (10 min. mean)	22 m/s
Survival wind speed	52.5 m/s
Generator	Variable Speed, Multi-pole Synchronous with Permanent Magnet Excitation
ROTOR	
Diameter	82
Swept area	5325 sq.m
Speed range (variable)	9 to 17.3 rpm
TOWER AND FOUNDATION	
Hub height	85 m
Design	Tubular, Four sections
Foundation type	Floating foundation
CONTROL AND SAFETY SYSTEMS	
Control of output	Pitch Regulation
Speed control	Variable, Micro-controller based
Low Voltage Ride Through (LVRT)	3 seconds
Primary brake system	Aerodynamic Brake, Single Pitch Control/triple redundant
Pitch System	Electromechanical, Maintenance Free Toothed Belt Drive (Patented)
Remote Monitoring	VPN, Visualization via web-browser
TYPE CLASSES	
Wind turbine type class	GL III A

Emission Reductions from anthropogenic sources:

The wind power generated from the project site will be displacing the electricity generated from thermal power stations feeding into NEWNE grid and will be replacing the usage of fossil fuels for meeting the power demand in the region. Since wind power is Green House Gas (GHG) emissions free, the power generated will prevent the anthropogenic GHG emissions generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas. The estimation of GHG reductions by this project is limited to carbon dioxide (CO₂) only.

1.9 Project Location

The project activity is located at Jaisalmer and Pratapgarh districts of Rajasthan State, India. The geo- coordinates of the project location is as follows:

1) "Project 1": Geo-coordinates of 39.9 MW Wind power project in Jaisalmer

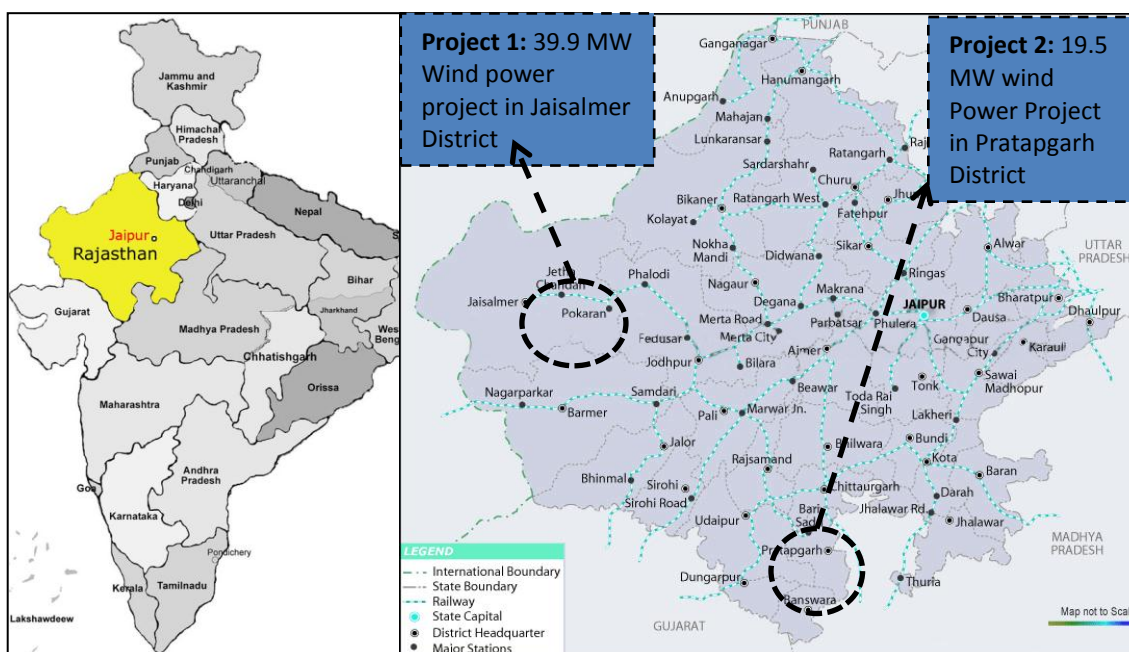
S. No	WTG No	Village	Taluk	District	Latitude	Longitude
1	RSA204	Luna Kala	Pokaran	Jaisalmer	26.64770	71.55631
2	RSA231	Luna Kala	Pokaran	Jaisalmer	26.65686	71.56304
3	RSA271	Luna Kala	Pokaran	Jaisalmer	26.65871	71.57321
4	RSA225	Naya Luna kala	Pokaran	Jaisalmer	26.62153	71.58829

5	RSA226	Naya Luna kala	Pokaran	Jaisalmer	26.62558	71.58246
6	RSA274	Naya Luna kala	Pokaran	Jaisalmer	26.64083	71.58605
7	RSA275	Naya Luna kala	Pokaran	Jaisalmer	26.63274	71.59008
8	RSA276	Naya Luna kala	Pokaran	Jaisalmer	26.62773	71.59484
9	RSA277	Naya Luna kala	Pokaran	Jaisalmer	26.62148	71.59838
10	RSA278	Naya Luna kala	Pokaran	Jaisalmer	26.61782	71.60192
11	RSA289	Naya Luna kala	Pokaran	Jaisalmer	26.61714	71.62101
12	RSA293	Motisar	Bhaniyana	Jaisalmer	26.63957	71.60723
13	RSA294	Motisar	Bhaniyana	Jaisalmer	26.64486	71.59981
14	RSA341	Motisar	Bhaniyana	Jaisalmer	26.65391	71.60882
15	RSA343	Motisar	Bhaniyana	Jaisalmer	26.64118	71.61789
16	RSA345	Motisar	Bhaniyana	Jaisalmer	26.62983	71.62431
17	RSA348	Motisar	Bhaniyana	Jaisalmer	26.61089	71.63743
18	RSA349	Motisar	Bhaniyana	Jaisalmer	26.60612	71.64224
19	RSA207	Naya Luna kala	Pokaran	Jaisalmer	26.62894	71.56688

2) "Project 2": Geo-coordinates of 19.5 MW Wind power project in Pratapgarh

S. No	WTG No	Village	Taluk	District	Latitude	Longitude
1	RDP2_01	Ambirama	Arnod	Pratapgarh	23.5622	74.8370
2	RDP2_02	Ambirama	Arnod	Pratapgarh	23.5653	74.8353
3	RDP2_03	Ambirama	Arnod	Pratapgarh	23.5674	74.8357
4	RDP2_04	Ambirama	Arnod	Pratapgarh	23.5708	74.8410
5	RDP2_05	Ambirama	Arnod	Pratapgarh	23.5713	74.8352
6	RDP2_06	Ambirama	Arnod	Pratapgarh	23.5747	74.8396
7	RDP2_07	Ambirama	Arnod	Pratapgarh	23.5773	74.8426
8	RDP2_08	Ambirama	Arnod	Pratapgarh	23.5602	74.8371
9	RDP2_09	Ambirama	Arnod	Pratapgarh	23.5946	74.8387
10	RDP2_10	Ambirama	Arnod	Pratapgarh	23.5843	74.8449
11	RDP2_11	Ambirama	Arnod	Pratapgarh	23.5872	74.8486
12	RDP2_12	Ambirama	Arnod	Pratapgarh	23.5884	74.8428
13	RDP2_13	Ambirama	Arnod	Pratapgarh	23.5919	74.8410

The geographical location of the project site is as shown below:



1.10 Conditions Prior to Project Initiation

The project activity is set up to produce clean power from the wind energy converters (WEC's) which can be also named as Wind Turbine Generator (WTG). The project activity involves supply, erection, commissioning and operation of 32 machines of rated capacity 59.4 MW. The project is Greenfield project. There was no project installed prior to commissioning of this project.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Indian Electricity Act, 2003¹, does not restrict the choice of fuel for power generation. Moreover, it does not mandate electricity generation from wind projects, although there are specific state policies to promote the utilisation of renewable sources of energy, so as to cut dependence on coal, which is the mainstay fuel for power generation in India. Hence no national or sectoral policies prevent the implementation of either the baseline or the project activity. Given that the project activity is generation of electricity using hydro energy and exporting the same to the grid system, which is also fed by other fuel sources such as fossil and non-fossil types. Emission reductions due to the project activity are considered to be equivalent to the emissions avoided in the baseline scenario by displacing the grid electricity. Emission reductions are related to the electricity exported by the project and the actual generation mix in the grid system.

1.12 Ownership and Other Programs

1.12.1 Right of Use

The project activity comprises of 32 WEGs each owned by "Project Participants" commissioning certificates will be available for verification.

1.12.2 Emissions Trading Programs and Other Binding Limits

Not Applicable.

1.12.3 Other Forms of Environmental Credit

Not Applicable.

1.12.4 Participation under Other GHG Programs

The project is not seeking registration under any other GHG programs.

1.12.5 Projects Rejected by Other GHG Programs

No, the project activity is not rejected by other GHG programs

1.13 Additional Information Relevant to the Project

Eligibility Criteria

Not Applicable.

¹ http://www.cea.nic.in/reports/electricity_act2003.pdf

Leakage Management

Not Applicable.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Further Information

Social wellbeing: The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region like development of roads and also may promote business with improved power generation. The project proponent will contribute 2% of net revenue realised from sale of VERs towards community development initiatives.

Economic wellbeing: The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits. The project activity will also help to reduce the demand supply gap in the state.

Environmental Wellbeing: The project activity will generate power using zero emissions wind based power generation which helps to reduce GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.

Technological wellbeing: The successful operation of project activity would lead to promotion of wind based power generation and would encourage other entrepreneurs to participate in similar projects

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

The methodology applied for the project is “Grid-Connected Electricity Generation from Renewable Sources” ACM 0002 of version 16.0.

2.2 Applicability of Methodology

The following steps will show the applicability of the project under this methodology.

Applicability Criteria	Applicability status
This methodology is applicable to grid-connected renewable power generation project activities that: (a) install Greenfield power plant; (b) involve a capacity addition to (an) existing plant(s); (c)	The proposed project activity is a Greenfield, NEWNE grid connected renewable power plant. Therefore, it confirms to the said criteria

involve a retrofit of (an) existing plant(s)/unit(s); (d) involve a rehabilitation of (an) existing plant(s)/unit(s); or (d) involve a replacement of (an) existing plant(s)/unit(s)	
The methodology is applicable under the following conditions: The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit	The project activity is the installation of a new grid connected renewable wind power project. Thus, it meets the first applicability condition
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 or 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	The proposed project activity is the installation of a new wind power plant/unit. Therefore, the said criteria is not applicable
In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of reservoirs; or (b) The project activity is implemented in an 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/m ² ; or (c) The project activity results in new single or multiple reservoirs and the power density calculate equation (3), is greater than 4 W/m ² .	The proposed project activity is the installation of a wind power plant/unit. Therefore, the said criteria is not applicable

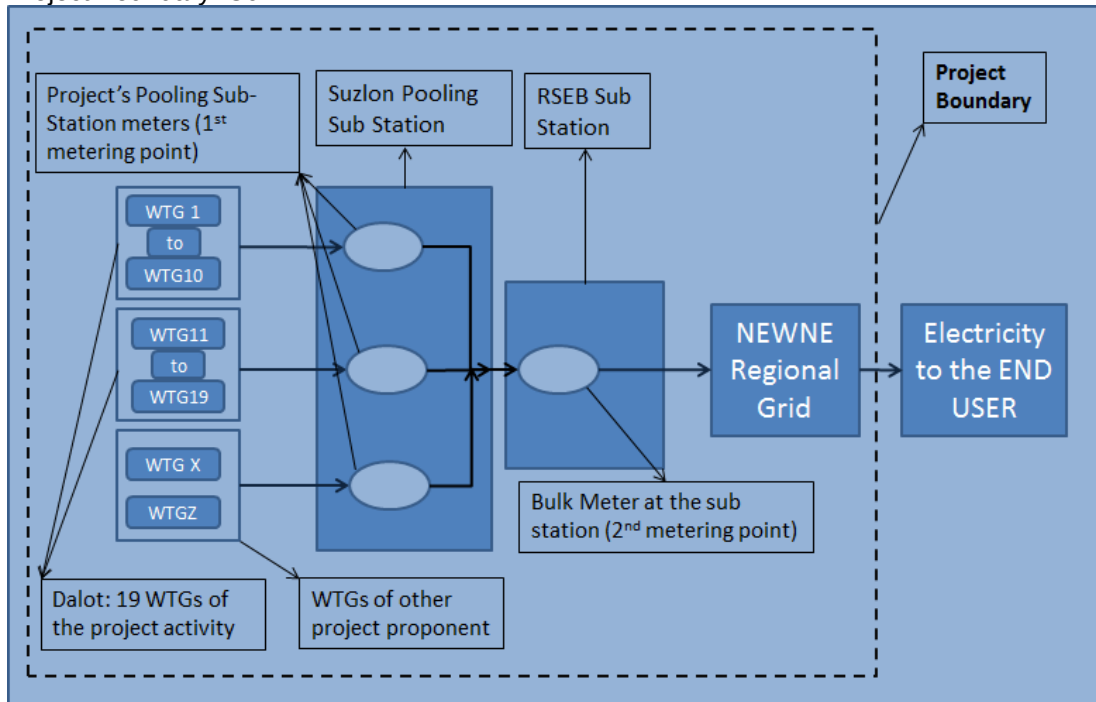
(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density of any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply. (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4) is greater than 4W/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% of the total installed capacity of integrated hydro power project	
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 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	The proposed project activity is the installation of a wind power plant/unit. Therefore, the said criterion is not applicable

years prior to implementation of CDM project activity.	
The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants;	The proposed project activity is the installation of a wind power plant/unit. Therefore, the said criteria is not applicable
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 proposed project activity is the installation of a greenfield wind power plant. Therefore, the said criterion is not applicable.

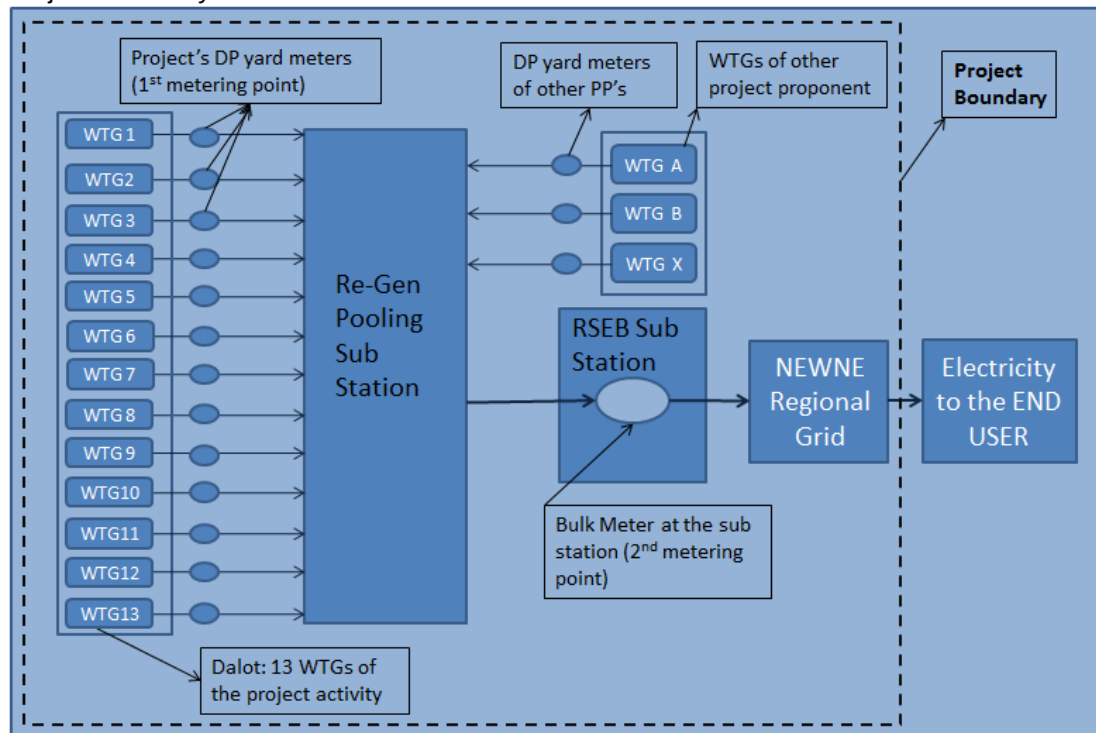
2.3 Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity	CO ₂	Yes	Major emission source
		CH ₄	No	
		N ₂ O	No	
		Other	No	
Project	Grid Connected wind power based electricity generation	CO ₂	No	Electricity generation by using WEGs does not generate any emissions
		CH ₄	No	
		N ₂ O	No	
		Other	No	

Project Boundary: OJWEPL



Project Boundary: ORPPL



2.4 Baseline Scenario

As per ACM0002 version 16.0, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

As per methodology, “Baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants”.

The baseline case is in compliance with all applicable legal and regulatory requirements references.

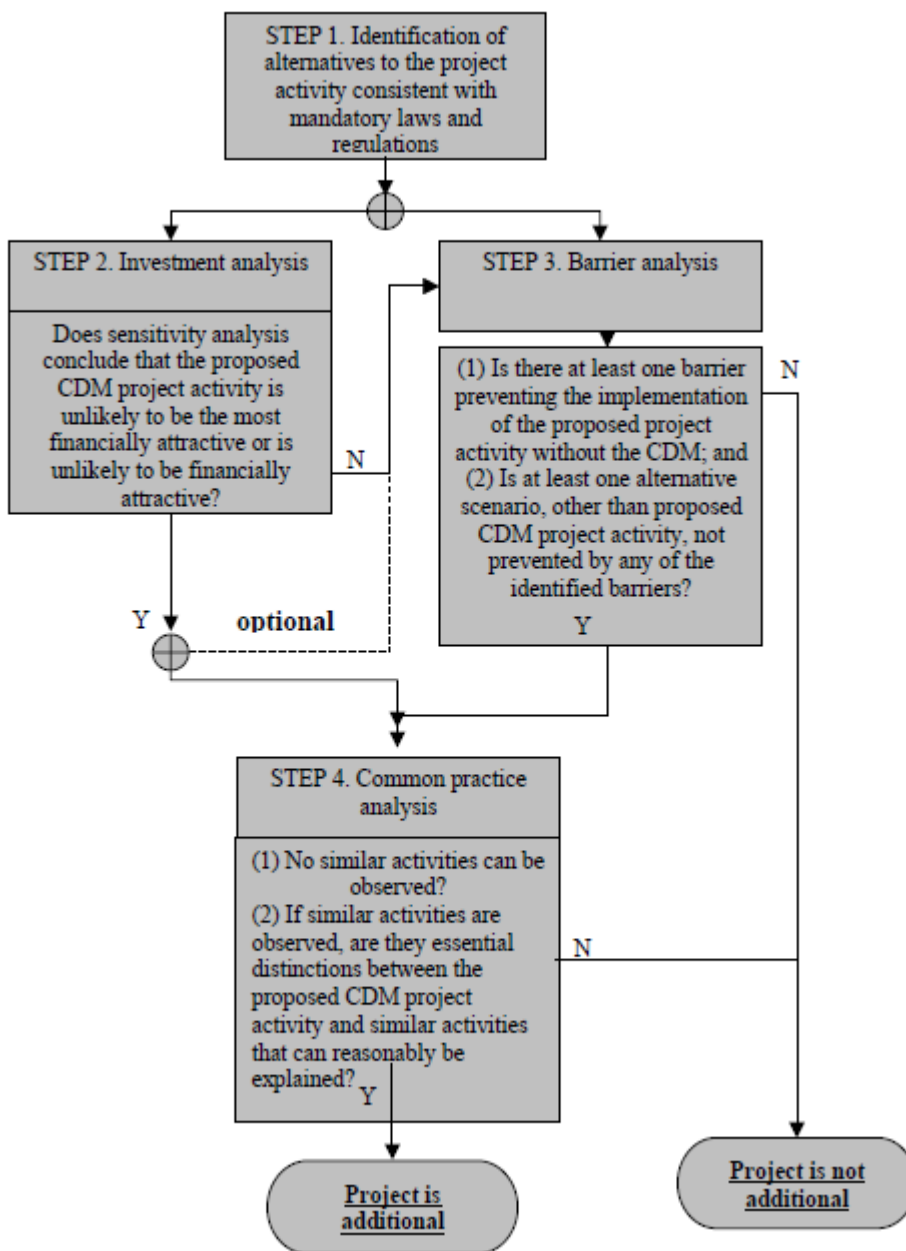
2.5 Additionality

ADDITIONALITY

As per the decision 17/cp.7 Para 43, a project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered project activity. As per the selected methodology ACM0002, the project developer is required to establish that the GHG emission reductions due to the project activity are additional to those that would have occurred in the absence of the current project activity as per the methodological tool “**Demonstration and Assessment of Additionality**”, version 07.0, EB 70.

This document provides a step-wise approach to demonstrate and assess additionality of the project activity as shown in the flow chart given below. These steps include:

1. Identification of alternatives to the project activity;
2. Investment analysis to determine that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible;
3. Barriers analysis; and
4. Common practice analysis.



Tool for Demonstration of additionality

Step-1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-Step 1a: Define alternatives to the project activity

Step 1 is to identify credible and realistic alternative scenarios to the project activity. The below section contains the discussion on the alternative scenarios of the project activity.

1. The Project is undertaken as without carbon credit benefits.
2. No project activity; continuation of the current scenario.

The alternatives are discussed in detail below.

Alternative 1- The project is undertaken without carbon credit benefits

Investment in wind energy involves high capital cost and low returns. This is due to the low plant load factor when as compared to the conventional power plants which could eventually end up in low returns and hence making the project less financially attractive. Therefore implementation of the project activity without carbon revenue is not financially attractive. The financial non-viability of the project is demonstrated in the subsequent sections and thus is not a baseline option.

Alternative 2- No project activity; continuation of the current situation

In this alternative the project activity is not established and the same amount of electricity is being supplied through current grid mix of NEWNE grid and there is no displacement of electricity of the grid mix of NEWNE grid with clean electricity.

In this alternative, an equivalent amount of electricity would be generated by the power plants comprising the NEWNE grid mix. An equivalent amount of Carbon Dioxide would be generated at the thermal power generation end. This is a realistic baseline for the project activity.

Sub-step 1b: Consistency with mandatory laws and regulations:

Step 2 is to check the compliance of the identified alternative baseline scenario with all mandatory applicable legal and regulatory requirements.

The alternative 2 (baseline case) is in compliance with all applicable legal and regulatory requirements and may be a part of the baseline. Also the National Electricity Policy (2005) asserts ***“coal would necessarily continue to remain the primary fuel for meeting future electricity demand²”*** and hence does not restrict the usage of coal for electricity generation.

Step 2. Investment analysis

As per the tool for additionality, it is determined that the proposed project activity is not an economically or financially feasible option.

To conduct the investment analysis, ‘**Guidelines on the Assessment of Investment Analysis’ Version 05**, EB 62, Annex 5 has been referred.

Sub-step 2a Determine appropriate analysis method

Since the project activity shall generate financial income from sale of power to the grid, we shall rule out Option I (simple cost analysis) and apply either Option II (Investment comparison analysis) or Option III (Benchmark analysis).

As per “**Guidelines on the Assessment of Investment Analysis**” guidance 19 *“The benchmark approach is suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest”*.

As there is no alternative baseline for the project activity and the project proponent is left with the option to invest or not to invest. Hence, Option III (Benchmark analysis) is selected as the appropriate method for demonstration of Investment analysis.

Sub-step 2b: Option III - Apply Benchmark analysis

To analyze the financial viability of the project, as explained above in step 2a, project IRR has been chosen as the financial indicator.

As per the guidance in “Demonstration and assessment of additionality” IRR analysis is an appropriate financial indicator in cases where a benchmark analysis has been applied.

There are two types of IRR analysis referred in “Guidelines on the Assessment of Investment Analysis”, project IRR and equity IRR.

² http://www.powermin.nic.in/whats_new/national_electricity_policy.htm

Both the project activities in the bundle are funded by debt: equity ratio and as the project activity is funded with both debt & equity, project IRR is considered to be the appropriate financial indicator for investment analysis. A post tax IRR analysis has been done for demonstration of additionality for the project activity.

As per 'Guidelines on the Assessment of Investment Analysis' **para 12**, "In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. **Local commercial lending** rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR".

Above referred guidance provides the project proponent with freedom to choose a proper benchmark against project IRR. Project proponent has chosen PLR of Bank Loans available at the time of decision making. The source of PLR is actual prevailing BPLR of leading National Banks in India, which works out to be 14.5% which is considered to be the benchmark of the project activity.

The Project proponent has chosen step 2b Option III for demonstration of Additoinality.

Detailed Chronology of the Project Activity:

Chronology Of Events	ORPPL	OJWEPL
Completion of DPR	01.10.2012	01.10.2012
Board decision for investing in Project and securing GBI & carbon credits	03.10.2012	03.10.2012
Loan Application to Banks	10.10.2012	10.10.2012
Loan Sanction by State Bank of Patiala	15.03.2013	--
Loan Sanction by State Bank of India		19.03.2013
Loan Sanction by State Bank of Hyderabad		28.03.2013
Loan Sanction by IREDA	28.03.2013	28.03.2013
Placement of the Purchase Orders	31.10.2012	12.12.2012
Signing of PPA with RSEB	21.03.2013	21.03.2013
Notices and Publication about Local Stakeholder' Meeting	04.01.2013	
Local Stake holder's meeting	19.01.2013	
Commissioning of Project	31.03.2013	
Appointment of the CDM consultant	17.11.2014	
Appointment of another DOE	28.02.2015	

Details of data/ information and assumptions used by the project proponent in the financial analysis and the results of financial analysis for both the projects are presented below:

A) 39.9 MW Wind power project Jaisalmer by (OJWEPL) (Project 1)

Particulars	Value	UoM	Ref Details
Energy Generation			
No. of generating units	19	Nos.	Page No 14 of SBICAPS DPR
Capacity of each generating unit	2100	kW	Page No 14 of SBICAPS DPR
Total generating Capacity	39900	kW	Calculated Value
Plant Load Factor	20.00%	%	Page No 31 of SBICAPS DPR
Transmission & Transformation Losses	2.00%	%	Page No 31 of SBICAPS DPR
Derating	1.25%	%	Page 18 of RERC Tariff Order

			dated 07.09.2012
Technical			
Tariff Rate	5.18	Rs./ kWh	Page No 14 of SBICAPS DPR
O & M Free for the First Two Year	0.00	Rs. Lakh	Page No 35 of SBICAPS DPR
O & M Expenses and Management Expenses	1.56%	% of project Cost	Page No 35 of SBICAPS DPR
Annual Escalation	5.00%	%	Page No 35 of SBICAPS DPR
Insurance	0.50%	% of project Cost	Page No 78 of SBICAPS DPR
Financial			
Total project cost	22495.21	Rs. Lakh	Page No 52 of SBICAPS DPR
Cost per MW	563.79	Rs. Lakh	Calculated Value
Debt	70%	%	Page No 55 of SBICAPS DPR
Equity	30%	%	Page No 55 of SBICAPS DPR
Term Loan	15650.36	Rs. Lakh	Calculated Value
Promoter's contribution	6844.85	Rs. Lakh	Calculated Value
Interest Rate on Term Loan	12.50%	%	Page No 90 of SBICAPS DPR
Repayment Period	54	Months	Page No 71 of SBICAPS DPR
Moratorium	6	Months	Page No 71 of SBICAPS DPR

B) 19.5 MW wind Power Project in Pratapgarh” by (ORPPL) (Project 2)

Particulars	Value	UoM	Ref Details
Energy Generation			
No. of generating units	13	Nos.	Page 14 of SBICAPS DPR
Capacity of each generating unit	1500	kW	Page 14 of SBICAPS DPR
Total generating Capacity	19500	kW	Calculated Value
Plant Load Factor	22.00%	%	Page 35 of SBICAPS DPR
Transmission & Transformation Losses	2.00%	%	Page 35 of SBICAPS DPR
Derating	1.25%	%	Page 18 of RERC Tariff Order dated 07.09.2012
Technical			
Tariff Rate	5.44	Rs./ kWh	Page 14 of SBICAPS DPR
O & M Free for the First Two Year	0.00	Rs. Lakh	Page 41 of SBICAPS DPR
O & M Expenses and Management Expenses	1.29%	% of project Cost	Page 41 of SBICAPS DPR
Annual Escalation	5.00%	%	Page 41 of SBICAPS DPR
Insurance	0.50%	% of project Cost	Page 86 of SBICAPS DPR
Financial			
Total project cost	13042.00	Rs. Lakh	Page No 77 of SBICAPS DPR
Cost per MW	668.82	Rs. Lakh	Calculated Value
Debt	68%	%	Page No 77 of SBICAPS DPR
Equity	32%	%	Page No 77 of SBICAPS DPR

Term Loan	8890.25	Rs. Lakh	Calculated Value
Promoter's contribution	4151.75	Rs. Lakh	Calculated Value
Interest Rate on Term Loan	12.50%	%	Page No 78 of SBICAPS DPR
Repayment Period	54	Months	Page No 78 of SBICAPS DPR
Moratorium	6	Months	Page No 78 of SBICAPS DPR

The input values used in the investment analysis are valid and applicable as per the investment decision making by the project participant. This is in-line with the “Guidelines on the Assessment of Investment Analysis, paragraph 6, Annex 05, EB 62”.

Considering the above mentioned assumptions and working out the project profitability, the Project IRR for Project 1 and Project 2 works out to **9.67%** and **9.58%** as against the benchmark value of **14.50%**. Hence it is clearly evident that the project is not a business as usual scenario and this needs additional revenue stream to make to strengthen the project returns.

1. Result of Financial Assessment

Sl. No	Project Proponent	Benchmark (%)	IRR (%)
1	Project 1	14.50%	9.67%
2	Project 2	14.50%	9.58%

2. Sensitivity Analysis:

The purpose of the sensitivity analysis is to examine whether the conclusion regarding the financial viability of the project activity is sound and tenable with those reasonable variation in the assumptions. The “GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS” has been applied to carry out sensitivity analysis.

Sensitivity Analysis	
Guidance	Reasoning
Para: 20: Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude), and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets.	<i>In line with the guidance, the following variables are subjected to the variation in the sensitivity analysis carried out –</i> •Project Cost •Plant Load Factor (PLF) •Tariff Rate •Operation & Maintenance Cost
Guidance 21: As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and -10%, unless this is not deemed appropriate in the context of the specific project circumstances.	<i>In line with the guidance, a range of +10% to -10% was considered for all the above variables in the sensitivity analysis.</i>

The financial performance of the project activity is found to be sensitive to the following factors –

1. Project cost
2. Plant Load Factor
3. Cost of O&M

4. Tariff

For Project 1:

1. **Project cost:**

The project cost as envisaged by Project 1 is INR. 22495.21 Lakh. A variation to the scale of 10% is unrealistic as the actual project cost realized by the project proponent (**INR 22036 Lakh**) has also been provided to DOE. Hence any variation over it is not required.

Breaching Benchmark: This is only possible when the project cost is put to variation of 25.00% or in other words bringing the project cost down to INR. 16871.41 Lakh. Such variation in project cost is unlikely. Moreover, the project has been commissioned hence any change in project cost is not possible.

Change in Project cost	-10%	0%	10%	-25.00%
Project IRR	11.39%	9.67%	8.15%	Benchmark Breach

2. **Plant Load Factor (PLF):**

This is the most critical of all factors that can have a major impact on the financial performance of the project activity. However, PLF is based on many factors which project proponent has no control on and it carries a lot of uncertainty. The PLF for the project activity works out to be 20.00% and is referred from the DPR. Moreover, it is to be noted that the PLF as recommended by RERC Tariff order dated 07.09.2012, is also 21% only. It can be verified from the past operational data that average PLF from the time of project commissioning works out to be ~20% which is in the same range as suggested by the PLF study.

A change of even +10% in PLF however is not able to make the project financially attractive.

Breaching Benchmark: A gross PLF of 25.98% would be required to shoot up the IRR to such high. It is unrealistic for the PLF to suddenly rise to such an extent as the past generation data speaks otherwise.

Change in energy generation	-10%	0%	10%	29.90%
Project IRR	7.76%	9.67%	11.40%	Benchmark Breach

3. **Tariff Rate:**

As per the PPA with EB the project tariff is fixed for the lifetime of the project activity at Rs. 5.18/ kWh without any escalation. Any change in the tariff is unlikely for the life time of the project activity. Further as the project is already commissioned it can also be verified that the same PPA is applicable. Hence any sensitivity on tariff is not applicable.

Breaching Benchmark: A variation of 29.90% on the tariff is required to breach benchmark. Any variation in tariff is evidently unrealistic.

Change in Tariff Rate	-10%	0%	10%	29.90%
Project IRR	7.76%	9.67%	11.40%	Benchmark Breach

It can be seen that even at a sensitivity of +10% on tariff, the IRR is still below benchmark.

4. Cost of O&M:

The cost of O&M maintenance for the project lifetime is also one of the factors constituting more than 20% of the project cost. Hence this parameter also subjected to a variation of $\pm 10\%$.

Breaching Benchmark: It is clear that the project does not cross benchmark at a variation of 10%. Even 100% variation in the O&M cost the does not breach benchmark.

Change in O&M Cost	-10%	0%	10%	-100%
Project IRR	9.87%	9.67%	9.47%	Not Applicable

As evident, Project IRR is below the benchmark even in most favourable conditions. The project IRR reaches benchmark only through unrealistic variation to the parameters of project cost, PLF and tariff. Further the IRR does not reach the benchmark even if the O & M cost is reduced to 0. All the four scenarios are not possible.

For Project 2:

1. Project cost:

The project cost as envisaged by Project 2 is INR. 13042 Lakh. A variation to the scale of 10% is unrealistic as the actual project cost realized by the project proponent (**INR 13044 Lakh**) has also been provided to DOE. Hence any variation over it is not required.

Breaching Benchmark: This is only possible when the project cost is put to variation of 25.70% or in other words bringing the project cost down to INR. 9690.21 Lakh. Such variation in project cost is unlikely. Moreover, the project has been commissioned hence any change in project cost is not possible.

Change in Project cost	-10%	0%	10%	-25.70%
Project IRR	11.27%	9.58%	8.07%	Benchmark Breach

2. Plant Load Factor (PLF):

This is the most critical of all factors that can have a major impact on the financial performance of the project activity. However, PLF is based on many factors which project proponent has no control on and it carries a lot of uncertainty. The PLF for the project activity works out to be 22% and is referred from DPR. It is to be noted that the even the RERC order recommends a PLF of 20% as standard for Pratapgarh district.

A change of even +10% in PLF however is not able to make the project financially attractive.

Breaching Benchmark: A gross PLF of 28.95% would be required to shoot up the IRR to such high. It is unrealistic for the PLF to suddenly raise to such an extent as even the Tariff order recommends otherwise.

Change in energy generation	-10%	0%	10%	31.60%
Project IRR	7.73%	9.58%	11.25%	Benchmark Breach

3. Tariff Rate:

As per the PPA with EB the project tariff is fixed for lifetime of the project at Rs. 5.44/ kWh without any escalation. Any change in the tariff is unlikely for the life time of the project activity. Further as

the project is already commissioned it can also be verified that the same PPA is applicable. Hence any sensitivity on tariff is not applicable.

Breaching Benchmark: A variation of 31.60% on the tariff is required to breach benchmark. Any variation in tariff is evidently unrealistic.

Change in Tariff Rate	-10%	0%	10%	31.60%
Project IRR	7.73%	9.58%	11.25%	Benchmark Breach

It can be seen that even at a sensitivity of +10% on tariff, the IRR is still below benchmark.

4. **Cost of O&M:**

The cost of O&M maintenance for the project lifetime is also one of the factors constituting more than 20% of the project cost. Hence this parameter also subjected to a variation of $\pm 10\%$.

Breaching Benchmark: It is clear that the project does not cross benchmark at a sensitivity of 10%. Even in the case of 100% variation in the O&M cost does not breach benchmark. Hence, even if this value is “zero” the IRR does not cross benchmark.

Change in O&M Cost	-10%	0%	10%	-100%
Project IRR	9.74%	9.58%	9.41%	Benchmark Breach

As evident, Project IRR is below the benchmark even in most favourable conditions. The project IRR reaches benchmark only through unrealistic variation to the parameters of project cost, PLF and tariff. Further the IRR does not reach the benchmark even if the O & M cost is reduced by almost 100%. All the four scenarios are not possible.

All the scenarios discussed above indicate that carbon credit revenue is an important part of the project activity to make it financially viable.

In the above background, the PP of the bundled project activity submits that the project is unlikely to achieve the benchmark even under favorable conditions and hence justifies the need of carbon credit funds to help in improving the project competitiveness and financial sustainability.

Conclusion of Financial Analysis:

The implementation of the project activity would result in anthropogenic GHG emission reductions. However, the PP is dependent on the projected revenues to be accrued from the sale of carbon credits as it would provide the necessary cover to overcome or alleviate the risks or the barriers faced. Registering the project activity as a VCS project, would provide additional revenue to the project activity improving the project's profitability and economic viability. Thus in accordance with the above barrier analysis, the project activity is deemed to be additional.

Step 4: Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:

The description of common practice test (Step 4 of Additionality tool) requires analysis of other similar activities that are operational. Similar activities are defined as those that rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing etc.

The project activity is a 59.40 MW wind power project set up in Rajasthan to generate and supply electricity to the Rajasthan state grid. The project is undergoing VCS cycle. The applicable tariff for the project has been determined by the Rajasthan Electricity Regulatory Commission.

Accordingly, all wind power projects of greater than 15 MW capacity set by private project proponents in the state of Rajasthan, have been analysed. Data for the common practice analysis have been sourced from the Indian Wind Power Directory.

The common practice guidance also states that projects of similar scale only need to be considered. Accordingly, for carrying out the common practice analysis the PP have considered following two criteria to define similar scale projects viz:-

- 1) Wind power projects that fall under the large scale definition of CDM i.e. that are of 15 MW of higher capacity.
- 2) The project activity has been set up by a private investor, in such cases; the additionality tool clearly states that the benchmark (Sub step 2 Paragraph 6a) for investment analysis should be increased to account for higher risks in private investments. Thus it is clear that government sector investments cannot be compared with private investments.
- 3) Further the small scale wind power projects by different investors combined to form a large scale bundled wind power project are not considered for common practice analysis since the investment risk profile of single private investor setting up a large scale project is different from the large scale bundled wind power projects.

Wind projects by individual investors in Rajasthan where the installed capacity is more than 15MW are presented in the table below:

S. No	Project Proponent	Capacity	CDM/VCS	Reference or Comment
1	Rajasthan State Mines & Mineral Limited	14.8	Yes	14.8 MW small scale grid connected wind power project in Jaisalmer state Rajasthan, India by RSMML. http://cdm.unfccc.int/Projects/DB/BVQI1139048635.42/view
		22.5	Yes	22.5 MW grid connected wind farm project by RSMML in Jaisalmer, India. http://cdm.unfccc.int/Projects/DB/BVQI1201770524.09/view
		15	Yes	15 MW Grid connected renewable energy generation by RSMML. http://cdm.unfccc.int/Projects/DB/DNV-CUK1243661243.16/view
		22.5	Yes	22.5 MW grid connected Wind Energy Project of RSMML of Rajasthan State Mines and Minerals Limited in Jaisalmer Rajasthan State. http://cdm.unfccc.int/Projects/Validation/DB/Y3O8IX2VXOH6L1WCZP48IC1UM74CU3/view.html
		31.5	Yes	31.5 MW grid connected wind power project in Rajasthan http://cdm.unfccc.int/Projects/DB/SIRIM1356423157.78/view
2	Friends Group of Companies	35.7	Yes	BUNDLED WIND POWER PROJECT IN RAJASTHAN BY FRIENDS GROUP http://www.vcsprojectdatabase.org/#/project_details/842
3	Senergy Global Private Limited	33.25	Yes	http://cdm.unfccc.int/Projects/Validation/DB/VQM5TF4DSH43SCWUJ90TK4W040VHT2/view.html
4	Rajasthan Ren. Energy Corp. Limited	25	Yes	25 MW Grid Connected Wind Farm project by RRECL in Jaisalmer, India. http://cdm.unfccc.int/Projects/Validation/DB/Y8W0UMSG3DA1VHPT2U3Y4IF9N7S4G/view.html
5	DLF Home Developers	67.5	Yes	PDD titled "Wind Power based electricity generation project in India by DLF Home Developers Limited" http://cdm.unfccc.int/Projects/Validation/DB/34CAG54CUL49MILW9S0SKWCWU38SSX/view.html
6	Enercon Wind Farms (Raj) Private Limited	30.59	Yes	PDD titled "Bundled wind energy power projects (2003 policy) in Rajasthan" http://cdm.unfccc.int/Projects/DB/SGS-UKL1181738388.43/view
7	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	25	Yes	PDD titled "Bundled Wind power project in Jaisalmer (Rajasthan in India) managed by Enercon (India) Ltd" https://cdm.unfccc.int/Projects/DB/DNV-CUK1143050217.74/view
8	Hindustan Petroleum Corporation Limited	25	Yes	PDD titled "Bundled grid-connected electricity generation using wind energy by Hindustan Petroleum Corporation Limited." https://cdm.unfccc.int/Projects/Validation/DB/H88VQDBMZDVSK37NPUUWXHR25K08FR/view.html

9	Modern Road Makers Private Limited	20	Yes	PDD titled "MRMPL Wind Power Project " http://cdm.unfccc.int/Projects/Validation/DB/AERX8YCUI2RBEAK41JC7IF8SN67G1P/view.html
10	Enercon Windfarms Hindustan P. Ltd.	60	Yes	Enercon Wind Farm (Hindustan) Ltd in Rajasthan https://cdm.unfccc.int/Projects/DB/SGS-UKL1181742063.57/view
11	CEPCO Industries Pvt. Ltd.	23.2	Yes	Cepco Wind Power Project in Rajasthan. http://cdm.unfccc.int/UserManagement/FileStorage/L054TBIUYEQWD9XRZ6KP82SJGONHM3
12	Kohinoor Planet construction Pvt Ltd.	24	Yes	Kohinoor Wind Power Project in Rajasthan. http://cdm.unfccc.int/UserManagement/FileStorage/VSH1BAM05YKP6RLX4F3D7UEWTNIOJ2
13	RuchiSoya IndustriesLtd.	35.1	Yes	35.10 MW Wind Energy Project by Ruchi Soya Industries Limited, India. http://cdm.unfccc.int/UserManagement/FileStorage/REB0AY72GUDJ3WC4P69MF8TO1SQVHN
14	Gujarat Fluorochemicals Ltd.	33.25	Yes	31.5 MW bundled wind power project in Rajasthan by Gujarat Fluorochemicals Limited (GFL) http://cdm.unfccc.int/Projects/Validation/DB/VQM5TF4DSH43SCWUJ90TK4W040VHT2/view.html
		19.5	Yes	19.5 MW wind power project in Ossiya, Rajasthan by Gujarat Fluorochemicals Limited (GFL) http://cdm.unfccc.int/Projects/DB/RWTUV1359639593.02/view
		110	Yes	110 MW wind power project in Rajasthan by Gujarat Fluorochemicals Limited https://cdm.unfccc.int/Projects/Validation/DB/YN04VZVGZJGDZ4VVB9G88FU6X3N59H/view.html
15	ReNew Wind Energy (Devgarh) Private Limited	51	Yes	Wind Power Project at Devgarh, Rajasthan https://cdm.unfccc.int/Projects/Validation/DB/T0KNRORQWLDP5BBLUU29D8OKDKC7Q/view.html
16	ReNew Wind Energy (Sipla) Private Limited	50.4	Yes	Wind Power Project at Sipla, Rajasthan https://cdm.unfccc.int/Projects/Validation/DB/Q2GD6XL6TX6UP4SN50Y61KMYF77GU4/view.html
17	CLP Wind Farms (India) Private Limited	67.2	Yes	Wind Energy Project in Sipla, Rajasthan – Phase I https://cdm.unfccc.int/Projects/Validation/DB/5UXXBKOSHMOTDX3FOGTESUAPEBMGON/view.html
18		35.2	Yes	Wind Energy Project in Sipla, Rajasthan – Phase II https://cdm.unfccc.int/Projects/Validation/DB/ON64RNIDNFAJRR6HE2KMPTGLTXEDIO/view.html
19		100.8	Yes	Wind Energy Project in Tejuva, Rajasthan https://cdm.unfccc.int/Projects/Validation/DB/5Z815212QTA6EI1AQGYXSIAR9EQVP1/view.html

20		102.4	Yes	Wind energy project near Bhakrani village in Rajasthan https://cdm.unfccc.int/Projects/Validation/DB/WDZP5800SZ931LGP69WPWTK23VC2RB/view.html
21	India Power Corporation Limited (IPCL)	60	Yes	Greenhouse Gas Abatement through installation of wind power project in Jaisalmer, Rajasthan, India. http://cdm.unfccc.int/Projects/Validation/DB/4KTUDCNX5Y93UEFQIREOXB1P0SN249/view.html
22	Green Infra Wind Farms Assets Limited (GIWFAL)	45	Yes	45 MW Wind Energy based Power Generation in Pratapgarh, Rajasthan https://cdm.unfccc.int/Projects/Validation/DB/SSCJ KI8JQBKLQ4FLF0YARBAFWZX1Z/view.html
23	Wind World (India) Limited (Earlier Enercon (India) Limited)	54	Yes	Bundled Wind power project in Jaisalmer (Rajasthan in India) managed by Enercon (India) Ltd. https://cdm.unfccc.int/Projects/DB/DNV-CUK1143050217.74/view
		30.59	Yes	Bundled wind energy power projects (2003 policy) in Rajasthan https://cdm.unfccc.int/Projects/DB/SGS-UKL1181738388.43/view
		24.8	Yes	Bundled wind energy power projects (2004 policy) in Rajasthan https://cdm.unfccc.int/Projects/DB/SGS-UKL1181723770.26/view
		20	Yes	Wind Power Project in Tinwari, Rajasthan http://www.vcsprojectdatabase.org/#/project_details/1102
24	VishWind Infrastructure LLP	29.6	Yes	Renewable Energy Wind Power Project in Rajasthan https://cdm.unfccc.int/Projects/DB/BVQI1312546277.77/view
25	Vaayu (India) Power Corporation Private Limited	50.4	Yes	Vaayu India Wind Power Project in Jaisalmer, Rajasthan https://cdm.unfccc.int/Projects/DB/DNV-CUK1315481394.7/view
26	DCW Ltd	20	Yes	Clean energy generation from wind energy in the state of Rajasthan http://www.vcsprojectdatabase.org/#/project_details/1063
27	Wind Urja India Private Limited	38.4 (out of 50.4)	Yes	Installation of wind power project in Rajasthan and Tamil Nadu https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1320667973.11/view

28	Terapanth Foods Limited	16.5	Yes	16.5 MW Grid-connected, Bundled Wind Power Project, Jodhpur, Rajasthan, India http://cdm.unfccc.int/Projects/DB/RWTUV1349092273.88/view
29	Hindustan Zinc Limited	27.3	Yes	27.3 MW Wind energy farm at Mokla Rajasthan by HZL http://cdm.unfccc.int/Projects/DB/DNV-CUK1351155785.18/view
		52.50	Yes	52.50 MW Wind energy farm at Mokla Rajasthan by HZL http://cdm.unfccc.int/Projects/DB/DNV-CUK1351252642.79/view
30	IL&FS Wind Power Limited	26.4	Yes	Wind power project in Rajasthan, India https://cdm.unfccc.int/PRCCContainer/DB/prcp795565392/view
31	Mytrah Energy (India) Limited	42	Yes	Wind power project in Rajasthan http://cdm.unfccc.int/Projects/DB/DNV-CUK1354785555.66/view
32	Bindu Vayu Urja Private Limited (BVUPL)	75.6	Yes	Kaladonger wind power project in Rajasthan http://cdm.unfccc.int/Projects/DB/RWTUV1356681143.52/view
33	LNJ Power Ventures Limited	20	Yes	20 MW LNJP Wind Project Power Project, Rajasthan http://cdm.unfccc.int/Projects/DB/KBS_Cert1356901378.31/view
34	Chamber Constructions Pvt. Ltd.	19.5	Yes	Large Scale Wind Power Project by Chamber Constructions Pvt. Ltd. (EKI-CDM.Mar-11-01) https://cdm.unfccc.int/Projects/Validation/DB/LM6QXZ79TCSO5RR09VE1LFQFVKVB17/view.html
35	EN Wind Power Pvt Ltd	20	Yes	20 MW Wind Project in Rajasthan https://cdm.unfccc.int/Projects/Validation/DB/997FQUCGRM4AII9HMGYLE6D8AYOGRR/view.html
36	Khandke Wind Energy Private Limited (KWEPL)	44	Yes	Wind energy project by KWEPL – 1 https://cdm.unfccc.int/Projects/Validation/DB/1UXQVIT82MSRDLYKGVCKK0LL447YI/view.html
37	Clean Wind Power (Devgarh) Private Limited (CWPPL)	37.5	Yes	37.5 MW Wind power project at Pratapgarh, Rajasthan https://cdm.unfccc.int/Projects/Validation/DB/JIFE5NWIWQUBZSXTGZB7X9J1HCRXNB/view.html

It can be seen that, without exception, all private investors in the state of Rajasthan with installations greater than 15 MW have developed these projects as CDM projects. In addition, all similar activities over 15 MW in size in the state of Rajasthan are CDM projects.

Sub-steps 4a is satisfied.

Sub-step 4b Discuss any similar options that are occurring:

From sub-step 4a it is clear that all similar projects have been undertaken only as CDM/VCS projects. Hence it can be concluded that similar activities are not widely observed or commonly carried out. Thus Sub-step 4b is not applicable.

Therefore the project activity is considered to be not a “Common Practice”

2.6 Methodology Deviations

There is no methodology deviation.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

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

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 current project activity in year y (MWh/yr)

EF_{grid,CM,y} = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO₂/MWh) (i.e, 0.9766 tCO₂/MWh)

3.2 Project Emissions

The project activity involves in harnessing wind power. So the emissions from the project are zero.

3.3 Leakage

No leakage emissions have been considered and hence the leakage emission is zero.

3.4 Net GHG Emission Reductions and Removals

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)

Year 1	102,870	0	0	102,870
Year 2	102,870	0	0	102,870
Year 3	102,870	0	0	102,870
Year 4	102,870	0	0	102,870
Year 5	102,870	0	0	102,870
Year 6	102,870	0	0	102,870
Year 7	102,870	0	0	102,870
Year 8	102,870	0	0	102,870
Year 9	102,870	0	0	102,870
Year 10	102,870	0	0	102,870
Total	1,028,700	0	0	1,028,700

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _{grid,OMsimple,y}
Data unit	tCO ₂ /MWh
Description	Operating margin CO ₂ emission factor of NEWNE Grid
Source of data	Central Electricity Authority:CO ₂ Emission Database CEA CO ₂ Baseline database Version 10
Value applied:	0.9857
Justification of choice of data or description of measurement methods and procedures applied	The data has been considered in accordance to the Tool to calculate emission factor of an electricity system.
Purpose of Data	Baseline Emission calculation
Comments	The operating margin emission factor is a 3-year generation-weighted average (2011-14) Data calculated to be 0.9857. The operating Margin is calculated ex ante and fixed during the crediting period

Data / Parameter	EF _{grid,BM,y}
Data unit	tCO ₂ /MWh
Description	Build margin CO ₂ emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO ₂ Emission Database

	CEA CO ₂ Baseline database Version 10
Value applied:	0.9495
Justification of choice of data or description of measurement methods and procedures applied	The date has been considered in accordance to the Tool to calculate emission factor of an electricity system
Purpose of Data	Baseline Emission calculation
Comments	The Build Margin would be calculated ex ante and fixed during the crediting period. For ex ante calculation the most recent data (2013-14) available has been used and the build margin thus calculated is 0.9495.

Data / Parameter	EF _{grid,CM,y}
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO ₂ Emission Database CEA CO ₂ Baseline database Version 10
Value applied:	0.9766
Justification of choice of data or description of measurement methods and procedures applied	The date has been considered in accordance to the Tool to calculate emission factor of an electricity system. The tool guides to take 75% weightage of EF _{grid,OMsimple} , & 25% weightage of EF _{grid,BM,y} .
Purpose of Data	Baseline Emission calculation
Comments	The combined margin would be calculated ex-ante and fixed for the entire crediting period and the combined margin thus calculated is 0.9766.

4.2 Data and Parameters Monitored

Data / Parameter	EG _{facility,y} ³
Data unit	MWh
Description	Quantity of net electricity supplied to the grid during the year y.
Source of data	Monthly billing records issued by EB. These are called JMR (Joint Meter Reading)
Description of measurement methods	Net electricity supplied will be calculated based on the difference between calculated values of “export”, “import” and “transmission

³ If the project activity is the installation of a Greenfield power plant, then: $EGPJ,y = EG_{facility,y}$

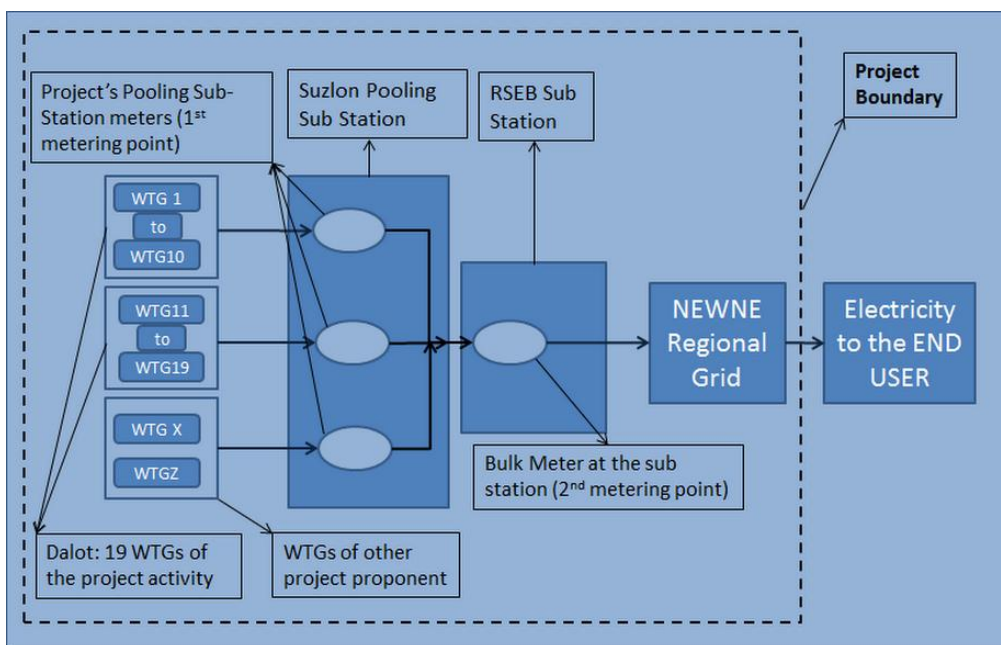
and procedures to be applied	loss" on the EB energy meter at the "evacuation point" and at "220 kV sub station". Transmission loss is calculated on pro-rata basis as per the readings of 220KV substation & "primary metering Point". (Net Electricity = Export – Import – Transmission Loss)
Frequency of monitoring/recording	Measurement: Continuous Recording: Monthly Monitoring Method: recording in JMR (Joining Meter Reading) The JMR includes, monthly recording of electricity export, import & transmission loss.
Value applied:	105335
Monitoring equipment	Energy meters of accuracy class 0.5 or better.
QA/QC procedures to be applied	Net electricity supplied to the grid by the project activity will be cross checked with invoices submitted to EB. The meter(s) shall be calibrated and maintained by the state utility as per their own schedule, and this frequency of meter calibration is not within the control of the Project Proponent
Purpose of data	Calculation of baseline emissions
Calculation method	-.
Comments	-

4.3 Monitoring Plan

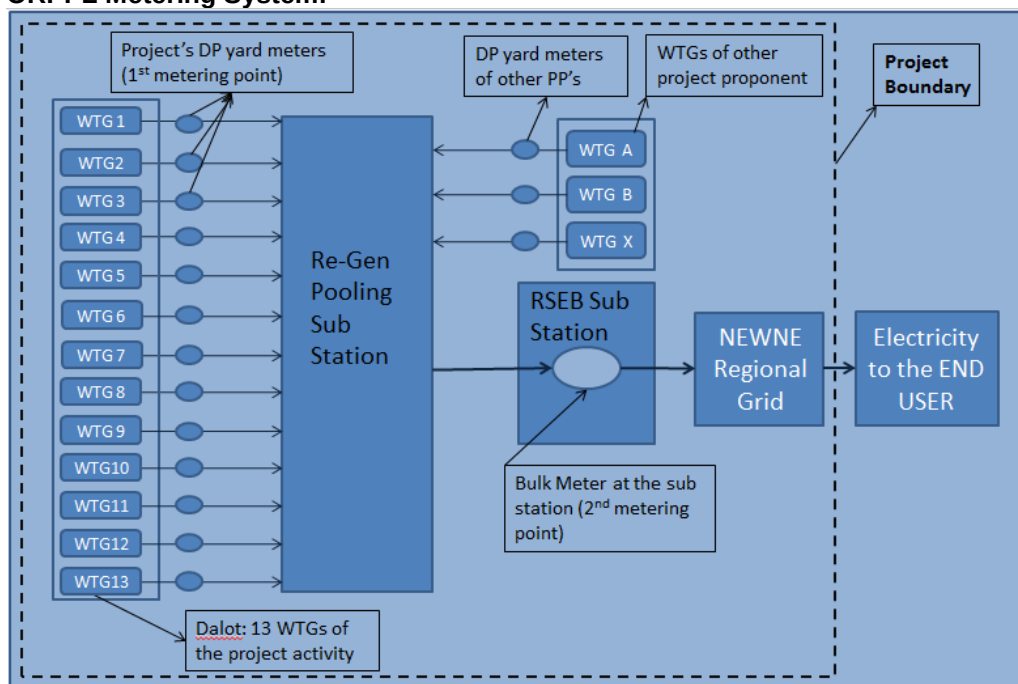
The project proponent has entered into agreement with the WTG Suppliers (Suzlon Energy Limited & ReGen) for the operation and maintenance of WTGs. The WTG supplier has dedicated and technically well-equipped O&M team for day to day Operation and maintenance of each WTG. O&M contractor will provide a monthly report, which includes generation data, major breakdown events and machine availability. Project manager is responsible for recording of monthly meter readings of export and import. Monthly power export and import data will be sent regularly to sire in charge of each project separately.

A schematic diagram indicating the metering system is provided below:

OJWEPL: Metering System



ORPPL Metering System:



5 ENVIRONMENTAL IMPACT

As per the prevailing Ministry of Environment and Forest laws, the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated 14 September (2006), 38 activities are required to undertake environmental impact assessment studies. Environmental Impact Assessment study is not required for wind mill project as there is no negative environmental impact due to the project activity and wind energy is one of the cleanest sources of energy.

6 STAKEHOLDER COMMENTS

Stakeholder Planning: The project proponent of the proposed power project activity conducted the Stakeholders Consultation (SHC) meeting on 19.01.2013 at project sites to account for the views of the people impacted either directly or indirectly due to the project activity. The objective of the SHC meetings was to inform the stakeholders on the environmental and social impact of the project activity and to discuss their concerns regarding it. The invitations for the meeting were sent out on 04.01.2013, requesting the stakeholders to participate and communicate any suggestions/objections regarding the same. The main stakeholders identified were, local farmers, villagers, school teachers, government officials, panchayat officials, local NGOs.

Comments: The project received positive comments from stakeholders; comments received from the stakeholders have been summarized below:

- The presence of the project has also ensured employment opportunities and infrastructure development in the project region.
- The project does not require any displacement of local population.
- The project has added to increased activity in local schools by means of donation of materials and furniture.

Consideration of Comments: The stakeholders expressed their views and welcomed the project activity. They also conveyed their best wishes to the success of the project activity. Since there were no negative comments received from the stakeholders, therefore, it was not necessary to take due account of any comments.