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TÜV®

CDM Executive Board

Our / Your Reference
09_452/1268

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Date
18.11.2010

Request for Revision of Monitoring Plan
"Tungabhadra wind power project in Karnataka"

CDM Registration No: 1268

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.1268.

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 EB49, Annex 28, para 7

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:

“Tungabhadra wind power project in Karnataka” (hereafter referred to as project activity) was registered on 27 October 2008 using the methodology “Consolidated methodology for grid-connected electricity generation from renewable sources” (ACM0002, Version 06).

The project activity involves the installation and generation of electricity from 38 WEGs in Koralahalli, Singatalur and Hammagi villages in Mundargi Taluk, Gadag District of Karnataka state, India. The total installed capacity of this wind power project is 22.8 MW. The generated electricity is evacuated to KPTCL/DISCOM of Southern Regional Grid of India. The monitoring of all Wind Turbine Generators (WEGs) is done at the project site and the 110 kV substation at Banikoppa Village, maintained and operated by M/s. Enercon India Ltd (hereafter referred to as O & M contractor).

In line with the paragraph 57 of the modalities and procedures for the CDM-EB 49, Annex 28, 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-55, Annex-1). The DOE has validated the detailed procedure to arrive on the monitoring parameters in section B.7.1, B.7.2 and Annex-4 of the revised monitoring plan in track change and clean mode.

Revision 1:

The monitoring plan in the registered PDD does not make a mention of the adjustment of transmission loss in the meter readings taken at 33 kV and the 110 kV substation for the project activity. However, this procedure is mentioned under articles of the PPA.

The electricity supplied to the grid is calculated based upon meter reading taken at the Enercon substation at 110 kV metering point. The meter reading for the project activity is taken at 33 kV metering point (one main and one check meter). Therefore, the transmission loss between the metering points at 33 kV and the metering point at 110 kV has to be adjusted in the meter reading taken at 33 kV metering points.

The monitoring parameters thus included in the revised monitoring plan are EG_y (Net electricity supplied to the grid by the Project), EG_{export} (Electricity Export recorded at meters (one main and one check) connecting 38 machines of the project activity), EG_{import} (Electricity Import recorded at the meters (one main and one check) connecting 38 machines of the project activity), T_E (Transmission loss for export between the metering location at 33 kV point and the metering location at 110 kV at the Enercon substation).

Revision 2:

The calibration frequency is not mentioned in the registered PDD. Annual calibration frequency has been mentioned in the revised monitoring plan, which is in line with the PPA and standard host country practices.

The above mentioned revisions have been addressed in B.7.1, B.7.2 and Annex 4 of the revised MP.

The DOE also confirms that the below mentioned monitoring plan is adequate and meets the requirements stipulated under monitoring methodology (ACM0002 Version 06).

Parameter	Description	Source	DOE Assessment
EGy	The WEGs of the project activity are connected to one set of meters at the 33kV metering point. The electricity is then evacuated at the 110kV substation where the projects WEGs are connected to two sets of meters. This bulk meter installed at the sub-station which is owned by Enercon India Ltd (Enercon), which includes energy supplied by non-project participants. Electricity supplied (EGy) to the grid by the project activity is measured by the difference between export energy (EGexport), 15% transmission loss applied import energy (EGimport) and transmission loss (TE) calculated by apportioning method. All the readings related to export energy; import energy and transmission loss will be mentioned in the monthly certified joint meter readings/B-Forms. Transmission loss is calculated based on apportioning mechanism as mentioned in PPA by KPTCL/DISCOM. The net electricity values generated by the project activity can be cross checked with the invoice raised by the PP to KPTCL/DISCOM.	Monthly joint meter readings at the 33 kV metering point, authenticated by state utility and PP representative To cross check (EGy) value, the invoices raised by the project proponent to KPTCL/DISCOM for the sale of electricity.	The location of the energy meters and the procedure undertaken for the measuring and recording the energy delivered to the grid, i.e. EGy was not described in a detailed manner in the registered PDD. The revised monitoring plan provides an accurate description of the energy meters at the 33kv metering point, as well as the 110 kV substation at Banikoppa. The same has been confirmed by the site visit interviews and review of JMRs taken at the 33kv metering point and the 110 kV evacuation point. The energy exported, imported after deducting of transmission losses are sourced from JMRs at the 33kv metering point.
EGexport	Energy exported by project activity will be monitored at 33 kV metering point by one set of meters. The meters installed at 33 kV metering point are capable of measuring both export and import of electricity.	Monthly joint meter readings at the 33 kV metering point, authenticated by state utility	The monthly joint meter readings ^{/JMR1/} issued by HESCOM were reviewed. The

		(DISCOM/KPTCL) and PP representative	JMRs provide the energy exported by the project every month.
EGimport	Energy imported by project activity will be monitored at 33 kV metering point. The meters installed at 33 kV metering point are capable of measuring both export and import of electricity. For conservative calculation of energy imported by the project activity, the state utility as is the standard practice in the state, will apply 15% transmission loss to the import value to the recorded import energy measured at 33 kV metering point.	Monthly joint meter readings at the 33 kV metering point, authenticated by state utility and PP representative	The monthly joint meter readings ^{/JMR1/} issued by HESCOM were reviewed, and it was found that the JMRs provide the energy imported by the project after deduction of 15% transmission loss. It was confirmed during the site visit interviews that the 15% deducted is as per standard practices adopted by the KPTCL. This procedure leads to a conservative EG _y value.
T_E	Transmission loss percentage for the WEGs of the project activity connected to 110 kV bulk meters which contains project participant WEGs and non-project participant WEGs will be calculated as per the procedure mentioned in the PPA. The transmission loss calculated by the state utility is applied to exported energy value measured at 33 kV metering point and reported in the monthly joint meter reading which will then be used to calculate electricity supplied by the project activity to the grid.	Monthly joint meter readings at the 33 kV metering point, authenticated by state utility and PP representative	The registered PDD does not mention the procedure of transmission loss for the WEGs of the project activity connected to the 110 kV bulk meter; energy meters belonging to the non-project WEGs are also connected to the bulk meter. The JMR at the 33 kV takes into account the transmission loss percentage. The energy delivered to the grid, EG _y , is thus calculated after deduction of

			the transmission loss. The revised MP provides an accurate procedure for transmission loss calculation (explained below). The JMRs for the 33 kV and 110 kV ^{/JMR1, JMR2/} were reviewed and found to be in line with the revised MP.	
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Assessment of calculation of transmission loss by KPTCL/HESCOM

By reviewing the JMRs^{/JMR1, JMR2/}, and PPA^{/PPA/} and conducting interviews with PP, the validation team confirms that the transmission loss procedure mentioned in the revised MP is accurate. Transmission loss will be calculated by the state utility and applied in monthly joint meter reading as per procedure set in Article 6 of the signed PPA. The calculation procedure of transmission loss is as follows,

1. Every month a joint meter reading will be prepared at 110 kV metering point for the energy export and import value for the whole wind farm. **(Y)**
2. Other than bulk meter monthly JMR, there are project site energy meters which are installed at 33 kV metering point for monthly energy generation.
3. The sum of energy exported by all the WEGs will be calculated as **(X_i)**, which is equal to $X_1 + X_2 + X_3 + \dots + X_n$
4. As per the procedure mentioned in the PPA, the transmission loss **(T_E)** will be calculated by the difference between the sum of energy exported by all the WEGs which is measured at 33 kV metering point **(X_n)** and energy exported value measured at 110 kV bulk metering point **(Y)** divided by sum of energy exported by all the WEGs **(X_n)**.

$$Z = (X_1 + X_2 + X_3 + \dots + X_n) - Y / (X_1 + X_2 + X_3 + \dots + X_n) * 100$$

5. The percentage transmission loss will be calculated for every month and the value will be applied to energy export value measured at each 33 kV metering point by the state utility.
6. All the transmission loss calculation procedure will be entirely under the control of state utility and the project proponents of WEGs will not have any control over the transmission loss calculation procedure and readings.

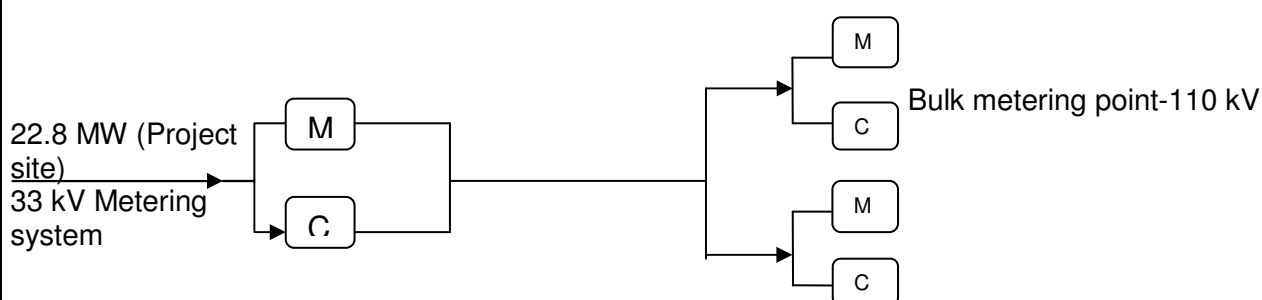
Assessment of the QA/QC procedures:

1. All the energy meters belong to the project activity will be tested for accuracy at least once in a year as per national standards ((As per the CEA Notification No.: 502/70/CEA/DP & D dated 17/03/2006, calibration interval should be of at least once in 5 years.). KPTCL will be in charge for yearly calibration of energy meters.
2. All the energy meters will be sealed and kept it under the custody of state utility.

3. For monthly joint meter, billing and invoice purpose, the main meter readings will be considered as long as the error identified by the main meter is within the permissible error of 0.2 accuracy class. If there is any discrepancy in accuracy of main meter identified during calibration, the energy generation by the WEGs will be monitored as per the procedure set out in PPA and Annex-4 of the revised monitoring plan.

The PPA and calibration reports were verified and the validation team confirms that the QA/QC procedures mentioned in the revised MP are accurate. The frequency of calibration will be annual, as mentioned in the revised MP.

The metering arrangement is as follows:



The proposed revised monitoring plan (in track change mode and clean versions submitted along with this report) ensures that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revisions.

The validation team confirms that the revised monitoring plan is accurate and reflects the actual site conditions.

References:

JMR¹- Monthly joint meter reading reports issued by HESCOM at the 33 kV Metering point

JMR²- Monthly joint meter reading reports issued by HESCOM at the 110 kV bulk meter at Banikoppa substation.

PPA- Power Purchase Agreement between KPTCL and PP dated 2006-08-1

CEA- Central Electricity Authority

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 adheres to the applied methodology i.e. ACM 0002, version 6.

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.