



**ASSESSMENT OPINION ON  
POST-REGISTRATION CHANGES**

**Yiyang Kaidi Green Energy Development Co.,  
Ltd**

**Hunan Yiyang Kaidi Biomass Power Project**

**UNFCCC Ref. No: 3072**

**Report No. 12012278-1**

China Environmental United Certification Center Co., Ltd (CEC)  
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<b>Date of First Issue</b>	<b>Project No.</b>		
22/05/2013	12012278-1		
<b>Approved by</b>	<b>Organizational Unit</b>		
SONG Tiedong	China Environmental United Certification Center Co., Ltd (CEC)		
<b>Client</b>			
Yiyang Kaidi Green Energy Development Co., Ltd			
<b>Project Name:</b> Hunan Yiyang Kaidi Biomass Power Project <b>Host Party:</b> P.R.China <b>Methodology:</b> ACM0002 ver. 10, ACM0006 ver. 9 <b>GHG Reducing Measure/Technology:</b> biomass power generation <b>ER Estimate:</b> 185,914 tCO <sub>2</sub> e annual average  <b>Size:</b> <input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale  <b>Validation Requirement:</b> <input type="checkbox"/> Temporary deviation from the monitoring plan and/or monitoring methodology <input checked="" type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Permanent changes from the monitoring plan or monitoring methodology <input checked="" type="checkbox"/> Changes to the project design of a registered project activity  Post registration change: <input type="checkbox"/> Prior approval track <input checked="" type="checkbox"/> Issuance track (Note: applicable to situations in Appendix 1 of PS)			
<b>Report No.</b>	<b>Date of this Revision</b>	<b>Rev.No.</b>	<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organizational unit <input type="checkbox"/> Limited distribution <input type="checkbox"/> Unrestricted distribution
12012278-1	25/06/2013	01	
<b>Report Title</b>			
Hunan Yiyang Kaidi Biomass Power Project			
<b>Work Carried out by</b>			
QIN Boya, XU Linghua, LIU Yaotian, SONG Quanbo			
<b>Work Reviewed by</b>			
YIN Yun, CUI Xiaodong			



## 1. Introduction

### 1.1 Objective

CEC performs this validation of the post-registration changes of the project in accordance with the PCP, PS, VVS and other UNFCCC criteria. The original project design is the registered PDD of the registered CDM project “Hunan Yiyang Kaidi Biomass Power Project” with Ref. No. 3072. The purpose of this validation is to assess the post-registration changes of the project by an independent third party in order to confirm that the changes meet the applicable CDM requirements and the identified criteria.

### 1.2 Scope

The scope of the validation is defined as an independent review of the PDD, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and other associated interpretations. The changes are identified during the first verification. The findings of the verification have been taken into account.

The validation is not meant to provide any consulting towards the client. However stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

### 1.3 Project Description

This project has been registered under UNFCCC with Ref. No. 3072 on 28/10/2010 with the first crediting period from 01/01/2011 to 31/12/2017. The first monitoring period covers from 01/01/2011 to 31/12/2011.

## 2. Methodology

### 2.1. Designation of the Assessment Team

According to the designation requirements on the assessment team in the CDM accreditation standards of Executive Board, and following requirements from the technical scopes and professional experiences in the sectoral scopes, CEC designated an assessment team.

It is required that the qualification with respect to the sectoral scope linked to the methodology has to be covered by the assessment team.

The assessment team consists of the following members:

Table 1: List of the assessment team

Verification team	Role	Qualification	Specific scope	Participated in the on-site visit
QIN Boya	Team Leader	Auditor	√	√
XU Linghua	Team Member	Auditor	--	√
LIU Yaotian	Team Member	Auditor	--	√
SONG Quanbo	Team Member	Auditor	--	√

Table 2: List of technical reviewer



Technical reviewer	Role	Specific scope
YIN Yun	Technical reviewer	√
CUI Xiaodong	Technical reviewer	—

Qin Boya is a lead Greenhouse Gas(GHG) assessor. She has attended various internal and external training courses on EMS, CDM related knowledge and low carbon development training since 2008. She has participated in and finished over 20 validation/verification CDM/VCS/GS project activities and programme of activities(PoAs) both in China and abroad in the areas of hydropower, wind power, biomass power generation as well as CFL distribution PoAs. Most of the projects are in sectoral scope 1 (energy industries), which gives her abundant experience in renewable energy sector. Besides CDM auditing, Ms.QIN has participated in the assessment of hydroelectric projects against the criteria set by the World Commission on Dams.

Xu Linghua is a lead Greenhouse Gas(GHG) assessor. Ms. Xu worked on environmental monitoring, waste water treatment, and quality control of the adhesive product for over 20 years. She is an experienced senior EMS auditor with over 10 years' accreditation organization working experience, who has completed various CEC CDM training courses and technology trainings. Ms. XU has participated in over 30 validation/verification CDM projects in the areas of hydropower, wind power and biomass power generation. Most of the projects are in sectoral scope 1 (energy industries), which gives her abundant experience in renewable energy sector.

Liu Yaotian is a lead Greenhouse Gas(GHG) assessor. She has attended extensive internal and external training courses on EMS, CDM and CDM related knowledge since 2006. She has participated in and finished over 20 validation/verification CDM/VCS projects in the areas of hydropower and wind power. Most of the projects are in sectoral scope 1 (energy industries), which gives her abundant experience in renewable energy sector.

Song Quanbo is a lead Greenhouse Gas(GHG) assessor. He worked in environmental protection research and EMS auditing area as a senior EMS auditor for over 10 years. He has involved in CDM work from 2009 and completed various CEC CDM training courses. Mr. Song has participated in several validation/verification CDM projects which are mainly in sectoral scope 1 (energy industries).

Yin Yun is a lead Greenhouse Gas(GHG) assessor. She worked in Metallurgical Industry for 17 years as technician and electric engineer, and later in technical management position for over 10 years. Since 2007, Ms. Yin has been involved in various CEC CDM training courses, and she is also a qualified senior EMS auditor, and has participated in over 30 validation/verification CDM projects in the areas of hydropower, wind power, waste heat recovery and biomass power generation, she has extensive experience in renewable energy sector in sectoral scope 1 (energy industries).

Cui Xiaodong is a lead Greenhouse Gas(GHG) assessor. He has attended various internal and external training courses on EMS, energy audit, CDM related knowledge and GHG accounting related courses since 2009. He has participated in and finished over 30 validation/verification CDM/VCS projects both in China and abroad in the areas of hydropower, wind power and biomass power generation.

## 2.2. Document Review

The revised PDD (version 05) submitted by the client and additional background documents were reviewed against applicable additionality and methodological requirements as an initial step of the assessment process.

According to the requirement of the EB, the PPs have applied the latest PDD template under the VVS tract, while the registered PDD (version 04) was under VVM tract. So the validation team shall also check if the information in the revised PDD has any material variation with that in the registered PDD.

The document review involves:



- 1) A review of data and information;
- 2) Cross checks between information provided in the PDD and information from sources other than those used, if available, CEC's sectoral and local expertise and if necessary, independent background investigations;
- 3) The findings of the first verification.

### **2.3. On-site Assessment and Follow-up Interviews**

During the period from 21/08/2012 to 22/08/2012, CEC performed a physical site inspection and on-site interviews with project stakeholders to:

- Confirm the implementation, operation and monitoring of the modified project activity as per the revised PDD;
- Assess the impacts of the actual changes on the compliance of the monitoring plan, the applied monitoring methodology and tools and/or the level of accuracy of the monitoring activity.

### **2.4. Internal Quality Control**

The assessment opinion underwent a technical review before being submitted to the PP and the EB according to CEC internal procedure. The technical reviewers were not part of the assessment team, and the technical review was independently of the assessment team.

After reviewing and confirming by the technical reviewers, the draft FVR was finalized and then sent for completeness check carried out by Quality Assurance Management Division (QAD). After correction and confirmed by QAD, the report was verified by the Director, and finally the report will be approved by the Chairman of Board.

After confirmation of the PP, the assessment opinion and relevant documents are submitted to the EB through the UNFCCC web-platform.

## **3. Validation Findings**

### **3.1. Description of the Changes**

#### **3.1.1. Temporary deviations from the registered monitoring plan and/or monitoring methodology**

Not applicable.

#### **3.1.2. Corrections**

The name of manufacturer (NanJing Steam Turbine(Group) Co., Ltd) for generator was mistyped as 'NanJing Steam Turbine(Group) Co.,' in Table A-2 of registered PDD, which is corrected in the updated PDD;

#### **3.1.3. Changes to the start date of the crediting period**

Not applicable.



#### 3.1.4. Permanent changes from the registered monitoring plan or monitoring methodology

Not applicable.

#### 3.1.5. Changes to the project design of a registered project activity

The main changes of the registered PDD are as follows:

1. The types of biomass residues used in this monitoring period is changed from "rice husk, rice straw, oil seed rape straw, cotton straw and maize straw" as described in the registered PDD to be the actual types of used biomass: rice husk, rice straw, oil seed rape straw, cotton straw, wood chips and bark;
2. The average loading capacity of the trucks used to transport the biomass is changed from the estimated value of 3t in the registered PDD to the actual value of 6t.

In addition, in order to reflect the change of the Project Participant, the PDD was revised to reflect that Camco International Limited was authorized to participate in this project, and it was also that revised that Switzerland was added as a Party involved in the project. This request had been approved by the UNFCCC on 18 April 2011.

According to the Standard for application of the global warming potentials to Clean Development Mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol (version 01.0) issued on 13/09/2012, the PPs voluntarily updated the global warming potential for CH<sub>4</sub> in the second commitment period (from 01/01/2013 onwards) to be 25.

### 3.2. Validation of the Changes

#### 3.2.1 Temporary deviations from the registered monitoring plan and/or monitoring methodology

Not applicable.

#### 3.2.2 Corrections

By means of checking the nameplates and purchasing contract, it is confirmed that the name of manufacturer is NanJing Steam Turbine(Group) Co., Ltd. as corrected in the revised PDD, which is an accurate reflection of actual project information. And this information do not affect the applicability of the applied methodologies and monitoring plan.

#### 3.2.3 Changes to the start date of the crediting period

Not applicable.

#### 3.2.4 Permanent changes from the registered monitoring plan or monitoring methodology

Not applicable.

#### 3.2.5 Changes to the project design of a registered project activity

- 1) Assessment of when the changes occurred

For the two changes (biomass residue types and truck loading capacity) occurred since the start



date of the project, which is 06/02/2010.

2) Assessment of the reasons for these changes taking place

For the two changes (biomass residue types and truck loading capacity) occurred because of the real operation situation is different with the previous estimation.

When the biomass collection of the project started, biomass residue suppliers tend to supply the surplus wood chips and bark from nearby forest and wood process factories, which was not considered in the FSR. Considering the maize production amount is not as much as the estimation in the FSR, and the collection is difficulty is larger than other types of biomass residues, the suppliers actually do not supply the maize straw to the project.

And the transport vehicles actually used by local biomass residue suppliers are bigger than the estimation in the FSR, which is more economical for the suppliers.

3) Assessment of whether the changes would have been known to the project participants prior to registration of the project activity

The registered PDD was finished on 31/03/2010, and the validation report was finished on 27/05/2010, in which the biomass types were estimated to be: rice husk, rice straw, oil seed rape straw, cotton straw and maize straw, and the average loading capacity of the trucks was estimated to be 3t. The information was sourced from the approved FSR. The changes of biomass types and truck capacity occurred from 06/02/2010, so it would have been known to the project participants prior to registration of the project activity. However at that time the project was on a trial start period, the project owner had not known the detailed information of the actual situation, so the information of FSR was still used.

4) Assessment of how the changes may impact the overall operation/ability of the project activity to deliver emission reductions as stated in the PDD

After the changes, the estimated emission reduction is recalculated in the revised PDD, the data flow and calculation process is validated by the validation team. Consequently, the estimated annual average GHG emission reduction in the first crediting period is changed from 198,348 tCO<sub>2</sub>e in the registered PDD to 185,914 tCO<sub>2</sub>e in the revised PDD. The overall emission reduction ability is decreased slightly due to more accurate data is applied.

5) The changes do not adversely impact any of the following thus do not require prior approval by the Board:

- The additionality of the project activity;

Considering that the changes do not affect the prior consideration of CDM, the alternative baseline scenarios, and the benchmark rate, the only affected additionality contents are project IRR and sensitive analysis. The barrier claimed to demonstrate the additionality of the project in the registered PDD is investment analysis, the project participants have demonstrated that the barriers are still valid under the actual circumstances as follows:

Applying the actual biomass fuel purchase price and actual net calorific values of each type of biomass residues, prices for each type of the biomass residues on energy basis is recalculated. As shown in the below table, the prices on energy basis for each type of the biomass residues



utilized by the project are all higher than the price used in the registered PDD. The price for each type of the biomass residues on energy basis in the registered PDD is crosschecked using the original data from the registered IRR calculation spreadsheet and ER calculation spreadsheet, the method is as follows:

Average price= Fuel Expenditure/Total wet weight/ lowest NCV of all types of biomass residues

=10027800RMB/(175800t+195600t)/11882.6KJ/kg=22.72 RMB/GJ

Table 3: prices for each type of the biomass residues on energy basis

Biomass Type	Rice husk	Rice straws	Cotton straws	Oil seed rape straws	Wood chips	Barks
NCV(GJ/t)	12.67	10.28	11.15	12.11	11.37	12.19
Price from invoice (RMB/t)	321.38	280	314	300	300.75	303
Prices of biomass residues utilized on energy basis (RMB/GJ)	25.37	27.24	28.16	24.77	26.45	24.86
Registered PDD	22.72 RMB/GJ (lowest NCV in the PDD is conservatively used)					

Therefore, it could be deduced that the actual project IRR is lower than the estimation in the registered PDD.

For accuracy, the PP re-calculated the project IRR using the actual values of the input parameters, calculation shows that the IRR is too low to have a normal result. So the NPV of the project is calculated, and it showed that the NPV is -555,011,312 RMB (for 48MW scenario), which is below zero. So the project is still additional when analyzed using actual input values.

As to the sensitive analysis, six parameters were selected in the registered PDD. The changes do not have impact on four of selected parameters: Static total investment, Equivalent operation hour at full load, Electricity tariff and Heat Price. The two affected parameters are: Biomass Cost and Total O&M Cost. Considering that the actual prices for each type of the biomass residues on energy basis is higher than the registered PDD, the value of both Biomass Cost and Total O&M Cost are higher than the applied value in the registered PDD, so the project IRR will still below the benchmark. For accuracy, the PP re-conducted the sensitive analysis using the actual values of the input parameters, calculation also shows that the IRR is too low to have a normal result. So it could be deduced that the sensitive analysis is not affected applying the actual value of the input parameters.

The re-calculation spreadsheet is provided and the calculation process is checked to be correct.

Based on the above analysis, it is confirmed that the additionality of the project activity is not affected.

- The scale of the project activity;

The scale of the project activity is 48MW equally divided into two construction phases, which is designed and carried out as per the FSR. This is not affected by the changes.

- The applicability and application of the applied methodology under which the project activity





has been registered or the later version of the applied methodology;

For the three changes, only the change of the types of biomass residues may have influence of the applicability of the applied methodologies. As per ACM0006 (version 09), possible leakages due to competing use of biomass have to be considered. When the types of used biomass residues are changed, the leakage has to be reconsidered. Related analysis is as follows:

In the registered PDD, according to the applied methodology ACM0006 (version 09), the approach L2 for estimating leakage is applied in the proposed project for demonstrating that the quantity of available biomass residue of each type in the region is at least 25% larger than the quantity of residues utilized. In response to the new type of biomass residues utilized in the project.

Because the wood chips and barks are included in the applied biomass residue types, the geographical boundary of the biomass collection is changed from "70km around the project site" in the registered PDD to be "100km" in the registered PDD. The demonstration of abundant surplus of biomass availability for the used biomass types is revised using the updated data of the year 2010 instead of the year of 2007 as used in the registered PDD. Considering that the project started operation in 2010, the application of updated data is appropriate. An investigation of the new biomass residue types carried out by Wuhan Kaidi Power Engineering Co., Ltd. and checked by the validation team. The report was issued in 2011, covering the real situation of 2010. The biomass availability analysis was stated in table B-14 of the revised PDD is cross checked by the validation team and confirmed to be correct.

Table 4: Demonstration of abundant surplus of biomass availability

	Rice husks (t)	Rice straws(t)	cotton straws(t)	Oil seed rape straws(t)	Wood chips (t)	Barks(t)
Available Biomass in the region	270496	1055599	49251	180870	450000.00	
Biomass utilised out of the project	54099	211120	9850	36174	67500.00	
Biomass utilised by the project	150000	115000	20000	40000	100000	82400
Total biomass utilised, including the project	204099	326120	29850	76174	252500.00	
Available Biomass/Total biomass utilised	132.53%	323.68%	164.99%	237.44%	178.22%	
Available Biomass/Total biomass utilised -100%	32.53%	223.68%	64.99%	137.44%	78.22%	
Abundant surplus? (more than 25%)	Yes	Yes	Yes	Yes	Yes	

The result shows that the biomass residue is abundant in local area. So the applicability and application of the applied methodologies is not affected.

- The compliance of the monitoring plan with applied monitoring methodology

The monitoring system, method and equipment in the registered monitoring plan are not affected



by the changes. The only information that has changed is that the biomass collection range is changed from 70km to 100km, and the average capacity of the biomass transport vehicle is changed from 3t to 6t. Also considering the actual quantity of consumed biomass in the year 2011, the number of truck trips for the annual transportation of biomass is changed from 123,800 to 84,567. This situation does not affect the registered monitoring plan. So the monitoring plan is still in compliance with the applied monitoring methodologies.

- The level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan

Similar as the above analysis, the monitoring system, method and equipment in the registered monitoring plan are not affected by the changes. The only information that has changed is that the biomass collection range is changed from 70km to 100km, and the average capacity of the biomass transport vehicle is changed from 3t to 6t. Also considering the actual quantity of consumed biomass in the year 2011, the number of truck trips for the annual transportation of biomass is changed from 123,800 to 84,567. This situation does not affect the registered monitoring plan nor the level of accuracy of monitoring. So the level of accuracy of the monitoring is still in compliance with the requirements contained in the registered monitoring plan.

- 6) Assessment of how the proposed revisions ensure that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revision

It is confirmed that the level of accuracy and completeness in the monitoring and verification process is not affected by the changes.

- 7) The changes will not lead to a reduction in the accuracy of the calculation of emission reductions

It is confirmed that the changes will not lead to a reduction in the accuracy of the calculation of emission reductions.

- 8) The findings of the previous verification reports have been taken into account

The inconsistent between real operation and registered PDD is identified during the first verification process. The findings during this verification process have been taken into account.

- 9) The changes comply with the requirements established in the Project Standard, thus it shall be submitted to the Board following the Project cycle procedure for post registration changes

It is confirmed that the changes comply with the requirements established in the Project Standard, thus it shall be submitted to the Board following the Project cycle procedure for post registration changes.

According to the requirement of the EB, the PPs have applied the latest PDD template under the VVS tract, while the registered PDD (version 4) was under VVM tract. After thorough check, the validation team confirms that the information in the revised PDD has no material variation with that in the registered PDD other than the changes that have been elaborated in this assessment opinion.



#### 4. Validation Opinion

China Environmental United Certification Center Co., Ltd (hereafter "CEC") has been contracted with Yiyang Kaidi Green Energy Development Co., Ltd. to perform a validation on the changes to the project design of a registered project activity for the project "Hunan Yiyang Kaidi Biomass Power Project", UNFCCC Ref. No. 3072. The validation was performed following the UNFCCC criteria, approved methodology and relevant EB guidance and meeting reports.

In accordance with the requirements of the VVS (version 03.0), CEC confirms that:

- 1) The changes to the project activity are assessed by the validation team compared to the registered PDD, a description of the changes and their validation opinion is provided in this report.
- 2) The changes only reflect the actual operation of the project activity, will not impact the overall operation to deliver emission reductions as stated in the PDD;
- 3) The changes do not adversely impact any of the following do not require prior approval by the Board: (a) The additionality of the project activity; (b) The scale of the project activity; (c) The applicability and application of the applied methodology under which the project activity has been registered or the later version of the applied methodology;
- 4) The changes ensure that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revision;
- 5) The changes to the monitoring plan are in compliance with the approved monitoring methodology applicable to the project activity.
- 6) The changes will not lead to a reduction in the accuracy of the calculation of emission reductions.
- 7) The changes are identified during the first verification. The findings of the verification report have been taken into account.
- 8) The changes comply with the requirements established in the Project Standard, thus it shall be submitted to the Board following the Project cycle procedure for post registration changes.
- 9) The information in the revised PDD has no material variation with that in the registered PDD other than the changes that have been elaborated in this assessment opinion.

Beijing, 25/06/2013

QIN Boya

Validation Team Leader

Beijing, 28/06/2013

SONG Tiedong

Chairman of Board

China Environmental United Certification Center Co., Ltd (CEC)



## 5. References

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42. ACM0002 Consolidated methodology for grid-connected electricity generation from renewable sources, version 10
43. ACM0006 Consolidated methodology for electricity generation from biomass residues, version 9
44. Combined tool to identify the baseline scenario and demonstrate additionality, Version 02.2
45. Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, Version 02
46. Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 01
47. Tool to calculate the emission factor for an electricity system, Version 02
48. Standard for application of the global warming potentials to Clean Development Mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol



## 6. Certificate of Competence

### QIN Boya

Qualification in accordance with CEC-4001C-B/8 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area (s): 1.1,1.2

Beijing, 12 May 2012

ZHANG Xiaodan

XU Linghua

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', is positioned above the title.

CDM Supervisor, Technical Director

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Quality Assurance Management Division

### XU Linghua

Qualification in accordance with CEC-4001C-B/7 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2

Beijing, 01 Dec 2011

ZHANG Xiaodan

XU Linghua

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CDM Supervisor, Technical Director

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Quality Assurance Management Division



## LIU Yaotian

Qualification in accordance with CEC-4001C-B/7 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2

Beijing, 01 Dec 2011

ZHANG Xiaodan

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CDM Supervisor, Technical Director

XU Linghua

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Quality Assurance Management Division

## SONG Quanbo

Qualification in accordance with CEC-4001C-B/7 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 13.2, 15.2

Beijing, 01 Dec 2011

ZHANG Xiaodan

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CDM Supervisor, Technical Director

XU Linghua

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Quality Assurance Management Division



## YIN Yun

Qualification in accordance with CEC-4001C-B/7 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.1, 1.2, 2.2, 3.1

Beijing, 01 Dec 2011

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Quality Assurance Management Division

## CUI Xiaodong

Qualification in accordance with CEC-4001C-B/8 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area (s): 1.2

Beijing, 27 Jun 2012

ZHANG Xiaodan

A handwritten signature in black ink, appearing to read 'Zhang Xiaodan', is positioned above the title.

CDM Supervisor, Technical Director

XU Linghua

A handwritten signature in black ink, appearing to read 'Xu Linghua', is positioned above the title.

Quality Assurance Management Division