



Validation opinion for post registration changes

Title of project activity:		
Poyang Kaidi Biomass Power Project		
CDM reference number:	DNV project No.:	
3056	PRJC-314597-2011-CCS-CHN	
Date:	Validation of the changes were conducted:	
8 November 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):
Liu Jinwei <i>Liu Jinwei</i>	Simon Yon-Sing, Wong <i>Simon Wong</i>	Michael Lehmann <i>Michael Lehmann</i>

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 <input checked="" type="checkbox"/> No post registration change of this type
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)	
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 C) <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

The manufacturer of steam turbine is changed from NanJing Steam Turbine (Group) Co., Ltd as stated in the PDD to Nanjing Turbine & Electric Machinery (Group) Co., Ltd. The manufacturer of generator is changed from NanJing Steam Turbine (Group) Co., as stated in the PDD to Nanjing Turbine & Electric Machinery (Group) Co., Ltd. The manufacturer of generator in the PDD shall be NanJing Steam Turbine (Group) Co., Ltd as well*. There is a missing of 'Ltd.' in the name of manufacturer in the PDD.

Nanjing Turbine & Electric Machinery (Group) Co., Ltd is in accordance with the purchase contracts of the steam turbine and generator verified by DNV*.

Nanjing Turbine & Electric Machinery (Group) Co., Ltd. (Formerly named as Nanjing Turbine & Electric Machinery Works, which was founded in 1956 and was changed to be a full state-owned company in July of 1995) after completing the ownership reformation in September of 2004, now is a joint venture enterprise of Nanjing and Hong Kong. DNV considers both NanJing Steam Turbine (Group) Co., Ltd and Nanjing Turbine & Electric Machinery (Group) Co., Ltd the same company.

The boiler model is KG65-450/5.29-FSWZ1 in the nameplate of the boiler which is inconsistent with the model (KG65-450/5.29-FSWZ-I) in the registered PDD. According to the "Model numbering method for utility boiler (JB/T 1617-1999)", the third part of the boiler's name refers to fuel code and the design serial number. "FSWZ" means the fuel is biomass, with "SWZ" being the initial letter of Chinese Pinyin "Sheng Wu Zhi" which means biomass. Both "1" and "-I" mean it's the first design for this model type. Hence DNV considers the model type of the boiler is line with the project design in the registered PDD.

* Wuhan Kaidi Electric Power Engineering Co., Ltd (the EPC contractor of Poyang Kaidi Green Energy Development Co., Ltd) and Nanjing Turbine & Electric Machinery (Group) Co., Ltd.: Technical specification of turbine, dated September 2007.

Wuhan Kaidi Electric Power Engineering Co., Ltd (the EPC contractor of Poyang Kaidi Green Energy Development Co., Ltd) and Nanjing Turbine & Electric Machinery (Group) Co., Ltd.: Technical specification of generator, dated September 2007.

Both weight meters and belt weighers are specified to monitor the quantity of each biomass residue type combusted in the project plant in year y ($BF_{k,y}$) in the registered PDD. The PDD has been revised to ensure consistency in stating the monitoring equipment, which will only be the belt weigher. Belt weigher is one kind of weight meters which is suitable for the measurement of solid particles such as smashed biomass reissued used by the project. DNV considers the monitoring equipment for $BF_{k,y}$ is in line with the monitoring plan in the registered PDD.

The registered PDD stated the energy balance used for crosscheck of the quantity of biomass combusted in the project plant will be prepared annually in section B.7.1 "Data and parameters monitored". However the registered PDD also stated that the energy balance will be prepared monthly in section B.7.2 "Description of the monitoring plan". Section B.7.2 was thus corrected to be consistent with the frequency of the energy balance stated in section B.7.1. An annual energy balance was verified to be in line with the requirements of ACM0006 (version 09).

Therefore DNV considers there is no changes in the project design and is merely correction to the name of the manufactures of steam turbines and generators, the model type of boilers, the name of monitoring equipment for $BF_{k,y}$ and the frequency of the energy balance.

In addition to revising the PDD with regard to the above corrections and the changes in the type of the biomass residue as described below, the PDD was also revised 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.

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 design of a registered project activity

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 regarding the biomass residue utilized:

It was stated in the registered PDD that "The biomass residues utilized in this proposed project will be mainly rice husk, cotton straw, rice straw, bean straw, peanut straw, gingili straw and oil seed rape straws". However, by checking the daily operating log during the site visit, DNV was able to confirm that rice husk, bamboo crumbs, wood scraps, branches, barks and stumps were used in 2011. Thus, the main biomass residues utilized for the project are rice husk, bamboo crumbs, wood scraps, branches, barks and stumps. As per the revision of PDD, this change of biomass type will last to the end of lifetime of the project.

E.2 Assessment of the changes to the project design

Assessment of when the changes occurred

The change occurred since 28 December 2010 which was verified through the internal notification of the project owner on the change of biomass residues.

Assessment of the reasons for these changes taking place

After the project was put into operation, the project owner had to seek other alternatives due to the seasonal production of types biomass residue types as mentioned in the registered PDD dated 31 March 2010 and difficulty in collection and transportation of straws. This affected the biomass fuel supply, whereas the biomass types in Poyang County, where the project is located, were much more diverse than predicted. Other types of biomass residues supply can guarantee the continuous operation of power plant and the collection and transportation for forestry residues ((bamboo crumbs, wood scraps, braches, barks and stumps) is much easier than the collection and transportation of straws.

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

From the validation report (version 03 dated 25 October 2010), the available biomass residues are mainly rice husk, cotton straw, rice straw, oil seed straw. The available biomass residue as envisaged during the validation stage has been verified from Biomass Availability Report (dated January 2008) prepared by the FSR author (Wuhan Kaidi Electric Power Engineering Co., Ltd.). The changes occurred since 28 December 2010, which was after the completion of the final validation report on 25 October 2010 (version 03) and prior to the registration as the CDM project activity on 06 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 L₂ for estimating the 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 in February 2012 and its effect on the leakage was re-assessed.

Demonstration of abundant surplus of biomass availability in 60 km radius from the plant*

Biomass Type	Rice husk (10 ³ tonnes)	Bamboo crumbs (10 ³ tonnes)	Wood scraps (10 ³ tonnes)	Branches (10 ³ tonnes)	Barks (10 ³ tonnes)	Stumps (10 ³ tonnes)
Total biomass generation in the region	300.0	60.0	500.0			
Biomass loss	30.0	6.0	50.0			
Available biomass in the region	270.0	54.0	450.0			
Biomass utilised out of the project	54.0	8.1	90.0			

* The statistic is issued by a reputed institute on the biomass availability

Biomass utilised by the project	75.0	30.0	133.0
Total biomass utilized, including the project	129.0	38.1	223.0
Available biomass/Total biomass utilised	209%	142%	202%
Available Biomass/Total biomass utilised - 100%	109%	42%	102%

The investigation of the biomass residues utilized shows that the quantity of available residues of the above mentioned biomass types within 60 km radius of the project plant are all 25% larger than the quantity of available of biomass type that are utilized. The conclusion is that 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 rice husk, bamboo crumbs, wood scraps, branches, barks and stumps) and the proportion of each biomass residue can be adjusted as per actual operation. Hence the change of biomass residues type has no impact on the output of the project.

In the FSR, the total energy consumed by two boilers was estimated to be 2 142.32 TJ. Considering the nature and availability of each biomass residue, the new energy balance was conducted as below:

Biomass Type	Rice husk	Bamboo crumbs	Wood scraps	Branches	Barks	Stumps
Wet Weight (t)	75 000	30 000	40 000	57 000	30 000	6 000
Moisture (%) [†]	14.05%	39.68%	35.17%	22.46%	29.63%	36.85%
Dry Weight (t)	64 463	18 096	25 932	44 198	21 111	3 789
NCV(GJ/t) [‡]	12.69	10.58	11.57	12.66	11.09	10.65
Energy input (GJ)	817 706.8	191 365.2	299 903.6	559 323.2	234 015.4	40 333.9
Total energy input (GJ)	2 142 648.1					

By checking relevant documents* and evidences^{†‡}, DNV was able to confirm that the quantity of all types of biomass residues used by the project activity was correctly reported and meets 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.

* Assessment on the fuel suitability of Poyang Kaidi Biomass Power Project issued by Wuhan Kaidi Electric Power Engineering Co., Ltd which is FSR author of the project on 22 August 2012.

[†] Moistures are sourced from the daily actual measurement.

[‡] NCV results were issued by reputed laboratory.

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 calculation process in the spread sheet along with the updated PDD and confirmed that the annual estimated baseline emissions and project emissions are changed from 129 802 tCO₂ and 12 684 tCO₂ to 130 712 tCO₂ and 14 084 tCO₂, respectively. As a result, the estimated emission reductions are changed from 117 118 tCO₂ to 116 628 tCO₂, which reflect the actual project implementation and operation.

E.3 Assessment of the impact of the changes to the project design (*applicable to project activities only*)

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 which have been identified as biomass residues in the registered PDD, additional five types of biomass residue 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, bamboo crumbs, wood scraps, branches, barks and stumps are forestry residues, which 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 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 60 km are surplus as compared to the biomass consumption of the project. The biomass residues utilized are procured from agriculture and forestry residues, and not from the product of any production process. Therefore even the five new biomass types are consumed in the project, it would not increase the processing capacity of the raw input of these biomass 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 of biomass residues and deterioration of biomass residues, the output of the power plant 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 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 impractical in China. B5 is eliminated as there is no generation or cogeneration project using biomass residues as fuel close to the proposed project. B6 also is excluded since there are no biomass boilers using biomass residues as fuel close to the 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. 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.

On the basis of information sourced from the biomass fuel invoices^{*}, and the data of the net calorific values for biomass residues used in the project activity from a reputed laboratory[†], DNV could verify that all the prices for the biomass residues utilized by the project are higher on an energy basis than those used in the registered PDD. The project IRR considering actual biomass residue prices is therefore lower than the one anticipated in the registered PDD.

Data source	Rice husk	Bamboo crumbs	Wood scraps	Branches	Barks	Stumps
Average prices from invoice (RMB/t)	350	320	330	330	320	300
NCV from the reputed laboratory (GJ/t)	13.05	10.74	11.87	12.93	11.32	10.83
Prices of biomass residues utilized on energy basis (RMB/GJ)	26.82	29.80	27.80	25.52	28.27	27.70
Registered PDD	21.71 RMB/GJ (the lowest NCV (11.883 GJ/t) from the rice straw and the biomass price of 258 RMB/t in the PDD is conservatively used to reach this value)					

^{*} The invoices for biomass fuel in 2011

[†] NCV of biomass residues test result issued by Luoyang City Coal Quality Test Centre on 3 January 2011 and 2 July 2011. The higher test result of the two tests is adopted for conservativeness.

As shown in the sensitivity analysis in the registration PDD, if the biomass cost increased by 10%, the project IRR will be -0.83%. If the revised biomass consumption of 238 000 tonnes which is 28% higher than the biomass consumption of 185700 tonnes stated in the registered PDD is applied in the IRR analysis and the biomass price is unchanged, the project IRR will be negative.

Therefore, using other biomass residue types does not impact the conclusion in the registered PDD of the proposed project that the project's additionality is thus not adversely impacted by this change.

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 and the project is already a large scale project.

F. Changes specific to afforestation or reforestation project activities

Not applicable

Validation opinion

DNV's verification of the emission reductions reported for the project revealed an inconsistency with regard to the actual type of biomass residues used compared to the types mentioned in the registered PDD, a change of manufacture name of steam turbine and generator and a change of the frequency of project's energy balance. Considering the assessment presented above, DNV was able to confirm that the change of biomass for the project, the change of manufacture name of steam turbine and generator and the change of the frequency of project's energy balance does not adversely impact the additionality of the project activity, 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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