Monitoring Report

Volume 1

Version 4.0

1 November 2010

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Start monitoring period: 25 June 2008
End monitoring period: 31 Jan 2009

Title: Straw generation project in Wei county Hebei province, P.R. China

UNFCCC Reference Number: 1546

Project developer

National Bio Energy Co., Ltd.,

This monitoring report is prepared by:	Wenyi Zhang, Climate Change Capital
Date:	1 November 2010
Project Owner:	National Bio Energy Co., Ltd.,

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1 Introduction

The purpose of this Monitoring Report is to calculate the emission reductions achieved by the project activity in the period covered by this report, and to serve as the basis for the verification of these reductions and issuance of the CERs.

1.1 Monitoring period

Monitoring period: 25 June 2008 – 31 Jan 2009

2 Project description

2.1 Title

Straw generation project in Wei county Hebei province, P.R. China

2.2 UNFCCC Reference Number

1546

2.3 Implementation status

The project activity is to collect and utilise biomass residues to generate electricity. The biomass residue fired power plant has a total installed capacity of 25 MW. This is in conformity with the PDD.

2.4 Operation of the project

The project was fully operational from 15 April 2007. The project has been operating since this date. In this context the use of the word "operational" includes downtime due to maintenance or technical issues.

There are two questions raised during the request for issuance process by members of the Executive Board, which are addressed below. In summary we, National Bio Energy Co., Ltd. ("NBE") being the Project Owner, do not believe that they impact the first issuance.

Question 1. The DOE is requested to clarify how it verified that the project activity has been operated as per the PDD with regard to i) the additional biomass of maize stalks considering that the validation report indicates that the project activity will only utilize cotton straw and ii) the higher operating hours than anticipated in the PDD considering that the monitoring report indicates that the higher operating hours will last in the future.

2.4.1 The validation report indicates that the project activity will only utilize the cotton straw. A small proportion (2.4%) of the feedstock was made up of maize stalk during the verification period in question. The Project Owner believes that the minor and temporary utilization of the maize stalk does not give rise to a non-conformity with the registered PDD for the reasons set out below.

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2.4.1.1 As referenced in section A.2.1 of the Validation Report, the initial PDD of the project set out that biomass residues would be corn straw (also known as maize stalk) as well as cotton straw. However, during the site visit, the validator was told orally by the Project Owner that only cotton straw would be used. This has subsequently proven not to be the case, though the predominant fuel (97.6%) is cotton straw.

2.4.1.2. In the registered PDD, the types of the biomass residues are not defined to be cotton straw only. In section B.2 on page 8 of the PDD, the following description is set out "Predominant fuels used by the proposed project are cotton straw."

It indicates that other types of biomass residue are also allowed to be consumed, while cotton straw should be the predominant fuel. In fact, in this monitoring period, the consumption of the cotton straw was 97.6% of the total quantity, while the maize stalk (corn straw) was only 2.4%. Please see table 5.1 of the monitoring report version 4.0.

2.4.1.3 In this monitoring period, the quantity, net calorific value ("NCV"), moisture content and other relative values of both the cotton straw and maize stalk have been monitored in accordance with section B.7.1 of the registered PDD.

2.4.1.4 The maize stalk feedstock was used during December 2008 to January 2009. Given the difficulties with collection of maize stalk and the decentralized and unstable production volumes it was decided that maize stalk would not be purchased after 1 February 2009[1]. It is not expected that maize stalk will be used as feedstock for this project in the future.

2.4.2 The operating hours are indeed higher than those indicated in the registered PDD. **However the project still satisfies the benchmark tests in respect of additionality since the NCV of the cotton straw feedstock has in practice proved to be significantly lower than that set out in the registered PDD.** These issues are further described below.

2.4.2.1 The net generation to the grid for this monitoring period for the purpose of calculating emission reductions in accordance with the PDD are 26.48% higher than anticipated in the PDD: this leads to the higher emission reductions than those anticipated in the PDD.

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2.4.2.2 The emission reductions from 25 June 2008 to 31 January 2009 amount to 100,420 tCO2e. The corresponding annualised emission reductions in respect of this monitoring period amount to 165,852 tCO2e. The annual emission reductions in the registered PDD are 130,638 tCO2e. As a result, the annualised emission reductions in respect of this monitoring period are 26.96% higher than those in the PDD.

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2.4.2.3 The NCV of the cotton straw (the main biomass residue) was set at 0.01744 TJ/t in the FSR and PDD: this was the best estimate at the time that these documents

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[1] The conference held by the fuel department on 21 Jan 2009, where it was decided that the maize stalk would not be purchased from 1 Feb 2009.

were finalized. Operational data has shown that the maximum NCV is 0.0121TJ/t. This results in a significant increase in the consumption of biomass fuel required to generate the same quantities of electricity as set out in the PDD. This results in a significant increase in the feedstock costs associated with the project. On the basis of this actual NCV, even with continuous operating hours of 8,760 per annum which is the maximum possible, the IRR of the plant would still only be still only 7.04% which is below the 8% additionality benchmark for this project. This is set out in more detail below.

2.4.2.4 The changed key parameters between the registered PDD and actual operational parameters relevant to determine the emission reduction are listed below.

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Item	**Actual data in the period**	**Estimates of annualized data based on actual data in the period**	**Values as set out in the PDD**	**Difference**
	A	B	C	D = B/C-1
Days (d)	221	365	365	0
EG_y (MWh)	96,877.28	160,000.9	126,500	26.483%
$BF_{k,y}$ (t)	122,681.31	202,618.5	119,792	69.14%
ER_y (tCO2e)	100,420	165,852	130,638	26.96%

To assess the impact of the increased electricity generation and biomass consumption on the additionality of the project, the Project Owner recalculated the IRR of the project using the registered IRR spreadsheet, but applying the following new values:

- in the revised IRR calculation spreadsheet, the operating hours were increased by 26.483% for the whole operational period of 25 years. (It is of course possible that the operating hours will not continue to exceed the PDD operating hours for the entire 25 years of planned operational of the project);
- 26.483% was used as this is equivalent to the increase in net electricity supply by during the monitoring period; and
- the biomass consumption was increased by 69.14% to 202,618.5 tonnes per annum.

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The recalculated IRR of the project activity without CDM revenue was 2.24%, which was still below the applied benchmark of 8%. This means that, in the most conservative scenario, the IRR will be 7.04%. This sets operating hours at 8760 per annum and the sets the biomass consumption at 255,137 tons per annum (which is based on the actual NCV of the cotton straw). These parameters were applied to the entire planned 25 year operational life of the plant. The resultant IRR of 7.04% is still below the benchmark IRR of 8%.

In conclusion, even where the operating hours remain higher than in the registered PDD in the future, the additionality will not be affected, given the related biomass will also be increased.

2.4.2.5 The Project Owner now has more experience in operation of the plant. The designed operating hours set out in the FSR and PDD are 5,500 per annum. No biomass-to-generation project operated in China before December 2006 and the FSR for this project was completed in March 2006.

Thus in the FSR the operating hours were assumed to be at a fairly low level considering lack of operational experience both by NBE and in China as a whole.

The average operating hours of all the 42 biomass-to-generation projects applying for CDM before June 25 2008 (the registration date of this project) was 5,551 hours per annum (as set out in Appendix 1 of the verification report). This is quite similar to the 5,500 hours set out in the FSR and PDD for this project. It implies that many project owners lack experience and confidence in operation of the biomass generation projects in China.

The critical issue is that even at the higher operating hours, the project remains additional given the low NCV of the feedstock.

Question 2. The DOE is requested to clarify why a notification or request for approval of changes from the project activity as described in the PDD was not submitted as per Annex 66, EB48 if there are permanent changes regarding the issues above.

2.4.3.1 The factors set out above in sections 2.4.1 and 2.4.2 contribute to a plant load factor (PLF) of 79% for the monitoring period in question. This is 16.2% more than the PLF estimated in the PDD where the PLF was 62.8% based on operating hours of 5,500 per annum. The Project Owner wishes to clarify that at the time of investment decision in 2005, it had not previously operated a biomass power generation project and there was significant uncertainty regarding PLF that could be achieved given the variability of the data inputs.

2.4.3.2 Since the over performance of the project in respect of the monitoring period in question does not result in the IRR passing the benchmark of 8% as described in the registered PDD the Project Owner does not believe that the project falls under Para 5(d) of Annex 67, EB 48.

2.4.3.3 Furthermore, the project has been implemented in accordance with the registered PDD. The installed capacity of this project is 1×25MW with the boiler of 1×130t/h, which had been confirmed by the DOE as part of project verification. There is no change of capacity or technology as compared with the PDD, no changes in the scale of CDM project activity(i.e. the project remains large scale project), and no changes which impact the applicability/application of baseline methodology. As a result, the Project Owner does not believe that the over performance falls within the provisions of Paras 5(a)(b)(c) and Para C, D of Annex 67, EB 48.

2.4.3.4 As a result, the Project Owner does not believe that it is appropriate to submit a Notification or changes for EB's approval regarding the changed operating hours of the project and the small amount of maize stalk used during the monitoring period.

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2.5 Category of project activity

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Using the agreed methodology ACM0006 version 4, the category of the project activity is:

- Sectoral scope 1: Energy industries
- Category: grid connected renewable electricity

3 Project timeline

First electricity generation date	28 December	2006
Start date of commercial operation	15 April	2007
CDM registration date	25 June	2008
The 1st Crediting period from	25 June	2008
to	24 June	2015
Start of this monitoring period	25 June	2008
End of this monitoring period	31 January	2009

4 Baseline methodology

4.1 Methodology

The project participants use the approved consolidated monitoring methodology ACM0006 (version 4) regarding grid-connected electricity generation from biomass residues, in conjunction with ACM0002 (version 6) to establish the grid emissions factor for renewable energy projects. The grid emissions factor has been fixed for the first 7-year crediting period.

4.2 Calculations Methodology

4.2.1 Electricity

The project participants used ACM0002 in the PDD to calculate the emissions factor for the net electricity displaced by the project. Following this methodology, the emission reductions achieved by the project activity from electricity generation can be calculated by multiplying the net electricity supplied to the grid and the appropriate emissions factor of the grid.

The emission reductions from electricity $ER_{electricity,y}$ by the project activity during a given year y is

$$ER_{electricity,y} = EG_y \times EF_{electricity,y}$$

Where EG_y is the net electricity supplied to the grid, $EF_{electricity,y}$ is the CO_2 emission factor of the grid and BE_y is the baseline emissions.

The emission factor $EF_{electricity,y}$ of the grid is represented as a combination of the Operating

Margin and the Build Margin, and was fixed for the duration of the crediting period in the PDD. The Operating Margin emission factor $EF_{OM,y}$ was calculated in the PDD as 1.1208 tCO_2e/MWh. The Build Margin emission factor $EF_{BM,y}$ was calculated as 0.9397 tCO_2e/MWh.

The weighted average of Operating and Build Margin emission factors is:

$$EF_{\text{electricity},y} = w_{OM} \times EF_{OM,y} + w_{BM} \times EF_{BM,y}$$

= 0.5 * 1.1208 + 0.5 *0.0397 = 1.03025 tCO_2/MWh

4.2.2 Project emissions from transport

Following ACM0006 in the PDD, the emissions from the transport were estimated in the PDD from the projected total amount of biomass residues combusted, the average truck load, average distance the biomass gets transported to the project plant, and the CO_2 emissions factor from fuel used for transportation. During operation, the truck load, transport distance, truck types are monitored so that the following formula is used to calculate the project emission from transportation:

$$PET_y = \frac{\sum_k BF_{k,y}}{TL_y} \times AVD_y \times EF_{km,CO_2,y}$$

$$EF_{km,CO_2,y} = DPK \times Density_d \times NCV_d \times EF_d$$

4.2.3 Project emissions from fossil fuel use

Fossil fuels are used by forklift in plant, but no fossil fuels are combusted as auxiliary fuel for boiler start up in operation. Following ACM0006 in the PDD, the project participants established the formulae for calculating the emissions from fossil fuel use in the project plant, using the quantity of each fuel used and the appropriate emissions coefficient, as follows:

$$PEFF_y = (FF_{project,plant,d,y} + FF_{project,site,d,y}) \times NCV_d \times EF_d$$

4.2.4 Project emissions from electricity consumption in straw collection sites ($PE_{EC,y}$)

The electricity consumption due to straw cracker is estimated as the product of electricity consumption and an appropriate grid emission factor, as follows:

$$PE_{EC,y} = EC_{PJ,y} \times EF_{electricity,y}$$

4.2.5 Methane from biomass

Finally, the project participants, using ACM0006, established in the PDD that methane emissions would occur in the baseline scenario. The biomass residue would have been burned in an uncontrolled manner or dumped and left to decay, generating significant methane emissions. Methane emissions from dumping biomass residues, and leaving them to decay, are higher than when they are burned in an uncontrolled manner. Therefore to be conservative, it is assumed, that all residues are burned. It was established in the PDD that the emissions can be calculated from the quantity of biomass that would not be used in absence of the project activity, with the net caloric value and the appropriate emissions factor (uncontrolled burning), as follows:

$$BE_{biomass,co_2,y} = GWP_{CH_4} \times \sum_k BF_{PJ,k,y} \times NCV_k \times EF_{burning,CH_4,k,y}$$

Accounting for the methane emissions in the baseline, methane emissions from the combustion in the project scenario also needs to be calculated. The formula used in the PDD presents project methane emissions, using the quantity of biomass used in the project activity, the net caloric value and the appropriate emissions factor (controlled burning in power plant), as follows:

$$PE_{Biomass,CH_4,y} = EF_{CH_4,BF} \times \sum_k BF_{k,y} \times NCV_k$$

4.2.6 Project emission

$$PE_y = PET_y + PEFF_y + PE_{Biomass,CH_4,y} \times GWP_{CH_4\,k}$$

4.2.6 Leakage

Following ACM0006 in the PDD, the project participants established that the leakage from the project activity is zero, as the surplus of biomass residues is far greater than the quantity of residues used ion the project plant (see section 7.3).

4.2.7 Emission reduction

The emission reduction due to project activity can be calculated as follows:

$$ER_y = ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y$$

5 Monitoring data

Monitoring has been carried out in accordance with the monitoring plan published on the UNFCCC website. The Monitoring Parameters are as follows:

5.1 Electricity

Data / Parameter:	**EG_y**
Data unit:	MWh
Description:	Annual electricity delivered to the grid by the proposed project
Source of data used:	Electricity meter
Value of data for this	**96877.28** MWh (see table 1 pls)

monitoring period	
Description of measurement methods and procedures applied:	The net electricity displacement by the project is calculated as EGy=A-A'-B, where A is the electricity delivered to the grid by the project, and monitored by main ammeter, located in the project site. The serial number of the meter is 36065966; A' is the electricity consumed by the project and also monitored through the same main meter; B is the electricity consumed by the project, purchased from the grid, and monitored by the another ammeter located in the project site, whose serial number is 36065969; But in this project no electricity from the grid via the main line is transmitted to the project, then A' equals to zero
QA/QC procedures applied:	Data measured by meters are cross checked against receipts from the grid company. Meters have been calibrated by an accredited agency, see table 6.
Any comment:	

Table 1 Monitored Data of EGy

The electricity delivered by the project to the grid through the main line (A)	
Period	Value (MWh)
25/06/2008~20/07/2008	11,058.30
21/07/2008~19/08/2008	13,244.55
20/08/2008~20/09/2008	12,997.60
21/09/2008~20/10/2008	17,054.40
21/10/2008~20/11/2008	16,385.33
21/11/2008~20/12/2008	18,414.00
21/12/2009~20/01/2009	15,883.18
21/01/2009~31/01/2009	6,275.22
Sub-total (25/06/2008~31/01/2009)	**111,312.58**
The electricity consumed by the project through the main line (A')	
Period	Value (MWh)
25/06/2008~31/01/2009	**0**
The electricity consumed by the project through the backup (emergency) line (B)	
Period	Value (MWh)
25/06/2008 0:00~15/07/2008 8:00	1,259.06
15/07/2008 8:00~15/08/2008 8:00	2,070.60
15/08/2008 8:00~15/09/2008 8:00	2,053.80
15/09/2008 8:00~15/10/2008 8:00	1,954.05
15/10/2008 8:00~15/11/2008 8:00	2,069.55

15/11/2008 8:00~15/12/2008 8:00	1,877.40
15/12/2008 8:00~15/01/2009 8:00	1,832.25
15/01/2009 8:00~31/01/2009 24:00	1,318.59
Subtotal (25/06/2008~31/01/2009)	**14,435.30**
EG_y (EG_y = A - A'- B)	
Period	Value (MWh)
25/06/2008~31/01/2009	**96877.28**

5.2 Transport

Data / Parameter:	**AVD_y**
Data unit:	km
Description:	Average round trip distance between biomass fuel supply sites and the project site
Source of data used:	Records by Power plant and the department who is responsible for the straw collection and transportation.
Value of data applied for this crediting period	58 (see table 2 pls)
Description of measurement methods and procedures to be applied:	A staff appointed by the project company is responsible for the record and monitor of recording average round trip for each trucks and the record will be reported and documented monthly.
QA/QC procedures to be applied:	Check consistency of distance records provided by the truckers by comparing recorded distances with other information from other sources (e.g. maps)
Any comment:	

Data / Parameter:	**TL_y**
Data unit:	Tons
Description:	Average truck load of the trucks used for transportation of biomass
Source of data used:	Measured by weight bridge in the Power plant
Value of data applied for this crediting period	8 (see table 2 pls) .
Description of measurement methods and procedures applied:	A staff is appointed by the project company to be responsible for the record of load for each truck in the power plant, using the weight bridge of No.6288, and the record is reported and documented monthly.
QA/QC procedures applied:	Check consistency of load record with straws receipts. The weight bridge have been calibrated by an accredited agency, see table 6.
Any comment:	

Data / Parameter:	**DPK_y**

Data unit:	L/km
Description:	The diesel consumption per km for the full-load truck in L/km
Source of data used:	The test report by the manufacture of the truck;
Value of data applied for this crediting period	0.58 (see table 2.1 pls)
Description of measurement methods and procedures applied:	The typical type of truck that transports biomass to the project is the 120 Horsepower Jiefang light truck. The assessment team has checked the records of biomass transported to the project site, and can confirm that the 120 Horsepower light truck was the mostly used truck, consisting 60%-70% of all the trucks that transporting biomass to the project site. And the power of the 120 Horsepower light truck is the largest among all the trucks transporting biomass to the project site. The transportation capacity and fuel consumption per kilometer of the 120 Horsepower light truck are the largest. It is conservative to use the DPK of the 120 Horsepower Jiefang light truck to calculate project emissions. The fuel consumption per kilometer of the 120 Horsepower Jiefang light truck was tested by the manufacturer, at the average load (about 8 tonne). The testing result was 0.29 L/km. To be conservative, PP multiplied the value with 2 and applied 0.58 L/km in the monitoring report.
QA/QC procedures applied:	The test report is held by the manufacture of the truck, and in a conservative estimation, viz.,two times of the value is used in ER calculation;
Any comment:	

Data / Parameter:	**$EF_{km,CO2,y}$**
Data unit:	tCO_2/km
Description:	Average CO_2 emission factor for the trucks during the year y.
Source of data used:	Calculated.
Value of data applied for this crediting period	0.001577 (see table 2.1 pls)
Description of measurement methods and procedures applied:	Measurement has been conducted on the fuel consumption per kilometer for the typical truck, the Jiefang 120 Horsepower light truck. And the distance travelled for all transportation tools are recorded; The CO_2 emissions are calculated by multiplying with appropriate net calorific values and CO2 emission factors. For net calorific values and CO2 emission factors, use reliable IPCC default values. .
QA/QC procedures applied:	It is cross-checked by the IPCC default value;
Any comment:	The CO_2 emissions factor of the fuel used for transportation is calculated as 0.001576, which is more than the IPCC default value of $EF_{km,CO2,y}$, 0.001011t CO_2/km. Then it is conservative;

Table 2 Monitored data of AVDy and TLy

Period	AVD_y (km)	TL_y (t)
25/06/2008~30/06/2008	72	8.26
01/07/2008~31/07/2008	71	8.24
01/08/2008~31/08/2008	61	7.41

01/09/2008~30/09/2008	69	7.82
01/10/2008~31/10/2008	73	8.56
01/11/2008~30/11/2008	49	10.23
01/12/2008~31/12/2008	40	7.82
01/01/2009~31/01/2009	29	8.55
Average (25/06/2008~31/01/2009)	**58**	**8**

Table 2.1 Calculation $EF_{km,CO_2,y}$

	A	B	C	D	E=A*B*C*I
Item	DPK (L/km)	Density(t/L)	NCV_d(TJ/t)	EF_d(tCO2/TJ）	$EF_{km,CO2,y}$
	0.58	0.00086	0.042652	74.1	0.001577
Source	The figure 0.29 is tested by the Manufacturer. It is then doubled here to be conservative	Chinese National Standard GB/T19147-2003	China Energy Statistical Yearbook 2008	IPCC 2006	

5.3 Fossil fuel use

Data / Parameter:	**$FF_{project,plant,d,y}$**
Data unit:	Tons
Description:	Quantity of diesel combusted in the straw-fired boiler start-up during the year y
Source of data used:	Measured
Value of data applied for this crediting period	0 (see table 3.1 pls)
Description of measurement methods and procedures applied:	The power plant measures diesel consumption for each boiler start-up by meter and the data are reported and documented monthly. In actual, no fossil fuel is used for start-up of the boilers;
QA/QC procedures applied:	The amount of diesel consumed are recorded monthly and crosschecked by an annual energy balance that is based on purchased quantities and stock (at power plant) changes.
Any comment:	

Data / Parameter:	**$FF_{project,site,d,y}$**
Data unit:	Tons
Description:	Quantity of diesel combusted in the straw forklift during the year y
Source of data used:	Power plant and straw brokers daily operation record
Value of data applied for this crediting period	74.88 (see table 3.2 pls)
Description of measurement methods and procedures applied:	The power plant collects diesel purchase receipt from fuel station and files these data monthly. The quantity of diesel combusted is equal to the quantity of stock (different stock from the parameter above, which is at fuel station) at the start of the month plus the purchased amount and then minus the stock at the end of the month.
QA/QC procedures applied:	The amount of diesel consumed are recorded monthly and crosschecked by an annual energy balance that is based on purchased quantities and stock changes of different straw brokers. The weight bridge have been calibrated by an accredited agency, see table 6.

Any comment:	

Table 3.1 Monitored data of $FF_{project\ plant,d,y}$

Period	$FF_{project\ plant,d,y}$ (t)
25/06/2008~31/01/2009	**0**

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Table 3.2 Monitored data of $FF_{project\ site,d,y}$

Period	Quantity at start (t)	Quantity at end (t)	Purchased (t)	$FF_{project\ site,d,y}$ (t)
25/06/2008~30/06/2008	0.16	1.66	9.8	8.3
01/07/2008~31/07/2008	1.66	2.14	7.52	7.04
01/08/2008~31/08/2008	2.14	0.68	7.94	9.4
01/09/2008~30/09/2008	0.68	2.44	10.14	8.38
01/10/2008~31/10/2008	2.44	2.56	8.26	8.14
01/11/2008~30/11/2008	2.56	1.32	10.82	12.06
01/12/2008~31/12/2008	1.32	3.86	11.4	8.86
01/01/2009~31/01/2009	3.86	2.46	11.3	12.7
Total (25/06/2008~31/01/2009)			77.18	**74.88**

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5.4 Electricity consumed in the straw collection sites

Data / Parameter:	**$EC_{PJ,y}$**
Data unit:	MWh
Description:	On-site electricity consumption attributable to the project activity during the year y.
Source of data used:	Calculated
Value of data applied for this crediting period	1239.8 (see table 4 pls)

<table>
<tr><td>Description of measurement methods and procedures applied:</td><td>A Part of the biomasses are smashed at the collection sites before they are transported into the project plant. To be conservative, the electricity consumption due to the smashing of the biomasses happened out side the project plant monitored. The on-site electricity consumption attributable to the project activity are measured by electricity energy meters at the collections sites outside the project plant. The PDD provided a conservative way to estimate the electricity consumption attributable to the project activity.
According to the PDD, the electricity factor for calculating $EC_{PJ,y}$ can be calculated as follows:
1) Collecting all the nameplate power (in kW) and capacity (t/h) of every straw crackers,
2) calculating the electricity factor corresponding to each cracker which equals to power/capacity (in kWh/t),
3) using the largest number as a conservative electricity factor for the calculation.
In the actual monitoring, 3 kinds of crackers were used during this monitoring period. The nameplate power and capacity of the cracker were collected and the electricity factor corresponding to each cracker are calculated following Step 2 as follows:
<table>
<tr><td>Manufacture</td><td>Type</td><td>Capacity (t/h)</td><td>Nameplate power (kW)</td><td>Electricity factor (kWh/t)</td><td>Testing report Value (kwh/h)</td></tr>
<tr><td>Sida</td><td>93QS－3</td><td>3</td><td>18.5</td><td>6.17</td><td>3.25</td></tr>
<tr><td>Jiuxin</td><td>9ZP-8.0A</td><td>4</td><td>27.5</td><td>6.88</td><td>8.5</td></tr>
<tr><td>Longmu</td><td>9QS-62</td><td>10</td><td>25</td><td>2.50</td><td>8</td></tr>
</table>
The monitoring complies with the monitor plan. The project owner also asked the manufactures of the crackers to test the electricity factor. The largest value of the nameplate values and tested values are applied in the monitoring report. It is conservative.</td></tr>
<tr><td>QA/QC procedures applied:</td><td>it is cross-checked by the consumption of electricity monitored by the meters and the purchasing invoices of electricity; the monitored consumption of electricity by the meters is only 131.95 MWh, then the value applied in this monitoring report is very conservative;</td></tr>
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Table 4 Calculation of $PE_{EC,y}$

Period	$\Sigma BF_{k,y,fresh\ matter}$ (t)	Electricity consumption factor (MWh/t)	$EC_{PJ,y}$ (MWh)
25/06/2008~31/01/2009	145857.8	0.0085	**1239.8**

5.5 Methane emissions

Data / Parameter:	**$BF_{k,y,fresh\ matter}$**
Data unit:	Tons

Description:	the quantity of cotton straw and maize stalk used as fuel in the project plant during the year y in tons in fresh matter;
Source of data used:	Measured
Value of data applied for this crediting period	145,857.80 (see table 5.1 pls)
Description of measurement methods and procedures applied:	The weigh bridge of No 6228 is operated by staffs appointed by the project company to be responsible for the record and monitor of straws purchased and consumed in the project plant, and build straws account rechecked by comparing with the purchase receipt and stock change record. The record will be reported and documented monthly.
QA/QC procedures applied:	Recorded each time by weigh Bridge, and crosscheck by the purchase receipt and stock change record. The weight bridge have been calibrated by an accredited agency, see table 6.
Any comment:	$\mathbf{BF_{k,y,dry\ matter}}$ is calculated based on moisture content and $\mathbf{BF_{k,y,fresh\ matter}}$

Data / Parameter:	$\mathbf{NCV_k}$
Data unit:	TJ/t
Description:	The net calorie value of cotton straw and maize stalk consumed by the proposed project
Source of data used:	measured
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.0121 for cotton straw and 0.0103 for maize stalk; see table 5.2 pls.
Description of measurement methods and procedures applied:	The net calorific value of straws are measured and reported by qualified test institution. For each test, three samples are measured and the maximum of NCV are used. Frequency of the NCV measurement: The analysis are made every six months.
QA/QC procedures applied:	Three samples (dry matter) are analysed at the same time by the test institution and reported. And the maximum of NCV of these samples are used in the emission reduction calculation.
Any comment:	

Data / Parameter:	**Moisture content of the biomass residues**
Data unit:	%
Description:	Average Moisture content of cotton straw and maize stalk
Source of data used:	On-site measurements
Value of data applied for this crediting period	15.82% for cotton straw and 18.67% for maize stalk; see table 5.3 pls.
Description of measurement methods and procedures applied:	The moisture content is measured by moisture content meter of No 1 and 2 each time of truck straw enter into the plant, and mean values is calculated annually.
QA/QC procedures applied:	Three samples are recorded at the same time and reported. And the average of moisture content of these samples should be used.

	Meters have been calibrated by an accredited agency, see table 6.
Any comment:	

Table 5.1 Monitored $BF_{k,y}$

Period	Fresh Matter			Dry Matter		
	Cotton Straw (t)	Maize Stalk (t)	Total (t)	Cotton Straw (t)	Maize Stalk (t)	Total (t)
25/06/2008~30/06/2008	3,459.88	0	3,459.88	2,912.53	0	2,912.53
01/07/2008~31/07/2008	12,306.75	0	12,306.75	10,359.82	0	10,359.82
01/08/2008~31/08/2008	16,827.99	0	16,827.99	14,165.80	0	14,165.80
01/09/2008~30/09/2008	16,732.44	0	16,732.44	14,085.37	0	14,085.37
01/10/2008~31/10/2008	18,807.05	0	18,807.05	15,831.77	0	15,831.77
01/11/2008~30/11/2008	36,670.51	2,229.84	38,900.35	30,869.24	1,813.53	32,682.76
01/12/2008~31/12/2008	24,143.35	577.03	24,720.38	20,323.87	469.30	20,793.17
01/01/2009~31/01/2009	13,338.44	764.52	14,102.96	11,228.30	621.78	11,850.08
Total (25/06/2008~31/01/2009)	**142,286.41**	**3,571.39**	**145,857.80**	**119,776.70**	**2,904.61**	**122,681.31**

Table 5.2 Monitored NCV_k(TJ/tonne)

Date	NCV_k (TJ/t)	
	Cotton Straw	Maize Stalk
20/06/2008	0.012	0.0103
20/12/2008	0.0121	0.00986
Average	0.01205	0.01008
Minimum	0.012	0.00986
Maximum	**0.0121**	**0.0103**

Table 5.3 Monitored data of Moisture content of the biomass residues

Period	Cotton Straw	Maize Stalk
Average (25/06/2008~31/01/2009)	**15.82%**	**18.67%**

6 Quality assurance and quality control measures

The accuracy of the monitoring results are in conformity with calibration requirements, recording frequency and quality assurance and quality control procedures stated in the monitoring plan.

6.1 Calibration of monitoring equipment

All monitoring equipment are calibrated and checked for accuracy in line with industry standards as follows:.

Table 6 Calibration information on monitoring equipments:

Equipments involved for monitoring：							
Item	Data Measured	Serial Number	Accuracy	Calibration Date	Valid Date	Calibrator	accreditation certificate No.of the calibrator
main meter for electricity supplied to the grid	electricity supplied to the grid	36065966	0.2S	11/12/2006 10/12/2007 11/25/2008	1 year	Hebei Electric Power Research Institute	（Ji）Faji（2007）D030 （Ji）Faji（2006）D030
Emergency line meter for electricity imported from the grid	electricity imported from the grid	36065969	0.2S	11/12/2006 10/12/2007 25/11/2008	1 year	Hebei Electric Power Research Institute	（Ji）Faji（2007）D030 （Ji）Faji（2006）D030
weigh bridge	amount of biomass purchased and fossil fuel	6288	III	10/12/2006 29/03/2007 28/09/2007 12/03/2008 29/07/2008 29/01/2009	0.5 year	Quality and Technology Supervision and Inspection Institution of Wei County	（Ji）Faji（2004）F00917
moisture content meter	moisture content of the biomass	1	0.20%	10/12/2006 09/12/2007 08/12/2008	1 year	Metrological and Testing Institution of Handan City	（Ji）Faji（2003）F001 （Ji）Faji（2008）F001
moisture content meter	moisture content of the biomass	2	0.20%	10/12/2006 09/12/2007 08/12/2008	1 year	Metrological and Testing Institution of Handan City	（Ji）Faji（2003）F001 （Ji）Faji（2008）F001

Table 6.1 Calibrator information:

Calibrator	accreditation certificate No.of the calibrator	authorizing entity for calibrator	Valid Date
Hebei Electric Power Research Institute	（Ji）Faji（2007）D030	Quality and Technology Supervision Bureau of Hebei Province	30/11/2007-29/11/2010
	（Ji）Faji（2006）D030	Quality and Technology Supervision Bureau of Hebei Province	29/12/2006-28/12/2007

	（Ji）Faji（2007）D030	Quality and Technology Supervision Bureau of Hebei Province	30/11/2007-29/11/2010
Hebei Electric Power Research Institute	（Ji）Faji（2006）D030	Quality and Technology Supervision Bureau of Hebei Provinceau	29/12/2006-28/12/2007
Quality and Technology Supervision and Inspection Institution of Wei County	（Ji）Faji（2004）F00917	Quality and Technology Supervision Bureau of Hebei Province	01/11/2004-31/10/2009
Metrological and Testing Institution of Handan City	（Ji）Faji（2003）F001	Quality and Technology Supervision Bureau of Hebei Province	01/01/2003-31/12/2007
	（Ji）Faji（2008）F001	Quality and Technology Supervision Bureau of Hebei Province	27/05/2008-26/05/2013
Metrological and Testing Institution of Handan City	（Ji）Faji（2003）F001	Quality and Technology Supervision Bureau of Hebei Province	01/01/2003-31/12/2007
	（Ji）Faji（2008）F001	Quality and Technology Supervision Bureau of Hebei Province	27/05/2008-26/05/2013

6.2 Monitoring frequency

The parameters to be monitored were read or done with the frequency indicated in section 5 of this document. This corresponds with the requirements from methodology ACM0006 ver.04 and the validated monitoring plan.

6.3 Monitoring system

Monitoring organisation

A monitoring organization has been set up. This involved setting up an organization and the development of procedures for

a) CDM staff training
b) CDM data and record keeping arrangements
c) Data collection
d) CDM data quality control and quality assurance
e) Equipment maintenance
f) Equipment calibration
g) Equipment failure

CDM staff training has taken place and this can be proven by training records which are available on site. Procedures for data collection, archiving and data quality assurance and quality control were described in a monitoring manual. The monitoring manual has been signed off by the project developer and is available on site. Procedures for equipment maintenance, failure and calibration have been included in this monitoring manual.

Monitoring equipment and installation

The meters and bridge were installed by qualified technicians and the proper functioning thereof has been proven during calibration [see section 6.1 above].
During the monitoring period no failure of meters occurred. Failure is proven when zero readings occur when project activities take place or when cross checks show deviations from expected values. Meter and bridge failures and replacements are registered in the log book and the procedure for this has been described in the monitoring manual.

Data records and management

Data records are filed electronically each month and kept for 2 years until the end of the crediting period. The procedures for data management are described in the monitoring manual.

Internal audits

The implementation of the monitoring manual is checked regularly by NBE Beijing office during field visits and/or the consistency and plausibility of the data which are processed each month.

7 Emission reduction calculations

Calculation of emission reductions took place on the basis of a complete set of cross checked data, applying the approved methodology. IPCC default data or other reference values were required for this calculation is described as in section 5. Calculations are summarized as below.

7.1 Data completeness

All data were monitored according to the frequency indicated in the validated monitoring plan. A complete set of data was used in the calculation of emission reductions. There was therefore no reason to apply a conservative scenario in view of partial data availability.

7.2. Cross checks of monitoring data

The monitoring data are cross checked with invoices etc, as describe in section 5. Events like meter failure or shut down of the project activity are registered in the log book. All procedures are documented in the monitoring manual referred to in section 5.
Implementation of the monitoring manual is regularly checked by NBE Beijing office. Cross checks applied during this period showed that the data used in the calculation of emission reductions are reliable.

7.3 Calculation of emission reductions

Emission reductions have been calculated on the basis of the formulas provided by the validated PDD and the approved methodology. The calculations are shown in as below. And the Excel spreadsheet of calculation is provided as annex.

$$PET_y = \frac{\sum_k BF_{k,y}}{TL_y} \times AVD_y \times EF_{km,CO_2,y}$$

$$EF_{km,CO_2,y} = DPK \times Density_d \times NCV_d \times EF_d$$

$EF_{km,CO_2,y}$ is calculated as 0.001577,which is more than the IPCC default value 0.001011 kg/km.

$$PEFF_y = (FF_{project,plant,d,y} + FF_{project,site,d,y}) \times COEF_{co_2,i}$$

$$=(FF_{project,plant,d,y} + FF_{project,site,d,y}) \times NCV_d \times EF_d$$

$COEF_{co_2,i}$ calculated from net caloric value of diesel and Emission Factor of diesel, all estimated

and adopted in the PDD: $COEF_{co_2,i} = NCV_d \times EF_d$ = 0.042652 TJ/tonne * 74.1 tCO_2/TJ = 3.16 tCO_2e/t.

$PE_{Biomass,CH_4,y} = EF_{CH_4,BF} \times \sum_k BF_{k,y} \times NCV_k$ With the GWP_{CH_4} = 21, and the methane emissions factor for burning biomass in a controlled manner $EF_{CH_4,BF}$ = 30 $kgCH_4/TJ$ with a conservativeness factor of 1.37.

Using the data presented in section 5, total project emissions can now be calculated as the aggregate of the above.

Table 7 Calculation of PE_y

Period	PET_y (tCO_2e)	$PEFF_y$ (tCO_2e)	$PE_{EC,y}$ (tCO_2e)	$PE_{biomass,CH4,y}$ (tCO_2e)	GWP_{CH4} (tCO_2e/tCH_4)	PE_y (tCO_2e)
	A	B	C	D	E	F=A+B+C +D*E
25/06/2008 ~31/01/2009	1,668	237	1278	61	21	**4,464**

Table 7.1 Calculation of PET_y

Period	$\Sigma BF_{k,y,fresh\ matter}$ (t)	AVD_y (km)	TL_y (t)	$EF_{km,CO2,y}$ (tCO_2e/km)	PET_y (tCO_2e)
25/06/2008~31/01/2009	145857.8	58	8	0.001577	**1,668**

Table 7.2 Calculation of $PEFF_y$

Period	$FF_{project\ plant,d,y}$ (t)	$FF_{project\ site,d,y}$ (t)	NCV_d (TJ/t)	EF_d (tCO_2e /TJ）	$PEFF_y$ ($tCO2e$)
25/06/2008~31/01/2009	0	74.88	0.042652	74.1	**237**

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Table7.3 Calculation of $PE_{EC,y}$

Period	$\Sigma BF_{k,y,fresh\ matter}$ (t)	Electricity consumption factor (MWh/t)	$EC_{PJ,y}$ (MWh)	$EF_{grid,y}$ ($tCO2e/MWh$)	$PE_{EC,y}$ ($tCO2e$)
25/06/2008~31/01/2009	145857.8	0.0085	**1239.8**	1.03025	**1278**

Table 7.4 Calculation of $PE_{biomass\ CH4,y}$

Period	$EF_{CH4,BF}$ (tCH_4/TJ)	Cotton Straw		Maize Stalk		$PE_{biomass,CH4,y}$ (tCO_2e)
		$BF_{k,y,dry\ matter}$ (t)	NCV_k (TJ/t)	$BF_{k,y,dry\ matter}$ (t)	NCV_k (TJ/t)	
	A	B	C	D	E	F=A*(B*C+ D*E)

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25/06/2008 ~31/01/2009	0.0411	119776.6999	0.0121	2904.611487	0.0103	**61**

7.31 Baseline emissions

Baseline emissions are the sum of the emissions from displaced electricity, and the methane emissions from the burning of biomass residues in an uncontrolled manner in the baseline scenario:

$ER_{electricity,y} = EG_y \times EF_{electricity,y}$ With $EF_{electricity,y}$ calculated and fixed in the PDD as 1.03025 tCO2e/MWh

$BE_{biomass,y} = GWP_{CH_4} \times \sum_k BF_{PJ,k,y} \times NCV_k \times EF_{burning,CH_4,k,y}$ With the GWP_{CH_4} = 21, and the methane emissions factor for burning biomass in an uncontrolled manner $EF_{burning,CH_4,k,y}$ = 300 kgCH_4/TJ with a conservativeness factor of 0.73.

Using the data presented in section 5, total baseline emissions can now be calculated as the aggregate of the above.

Table 7.5 Baseline emissions calculation (tCO_2e)

Monitoring period	$ER_{electricity,y}$	$BE_{biomass,co_2,y}$	baseline emission
	A	B	C=A+B
25/06/2008~31/01/2009	tCO2e	tCO2e	tCO2e
total	99807	5077	**104,884**

Table 7.6 Calculation of $ER_{electricity,y}$

Period	EG_y (MWh)	$EF_{electricity,y}$ (tCO2e/MWh)	$ER_{elelctricity,y}$ (tCO2e)
25/06/2008~31/01/2009	96,877.28	1.03025	**99,807**

Table 7.7 Baseline biomass emissions ($BE_{biomass,co_2,y}$) calculation (tCO2e)

Period	GWP_{CH4} (tCO_2e/tCH_4)	$\Sigma BF_{k,y,dry\ matter}$ (t)	$NCV_k * EF_{burning,CH4,k,y}$ (tCH_4/t)	BEbiomass,y (tCO_2e)
25/06/2008~31/01/2009	21	122,681.31	0.001971	**5,077**

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7.32 Leakage emissions

In line with the approved methodology ACM0006 (version 4), the PDD determined that no leakage would occur due to diversion of biomass from other uses to the project plant. In the PDD, option L2 was used to demonstrate that there is an abundant surplus of biomass in the region of the project activity which is not utilised.

During this monitoring period, the utilization of the types of biomass used by this project have been monitored by the project participants, and the total available biomass and other utilizations in the area (not including this project) was from the official statistics.

Project participants use the biomass resource investigation report to demonstrate that the biomass used in this project activity did not lead to leakage emissions by increasing fossil fuel consumption elsewhere. The data shows that the project does not influence the biomass utilization structure in Wei county, and that the two types of biomass were all in abundant surplus during this monitoring period.

Table 7.8 below demonstrates that the quantity of available biomass in the region is 'at least 25% larger than the quantity of biomass utilised (e.g. for energy generation or as feedstock), including the project plant.'

Table 7.8 Demonstration of abundant surplus of biomass availability

Biomass type	Cotton Straw	Maize Stalk
Total biomass generation in the region (10^4t)	38.2833	2.5
Available biomss (10^4t)	32.5408	2.125
Biomass used excluding project (10^4t)	4.5	0.05
Biomass demand of the project in one year (10^4t)	18.3789	0.4334
Total used biomass including project (10^4t)	22.8789	0.4834
Available biomass/total used biomass	167.33%	517.17%
Abundant surplus?(more than 25%?)	yes	yes

Sources: "Report of Resource Investigation in Wei county" 2008

Thus, the leakage from this project is neglected and considered as zero: $L_y = 0$.

Table 7.9 Leakage

Period	L_y (tCO_2e)
25/06/2008~31/01/2009	0

7.33 Summary of emission reductions during the monitoring period

Table 7.10 Emission reductions calculation (tCO2e)

Period	$ER_{elelctricity,y}$ (tCO2e)	BEbiomass,y (tCO_2e)	PE_y (tCO_2e)	L_y (tCO_2e)	ER_y (tCO2e)
	A	B	C	D	E =A+B-C-D

25/06/2008~31/01/2009	99,807	5077	4464	0	100,420

7.4 Assumptions in emission calculations

No assumptions were required when calculating the emission reductions over the monitoring period.

7.5 Application of emission factors, IPCC default values and other reference values

The emission factor used in the calculation of the emission reductions is the combined margin grid emission factor. This has been calculated in the PDD and validated. The value is shown in this report and it is valid throughout the crediting period. IPCC default values or other reference values were required in the calculation of emission reductions of this project as follows:..

Data / Parameter:	**$EF_{OM,y}$**
Data unit:	tCO_2/MWh
Description:	Operation Margin Emission Factor of NCPG
Source of data used:	Chinese DNA
Value applied:	1.1208
Justification of the choice of data or description of measurement methods and procedures actually applied :	This operation margin emission factor is calculated and recommended by Chinese DNA, see also http://cdm.ccchina.gov.cn/ .
Any comment:	

Data / Parameter:	**$EF_{BM,y}$**
Data unit:	tCO_2/MWh
Description:	Build Margin Emission Factor of NCPG
Source of data used:	Chinese DNA
Value applied:	0.9397
Justification of the choice of data or description of measurement methods and procedures actually applied :	This build margin emission factor is calculated and recommended by Chinese DNA, see also http://cdm.ccchina.gov.cn/ .
Any comment:	

Data / Parameter:	**EF_d**
Data unit:	tCO_2/TJ
Description:	Emission factor of diesel used for straws transportation and on-site fuel use
Source of data used:	IPCC default value
Value applied:	74.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default value, 2006 IPCC Guidelines for National Greenhouse Gas Inventories" Volume 2 Energy,
Any comment:	

Data / Parameter:	**GWP_{CH4}**
Data unit:	tCO_2e/tCH_4
Description:	Global warming potential for CH_4
Source of data used:	IPCC
Value applied:	21 for the first commitment period and will be updated according to any future COP/MOP decisions.
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default value, 2006 IPCC Guidelines for National Greenhouse Gas Inventories" Volume 2 Energy,
Any comment:	

Data / Parameter:	**$Density_d$**
Data unit:	t/L
Description:	Density of diesel used for straws transportation
Source of data used:	National standard value：GB/T19147-2003
Value applied:	0.00086
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the national standard GB/T19147-2003, the density of diesel should be 0.82-0.86 kg/L. The upper limit used here will lead to an overestimation of project emission, thus a conservative estimation.
Any comment:	

Data / Parameter:	**$EF_{burning,CH4,k,y}$*NCV_k**
Data unit:	tCH_4/t
Description:	CH_4 emission factor for uncontrolled burning of the straw.
Source of data used:	Version 04 of ACM0006
Value applied:	0.001971
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the IPCC default value provided in table 5 of ACM0006, the CH_4 emission factor of combustion of biomass in power plant is 0.0027 tCH_4/t. Considering a conservativeness factor of 0.73, the CH_4 emission factor in this PDD is taken as 0.001971 tCH_4/TJ.
Any comment:	

Data / Parameter:	**$EF_{CH4,BF}$**
Data unit:	tCH_4/TJ
Description:	CH_4 emission factor for controlled burning of the straw.
Source of data used:	Version 04 of ACM0006
Value applied:	0.0411
Justification of the choice of data or description of measurement methods	According to the IPCC default value provided in table 3 of ACM0006, the CH_4 emission factor of combustion of biomass in agriculture is 0.03 tCH_4/TJ. Considering a conservativeness factor of 1.37, the CH_4 emission factor in this PDD is taken as 0.0411 tCH_4/TJ.

and procedures actually applied :	This value will be fixed in the entire crediting period
Any comment:	

Data / Parameter:	**NCV_i**
Data unit:	TJ/t
Description:	Net calorie value of fossil fuel type i.
Source of data used:	National default value
Value applied:	i=d for diesel and NCV_d=0.042652
Justification of the choice of data or description of measurement methods and procedures actually applied :	The net calorific value of diesel is collected from the latest China Energy Statistical Yearbook.
Any comment:	As a national specific value, the uncertainty is low.

7.6 Comparison of Emission Reductions with the Estimates in the PDD

The emission reductions from 25/06/2008 to 31/01/2009 is 100,420 tCO2e, and the corresponding annualized emission reductions is 165,852 tCO2e, while the annual emission reductions in registered PDD is 130,638 tCO2e; then annual emission reduction is increased by 26.96%, and it has been described in Par 2.4.

8. Summary

The CDM project activity Straw generation project in Wei county Hebei province, P.R. China, CDM reference 1546 has reduced 100,420 tCO2e in the period 25/06/2008 00:00 to 31/01/2009 24:00. The emission reduction has been calculated as set out in the validated PDD and the approved methodology. The project activity is implemented as set out in the validated PDD. The validated monitoring plan is in accordance with the approved methodology. Monitoring has been carried out as per validated monitoring plan.

Deleted: ;
The reasons that the project plant generated more emission reductions than estimated in registered PDD are as follows:
<#>the cotton straw are produced and collected mainly from October to January per year, then enough biomass residue makes the generation in these months higher than other months;
<#>it was extreme dry weather in 2008, and the rainfall from Nov 2008-Jan 2009 is only one third of the value in the history; the dry weather made the collecting and storing of cotton straw easier, which provided enough biomass residue in this period;
<#>The project owner has more and more experience in operation; the designed operating hours in FSR and PDD is 5500, as no biomass to generation project operated in China before December 2006, while the FSR was finished in March 2006. Thus in FSR the operating hours was assumed at a low value considering lack of operation experience in China. At the same time, the average operating hours of all the 42 biomass to generation projects applying for CDM before June 25 2008(the registration date of this project) was 5551 as contained in Appendix 1, which is quite similar to 5500. It implies that most of project owners lack experience and confidence in operation of the biomass generation projects in China;
<#>But at the same time the NCV of the cotton straw (the main biomass residue) was assumed at a high valued, 0.01744 TJ/t in FSR and PDD, as lacking experience, while in operation the maximum NCV is only 0.0121TJ/t, which increases the consumer of biomass fuel and the operation cost significantly;
The 1st reason is considered to be reasonable, and will not impact the additionality of the project;
The 2nd reason will not last in the future, and will not impact the additionality either;
The 3rd and 4th reason are out of expectation of FSR, and will last in the future, which might impact the additionality, then the financial analysis is used to identify the impact.
The changed key parameters between the registered PDD and actual operational parameters relevant to determine the emission reduction are listed below:
Item

Annex 1: The energy balance calculation for the verification period

The total inputs of all types of fuels combusted and useful output of electricity from the project are presented below. From this data the conversion efficiency of the project in this period is calculated as 27.21%.

The energy input and output in the project activity in this period

8. Energy Balance

8.1 The energy input in the project activity in this monitoring period

	Quantity (t)	NCV (TJ/t)	Energy Input (TJ)
Cotton Straw	119,776.70	0.0121	1,449.30
Maize Stalk	2,904.61	0.0103	29.92
Startup Oil	0	0.0427	0
Total			1,479.22

8.2 The energy output in the project activity in this monitoring period

	Value (MWh)	Energy Output (TJ)
Electricity generation	111312.58	400.725288

6.3 The energy output /output

Output/Input	27%

;

The reasons that the project plant generated more emission reductions than estimated in registered PDD are as follows:

the cotton straw are produced and collected mainly from October to January per year, then enough biomass residue makes the generation in these months higher than other months;

it was extreme dry weather in 2008, and the rainfall from Nov 2008-Jan 2009 is only one third of the value in the history; the dry weather made the collecting and storing of cotton straw easier, which provided enough biomass residue in this period;

The project owner has more and more experience in operation; the designed operating hours in FSR and PDD is 5500, as no biomass to generation project operated in China before December 2006, while the FSR was finished in March 2006. Thus in FSR the operating hours was assumed at a low value considering lack of operation experience in China. At the same time, the average operating hours of all the 42 biomass to generation projects applying for CDM before June 25 2008(the registration date of this project) was 5551 as contained in Appendix 1, which is quite similar to 5500. It implies that most of project owners lack experience and confidence in operation of the biomass generation projects in China;

But at the same time the NCV of the cotton straw (the main biomass residue) was assumed at a high valued, 0.01744 TJ/t in FSR and PDD, as lacking experience, while in operation the maximum NCV is only 0.0121TJ/t, which increases the consumer of biomass fuel and the operation cost significantly;

The 1st reason is considered to be reasonable, and will not impact the additionality of the project;

The 2nd reason will not last in the future, and will not impact the additionality either;

The 3rd and 4th reason are out of expectation of FSR, and will last in the future, which might impact the additionality, then the financial analysis is used to identify the impact.

The changed key parameters between the registered PDD and actual operational parameters relevant to determine the emission reduction are listed below:

we Item	**Actual**	**Estimates based on actual**	**PDD**	**Difference**
	A	B	C	D = B/C-1
Days (d)	221	365	365	
EG_y (MWh)	96877.28	160000.9	126,500	26.483%
$BF_{k,y}$ (t)	122,681.31	202618.5	119,792	69.14%
ER_y (tCO2e)	100,420	165852	130,638	26.96%

To assess the impact of the increased electricity generation and biomass consumption on the additionality of the project, we recalculated the IRR of the project using the registered IRR spreadsheet. In the revised IRR calculation spreadsheet, the operation hours was increased by 26.483%, which also led to the increase of net electricity supply by 26.483%. The biomass consumption was increased by 69.14% to 202618.5 t per year. Other parameters were not changed, except those depending on the operation hours (electricity generation) and biomass consumption, as other parameters and the calculation formulas had been validation during

validation. The recalculated IRR of the project activity without CDM revenue was 2.24%, which was still below the applied benchmark of 8%.
In conclusion, even the operating hours keeps higher in the future, considering the related biomass will also be increased, the additionality will not be affected.