

MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 02: Date: 14/04/2011

SHANDONG HUANENG SHOUGUANG 49.5MW WIND FARM PROJECT
CDM registration reference No. 3391
The 1st Monitoring Period: 19/07/2010- 24/12/2010

SECTION A. General description of the project activity

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

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1. Purpose of the project activity and the measures taken to reduce greenhouse gas emissions;
Shandong Huaneng Shouguang 49.5MW Wind Farm Project (hereinafter referred as “the proposed project”) is located on the west of the old river mouth, Dajiawa town, Shouguang county, Weifang City, Shandong province, P. R. China. It is designed to generate electricity from wind, a clean and renewable resource and provide annual net on-grid power generation of 96.4788GWh and achieve 101,765tCO₂e GHGs reductions per annum.

The area covered by North China Power Grid (hereinafter referred as NCPG) is abundant in coal and oil resources, and thermal power plant is the major power source of NCPG. By avoiding operation of existing thermal power plants and future expansion of fossil fuel-based generation by the NCPG, the proposed project displaces part of thermal power in NCPG by making use of clean and renewable energy.

2. Brief description of the installed technology and equipments;
The proposed project is a grid connected wind farm with total installed capacity of 49.5MW (33×1500kW), which supplies 96.4788GWh electricity to NCPG annually, and 33 wind turbines with rated capacity of 1500kW each are installed according to the proper design based on local climate and geographical condition. The height of the turbine hub is 80m, and the turbines are distributed with row spacing of 540m and column spacing of 500m.

3. Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.).

Date	Key events
15/04/2008	The starting date of construction ¹
16/12/2008	The project began commissioning and then turned into full operation ²
19/07/2010	Registration date and starting date of the crediting period
19/07/2010-24/12/2010	The 1 st monitoring period

4. Total emission reductions achieved in this monitoring period.
From 19/07/2010 to 24/12/2010, the net power supplied to the grid by the project is 47,125.76 MWh, corresponds to the emission reductions of 49,708 tCO₂e.

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)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
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¹ Please refer to the Construction Contract.

² Please refer to the Project Operation Log.

People's Republic of China (Host)	Huaneng Shouguang Wind Power Co., Ltd	No
Japan	The Kansai Electric Power Co., Inc.	No

A.3. Location of the project activity:

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The proposed project is located on the west of the old river mouth of Dajiawa township, Shouguang county, Weifang city, Shandong Province, P.R. China, 10km away from Dajiawa town, 40km away from Shouguang City and 150km from Jinan city (provincial capital). Shouguang city lies in the north of Shandong province, in the middle part of Shandong peninsula and southwest to the Laizhou Bay. It is east to the Hanting district and Weicheng district of Weifang city, south to Qingzhou city and Changle city, west to the Guangrao county of Dongying city and north to Bohai Sea. According to the data measured by the Marine Environment Monitoring Center Station, the proposed project's geographical coordinate is longitude 118°56'59.636''~119°02'53.821''E and latitude 37°13'44.198''~37°16'02.668''N, and with its geographical coordinate of substation at longitude 118°56'59.636''~118°57'11.300''E and latitude 37°14'14.110''~37°14'20.603''N.

A.4. Technical description of the project

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The proposed project installs 33 IEC3 type three-blade rotor wind turbines with rated capacity of 1500KW, build a control centre including a 35kV switchyard and central control centre, and extend 110kV transmission lines for power transmission. The proposed project is connected to Shouguang Power Grid (SGPG), and then to the North China Power Grid (hereinafter referred as NCPG) finally. Please refer to the diagram in section C below.

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

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The project operation has been monitoring in accordance with the requirements of the applicable monitoring methodology as described in PDD and the approved monitoring methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (ACM0002/ Version 09, Sectoral Scope: 01, EB45).

A.6. Registration date of the project activity:

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19/07/2010

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

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The proposed project employs the renewable crediting period (7 years*3), and the first crediting period is from 19/07/2010 to 18/07/2017, and there was no post-registration change to the start date of the crediting period.

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

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The monitoring report is compiled by the Beijing Changjiang River International Holding.

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The entity and the persons listed above are not considered as project participants.

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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1) Starting date of operation

16/12/2008. The project consists of one site only and the implementation is not phased.

2) Actual operation of the project activity during this monitoring period

There were no special events during the monitoring period. No equipment was exchanged or overhauled.

3) Events affecting the applicability of the methodology

No events occurred that affected the applicability of the methodology.

B.2. Revision of the monitoring plan

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The actual monitoring plan is consistent with the one in the registered PDD, therefore, there was no revision in the monitoring plan.

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

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No applicable.

B.4. Notification or request of approval of changes

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No applicable.

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

SECTION C. Description of the monitoring system

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The proposed project is connected to SGPG within NCPG, the power delivered to the grid is determined and monitored by a bidirectional meter (M1) installed at the output side of the switching substation. This meter can measure both of the electricity delivered to the grid and the electricity dispatched from the grid, and the net on-grid power supply (EG_y) is defined as $(EG_{out,y} - EG_{in,y})$. This meter is owned, operated and maintained by the grid company. And a check bidirectional meter (M2) is also installed on the project site in order to cross check the record data of the M1. This check meter is owned, operated and maintained by the project owner. The locations of the meters are shown in Figure as follows.

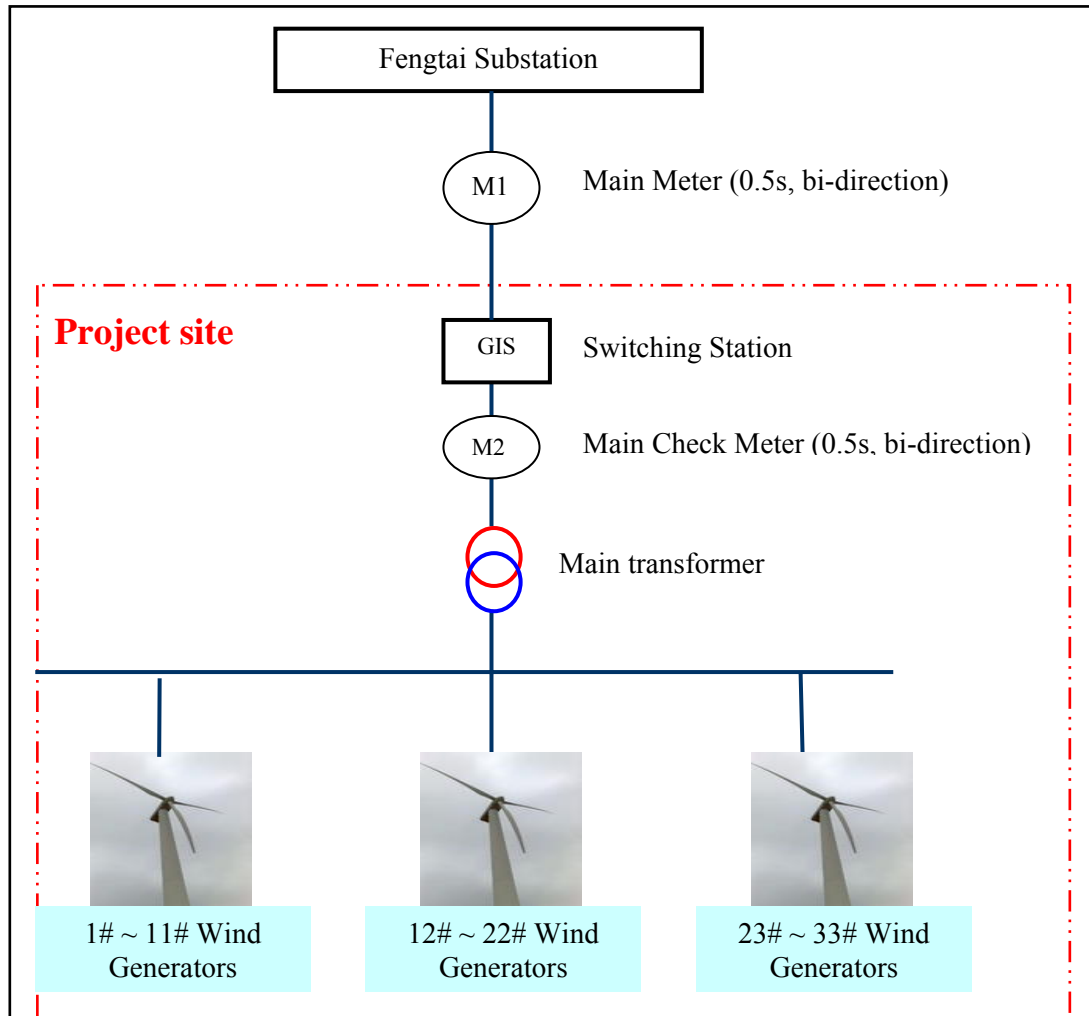


Figure: Diagram of the Grid Connection

※ Data collection system

- The grid company read main meter(M1) and record data monthly³, and then supply sale receipts to the Project owner.
- The Project owner monitors on-site meter M2 and records data continuously everyday, and prepare monthly reading records.
- The monthly reading records of M2 and the sale receipts are cross-checked with the reading records of M1.

※ The Organizational Structure, Role and Responsibility

Overall responsibility for monitoring and carrying out the monitoring following this monitoring plan lies with the project owner. And the Beijing Changjiang River International Holding had advised the project developer on how to perform the monitoring work. The staffs who were responsible for

³ The cut-off time is 24:00 in the cut off-date. As for the cut-off date each month, it has been regulated on around 24th of each month, but for the detailed date, it is usually determined by the availability of the Grid Company. However, once the cut-off date is chosen, the project owner could be informed in advance.

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

electricity meter readings and recording, and who were responsible for auditing the metered data had been trained according to the CDM requirements.

※ Emergency Procedures

If any error is identified, the project company shall inform the grid company of the error. Then necessary calibration and/or repair are required.

After processing error, the project owner must prepare a report/explanation regarding the emergency to explain to DOE that the handling method is reasonable.

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:	EF _y
Data unit:	tCO ₂ /MWh
Description:	Combined margin CO ₂ emission factor for the NCPG
Source of data used:	Calculated according to the procedure outlined in B.6.1 of the registered PDD
Value(s) :	1.0548
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Additional comment:	Not applicable

D.2. Data and parameters monitored

In order to calculate emission of baseline, the electricity supplied by the proposed project to the NCPG (EG_{out,y}) and the electricity purchased from NCPG by the proposed project (EG_{in,y}) are monitored, and according to these two data, the net power supplied to the grid by the proposed project (EG_y) can be calculated as $EG_y = EG_{out,y} - EG_{in,y}$.

Data / Parameter:	EG _{out,y}																				
Data unit:	MWh																				
Description:	Electricity supplied to SGPG within NCPG by the proposed project																				
Measured /Calculated /Default:	Measured continuously																				
Source of data:	Meter measured continuously and reported on a monthly basis																				
Value(s) of monitored parameter:	The actual power supplied to the grid by the project is 47,278.88MWh from 19/07/2010 to 24/12/2010. The detailed data are provided in Table 1.																				
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data of 47,278.88MWh is used for baseline emissions calculation																				
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<div>The electricity is monitored continuously through the bidirectional meter M1 and recorded monthly by the Grid company, and the project owner crosschecks the recorded readings on the meter M2 at the project site. Detailed information refers to the following Table.</div> <table><tr><th rowspan="2">Meter</th><th rowspan="2">Accuracy</th><th rowspan="2">Meter No.</th><th colspan="2">Calibration Period</th><th rowspan="2">Calibration frequency</th></tr><tr><th>Date of Calibration</th><th>Valid until</th></tr><tr><td>M1</td><td>0.5S</td><td>20070808020043</td><td>07/06/2010</td><td>06/06/2011</td><td>Yearly</td></tr><tr><td>M2</td><td>0.5S</td><td>09100170220042</td><td>07/06/2010</td><td>06/06/2011</td><td>Yearly</td></tr></table> <div>(Note: These meters were checked and calibrated by the Weifang Power Company Meter Measuring Centre.).</div>	Meter	Accuracy	Meter No.	Calibration Period		Calibration frequency	Date of Calibration	Valid until	M1	0.5S	20070808020043	07/06/2010	06/06/2011	Yearly	M2	0.5S	09100170220042	07/06/2010	06/06/2011	Yearly
Meter	Accuracy				Meter No.	Calibration Period		Calibration frequency													
		Date of Calibration	Valid until																		
M1	0.5S	20070808020043	07/06/2010	06/06/2011	Yearly																
M2	0.5S	09100170220042	07/06/2010	06/06/2011	Yearly																

Measuring/ Reading/ Recording frequency:	Measure continuously and reported on a monthly basis
Calculation method (if applicable):	The reading of meter M2 is monitored continuously and recorded monthly, and then cross-checked with the reading of meter M1 installed and owned by the grid company. The conservative value is used for emission reductions calculation
QA/QC procedures applied:	Meters have been calibrated annually. Data measured by meters are double checked by sales receipt

Data / Parameter:	EG _{in,y}					
Data unit:	MWh					
Description:	Electricity purchased from SGPG within NCPG by the proposed project					
Measured /Calculated /Default:	Measured continuously					
Source of data:	Meter measured continuously and reported on a monthly basis					
Value(s) of monitored parameter:	The actual power imported from the grid is 153.12MWh from 19/07/2010 to 24/12/2010. The detailed data are provided in Table 1.					
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data of 153.12MWh is used for baseline emissions calculation					
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The electricity is monitored continuously through the bidirectional meter M1 and recorded monthly by the Grid company, and the project owner crosschecks the recorded readings on the meter M2 at the project site. Detailed information refers to the following Table.					
	Meter	Accuracy	Meter No.	Calibration Period		Calibration frequency
				Date of Calibration	Valid until	
				M1	0.5S	
	M2	0.5S	09100170220042	07/06/2010	06/06/2011	Yearly
(Note: These meters were checked and calibrated by the Weifang Power Company Meter Measuring Centre.)						
Measuring/ Reading/ Recording frequency:	Measure continuously and reported on a monthly basis					
Calculation method (if applicable):	The reading of meter M2 is monitored continuously and recorded monthly, and then cross-checked with the reading of meter M1 installed and owned by the grid company. The conservative value is used for emission reductions calculation					
QA/QC procedures applied:	Meters have been calibrated annually. Data measured by meters are double checked by sales receipt					

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

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Baseline emissions are calculated with baseline emission factor (EF_y) and electricity supplied by the Project to the grid (EG_y), as follows:

$$BE_y = EG_y \cdot EF_y = (EG_{out,y} - EG_{in,y}) \cdot 1.0548$$

The following table 1 provides the calculation of the baseline emissions during the monitoring period.

Table 1 Baseline emissions during the monitoring period

Monitoring period	EG _{out, y}				EG _{in, y}				EG _y (MWh)	EF _{CM} (tCO ₂ e/MWh)	BE _y (tCO ₂)
	Readings from reading records of M1(MWh)	Readings from sales receipts (MWh)	Readings from reading records of M2(MWh)	Conservation data applied	Readings from reading records of M1(MWh)	Readings from sales receipts (MWh)	Readings from reading records of M2(MWh)	Conservation data applied			
	A1	A2	A3	A=Min(A1,A2,A3)	B1	B2	B3	B=Max(B1,B2,B3)			
19/07/2010-22/07/2010 ⁴	-- ⁵	--	1,011.12	0.00	--	--	0.00	0.00	0.00	1.0548	0
23/07/2010-22/08/2010	7,478.24	7,478.24	7,539.84 ⁶	7,478.24	26.4	26.4	25.52	26.40	7,451.84	1.0548	7,860
23/08/2010-25/09/2010	5,422.56	5,422.56	5,584.48	5,422.56	52.8	52.8	51.92	52.80	5,369.76	1.0548	5,664
26/09/2010-26/10/2010	9,065.76	9,065.76	9,160.80	9,065.76	24.6	24.6	23.76	24.60	9,041.16	1.0548	9,537
27/10/2010-25/11/2010	9,903.52	9,903.52	10,018.80	9,903.52	28.2	28.2	27.28	28.20	9,875.32	1.0548	10,416
26/11/2010-24/12/2010	15,408.88 ⁷	15,408.80	15,502.96	15,408.80	21.12	21.12	20.24	21.12	15,387.68	1.0548	16,231
Total				47,278.88				153.12	47,125.76		49,708

⁴ During these several days, the project was also normally operated. However, for there is only electricity sales receipts for the whole July and without the relevant receipt for the day from the registered date of 19/07/2009 to the date of 22/07/2009, thus the electricity in these days is ignored and without any emission calculation.

⁵ The readings of M1 were only monthly recorded, thus the value from 19/07./2010 to 22/07/2010 was not available.

⁶ The differenc between the sale receipts and the reading records is due to the line loss.

⁷ The minor difference between 15,408.88 from reading records and 15,408.80 from sales receipts is due to the minor difference of reading time (about 5-6 seconds).

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

E.2. Project emissions calculation

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As per methodology and the registered PDD, there are no expected project emissions related to the generation of electricity, as generation is based on a renewable resource. Therefore, the project emission (PE_y) is zero, $PE_y=0$.

E.3. Leakage calculation

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According to methodology, as a newly built hydropower plant, there is no energy generating equipment be transferred from another activity and no existing equipment be transferred to another activity involved in the project activities. Therefore, the leakage is not to be considered.

E.4. Emission reductions calculation / table

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Therefore, according to the methodology ACM0002 (version 09), the baseline emission shall be calculated as follows:

$$ER_y = BE_y - PE_y - L_y = BE_y - 0 - 0 = BE_y = EF_y \cdot EG_y = (EG_{out,y} - EG_{in,y}) \cdot EF_y$$

where:

EF_y is the emission factor in year y; the emission factor is determined ex-ante.

EG_y is the net power supplied to the grid by the proposed project in year y which is calculated as $EG_y = EG_{out,y} - EG_{in,y}$.

Then: $ER_y = 1.0548 \cdot EG_y$

Below provides the calculation of the emission reduction in the monitoring period:

Table 2: Calculation of the emission reduction during the monitoring period

Monitoring period	BE_y (tCO ₂)	PE_y (tCO ₂)	L_y (tCO ₂)	ER_y (tCO ₂)
19/07/2010- 22/07/2010	0	0	0	0
23/07/2010- 22/08/2010	7,860	0	0	7,860
23/08/2010- 25/09/2010	5,664	0	0	5,664
26/09/2010- 26/10/2010	9,537	0	0	9,537
27/10/2010- 25/11/2010	10,416	0	0	10,416
26/11/2010- 24/12/2010	16,231	0	0	16,231
Total	49,708			49,708

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 ₂ e)	The estimated emission reduction is 44,330 tCO ₂ ⁸ in this monitoring period (159days in total) based on the registered PDD	The actual emission reduction is 49,708tCO ₂ during this monitoring period

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

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⁸ It is calculated by: $159 \cdot (\text{estimated emission reductions in the registered PDD} / 365 \text{ days in a year}) = 159 \cdot (101,765 / 365) = 44,330 \text{ tCO}_2$

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

Since this monitoring period only covers 159 days and the annual emission reduction has been adopted to assess in the PDD, thus it is reasonable to compare the actual emission reduction with the whole year. And in accordance with the reading records, the EG_y during the whole 2010 year is 118,836.96MWh, thus with an annual emission reduction of 125,349.225tCO₂. Comparing with the annual emission reduction in PDD (101,765 tCO₂), the actual emission reduction is 23.18% higher.

However, in accordance with the statistic historical wind data during 1988-2006 year from the Shouguang Weather Station, the average wind speed in that period is 2.79m/s, and the highest wind speed in this period has reached to 3.18m/s in 1997 year⁹. Theoretically, in accordance with the wind energy formula $E=1/2(\rho tsv^3)$, (Note: The “ ρ ” stands for the air density; “ t ” for time; “ s ” for the square; “ v ” for wind speed). For the wind power energy is proportional to the cube of wind speed, thus the reasonable maximum fluctuating proportion is calculated to be 48.07% $((3.18^3-2.79^3)/2.79^3)$. And this ratio is much higher than the increase of the actual emission reduction in this monitoring period.

This annual growth is mainly because the actual wind speed in the 2010 year is higher than the historical average speed in the FSR. And according to the “2010 year Wind Speed in Shouguang City” which is provided by Shouguang Weather Station, the actual local wind speed in 2010 is 3.05m/s. Theoretically, the actual wind power density in 2010 is 30.64% $((3.05^3-2.79^3)/2.79^3)$ higher than the estimated value, thus leading to 30.64% of the net electricity and emission reductions higher than the estimated value. The actual emission reduction is 23.18% higher than the estimated value, which is within the reasonable range of 30.64%.

History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory Document Type: Guideline, Form Business Function: Issuance		

⁹ All these data are derived from the approved FSR, and which also have been provided to DOE for checking.