
**Assessment Opinion
on Post-registration Changes Request:
Changes to Correction and Permanent
changes from the registered monitoring
plan or monitoring methodology**

**3MW Shinan
Wind power project (3110)**

**Report No. 00325PRC
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1 INTRODUCTION

Deloitte-TECO has been performing the 1st verification of “3MW Shinan Wind Power Project (3110)” (the 1st monitoring period: 18 April 2010 – 17 April 2012) in Republic of South Korea. On-site visit was implemented during 27 – 28 June 2012, and Deloitte-TECO found out some corrections and change to project information of the registered PDD (completed on 20 October 2010: version 2.4). The details of the corrections and Permanent changes from the registered monitoring plan or monitoring methodology are in the following section.

Deloitte-TECO assessed on the post-registration change after the on-site assessment and prepared this assessment opinion for the approval of post-registration changes of correction and Permanent changes from the registered monitoring plan or monitoring methodology according to the “Clean Development Mechanism Validation and Verification Standard (CDM-VVS : Version 02.0)” and relevant documents.

2 CORRECTION

2.1 Technical parameters of equipment

Some of specifications of Turbine were incorrectly stated as the specification of Generator in the registered PDD.

2.2 Quality assurance (QA) and Quality control (QC) procedures

According to the QA/QC procedure, it was stated that “Person in charge of monitoring and electricity safety shall attend the following courses three times per year”.

The courses are,

- Course on “Law regarding measurement”
- Course on “Act on operation of electricity market”
- Course on “Electricity safety”

However, DOE confirmed that it is the typing miss of once per three years.

Moreover, the only Course on “Electricity safety” is a requirement for appointed person of electricity manager based on local law and regulation.

3 PERMANENT CHANGES FROM THE REGISTERED MONITORING PLAN OR MONITORING METHODOLOGY

3.1 Imported electricity meter accuracy

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According to the monitoring plan, the imported electricity meter accuracy was stated as 0.5% in the registered PDD. However, DOE confirmed that the imported electricity meter has accuracy of 1.0% and was installed prior to validation stage.

4 ASSESSMENT OPINION

4.1 Correction

4.1.1 Technical parameters of equipment

Deloitte-TECO confirmed that a part of installed technologies (equipment and facilities) were not consistent with the PDD by checking evidence and the nameplates of turbines and generators at the on-site visit as indicated below. It was confirmed that the model no. and output power of the installed generator is inconsistent with those of the registered PDD. However, Deloitte-TECO confirmed by performing the interview with the PO and reviewing relevant documentary evidence that the difference was not due to the equipment changes but due to the misunderstanding of the equipment model number. during the validation period. The key events of the project is as follows:

Table 1. Key events of the project

Date	Events	Remarks
15 February 2006	Contract of equipment purchase	
20 August 2008	Contract of wind power construction with Dong Kuk S&C	
01 October 2008	Contract of electricity distribution system usage	Contract capacity: 3MW
11 November 2008	Permission of Electricity generation business	Installed capacity : 3MW
26 November 2008	Export meters installation date	Calibration report
27 November 2008	Approval of Electricity generation Initial synchronizing	Operation starting date
28 November 2008	Import meters installation date	KEPCO website
24 December 2008	Commissioning date	
29 December 2008	Certificate of 72 hours testing operation	Issued by KECO
31 December 2008	Completion of construction	
22 December 2008 ~ 13 January 2009	Desk Review (Validation)	Performed by DOE
20 ~ 21 January 2009	On-site assessment (validation)	Performed by DOE

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20 October 2009	The registered PDD completed date	By PP
1 November 2009	Request for registration submitted	By DOE
17 April 2010	Registration date in the UNFCCC	UNFCCC website

According to Table 1, the commissioning date of “3MW Shinan Wind power project” was on 24 December 2008 and the Validation for the CDM registration was completed and submitted the Validation report by DOE on 1 November 2009. The project had already been operated based on Table 1, during the validation stage.

Deloitte-TECO confirmed that the installed technologies (equipment and facilities) were not consistent with the registered PDD by checking documentary evidences and the nameplates of turbines and generators at the on-site visit as indicated below Table 2. However, Deloitte-TECO confirmed by performing interview with the PO and reviewing relevant documentary evidences that the difference was not due to the equipment change but because of the misunderstanding of model number of the equipment during the validation. As mentioned in Table 1, the commissioning start date of this project was on 24 December 2008, and the validation for the CDM registration was completed and requested for registration by the DOE on 1 November 2009. During the validation stage, the project had already been operated.

Table 2. Technical specification of the proposed project of Blade

Blade	Registered PDD	Nameplate
Material	Glass fiber reinforced plastics	
Rotor diameter	61.4m	61.4m
Swept area	2,960m ²	2,960m ²
Turbine	Registered PDD	Nameplate
Model	MWT-1000A	MWT-1000A
Wind velocity	N/A	12.5m/s
Output Voltage	N/A	600V
Output Power	N/A	1,000kW
Rotational speed	N/A	19.8rpm
Cooling system	Air Cooling	
Generator	Registered PDD	Nameplate

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	Induction generator	
Model	MWT-1000A	HRQ1 455-48E
Wind velocity	12.5m/s	N/A
Output Voltage	600V	600V
Output Power	1,000kW	1,100kW
Rotational speed	19.8rpm	1,824rpm
Steel Tower	Registered PDD	Nameplate
Type	Tubular	
Height	66.9m	66.9m

According to Table 2, it can be seen that some specifications of Turbine and Generator were incorrectly stated in the registered PDD. Especially, the generator is seems to be changed after registration because the manufacturer (Hyundai heavy industry), model number (HRQ1 455-48E) and output capacity (1,100kW) in the nameplate are different from those (Mitsubishi, MWT-1000A and 1,000kW) of the registered PDD. However, Deloitte-TECO confirmed by reviewing the manufacturer's confidential equipment order and drawing file of "Shinan wind farm Specification & Outline drawing of generator", which was issued by Mitsubishi Heavy Industries, Ltd. issued on 30 June 2006 that the generator, which model number, HRQ1 455-48E, and output power, 1,100kW, was originally ordered and included in the confidential equipment order and drawing file of "Specification & Outline drawing of generator". In fact, the PDD author misunderstood of model number and output power. Therefore, Deloitte-TECO concluded that the specifications and values for the equipment in the PDD were incorrectly stated. Therefore, there was no equipment change was occurred after request for registration.

Additionally, Deloitte-TECO confirmed by reviewing "Statement of Compliance" (Annex #1) issued by the third party on 25 January 2006, and electricity equipment test report (Annex #2), issued by Korea Electrical Safety Corporation, issued after the test on 29 December 2008, that the generator, model number of HRQ1 455-48E, with output capacity of 1,100kw was installed, tested and no changed after installation from 27 November 2008, when is the starting date of operation. The Model No. MWT-1000A and technical specification of turbine were also confirmed by the above documentary evidences (the confidential generator drawing, Annex #1 and Annex #2). From these official documents,

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Deloitte-TECO confirmed the corrected details of technical specification of the installed equipment were given in Table 2 as above.

As it can be seen, some of specifications of Turbine were incorrectly used for the specification of Generator in the registered PDD. Regarding the capacity of the equipment, even though output power of generator was confirmed not 1,000kW but 1,100kW, because the output power of Turbine was confirmed 1,000kW, in consistent with the registered PDD, the capacity of this project was not changed. In addition to that, in terms of the installed capacity description, it was stated that “The installed/rated capacity of renewable electricity generating units that involve turbine-generator systems shall be based on the installed/rated capacity of the generator” based on Project Standard, paragraph 82. (a). However, DOE confirmed that, during the validation stage, the project was referred the EB clarification from paragraph 32 of the meeting report of the SSC WG 21 “the SSC WG agreed to clarify that the maximum or rated/installed capacity for small scale CDM hydro-electric project can be determined using one of the following options (in the order of preference): a) Nameplate/rated capacity of the turbine i.e., based on turbine manufacturer’s specification and b) Generator capacity in MW (which is an equivalent of name plate/rated capacity in MVA times the name plate/rated power factor, specified by the manufacturer).”

Deloitte-TECO concluded that this difference between the actual implementation and the registered PDD is due to misunderstanding of definition regarding Model number of Turbine and Generator during the validation period and do not affect the the scale of the project activity. Deloitte-TECO also confirmed that the correction was properly demonstrated in the revised PDD.

4.1.2 Quality assurance (QA) and Quality control (QC) procedures

According to the QA/QC procedure, it was stated that “Person in charge of monitoring and electricity safety shall attend the following courses three times per year”.

The courses are,

- Course on “Law regarding measurement”
- Course on “Act on operation of electricity market”
- Course on Electricity safety

However, Deloitte-TECO found out that there are some incorrect information regarding “Person in charge of monitoring and electricity safety” by performing interview with the

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staffs and reviewing the relevant local law and regulation, “Law of electricity business” and “Act on operation of electricity business”. It was confirmed that appointed electricity safety manager has to complete the course on electricity safety provided by Korea Electric Engineers Association, which stated on appendix 15 of “Act on operation of electricity business”(Annex #4) as below table and quoted clause 46 of the “Act on operation of electricity business” and based on clause 73 of the “Law on electricity business” and. The requirements was as follows:

Table 3. Appendix 15 the course of electricity safety of “Act on operation of electricity business”

Process	Target	Period
A technical training of electric safety (I)	For electric safety managers with less than five years	Once every three years
A technical training of electric safety (II)	For electric safety managers with more than five years	
Special Training	For electric safety managers for the first time	Within six months

Deloitte-TECO confirmed that the required frequency of taking the electric safety course was not three times per year but once every three years. It was confirmed by performing interview that it was typing miss of PDD by the PP. Therefore, the frequency of taking the electric safety course needs to be corrected as post-registration change. In addition to that, Deloitte-TECO also confirmed that only the “Course on Electricity safety” was mandatorily required to be taken for electric safety managers. There is no regulation that appointed electricity safety manager has to complete the courses of “Course on Law regarding measurement” and “Course on Act on operation of electricity market”. It was confirmed that “Law regarding measurement” and “Act on operation of electricity market” are the Law and Act for meter business entity, such as manufacturer, repairing, etc, not related to monitoring and electricity safety. DOE confirmed that the person in charge of monitoring and electricity safety of this project attended “Course on Law regarding measurement” and “Course on Act on operation of electricity market” because it was stated in the registered PDD. It need to be corrected the courses of electricity safety in the registered PDD because it was due to PP’s misunderstanding of the requirements of training for electricity safety manager under the Korean local law and regulation at validation period.

4.2 Permanent changes from the registered monitoring plan or monitoring methodology

4.2.1 Imported electricity meter accuracy

Regarding the monitoring plan, it was stated that the accuracy of the meters must be within $\pm 0.5\%$ in the registered PDD. However, Deloitte-TECO confirmed the accuracy of imported electricity meter was confirmed as 1.0% during the on-site assessment.

Deloitte-TECO confirmed by performing interview with the PP and reviewing the relevant documents that the imported electricity meter had been installed and used prior to the validation stage. It was also confirmed that the imported meter was owned and controlled by the power grid, KEPCO. Meter and accuracy selection is not within the control by the PP.

Same as the equipment installation, Deloitte-TECO confirmed the import electricity meter was already installed and operated during the validation period based on the table 1. It can be seen as table 1, the imported electricity meter was installed on 28 November 2008 and carried out internal calibration on 17 December 2008 by the KEPCO. However, the Request for registration was submitted on 1 November 2009. Therefore, the imported electricity meter had already been installed and used during the validation period, which means that there was no change of import meter in the monitoring period after the registration. Moreover, Deloitte-TECO reviewed the relevant local regulation regarding the meter accuracy and in accordance with 'Power market operation regulations' (Annex #3), which is stated that "allowable error of import meter can be within $\pm 2.0\%$ ", if equipment capacity is from 500kW to 10,000kW. Therefore, the import meter accuracy of 1.0% is acceptable for the regulation. The power grid of KEPCO has issued imported electricity invoice based on the monitored value. Deloitte-TECO concluded that the meter accuracy is acceptable and in line with the domestic regulation in Korea. As the result, Deloitte-TECO concluded that this monitoring plan change does not affect to level accuracy of monitoring system in this project and does not require prior approval because this change is not within the control of project participants.

Deloitte-TECO confirmed that the correction and Permanent changes from the registered monitoring plan or monitoring methodology was properly demonstrated in the revised PDD and concluded that these changes do not affect the design of project activity and the monitoring level of the project activity.

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Relevant Documents

Annex. #1..“Statement of compliance” (confidential & Public)

Annex. #2. “Electricity equipment test report”

Annex. #3.”Power market operation regulation”

Annex. #4. Appendix 15 of “Act on operation of electricity business”