13.25 MW WIND POWER GENERATION BY RMTL, IN KUTCH, GUJARAT

Document Prepared by EKI Energy Services Limited

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Prepared By	Tapti Saha Asst. Manager- Operations EKI Energy Services Limited
Contact	EnKing Embassy, Office No. 201, Plot 48, Scheme 78, Part 2 Vijay Nagar, Near brilliant Convention Centre, Indore- 452010 Madhya Pradesh, India Website: www.enkingint.org Email ID: tapti@enkingint.org M: +91 8017028148

CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The purpose of the project activity is to generate clean and green energy to help combat greenhouse gas emissions from conventional sources of energy. The project activity entails installation of wind turbines having a total capacity of 13.25 MW. Eight wind turbines of 1.5MW each and one wind turbine of 1.25 MW are installed in this project activity. The electricity produced from the wind turbines is exported to the connected state grid barring upto 100% power generated by the 1.25 MW WTG and one of the 1.5MW WTG would be wheeled to the project proponent"s unit. The project activity is a part of the Western Region (WR) grid (Now INDIAN Grid). WR grid is predominantly fossil fuel dependent and has a grid emission of 0.898 tCO2e/MWh. The project activity reduces greenhouse gas (GHG) emission in power generation in the grid, which predominantly has fossil fuel based power stations. All the nine wind turbines have been installed in Kutch district in Gujarat state as shown in the table below:

WTG ID Number	Capacity (MW)
SEL/1500/06-07/0358	1.50
SEL/1500/06-07/0359	1.50
SEL/1500/06-07/0360	1.50
SEL/1500/06-07/0361	1.50
SEL/1500/06-07/0382	1.50
SEL/1500/06-07/0383	1.50
SEL/1500/06-07/0384	1.50
SEL/1500/06-07/0362	1.50
SEL/1250/05-06/0139	1.25
Total	**13.25**

The project proponent, Ratnamani Metals and Tubes Ltd (RMTL), is a well known manufacturer of carbon steel and stainless steel tubes. It employs state-of-the-art technology and caters to the niche markets of almost all the emerging sectors like oil and gas, refineries, petrochemicals, process industries, power plants and water distribution. The project meets the sustainable development aspects and also contributes its mite to the Government of India's target of meeting its 10% power requirements through renewable energy sources by 2012.

1.2 Sectoral Scope and Project Type

The project is a small scale CDM project activity and is based on Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The project activity conforms to the following category -

Project Type: I– Renewable Energy Projects

Project Category: AMS ID. 'Grid connected renewable electricity generation' Version 13, Scope 1, EB 36

The project is a Renewable Energy project with maximum output capacity of 13.25 MW (<15 MW, the maximum output for small scale project); hence, this comes under the Appendix B of the simplified modalities & procedures for small-scale CDM-project activities.

1.3 Project Proponent

Organization name	Ratnamani Metals and Tubes Ltd
Contact person	Mr. Vimal Katta
Title	VP (Finance)
Address	17, Rajmugat Society, Naranpura Char Rasta Ankur Road, Naranpura Ahmedabad - Gujarat
Telephone	91-79-2741 5501/2/3/4
Email	vkatta@ratnamani.com

1.4 Other Entities Involved in the Project

Organization name	**EKI Energy Services Limited**
Role in the Project	Project Consultant
Contact person	Tapti Saha

Title	Assistant Manager-Operations
Address	EnKing Embassy, Office No 201, Plot 48, Scheme 78, Part 2, Vijay Nagar, Indore- 452010, Madhya Pradesh, India.
Telephone	+91 8017028148
Email	tapti@enkingint.org

1.5 Project Start Date

Start date of the project is 31/03/2006 which is the date of commissioning of 1st WTG of 1.25 MW as per commissioning certificate. Also, the generation from the project activity is started from the same date.

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1.6 Project Crediting Period

Crediting Period Start date: 01-January-2009

Crediting Period End date: 31-December-2018

The project activity adopts fixed crediting period of 10 years period.

1.7 Project Location

Village: Arikhana, Kamand, Suthri,

District: Kutch

Gujarat

India

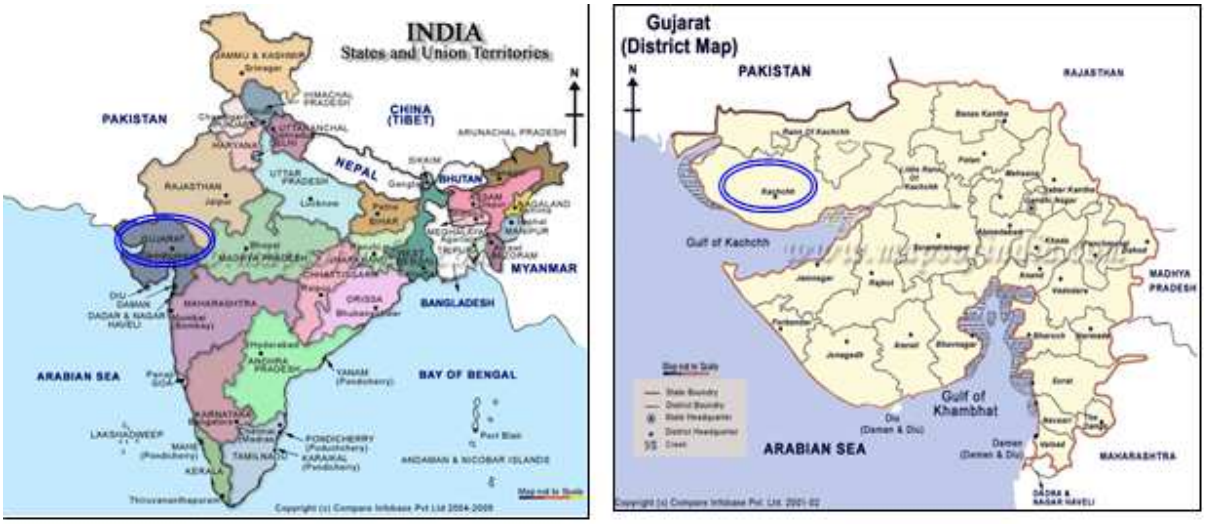
The project activity is located in three villages namely Arikhana, Suthri, Kamand in district, Kutch. Kutch is well connected by road (National Highway No. 15) and also has a domestic airport at Bhuj. It is also connected by railways and the nearest railway station is in Bhuj.

The latitude and longitude of the location of wind mills are given below:

WTG ID number	Capacity (MW)	Village Location	Latitude	Longitude
SEL/1500/06-	1.50	Suthri	23 03 N	E68 52

07/0358				
SEL/1500/06-07/0359	1.50	Arikhana	23 00 N	E68 55
SEL/1500/06-07/0360	1.50	Arikhana	23 03 N	E68 52
SEL/1500/06-07/0361	1.50	Kamand	23 03 N	E68 52
SEL/1500/06-07/0382	1.50	Suthri-old	23 02 N	E68 53
SEL/1500/06-07/0383	1.50	Suthri	23 02 N	E68 52
SEL/1500/06-07/0384	1.50	Suthri-old	23 02 N	E68 52
SEL/1500/06-07/0362[1]	1.50	Suthri	23 02 N	E68 54
SEL/1250/05-06/0139	1.25	Vanku	22 51N	E68 32
Total	13.25			

The map below shows the location of the district Kutch.



1.8 Title and Reference of Methodology

Methodology: AMS ID 'Grid connected renewable electricity generation' Scope 1 Version 13, EB 36

"Tool to calculate the emission factor for an electricity system" Version 01, EB 35

1.9 Participation under other GHG Programs

The project is registered under the CDM mechanism. The registered CDM number of the project is 2247.. The CDM project weblink is https://cdm.unfccc.int/Projects/DB/RWTUV1222760737.24

The project proponent (PP) has submitted undertaking that they will not claim same GHG emission reductions of the project from CDM and VCS. PP would not use net GHG emission reductions by the projects for compliance with emission trading program to meet binding limits on GHG emissions. PP has also submitted undertaking for not availing other forms of environmental credit for the same crediting period under consideration.

Further, the Project is not rejected by any other GHG programs.

1.10 Other Forms of Credit

India is Non-annex1 country and there is no compliance with an emission trading program or to meet binding limits on GHG emissions for this project activity. The project is registered under CDM with registration ID 2247. Project Proponent has submitted undertaking that they will not claim same GHG emission reductions of the project from CDM and VCS. PP would not use net GHG emission reductions by the projects for compliance with emission trading program to meet binding limits on GHG emissions.

Project has been registered with UNFCCC under Clean Development Mechanism program. Registration reference number is 2247. Project Proponent has submitted undertaking for not availing other forms of environmental credit for the same crediting period under consideration.

PP has also submitted an undertaking stating that they will not take REC benefits for the same Emission Reductions.

1.11. Sustainable Development

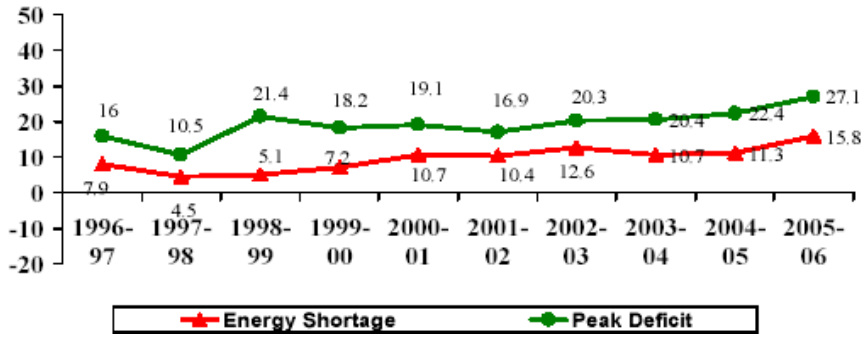
Social well being:

- The project activity being undertaken is in a rural area of the State of Gujarat. Majority of the population in Kutch district is rural (Census 2001, www.censusindia.gov.in). Thus such an initiative in the region has promoted development of the region as well as lead to improved well being of the society.
- The project activity helped in better connectivity to the wind farms and villages by enabling improved conditions of the roads.
- The project activity improved economic activities by increasing the electricity generation and availability of power and hence lead to the betterment of the society.

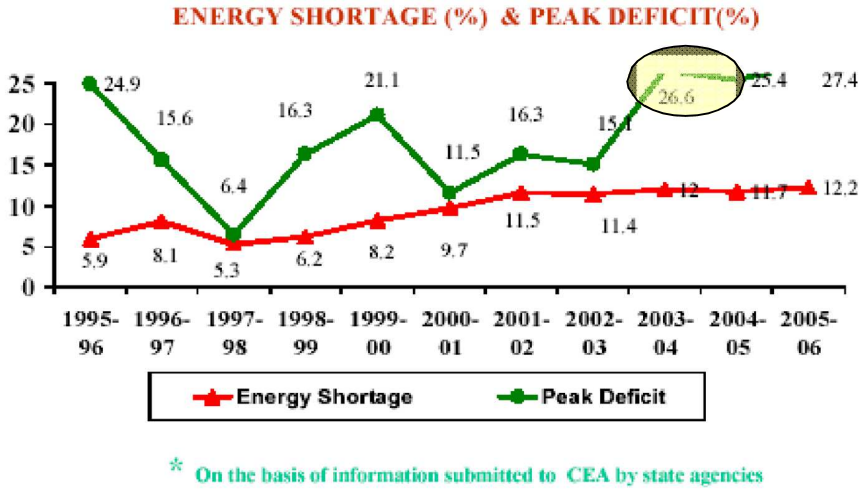
- The project activity generated employment opportunities for the people, both during construction and operation phases.

The WR grid in India faces power deficit which is approximately 27%. This is a reflection of the fact that power demand is more than power supplied in the states.

ENERGY SHORTAGE (%) & PEAK DEFICIT(%) IN WESTERN REGION



A similar situation prevails in the state of Gujarat. It has a peak deficit of ~27% as can be seen from graphs below.



Source: http://powermin.nic.in

Power generation using wind-energy would help meet power shortage in the state. It has also contribute towards Government of India's plan of meeting 10% of total power demand in the country using renewable energy sources.

Economical well being:

- The project activity would create business opportunity for local stakeholders such as suppliers, manufacturers, contractors etc.
- This initiative would encourage other entrepreneurs from various sectors, to adopt this technology and invest in wind energy.

Environmental well being:

- The project activity is a step towards environmental sustainability by avoiding fossil fuels, such as coal, utilized for power generation.
- Since, the project would be using renewable wind resources for power generation; it would not lead to any GHG emissions in the environment.

Technological well being:

- The technology selected for the power project is Wind Turbine Generators,

manufactured by Suzlon Energy Limited. The technology is latest and environmentally safe.

2 SAFEGUARDS

2.1 No Net Harm

The project activity has no significant impact on the environment. wind power projects are not included in the Schedule I of the EIA notification S.O.1533 (E) dated 14th September 2006[2] and thus an EIA is not required. Ministry of Environment & forests vide their OM J-11013/41/2006 - IA II (I) dated 13th May 2011, has re-affirmed this and exempted wind power plants from EIA and Environmental Consent requirement.

Hence, there are no significant environmental impacts due to implementation of the project activity.

2.2 Local Stakeholder Consultation

The local stakeholder meeting was carried out for the project activity and the details of the same can be referred from the registered VCS PD.

As a part of continuous feedback from stakeholders, the PP also placed a grievance register onsite where-in, the stakeholders can put down their complaint and the same if found genuine are addressed immediately.

Some of the inputs about the project/grievances and their resolution dates are shown below

Sl. No	Date of Complaint	Site	Topic	Date of Resolution	Remark from PP
1	10-May-2014	Gujarat	Street lights not working	18-May-2014	Street lights have been changed
2	24-August-2015	Gujarat	Request to repair RO at the primary school	30-August-2015	RO purifier was repaired

[2] http://envfor.nic.in/legis/eia/so1533.pdf

2.3 AFOLU-Specific Safeguards

Not Applicable.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity entails installations of wind turbines having a total capacity of 13.25 MW Eight wind turbines of 1.5 MW each and one turbine of 1.25 MW are installed in this project activity.

The commissioning details of the WTGs are provided in the table below:

Sl. No.	WTG ID	Commissioning Date
1	SEL/1500/06-07/0358	30-March-2007
2	SEL/1500/06-07/0359	29-March-2007
3	SEL/1500/06-07/0360	22-March-2007
4	SEL/1500/06-07/0361	21-March-2007
5	SEL/1500/06-07/0382	31-March-2007
6	SEL/1500/06-07/0383	22-March-2007
7	SEL/1500/06-07/0384	22-March-2007
8	SEL/1500/06-07/0362	30-June-2007
9	SEL/1250/05-06/0139	31-March-2006

These WTGs are connected to Line1 and Line2 of Suthri and Vanku Substations.

The project is a small scale CDM project activity and is based on Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The project activity conforms to the following category -

Technology:

Technical specifications of Suzlon 1500 kW WTG is given below:

Wind Turbine Generator Type	**1.5 MW**

Make	Suzlon
Rotor	
Rotor Diameter	82.0 m
Cut-in wind speed	4m/s
Rated wind speed	14m/s
Rotor swept area	5281 m^2
Rotational Speed	16.30 rpm
Rotor material	GRP
Regulation	Pitch
Gear Box	
Type	3 Stage gear box, 1 planetary & 2 helical
Manufacturer	Winergy
Nominal load	1650 kW
Type of cooling	Oil cooling system
Gear ratio	95.09
Generator	
Type	Asynchronous generator 4 pole
Rotational Speed	1511 rpm
Rated output	1500 kW
Operational Voltage	690 V
Frequency	50 Hz
Insulation class	Class “H”
Protection	IP 54
Cooling system	Air cooled

Safety system	
Aerodynamic brake	3 times Independent systems pitch regulation
Mechanical brake	Spring powered disc brakes, hydraulically released, fail safe
Control unit	Microprocessor controlled, indicating actual operating conditions, UPS back up system
Yaw Drive System	4 active electrical yaw motors
Yaw bearing	Polyamide slide bearing

Technical specifications of Suzlon 1250 kW WTG is given below.

Wind Turbine Generator Type	**1.25 MW**
Make	Suzlon, S.64
Rotor	
Rotor Diameter	64 m
Cut-in wind speed	3 m/s
Rated wind speed	14 m/s
Rotor blades	3 no.
Rotor swept area	3217 m^2
Rotational Speed	13.9 rpm
Rotor material	GRP
Regulation	Pitch regulated
Gear Box	
Type	3 Stage gear box, 1 planetary & 2 helical
Manufacturer	Winergy

Nominal load	1390 kW
Type of cooling	Oil cooling system
Gear ratio	74.917:1
Generator	
Type	Asynchronous generator 4 pole
Rotational Speed	1006/ 1506 rpm
Rated output	250/1250 kW
Rated Voltage	690 V
Frequency	50 Hz
Insulation class	Class “H”
Protection	IP 56
Cooling system	Air cooled
Safety system	
Aerodynamic brake	3 Independent systems with blade pitch
Mechanical brake	Spring powered disc brakes, hydraulically released, fail safe
Control unit	Microprocessor controlled, indicating actual operating conditions, UPS back up system
Yaw Drive System	4 active electrical yaw motors
Yaw bearing	Polyamide slide bearing

The technology used in the project activity is environmentally safe and sound.

3.2 Deviations

2.3.1 Methodology Deviations

No methodology deviations during current monitoring period.

2.3.2 Project Description Deviations

The accuracy class of the substation meters installed is 0.2s which is more accurate and acceptable compared to accuracy class 0.5s mentioned in the PDD of the project. The 0.2s accuracy class of the meter is justifiable as it is more accurate and conservative hence deviation is requested for changing in accuracy class of substation meters from 0.5s to 0.2s.

It was stated in the registered PDD that 70% power produced from one among 8 WTGs of 1.5 MW capacity (with WTG No-SEL/1500/06-07/0362) was to be wheeled to the manufacturing unit of the project proponent while in actual 100% of power produced from the same WTG is being wheeled. This is the reason for which project proponent has sought for the deviation in registered PDD.

Further, as per registered CDM PDD of the registered CDM project (UN ref 2247) the calibration frequency is once in three years for substation meters. These meters are not in control of PP and same is done by state electricity board. The state electricity board does not follow any fixed calibration frequency, hence deviation taken to change in calibration frequency as once in five years. This calibration frequency is as per CEA notification[3].

The change in calibration frequency does not have any impact on ER calculations as during monthly reading state electricity board official and PP representative check the meter conditions.

Grouped Projects

Not Applicable

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2 / MWh
Description	Combined Margin for WR grid
Source of data	Central Electricity Authority ,India
Value applied	0.898

[3] https://cea.nic.in/wp-content/uploads/2020/04/review_regulation.pdf

Justification of choice of data or description of measurement methods and procedures applied	Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement. http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf
Purpose of Data	-
Comments	-

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2 / MWh
Description	Operating Margin for WR grid
Source of data	Central Electricity Authority ,India
Value applied	1.00
Justification of choice of data or description of measurement methods and procedures applied	Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement. http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf
Purpose of Data	-
Comments	-

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2 / MWh
Description	Build Margin for WR grid
Source of data	Central Electricity Authority ,India
Value applied	0.59
Justification of choice of data or description of measurement methods and procedures applied	Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement. http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf
Purpose of Data	-
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	GEN
Data unit	kWh per annum
Description	Net electricity supplied by WTGs per annum in the project activity
Source of data	Monthly certificates issued by GEDA/ Electricity meter installed by State Electricity Board at uploading station connected to WTGs
Description of measurement methods and procedures to be applied	Reading from meter installed by State Electricity Board at uploading station as shown in section 4.3 is used for estimation of emission reduction in the project activity. Meter readings are taken jointly by respective SEB and O&M service provider
Frequency of monitoring/recording	Monthly
Value monitored	90,214,770
Monitoring equipment	Energy Meter
QA/QC procedures to be applied	These meters are the property of state electricity boards and calibration of the meters have been carried out by them as per UNFCCC requirements. The meters have an accuracy class of 0.5s Calibration and meter details mentioned in Appendix 1
Purpose of the data	-
Calculation method	-
Comments	-

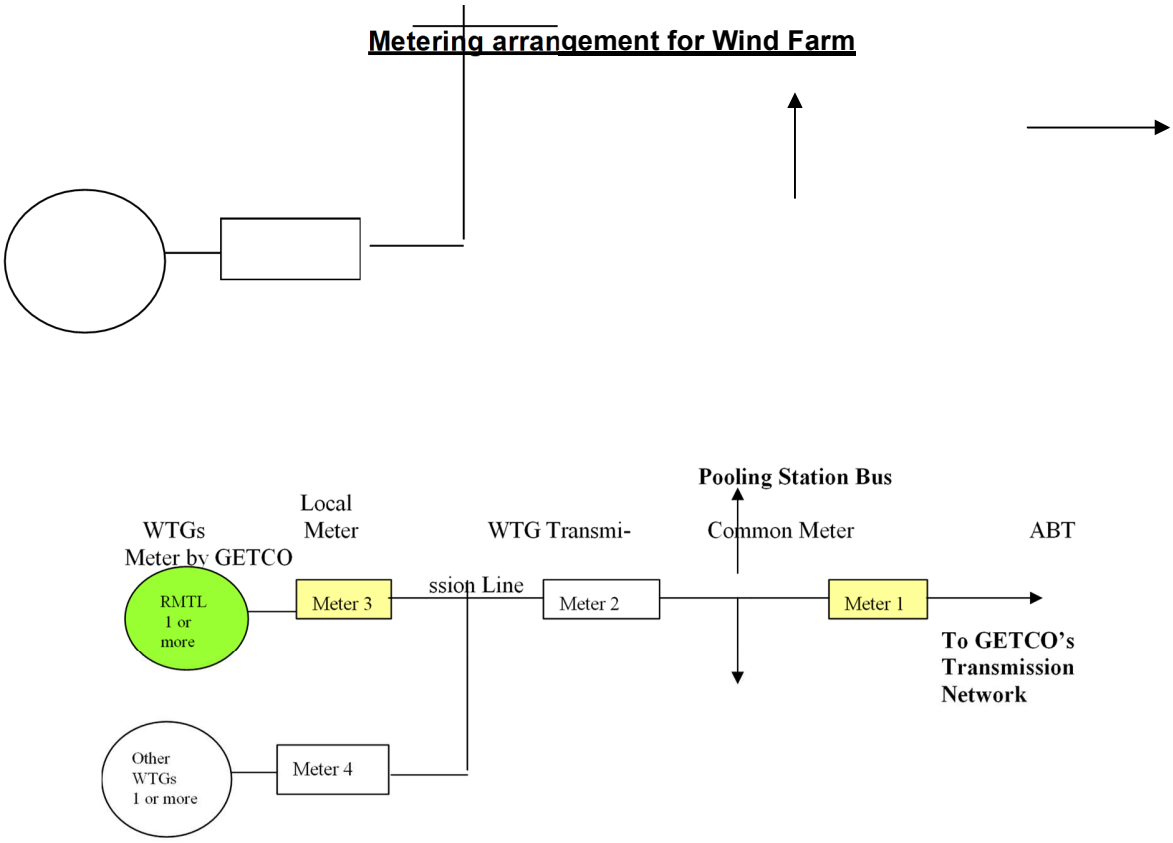
4.3 Monitoring Plan

The project proponents have proposed a detailed procedure to ensure proper monitoring for the purpose of CDM activity.

The methodology requires monitoring of the electricity generation from the project activity. Analysis of daily power generation reports, performance report and monthly meter reading are handled by project proponent on a regular basis. The metering system comprises a main meter and a back up meter, which is sealed in the presence of the representatives of

the power producer and GETCO. The State Electricity Board personnel takes reading of power generation every month; this data is used for billing purposes.

The meter reading taken jointly at the appointed date and time has been signed by the representatives of the GUVNL, GETCO and the O&M service provider every month. The back up meter has been used during the period the main metering system is not in service. The project proponent ensured that the meters are repaired, re-calibrated or replaced immediately in case they are found outside the acceptable limits of accuracy or not functioning properly. The substation meters are calibrated once in 5 years and 33 KV yard meters have been calibrated at least once in three years . The metering arrangement details is given below:



Metering of wind power is done as under:

- Joint meter reading is taken at Meter-1 by representative of GETCO (Gujarat Energy Transmission Company, GEDA (Gujarat Energy Development Agency) and O&M service provider (on behalf of individual wind farm owners). Meter-1 (M-1) is the meter at the substation. Let us assume total generation recorded for particular month is 'X' units.
- Joint meter reading is taken at Local Meter-3 by representative of GEDA (Gujarat Energy Development Agency) and O&M service provider (on behalf of individual wind farm owners). Let us assume total generation recorded for particular month is 'Y1' units.
- Similarly joint meter reading for other wind farm owners is also taken. Let us assume generation of individual owner recorded for particular month are ....."Y2, Y3 Yn' units.
- GEDA distributes 'X' to individual wind farm owners using following formula and issues monthly certificates.

- For RMTL (project promoter): Units generated = 'X' x $\frac{\text{'Y1'}}{\text{'Y1+Y2+Y3……..+Yn'}}$

o In other words, total 'X' units are shared in proportion to generation by individual wind turbine / wind farms.

- Based on certificates issued by GEDA, either credit in consumption is given by corresponding distribution company after deducting 4% wheeling charges or power is purchased by Gujarat Urja Vikas Nigam Ltd. (GUVNL) @ Rs.3.37 without deducting wheeling charges.

  The proponent shall keep complete and accurate records and all other data required for the purpose of proper administration and operation of the windmills. The proponent shall also maintain an accurate and up-to-date operating log at the wind mill sites. The data will be kept for at least 2 years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline emission:

BE = Gen * CM/1000

Where;

BE = Baseline emissions in year y (tCO_{2e}/yr)

GEN = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y(kWh/yr)

CM = Combined margin CO_2 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" (tCO_2/MWh)

Parameter	Unit	Value
GEN	kWh	90,214,770
CM	tCO_2e	0.898
BE	=	90,214770* 0.898/1000
	=	81,011(Round down value)

5.2 Project Emissions

$PE_{FF,y}$ = 0, As per applied methodology AMS I.D. Version 13 , there is no project emission . Hence, $PE_{FF,y}$= 0.

5.3 Leakage

As per applied methodology AMS I.D. Version 13, No leakage emissions need to considered for the project activity. Hence, LE_y= 0.

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)

2012	18,723	0	0	18,723
2013	19,188	0	0	19,188
2014	21,265	0	0	21,265
2015	19,946	0	0	19,946
2016	1,889	*0*	*0*	1,889
Total	**81,011**	**0**	**0**	**81,011**

It is to be noted here that as per the estimated emission reduction to be achieved from the project activity for the current monitoring period is 95,840 tCO_2e, whereas actual emission reductions achieved are 81,011 tCO_2e, which is approximately 15.1 % lower than the estimated emission reductions. The generation of electricity depends upon many other climatic conditions, which are not within the control of the project participant. The higher generation during the current verification period is due to certain natural conditions. Hence, it is acceptable.

APPENDIX I: < BREAK DOWN DETAIL>

Gen. Date	Customer Name	State	Site	MW	Breakdown Remark	Formula Parameter	Breakdown Hrs.
01-April-12	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.20
06-September-12	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.20
07-September-13	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.20
08-September-13	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.10
28-November-13	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Elec Voltage Asymmetry	U	0.30
29-November-13	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Elec Voltage Asymmetry	U	0.20
30-November-13	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	5.60
01-December-13	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Elec Voltage Asymmetry	U	0.20
02-December-13	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	5.60
06-Dec-13	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	12.80
01-January-14	Ratnamani Metals and	Gujarat	Kutch	13.25	FSS Fault	U	2.20

	Tubes Limited						
02-January-14	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	12.80
07-February-14	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	FSS Fault	U	1.60
08-February-14	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.10
09-February-14	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	5.00
10-February-14	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Preventive Check	U	0.70
24-March-14	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	FSS Fault	U	1.20
25-March-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	5.00
26-June-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	5.00
27-June-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.40
28-June-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	FSS Fault	U	7.20
29-June-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.20
06-September-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	2.60
07-September-	Ratnamani Metals and	Gujarat	Kutch	13.25	Monthly Lubrication	S	0.80

15	Tubes Limited						
08-September-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Elec Voltage Asymmetry	U	0.10
09-September-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	2.60
10-October-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Monthly Lubrication	S	1.00
11-October-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.40
12-October-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Modification	S	1.70
13-November-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Monthly Lubrication	S	1.00
14-November-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.10
15-November-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	0.10
02-December-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Elec Voltage Asymmetry	U	0.20
03-December-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	1.80
04-December-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Grid Down from EB	GF	1.80
05-December-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Elec Voltage Asymmetry	U	0.10
06-December-	Ratnamani Metals and	Gujarat	Kutch	13.25	Elec Yaw Sensor Err Stop	U	0.40

15	Tubes Limited						
20-December-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Mech Switch Twist CCW End Stop	U	3.50
22-December-15	Ratnamani Metals and Tubes Limited	Gujarat	Kutch	13.25	Yaw North Sensor Not Detected	U	0.50

APPENDIX II: < CALIBRATION DETAIL>

33 kV yard meter:

WTG ID number	Meter Serial no	Date of Calibration(2012)	Date of Calibration(2015)	Accuracy class	Meter Make	Calibration frequency
SEL/1500/06-07/0358	GJU04461	14-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years
SEL/1500/06-07/0359	GJB00659	14-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years
SEL/1500/06-07/0360	GJU03912	14-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years
SEL/1500/06-07/0361	RJU00250	14-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years
SEL/1500/06-07/0382	GJB01697	14-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years
SEL/1500/06-07/0383	GJB01071	14-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years
SEL/1500/06-07/0384	GJB00128	10-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years
SEL/1500/06-07/0362	GJB01294	10-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years
SEL/1250/05-06/0139	GJB00796	10-February-2012	10-January-2015	0.5s	Secure Meters Ltd.	3 years

Substation Meter Detail

Meter location	Serial No	Calibration 2008	Calibration 2009	Calibration 2010	Calibration 2013	Calibration 2015	Accuracy class	Calibration frequency
Vanku substation – Line 1	GJ-2123-A	22-October-2008			16-October-2013		0.2s	5 years
Vanku substation – Line 2	GJ-2150-A	22-October-2008			16-October-2013		0.2s	5 years
Suthri substation - Line 1	GJ-2104-A		01-January-2009		27-December-2013		0.2s	5 years
Suthri substation - Line 2	GJ-2110-A			08-March-2010		06-March-2015	0.2s	5 years