MONITORING REPORT
Version Number 1 and date 27/07/2011

Title: 8.75 MW Wind Power Project in Gujarat
Reference Number: 0776
Monitoring period no: 03
First and last days included (26/02/2010 - 30/06/2011)

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

>>
This is a wind energy project of capacity 8.75 MW comprising 7 Wind Turbine Generators (WTG's) of 1.25MW each. The WTG's are located at sites Bhogat, Lamba and Mandvi. The project activity is executed in a phased manner during March 2003 to March 2005.

The project conceptualizes wheeling of electricity, produced at wind energy farms, using state grid to the investing company for its internal use. Rolex Rings Private Limited, referred to as RRPL hereafter, has business interests in the area of auto component manufacturing. RRPL generates electrical power using wind energy at their wind farms in Gujarat. Power is wheeled to the forging and component manufacturing plant at Rajkot, Gujarat. Gujarat State Electricity Board grid (part of Western Regional (WR) grid in India) network is used for transmission of power to RRPL plant.

The commissioning dates for WTGs are tabulated below. These are also the start date of operation of WTGs respectively:

Capacity	Unique ID	Location	Commissioning Date
1.25MW	B1	Bhogat	27/03/2003
1.25MW	B2	Bhogat	29/07/2003
1.25MW	B4	Bhogat	29/07/2003
1.25MW	W06	Lamba	01/06/2005
1.25MW	V09	Vanku	29/04/2006
1.25MW	V10	Vanku	18/04/2006
1.25MW	V18	Vanku	29/04/2006

Total emission reductions achieved in the monitoring period are 12, 140 tCO_2e.

A.2. Project Participants

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Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)
Government of India (Host Party)	Rolex Rings Private Limited (RRPL)
Government of Japan	Mitsubishi Corporation

A.3. Location of the project activity:

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The project sites are located in the State of Gujarat.

Capacity	Unique ID	Location	Latitude/Longitude
1.25MW	B1	Bhogat	21° 57' 26.28"N, 69° 13' 19.5594"E
1.25MW	B2	Bhogat	21° 57' 41.76"N , 69° 13' 30.72"E
1.25MW	B4	Bhogat	21° 57' 48.5994"N, 69° 13' 23.52"E
1.25MW	W06	Lamba	21° 51' 53.2794"N, 69° 19' 27.12"E
1.25MW	V09	Vanku	23° 6' 51.8394"N, 68° 49' 59.8794"E
1.25MW	V10	Vanku	23° 6' 38.88"N, 68° 49' 59.8794"E
1.25MW	V18	Vanku	23° 6' 40.6794"N, 68° 50' 27.9594"E

A.4. Technical description of the project

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The project is a Renewable Energy project with maximum output capacity of 8.75 MW. WTGs installed in the project activity are of 1.25 MW capacities. Details are given in table below –

Wind Turbine Generator Type	**1.25 MW**
Make	Suzlon
Rotor	
Rotor Diameter	64 m
Number of rotor blades	03
Orientation	Upwind / Horizontal axis
Hub Height	65 m
Swept Area	3217 square meter
Rotational Speed	13.8 / 20.7 rpm
Rotational Direction	Clockwise
Rotor Blade Material	GRP
Regulation	Pitch –regulated

Operational Data	
Cut in wind speed	3 m/s
Rated wind speed	13 m/s
Cut off wind speed	25 m/s
Gear Box	
Type	Integrated 3 Stage 1 planetary & 2 helical
Manufacturer	Flender - Winergy
Nominal load	1390 kW
Type of cooling	Oil cooling system, Forced lubrication
Gear ratio	1: 74.917
Generator	
Type	Asynchronous 4/6 pole
Rotational Speed	1006/1506 RPM
Rated output	250/1250 kW
Rated Voltage	690 V
Frequency	50 Hz
Insulation	Class "H"
Enclosure class	IP 56
Cooling system	Air cooled
Operating Brakes	
Aerodynamic brake	3 Independent systems with blade pitching
Mechanical brake	Spring powered disc brakes, hydraulically released, fail safe
Yaw Drive	
Method of operation	4 active electrical yaw motors
Bearing type	Polyamide slide bearing

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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Methodology*:* AMS I.D. '*Grid connected renewable electricity generation'*, Version 09, 28 July 2006/Scope 1

Reference: Appendix B of the simplified modalities & procedures for small-scale CDM-project Activities

A.6. Registration date of the project activity:

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11/02/2007

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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Start date of crediting period: 11/02/2007
Choice of crediting period: Fixed crediting period for 10 years

There is no change of credit period start date post registration of the project activity.

A.8. Name of responsible person(s)/entity(ies):

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www.rolexrings.com

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

>>
All WTGs part of the project activity have been commissioned and are operating. The project activity has issued CERs earlier. Please find below the commissioning details of the WTGs:

Capacity	Unique ID	Location	Commissioning Date
1.25MW	B1	Bhogat	27/03/2003
1.25MW	B2	Bhogat	29/07/2003
1.25MW	B4	Bhogat	29/07/2003
1.25MW	W06	Lamba	01/06/2005
1.25MW	V09	Vanku	29/04/2006
1.25MW	V10	Vanku	18/04/2006
1.25MW	V18	Vanku	29/04/2006

There are no changes that have happened in project activity which may impact the applicability of the methodology.

B.2. Revision of the monitoring plan

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The monitoring plan has not been revised for the project activity.

B.3. Request for deviation applied to this monitoring period

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No request for deviation applied to this monitoring period

B.4. Notification or request of approval of changes

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No notification or request of approval of changes applied to this monitoring period.

SECTION C. Description of the monitoring system

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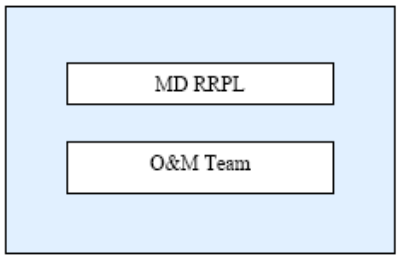
As per the registered PDD, following monitoring systems has been implemented in the project activity.

Organizational structure, roles and responsibilities



The WTGs are owned by RRPL and the machines are under contract for the turn-key operation and maintenance by the manufacturer itself. The responsibility of WTG maintenance (usual and preventive as well), daily WTG wise power generation data collection & reporting, monthly joint meter reading of common meter with SEB personnel are with manufacturer itself. WTG manufacturer is an ISO certified company and has standard procedures for O&M, training, emergency situations, meter calibration etc.

Data Monitoring:
The methodology requires monitoring of the following:

- Actual Electricity generation from the project activity

Completeness-
For Electricity generation data: There is tower wise meter which is used to monitor tower wise power generation data. This meter is maintained by O&M team contracted by Rolex Rings Private Limited (RRPL). A daily generation report is prepared which is sent to RRPL. Overall plant electricity generation is monitored using GEB meter. GEB takes reading of power generation every month; this data is used for billing purposes. This meter is maintained by GEB.

A daily log is maintained by O&M team about issues related to power generation (tower shutdown, grid failure etc). A monthly MIS is prepared based on this data and is reviewed by RRPL.

Calibration of Meters-
Tower wise meter is of high accuracy level, and is checked for accuracy on a regular basis. GEB meter is maintained by GEB personnel and calibration is done periodically. If there are problems found with performance of the meter, necessary actions are taken by GEB. The details of calibration of meters are provided in Annex-1

Frequency-
Electricity generation data is collected daily by O&M team. GEB meter reading is done every month by GEB.

Emergency procedures for the monitoring system
If there are problems found with performance of the meter, necessary actions are taken by GEB.

For line diagrams showing relevant monitoring points, please refer Annex 2.

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors	
Data / Parameter:	**NA**
Data unit:	
Description:	
Source of data used:	

Value(s) :	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	
Additional comment:	

D.2. Data and parameters monitored[1]	
Data / Parameter:	$GEN_{i,y}$
Data unit:	kWh
Description:	Electricity generated in Wind Energy Generator (i) i.e. delivered to grid
Measured /Calculated /Default:	Measured
Source of data:	Energy meter
Value(s) of monitored parameter:	14745393
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Please refer Annex 1
Measuring/ Reading/ Recording frequency:	Measuring frequency: Continuous Recording frequency: Continuous Reading frequency: Monthly
Calculation method (if applicable):	Monthly GEDA share of electricity certificate is used for this variable. The reading from common meter as well individual meters is used by GEDA personnel to calculate share of each WTG on Pro-rata basis.
QA/QC procedures applied:	The data is very accurately measured. Tower wise electricity generation is measured using WTG meter. Electricity exported to grid is measured using SEB meter installed on uploading station, this reading is taken monthly by joint team of O&M team at wind farm and SEB personnel. The meter at the uploading station is a two way meter and is in custody of State electricity board. GEDA issues monthly certificate for actual power exported by each WTG on the wind farm. This reading is derived using above meters. Reading recorded in this certificate is used for actual estimations.

Data / Parameter:	EF_y
Data unit:	t CO_2 /MWh
Description:	CO_2 emission factor of the grid.
Measured /Calculated	Calculated

[1] The monitoring parameters other than the emission factor of the grid were not included in the MR as these parameters are being used for the emission factor calculation and available at the CEA (central electricity authority) web site. The emission factor values are being referred from the CEA database itself.

/Default:	
Source of data:	Central Electricity Authority (CEA) data
Value(s) of monitored parameter:	0.82
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Frequency: Yearly
Calculation method (if applicable):	Calculated as emission factor pertaining to current generation mix, i.e. the year in which generation from project activity takes place.
QA/QC procedures applied:	Not required

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SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

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Baseline emissions are calculated as:

$$\mathbf{BE_y = \sum GEN_i \; X \; EF_y \; / \; 1000}$$

Where:

BE_y - Baseline emissions in year y, tCO_2e

GEN_i – Net power wheeled to the grid from wind mill i, kWh

EF_y - Grid emission factor calculated ex-post for year y, kg CO_2e/MWh

Sample calculation for the month of April 2010

BE_y = 438512 (kWh) * 0.82 (tCO_2/MWh)/ 1000
= 361 (tCO_2e)

Sample calculation for the month of March 2011

BE_y = 600855 (kWh) * 0.82 (tCO_2/MWh)/ 1000
= 495 (tCO_2e)

The cumulative baseline emissions for the entire monitored period are:

BE_y = 12,140 (tCO_2e)

The detailed worksheet of baseline emissions is as below:

Month	GEN_i (kWh)												$\sum GEN_i$ (kWh)	Estimations of baseline emissions (tCO_2e)
	Bhogat				Vanku				Lamba					
	Bhogat (As per GEDA),a	Bhogat (As per Apportion),b	Bhogat (Min a,b)	Permissible error	Vanku (As per GEDA), c	Vanku (As per Apportion),d	Vanku (Min c,d)	Permissible error	Lamba (As per GEDA), e	Lamba (As per Apportion),f	Lamba (Min e, f)	Permissible error		
Mar-10	364227	364354	364227	0	280694	280694	280694	0	140936	140936	140936	0	785857	647
Apr-10	129289	128981	128981	0	249955	229955	229955	0	82043	79576	79576	0	438512	361
May-10	575279	575303	575279	0	637441	637441	637441	0	269874	269647	269647	0	1482367	1221
Jun-10	516676	516752	516676	0	490260	490260	490260	0	214745	213361	213361	0	1220297	1005
Jul-10	452342	452499	452342	0	475758	475758	475758	0	276387	276387	276387	0	1204487	992
Aug-10	460799	460931	460799	0	239775	239775	239775	0	210503	210503	210503	0	911077	750
Sep-10	217533	218181	217533	0	117518	117518	117518	0	106778	106778	106778	0	441829	364
Oct-10	218023	218220	218023	0	120370	120527	120370	0	78120	78194	78120	0	416513	343
Nov-10	333804	326380	326380	0	206919	206919	206919	0	137363	137363	137363	0	670662	552
Dec-10	319549	311593	311593	0	212157	212157	212157	0	142454	142454	142454	0	666204	549
Jan-11	468275	458195	458195	0	227479	227479	227479	0	199298	199298	199298	0	884972	729
Feb-11	284993	278840	278840	0	176156	176156	176156	0	117712	117712	117712	0	572708	472
Mar-11	286643	279626	279626	0	210854	210854	210854	0	110375	110375	110375	0	600855	495
Apr-11	390962	383122	383122	0	242143	242143	242143	0	154553	154552	154552	0	779817	642
May-11	650621	634916	634916	0	692512	692512	692512	0	252714	252848	252714	0	1580142	1301

Jun-11	867603	883909	867603	0	877367	877367	877367	0	344125	344124	344124	0	2089094	1720
Total	**6536618**	**6491802**	**6474135**	**0**	**5457358**	**5437515**	**5437358**	**0**	**2837980**	**2834108**	**2833900**	**0**	**14745393**	**12,140**

*As per para 8 of "Guidelines for Assessing Compliance With The Calibration Frequency Requirements (Version 01), "*In cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used"*.

For substation meters:

The PP has used the calibration approach, for substation meters, as per the available local standards (GETCO - Gujarat Energy Transmission Corporation Ltd.). As per this GETCO guideline, the substation meters would be tested once in three years.

For meters other than substation:

In the project case calibration frequency of meter is not specified either in monitoring methodology or in monitoring plan of registered CDM-SCC-PDD. Calibration frequency for the project case is considered as per national standard, CEA Regulation on "*Installation and operation of meters*" Para 18 (3). As per this regulation energy meters requires to be calibrated once in five years. However, taking the conservative approach, PP has considered the guidance on calibration of meters for small scale projects which prescribes calibration of meters at least once in 3 years, *As per para 12 (c) of EB 35 Annex 35 "Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in 3 years"*.

E.2. Project emissions calculation

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Since, the proposed project activity is a renewable energy project which generates electricity using wind power; no anthropogenic emissions by sources of greenhouse gases within the project boundary are identified. Hence, project emissions are zero.

$\mathbf{PE_y = 0}$

E.3. Leakage calculation

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No anthropogenic greenhouse gases by sources outside the project boundary that are significant, measurable and attributable to the project activity are identified. Hence, no leakage is considered from the project activity.

$\mathbf{L_y = 0}$

E.4. Emission reductions calculation / table

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In accordance with the applied methodology-AMS I.D., Version 09, the emission reductions can be calculated as follows:

$\mathbf{ER_y = BE_y - PE_y - L_y}$

Where,
ER_y: Emission reductions in year y (tCO_2e.)
BE_y: Baseline emissions in year y (tCO_2e.)
PE_y: Project emissions in year y (tCO_2e.)
L_y: Emissions due to leakage in year y (tCO_2e.)

Total baseline emissions: 12, 140 tCO_2e
Total project emissions: 0
Total leakage: 0 tCO_2e
Total emission reductions: 12, 140 tCO_2e

The detailed worksheet of emission reductions is as below:

Month	Estimation of project activity emissions (tCO_2 e)	Estimations of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
Mar-10	0	647	0	647
Apr-10	0	361	0	361
May-10	0	1221	0	1221
Jun-10	0	1005	0	1005
Jul-10	0	992	0	992
Aug-10	0	750	0	750
Sep-10	0	364	0	364
Oct-10	0	343	0	343
Nov-10	0	552	0	552
Dec-10	0	549	0	549
Jan-11	0	729	0	729
Feb-11	0	472	0	472
Mar-11	0	495	0	495
Apr-11	0	642	0	642
May-11	0	1301	0	1301
Jun-11	0	1720	0	1720
Total	**0**	**12, 140**	**0**	**12, 140**

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

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Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	20,597	12,140

There are 489 days in this monitoring period (26/02/2010 – 30/06/2011)
Emission reductions estimated in the registered PDD: 20,597 tCO_2e (=15342/365*490 tCO_2e)
The actual emission reductions achieved during the monitoring period: 12, 140 tCO_2e

E.6. Remarks on difference from estimated value in the PDD

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Estimated Emission Reduction	Actual Emission Reduction	Variation
20,597*	12,140	-41.06 %

* Estimated emission reduction is 490 days; this is as per registered PDD.

Variation in actual emission reduction is due to the lower capacity utilization factor (CUF) achieved in the present monitoring period.

ANNEX-1

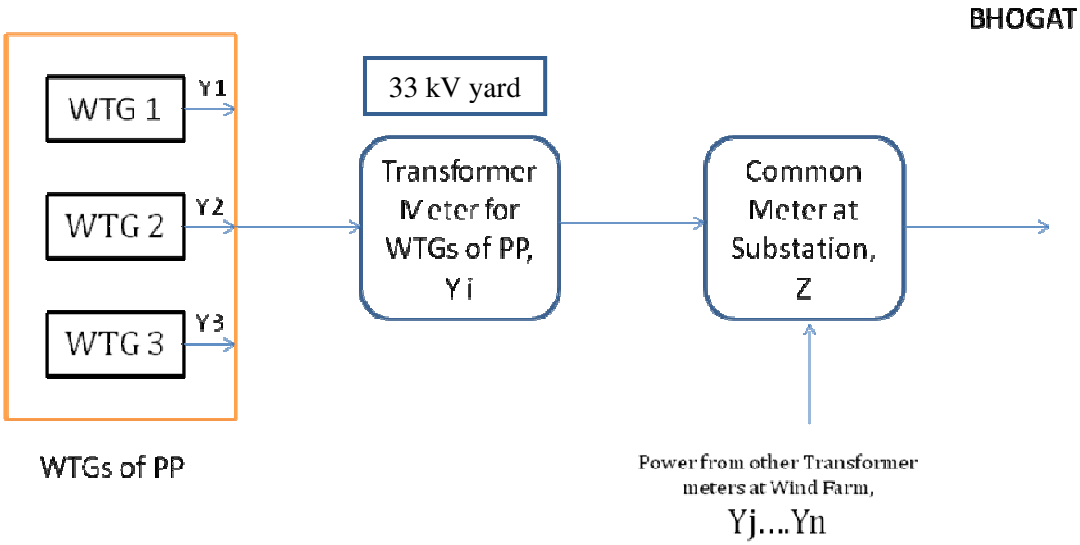
Calibration details[2] of the energy meters are given below:

SN	Meter location	Site	Date of testing	Meter Serial No	Make	Accuracy Class/ Least Count
1	B1 - B2 - B4	Bhogat	06-04-2010	GJB 01396	Secure	0.2S
2	B86	Lamba	09/04/2010	GJB 00133	Secure	0.5S
3	V9	Vanku	08-07-2010	GJU 00855	Secure	0.5S
4	V10	Vanku	15-07-2010	GJU 03427	Secure	0.5S
5	V18	Vanku	12-07-2010	GJB 00123	Secure	0.5S
6	Substation (Lamba)	SS 1	26-05-2010	GJB 00487	Secure	0.5S
		SS 2	26-05-2010	MSB 02438	Secure	0.5S
7	Substation (Vanku)	TR 1	31-01-2011	GJB 00591	Secure	0.5S
		TR 2	31-01-2011	GJB 00592	Secure	0.5S
8	Substation (Bhogat)	SS 1	29-05-2010	GJB 00270	Secure	0.5S
		SS 2	24-02-2009	GJB 00595	Secure	0.5S

[2] There have been a few changes in meters at site by the authorities beyond PP's control. Details of all meters, old and new, are provided separately as part of Emission Reduction worksheet to DOE.

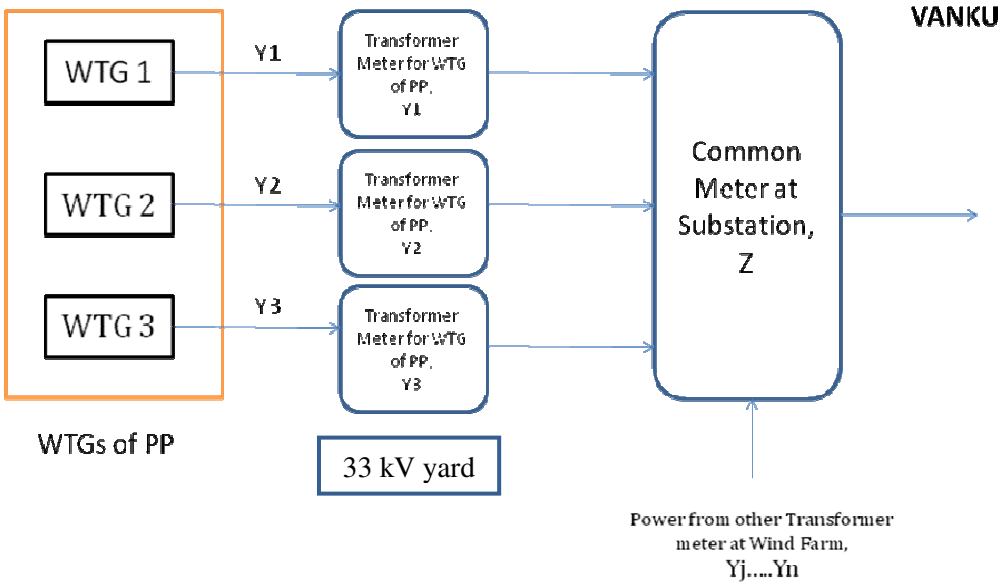
ANNEX -2

Line diagrams showing all relevant monitoring points



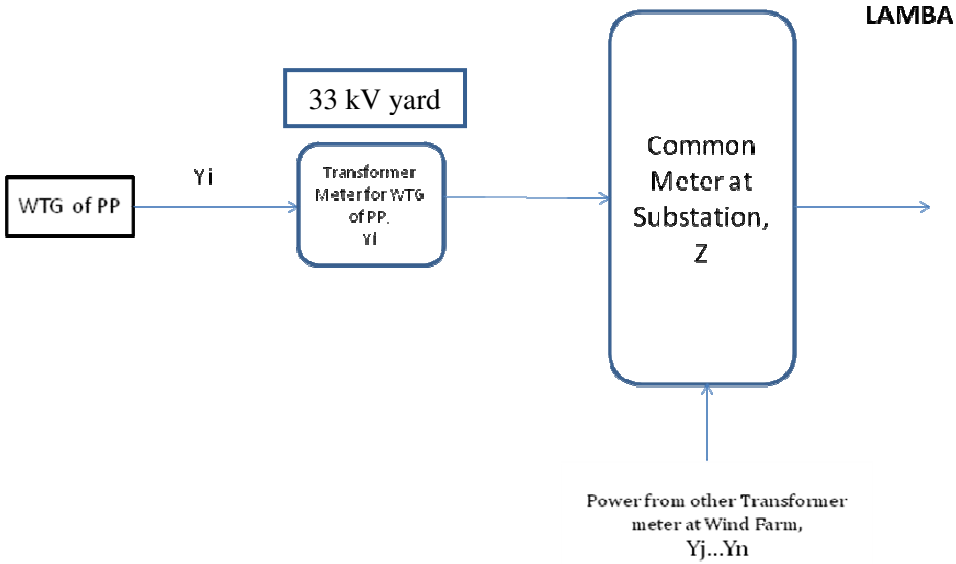
Net Electricity apportioned to WTGs of PP (WTGs 1, 2 & 3) – Yi x Z / (Yi + Yj + ...+ Yn)

Both Transformer meter and Common meter are calibrated at regular intervals.



Net Electricity apportioned to WTG of PP (WTG 1) – Y1 x Z / (Y1 + Y2 + Y3 + ...+ Yn)

Transformer meters and Common meter are calibrated at regular intervals.



Net Electricity apportioned to WTG of PP (WTG 1) = Yi x Z / (Yi + ...+ Yn)

Transformer meters and Common meter are calibrated at regular intervals.

ANNEX-3

Apportioning approach for Bhogat, Vanku and Lamba

GEN_i = Net electricity export to the grid (measured at Substation Meter) x [sum of electricity generation recorded at controller meters of WTGs of PP / sum of electricity generation recorded at controller meters of all WTGs located at the wind farm]

Sample calculation at Bhogat for the month of June-10

= 2736944 * (524160 / 2776179)
= 516752 kWh

As per JMR of month of June-10 the PP share is 516676 kWh

Now the lower of the two, i.e. 516676 kWh is considered for the CER calculation, which is conservative.

Sample calculation at Vanku for the month of Oct-10

= 1798693 * (128034 / 1910721)
= 120527 kWh

As per JMR of month of Oct-10 the PP share is 120370 kWh

Now the lower of the two, i.e. 120370 kWh is considered for the CER calculation, which is conservative.

Sample calculation at Lamba for the month of Oct-10

= 1670605 * (80118 / 1711719)
= 78194 kWh

As per JMR of month of Oct-10 the PP share is 78120 kWh

Now the lower of the two, i.e. 78120 kWh is considered for the CER calculation, which is conservative.