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Request for Revision of Monitoring Plan
"3.7 MW Bundled Wind Power Project at Priyadarshini Polysacks Ltd. Dhulia District Maharashtra"

CDM Registration No: 1009

Dear Sir/Madam,

Please find below the validation opinion of TÜV NORD JI/CDM Certification Program to the revision of the monitoring plan for the above mentioned project no. 1009.

If you have any questions do not hesitate to contact us.

Yours sincerely,

TÜV NORD JI/CDM Certification Program

Rainer Winter

Validation opinion as per requirement of EB26, Annex 34, para 5
Level of accuracy or completeness
☒ *TÜV NORD herewith confirms that the proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced.* *Additional comment:* "3.7 MW Bundled Wind Power Project at Priyadarshini Polysacks Ltd. Dhulia District Maharashtra" (hereafter referred to as project activity) was registered on 12 May 2007 using "Grid connected renewable electricity generation" (AMS I.D, Version 10). The bundled project activity involves the establishment sub-bundle I, having capacity of 2.5 MW (2 Nos X 1.25 MW) located at Chhadvel, Taluka Sakri in Dhulia district of Maharashtra and sub-bundle II having capacity of 1.2 MW (2 Nos X 0.6 MW) located at village Tisangi, Taluka Kavtemahankal in Sangli district of Maharashtra. India. The monitoring of all Wind Turbine Generators (WTGs) is done at Central Monitoring Station (CMS) maintained and operated by M/s Suzlon Energy Limited (hereafter referred to as O & M contractor). In line with the paragraph 57 of the modalities and procedures for the CDM the DOE instructed the project participant to revise the monitoring plan to improve accuracy and completeness of information and also the requirements mentioned under paragraph 17 and 18 of Clean Development Mechanism Validation and Verification Manual (VVM) (EB-44, Annex-3). The DOE has validated the detailed procedure to arrive on the monitoring parameter "Net Electricity supplied to the western region electricity grid" (id: D.3.1) adopted by the Maharashtra State Electricity Distribution Company Limited (MSEDCL). Furthermore, following the EB guidance under the same context (email dated 2009/02/24) the monitoring plan is upgraded to include the parameters "Total net electricity supplied to the grid (by all WTGs connected to the substation) measured at the substation" (id: D.3.2), "Total electricity generation by WTGs owned by PPL" (id: D.3.3) and "Total electricity generation by all other WTG connected to the substation feeder" (id D.3.4). The documents and evidences in relation to monitoring of electricity generated by installed WTG's (with the help of id: D.3.3) and monitoring of net electricity delivered to the grid (with the help of id: D.3.2, D.3.3 and D.3.4) by WTGs are verified by DOE during site visit for the Monitoring Period (2007-06-01 to 2008-05-31). The monitored data (id: D.3.1) was cross verified in accordance to the procedure laid down by O & M contractor and MSEDCL. The DOE verified and found that "Net Electricity supplied to the western region electricity grid" (id: D.3.1) is obtained from two measurements viz • The electricity generated by WTG's of all the project promoters (measurements for id: D.3.3 and D.3.4) with the help of integrated electronic meter. This measurement is undertaken by the O & M contractor (at the CMS) in line with the clause 11.05 of the submitted PPA by the project proponent. • The import, export and net electricity exported to the MSEDCL (id: D.3.2) measured by the main and check meters for all the connected WTG's which is recorded by representative of MSEDCL in presence of O & M contractor

Procedure for Apportioning: (Sample for Bundle-I)

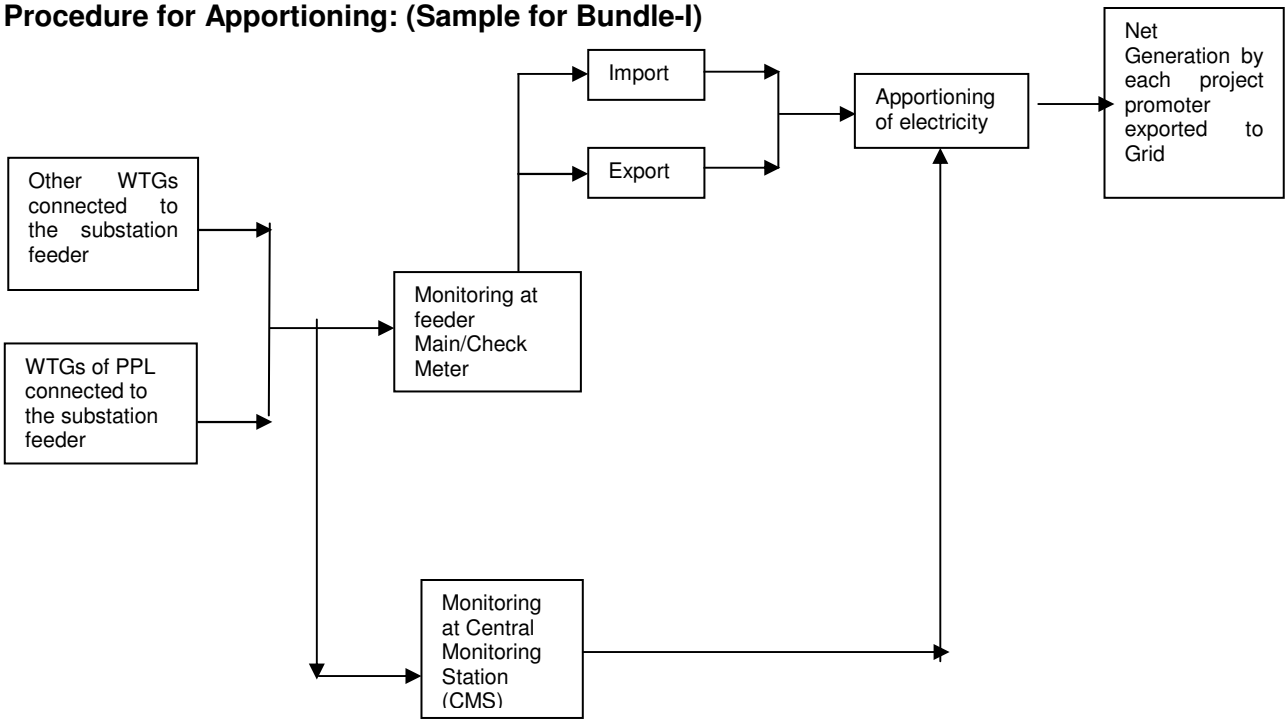

Figure-1: Metering arrangement of WTG's connected to the Feeder

Id number	Parameter	Description	Source
D.3.1	$EG_{PPL, MSEDCL}$	Net Electricity supplied to the western region electricity grid.	Calculated from measured values (refer Logic of Apportioning Step-2)
D.3.2	$EG_{NET, MSEDCL}$	Total net generation at MSEDCL substation obtained from main and check meter readings	Monthly measurements undertaken by representative of MSEDCL in presence of representative of O & M contractor
D.3.3	$EG_{WTG, PPL}$	Electricity generated by WTGs owned by PPL measured by integrated electronic meter	Wind Mill's Break-up Energy Report provided by O & M contractor, measured at CMS.
D.3.4	$EG_{WTGothers}$	Gross generation of all the WTGs connected to the substation, excluding PPL (i. e. D.3.3)	Monitoring of all wind turbines is done at CMS.

Table-1: Nomenclature

Logic of Apportioning:

The apportioning protocol is similar for both the bundles.

Step-1

- The verification team in accordance to the procedure followed by the O & M contractor cross verified the multiplying factor (M_F).

- The multiplying factor for PPL was calculated as the ratio of electricity generated by installed WTG's of PPL (measured by integrated electronic meter and recorded, aggregated and maintained at CMS) to the total generation by all the connected WTGs (measured by integrated electronic meter and recorded, aggregated and maintained at CMS) in the given feeder at the substation. Thus,

$$MF_x = \frac{EG_{WTG,PPL}}{\sum_{0}^{X} EG}$$

MF_x Multiplying Factor for the respective WTG(s) per project proponent x of the wind farm

$\sum_{0}^{X} EG$ sum of D.3.3 and D.3.4

Step-2

- The Main and Check meter at the feeder of the substation display the electricity exported, imported and the net electricity exported to the grid. The net generation by PPL (here Bundle I) is then calculated in the following manner:

$$EG_{PPL,MSEDCL} = MF_x \times EG_{NET,MSEDCL}$$

This calculation approach was verified as applicable by the verification team for Bundle II also.

Results of Apportioning logic Vs readings in Joint Meter Reading (JMR) Report:

Sample demonstration for Bundle I (Dhulia):

Bundle I (Dhulia)							
Capacity:2.5 MW (2 Nos. x 1250 kW)							
Feeder: Valve I							
Sr. No.	Name of WTG Developer (customer)	Loc. No.	WTG Capacity, MW	Units recorded by the CMS at the time of JMR as per Break up Energy Report in kWh	Break up of energy		
					Import kWh	Export kWh	Net kWh
1	PPL	K248	1.25	429462	421126	109	421017
2	PPL	K277	1.25	444353	435728	113	435615
	Total measurements at the CMS and Main/ Check meter for all the connected WTG's		**32.95**	**8207385**	**8048080**	**2080**	**8046000**
K248	Multiplying factor (MF_x)	0.052326289					
K277	Multiplying factor (MF_x)	0.054140631					

The above mentioned logic (with corresponding values of import and export) can also be applied to cross verify the import, export values appearing on the JMR issued by the MSEDCL.

In light of above substantiation, the DOE concludes that the inclusion of the "Procedure for Apportioning" and monitoring parameters (id: D.3.2, D.3.3, D.3.4) will provide increased level of accuracy and completeness in the monitoring. The monitoring parameter "Net Electricity supplied to the western region electricity grid" is therefore considered as measured and calculated value (m & c). The DOE also confirms that the below mentioned monitoring plan is adequate and meets the requirements stipulated under monitoring methodology (AMS I.D Version 10, paragraph 13).

ID Number (Please use numbers to ease cross-referencing to table D.4)	Data Type	Data variable	Data Unit	Measured (m), Calculated (c) or Estimated (e)	Recording Frequency	Proportion of Data to be Monitored	How will the Data be Archived? (Electronic/ Paper)	For How Long is Archived Data to be Kept?	Comment
D.3.1	Energy	Net electricity supplied to the western region electricity grid.	KWh	m & c	Continuously	100%	Electronic	For a period of 2 years from the end of crediting period or after last issuance of CERs	Joint meter reading will be taken by MSEDCL and promoter by applying logic of apportioning. The project revenue is based on the net units displaced as measured by metering system involving common bulk meter and the individual WTG controller meter. Every month these meter readings will be recorded by plant personnel, these records will be archived for crosschecking yearly figures.
D.3.2	Energy	Total net electricity supplied to the grid (by all WTGs connected to the substation) measured at the substation	kWh	m & c	Continuously	100%	Electronic	For a period of 2 years from the end of crediting period or after last issuance of CERs	This parameter will be monitored at the substation bulk meter (main & check meter) by representative of MSEDCL in presence of the representative of the O & M contractor. This will be calculated by subtracting the total export from total import recorded at the substation meter. The data will be recorded both at CMS & substation. This will be further useful in calculating the net electricity supplied by PPL to the grid by multiplying it with the multiplication factor.
D.3.3	Energy	Total electricity generation by WTGs owned by PPL	kWh	m & c	Continuously	100%	Electronic	For a period of 2 years from the end of crediting period or after last issuance of CERs	The electricity generated by all four WTGs will be monitored at the inbuilt control panel meters of all these WTGs. It will be recorded at the CMS on continuous basis. The electricity generation by the individual WTG will be recorded in the monthly Joint Meter Reading Report issued by MSEDCL to PPL. The sum of all these readings will give the total electricity generated by all the WTGs by PPL.

D.3.4	Energy	Total electricity generation by all other WTG connected to the substation feeder	kWh	m & c	Continuously	100%	Electronic	For a period of 2 years from the end of crediting period or	The electricity generated by any individual WTG will be recorded at the inbuilt control panel meter at the WTG. This will be further connected to the CMS. The sum of all these readings will give the total electricity generated by all other connected WTGs at the wind farm.
D.3.5	Emission Factor	CEA/WREB	tCO_2/GWh	c	Annually (Data of the year in which project generation occurs)	100%	Electronic	For a period of 2 years from the end of crediting period or after last issuance of CERs	Data for emission factor calculation was taken from CEA General Review, which is an official publication of Ministry of Power, Government of India. Refer: http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

The proposed revision of the monitoring plan does not impact the estimation of emission reduction for the project activity. The DOE concludes that the revision in the monitoring plan will effect real, measurable and attributable emission reductions.

Accordance with approved monitoring methodology

☒ *TÜV NORD herewith confirms that the proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity.*

Additional comment:

The proposed revised monitoring plan correctly follows the applied methodology i.e. AMS I.D, version 10, paragraph 13.

Previous verification findings

☐ *TÜV NORD herewith confirms that the findings of previous validation reports, if any, have been taken into account.*

☒ *No findings from previous validation had to be considered.*

Additional comment:

The DOE has identified the need of revising the monitoring plan to improve accuracy and completeness of the monitoring information (Cp para 57 of CDM M&P) during the first periodic verification and validated the revision of the monitoring plan.