



## Validation opinion for post registration changes

Title of project activity:		
Suqian Kaidi Biomass Co-generation Project		
CDM reference number:	DNV project No.:	
3068	PRJC-314604-2011-CCS-CHN	
Date:	Validation of the changes were conducted:	
11 December 2012	<input type="checkbox"/> Prior to the commencement of a verification of the project activity <input checked="" type="checkbox"/> When performing a verification of the project activity	
Work carried out by (name & signature):	Work verified by (name & signature):	Approved by (name & signature):
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## Overview of post registration changes

Type of post registration change		Are the changes of a type specified in Appendix 1 of the CDM Project Standard? Note: In case of "No", prior approval by the EB is required
A: Temporary deviations from the registered monitoring plan and/or monitoring methodology (refer to section A)		<input type="checkbox"/> Yes <input type="checkbox"/> No
Applicable period for proposed deviations (inclusive):	From DD/MM/YYYY start date of the earliest included deviation to DD/MM/YYYY end date of the latest included deviation	<input checked="" type="checkbox"/> No post registration change of this type
B: Corrections (refer to section B)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No post registration change of this type
C: Changes to the start date of the crediting period (refer to section 0) <i>Prior approval by the CDM EB is not required in case of (a) bringing forward the start date up to one year earlier or (b) postponing the start date by up to one year (by up to two years for project activities in LDCs).</i>		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type
Proposed start date of the crediting period:	DD/MM/YYYY (changed from DD/MM/YYYY)	
D: Permanent changes from the registered monitoring plan or applied methodology (refer to section 0)		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type

E a): Changes to the project design of a registered project activity (refer to section 0)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No post registration change of this type
E b): Changes to the programme design of a registered PoA (refer to section 0)	Note: All changes to the programme design of a registered PoA require prior approval by the EB. <input checked="" type="checkbox"/> No post registration change of this type
F. Changes specific to afforestation or reforestation project activities (refer to section 0F)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type

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

Not applicable

### **B. Corrections**

In the registered PDD, the generator's manufacturer was "Nanjing Steam Turbine (Group) Co.,". However, by checking the nameplate and generator supply contract during the site visit, DNV found the manufacturer of the generator was "Nanjing Steam Turbine (Group) Co., Ltd". The typo error on the generator's manufacturer has been corrected in the revised PDD to be "Nanjing Steam Turbine (Group) Co., Ltd".

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

Not applicable

### **D. Permanent changes from the registered monitoring plan or applied methodology**

Not applicable

### **E. Changes to the project or programme design of a registered project activity or PoA**

#### **E.1 Description of the changes as compared to the description in the registered PDD and description of the changes to the monitoring plan**

The project applies the approved consolidated baseline methodology ACM0006 (version 09) "Consolidated methodology electricity generation from biomass residues". The change requested to the registered PDD is mainly regarding the biomass residue utilized and turbine-generator supplied:

It was stated in the registered PDD that "The biomass residues utilized in this proposed project will be mainly rice husk, wheat straw, rice straw, oil seed rape straw, maize straw". However, by checking the daily operating log during the site visit, DNV was able to confirm that besides the rice husk, rice straw, wheat straw and maize straw as mentioned in the PDD,

the additional types of biomass residues were utilized by the project activity including peanut shell and bark. Thus, the biomass residues utilized for the project are rice husk, rice straw, wheat straw, maize straw, peanut shell and bark.

In addition, to revising the PDD with regard to the changes, the PDD was also revised in section A.3 to reflect that Camco International Limited was authorized by Switzerland to participate in this project. The request to also add Switzerland as Party involved in the project has been accepted by the UNFCCC on 18 April 2011.

## **E.2 Assessment of the changes to the project design**

### ***Assessment of when the changes occurred***

The change of biomass residues occurred in December 2010, subsequent to start of the project operation in August 2009.

### ***Assessment of the reasons for these changes taking place***

The project was put into operation from 23 August 2009. After the project operated for a period, based on the feedbacks from the biomass fuel purchase department and the plant operation practice, the project developer was compelled to seek other alternatives on the biomass residues as the project owner realized that the seasonal production of biomass residue types, as mentioned in the registered PDD (version 04 dated 31 March 2010), affected the biomass fuel supply. The biomass types in Suqian City where the project located were much more diverse than predicted and various types of biomass residues supply can guarantee the continuous operation of power plant.

### ***Assessment of whether the changes would have been known to the project participants prior to registration of the project activity***

As stated in the validation report (version 03 dated 25 October 2010), the biomass residues utilized in this proposed project will be mainly rice husk, wheat straw, rice straw, maize straw and oil seed rape straw. The available biomass residue, as envisaged, during the validation stage has been verified from FSR (dated October 2007) prepared by the accredited third party Wuhan Kaidi Electric Power Engineering Co., Ltd. The changes occurred in December 2010, which was later than the final validation report completed on 25 October 2010 but it was prior to the registration as the CDM project activity on 11 January 2011.

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

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. This was done as follows:

In the registered PDD, according to the applied methodology ACM0006 (version 09), the approach L<sub>2</sub> 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, an investigation of the new biomass residue types was carried out by Wuhan Kaidi Power Engineering Co., Ltd\*.

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\* Investigation report for the biomass supply/demand in Suqian City issued by Wuhan Kaidi Power Engineering Co., Ltd in May 2012

Table 1: Biomass resources in 70 km radius from the plant in Suqian City

<b>Biomass type</b>	<b>Rice Husk</b>	<b>Wheat straw</b>	<b>Rice straw</b>	<b>Maize straw</b>	<b>Peanut shell</b>	<b>Bark</b>
Total biomass generation in the region (10kt)	49.68	161.43	170.91	61.76	7.45	70
Biomass loss (10kt)	4.97	24.21	25.64	9.26	1.12	7
Available biomass in the region (10kt)	44.71	137.22	145.27	52.50	6.33	63.00
Biomass utilised in traditional method (10kt)	6.71	20.58	21.79	7.87	0.95	9.45
Biomass utilised other power plants (10kt)	7	13.86	16.05	0	0	7.4
Biomass utilised by the project (10kt)	6.0	3.60	1.40	4.5	1.4	6
Total biomass utilised, including the project (10kt)	19.91	38.04	39.24	12.37	2.35	22.85
Available biomass/Total biomass utilised	125%	261%	270%	324%	169%	176%

All data are sourced from the investigation report for the biomass supply and demand in Suqian City the project located issued by the FSR designer, in which the biomass utilised by the project is the estimation.

The investigation of the biomass residues utilized shows that the quantity of available residues of the above mentioned biomass types in 70 km away from the project plant are all more than 25% larger than the quantity of available biomass. In the registered PDD, it stated “the geographical boundary in the biomass availability report is covering a radius of 100 km around the project site”. As the boundary with the radius of 70 km around the project site has proved that the surplus quantity of biomass is available for the project, the boundary with radius of 100 km around the project site has the same conclusion, i.e. the project will not influence the present biomass utilisation and it will not create any leakage. This is in compliance with ACM0006 (version 09).

However, due to the change of biomass residues type, the biomass quantity consumed by the project has been re-assessed. The project participant commissioned the FSR’s designer to assess the quantity of biomass residues consumed by the project, which is based on the same operation output. In the assessment, it was stated that the applicability of the boilers selected is good enough for various types of biomass residues (also including branch, bark and saw dust), and the proportion of each biomass residue can be adjusted as per actual operation. In the FSR, the total energy consumed by two boilers was estimated to be 2 143.75 TJ. Considering the nature and availability of each biomass residue, the new energy balance was conducted as below:

Table 2: Energy balance calculation

<b>Biomass type</b>	<b>Rice husk</b>	<b>Wheat straw</b>	<b>Rice straw</b>	<b>Maize straw</b>	<b>Peanut shell</b>	<b>Bark</b>
Wet weight (10kt)	60	36	14	45	14	60
Moisture (%)	13.51	12.26	27.01	32.56	18.35	43.61
Dry weight (10kt)	51.894	31.586	10.219	30.348	11.431	33.834
NCV (GJ/t)	13.35	14.48	12.88	11.86	13.73	10.20
Energy (TJ)	692.78	457.37	131.62	359.93	156.95	345.11
Total energy (TJ)	2143.75					

(1) Moistures are sourced from the average daily actual measurement

(2) NCV results were issued by reputed laboratory

By checking relevant documents/evidences, DNV was able to confirm that the quantity of all types of biomass residues used by the project activity was reasonable and can meet the requirement of project implementation and operation. Hence, the updated quantity and nature of each biomass residue are applied in the calculation of baseline emissions and project emissions. Furthermore, due to the change of total quantity of biomass residues, the number of truck trips for the transportation of biomass residues and on-site electricity consumption attributable to the project activity has also been updated in the calculation. DNV has verified the calculations in the spread sheet along with the updated PDD and confirmed that the annual estimated baseline emissions and project emissions are changed from 119 012 tCO<sub>2</sub> and 17 928 tCO<sub>2</sub> to 119 637 tCO<sub>2</sub> and 20 488 tCO<sub>2</sub>, respectively. As a result, the estimated emission reductions are changed from 101 084 tCO<sub>2</sub> to 99 149 tCO<sub>2</sub>, which reflects the actual project implementation and operation.

### E.3 Assessment of the impact of the changes to the project design

*In the case of a project activity, do the changes adversely impact any of the following?*

- ☐ The applicability and application of the applied methodology under which the project activity has been registered
- ☐ The additionality of the project activity
- ☐ The scale of the project activity
- ☒ None of the above

#### ***Assessment of impacts of the changes on the applicability and application of the applied methodology under which the project activity has been registered***

The project applied the approved consolidated baseline methodology ACM0006 (version 09) “Consolidated methodology electricity generation from biomass residues”, which is applicable to the project activity as:

- Other than rice husk, rice straw, wheat straw and maize straw which have been identified as biomass residues in the registered PDD, additional two types of biomass residue (peanut shell and bark) were used in the project activity as confirmed by DNV through the site visit. As stated in the investigation report of local biomass resource issued by the accredited third party, peanut shell was sourced from the agriculture and bark was source from the forestry residues, which both are considered as renewable biomass residues. Hence, no other biomass types than biomass residues, as defined in ACM0006 (version 09), are the predominant fuel used in the project activity and there are no fossil fuels was co-fired, which can be verified by the purchase and operating records of biomass residues as well as the on-site visit.
- The biomass residues abundantly available within the boundary of the project covering radius of 70 km (and also 100 km) are surplus as compared to the biomass consumption of the project. The biomass residues utilized are procured from agriculture and forestry residues, not the product of any production process. Therefore, the implementation of the project activity will not increase the biomass production in the identified region, which can be verified by the investigation report of local biomass resource by the accredited third party.
- Due to the volatility and deterioration of biomass residues, the performance of the power plant equipment will be affected by the calorific value decreasing. Therefore, the biomass residues used in the proposed project will not be stored for more than 1 year. The biomass fuels will be consumed on a first-come first-burn basis.

- There is no significant energy quantities except from transportation and mechanical treatment of the biomass residues required. The project activity will consume a few liters of diesel for start-ups and transportation and mechanical treatment of the biomass residues.

The methodology is hence still applicable for the project after the change of project design.

#### **Baseline determination of biomass residues used and determination of scenario:**

The alternative B2 is not realistic as the practice of land filling and other planned dumping of biomass residues in anaerobic conditions in rural area is not a common practice and highly impractical in China. B5 is eliminated as there is no generation or cogeneration project using biomass residues as fuel close to proposed project. B6 also is excluded since there are no biomass boilers using biomass residues as fuel close to proposed project. There is no project using the surplus biomass residues for other energy purposes at the project site, which could be confirmed by DNV through reviewing the investigation report of local biomass resource issued by the accredited third party. Thus B7 is not eligible. As stated in the investigation report of local biomass resource, there is a little amount of biomass residues that has been used as fertilizer or firewood around the project site. But the biomass residues consumption by the proposed project activity is derived from local surplus biomass residues within the identified boundary, which will not appropriate the biomass residues as fertilizer. Thus, B8 is eliminated.

In conclusion, the baseline for all the biomass residues is B1/B3 and the baseline for cogeneration is unchanged. Hence, the baseline of the project after the change of project design is still Scenario 2 of the methodology.

#### ***Assessment of impacts of the changes on the additionality of the project activity***

The change of biomass impacts the project's additionality as an investment analysis was used to demonstrate the additionality of the project and with a change of biomass residue types, the prices are different. However, no concerns are raised with respect to additionality. Hence, in accordance with the Appendix 1 of CDM Project Standard, no prior approval by the CDM EB on such change of the project design is required.

On the basis of information sourced from the fuel purchase contracts<sup>\*</sup> of biomass residue used, and the data of the net calorific values for biomass residues used in the project activity from a reputed laboratory<sup>†</sup>, DNV could verify that the average prices for the biomass residues utilized by the project on an energy basis are higher than those used in the registered PDD, except wheat straw. By considering the re-designed quantity of each biomass residue utilized, the weighted average price of actual biomass residues utilized by the project on the energy basis was calculated to be 23.44 RMB/GJ, which was higher than the estimation of 20.20 RMB/GJ in the registered PDD.

Table 3: Prices of biomass residues utilized on energy basis

<b>Data source</b>	<b>Rice husk</b>	<b>Rice straw</b>	<b>Wheat straw</b>	<b>Maize straw</b>	<b>Peanut shell</b>	<b>Bark</b>
Prices from invoice (RMB/t)	370	270	270	250	375	240
NCV from the reputed laboratory (GJ/t)	13.07	12.50	14.76	12.21	13.19	10.27

<sup>\*</sup> The biomass fuel purchase contracts in year 2011

<sup>†</sup> NCV of biomass residues test result issued by Luoyang City Coal Quality Test Centre in June 2011

Prices of biomass residues utilized on energy basis (RMB/GJ)	28.31	21.60	18.29	20.48	28.43	23.37
Designed quantity of biomass residues utilized (t)	60 000	14 000	36 000	45 000	14 000	60 000
Average price of biomass residues utilized on energy basis (RMB/GJ)	23.44 RMB/GJ					
Registered PDD	20.20 RMB/GJ (lowest NCV of the rice straw is conservatively used in the registered PDD)					

The price and NCV of biomass residues are from the year 2011

Furthermore, by using the re-designed quantity of each biomass residue utilized and the actual price, the project IRR was re-calculated to be less than 0%, which was lower than the value of 5.74% reported in the registered PDD. For the comparison purpose, even use the re-designed quantity of each biomass residue utilized and the conservative price of biomass residue of 240 RMB/t indicated in the registered PDD, the project IRR was calculated to 3.45%, which was still lower than the value reported in the registered PDD.

Furthermore, by using the re-designed quantity of each biomass residue utilized and the actual price, the project IRR was re-calculated. The project IRR without CDM revenue cannot be obtained due to the sum of net flow after the tax during the project lifetime is negative value, even the “Guess” value in the IRR calculating formulae was assumed to be close to -1.0. Hence, the project IRR without CDM revenue cannot be displayed in the IRR spreadsheet, and it is obvious that the project IRR after the change, by considering the re-designed quantity of each biomass residue and actual price, was remarkable lower than the value of 5.74% reported in the registered PDD. Even use the re-designed quantity of each biomass residue utilized and the conservative price of biomass residue of 240 RMB/t indicated in the registered PDD, the project IRR was calculated to 3.45%, which was still lower than the value reported in the registered PDD. Moreover, for the comparison purpose, the NPVs for two scenarios (Scenario I includes re-designed quantity of biomass residues and actual prices, and Scenario II includes original quantity and price of biomass residues) were also calculated. It was found that the Scenario one has lower NPV (-212 184 465 RMB) than the Scenario II (-30 354 228 RMB). Hence, using other biomass residue types does not impact the conclusion in the registered PDD that the project is additional.

From the IRR spreadsheets, it can see that the drop of project IRR without CDM revenue was due to the increasing of O&M cost, which was made by increasing quantity of biomass residue used and higher price of biomass residues against estimation in the registered PDD. The following is the assessment for these two factors:

1. As mentioned above in E.2, due to the change of biomass residues type, the biomass quantity consumed by the project was re-assessed by the FSR's designer Wuhan Kaidi Electric Power Engineering Co., Ltd, which is based on the same operation output. In the assessment, it was stated that considering the resource of biomass residues within the project boundary, and the moisture and NCV of each biomass residue measured in the operation, based on the same operating hours and operating conditions, the quantities of each biomass residue were re-calculated. Wuhan Kaidi Electric Power Engineering Co., Ltd is a third party in the engineering assessment accredited directly by the government. It is in DNV's opinion that the re-assessment on the biomass residues type and quantity by Wuhan Kaidi Electric Power Engineering Co., Ltd can

be regarded as a reliable and trustworthy source of information coming from a recognized entity.

2. The biomass residues can be used as fuel in the project activity creates a market and also leads to an escalation in the cost of the biomass residues. The cost associated with the biomass is reasonable as there are costs associated with labour, collection, transportation and storage of the biomass residues. From the Table 3 above, it can find that the prices (RMB/t) of all biomass residues used are no less than the estimation of 240 RMB/t in the registered PDD. Even from the energy basis, the weighted average price of actual biomass residues utilized by the project 23.44 RMB/GJ was also higher than the estimation of 20.20 RMB/GJ in the registered PDD. The actual prices of biomass residues are sourced from the biomass purchase contracts, which also were confirmed by the biomass purchase invoices. Furthermore, as the material price and labour cost continue to rise recently in China, the cost on the biomass collection, transportation and treatment kept increasing. It was confirmed from the statistic that the biomass prices for most operating biomass power plant in China was about 300 RMB/t, which was from the statistic of the authority NDRC. Hence, it is concluded that the biomass fuel price for the project applied in the analysis is deemed to be reasonable.

Therefore, in DNV's opinion, the increasing of O&M costs in the biomass power plant reflects to the operation practice and is reasonable.

#### ***Assessment of impacts of the changes on the scale of the project activity***

The capacity of the project is not changed by the change of biomass residue. The project is already a large scale project.

#### ***Assessment of impacts of the changes on the compliance of the monitoring plan with the applied monitoring methodology***

The biomass type change does not involve the change of the monitoring plan with the applied monitoring methodology.

#### ***Assessment of impacts of the changes on level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan***

The biomass type change does not involve the change compared with the registered monitoring plan.

### **F. Changes specific to afforestation or reforestation project activities**

Not applicable.

### **Validation opinion**

DNV's verification of emission reductions reported for the project revealed an inconsistency with regard to the type of biomass residues actually used and the the generator's manufacturer compared to the types mentioned in the registered PDD. Considering the assessment presented above, DNV was able to confirm that the typo error on the generator's manufacturer has been corrected in the revised PDD, and the change of biomass types for the project does



not impact the additionality of the project activity, does not impact the scale of CDM project activity, and does not impact the applicability of ACM0006 (version 09). Since the quantity and nature of each biomass residue used in the calculation of emission reductions in the registered PDD are changed due to the change of biomass residue types, the annual estimated emission reductions have been updated to reflect the actual project implementation and operation.

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