CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

SECTION A. General description of project activity

A.1 Title of the project activity:

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Biomass generation project, in Sheyang county, Jiangsu province, P.R. China

PDD version 4.0
Revision history of this document:

Version Number	Date	Description
3.3	20/07/2007	Final version of PDD submitted for registration request
4.0	23/03/2012	PDD prepared for notification and Request for Approval of Changes

A.2. Description of the project activity:

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The proposed project is a newly-built generation project with local surplus biomass residues wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw as fuel, which is located in Sheyang County, Jiangsu province. The install capacity of this project is 30MW[1] with 130 t/h boiler. The annual biomass residues consumption are about 170,194.67 tons /25,175.05 tons /1.01 tons /19,386.04 tons /27,212.57 tons /16,392.39 tons /10,497.07 tonne for wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately (in wet base), which are re-calculated from actual operation statistics in 2009/2010, and it is expected to deliver annually 188,488.80 MWh electricity to East China Power Grid (ECPG) of China.

The proposed project has been put into operation on Sep 3rd 2007, the GHG emission reductions are from two components. Firstly, it will substitute some electricity generation of ECPG dominated by fossil fuel power plants. Secondly, it will use local surplus biomass residues in high efficiency, which will reduce CH_4 emissions because the biomass is dumped or left to decay or burned in an uncontrolled manner in the absence of the proposed project. The estimated annual GHG emission reductions are 148,695 tCO_2e.

The proposed project makes good use of the renewable biomass residues as fuels for generation; it will produce positive economic and environmental benefits and contributes to the local sustainable development through following aspects:

- Utilizing the biomass residues for electricity generation, which will reduce a great deal of biomass residues dumped or left to decay or burned in an uncontrolled manner and released pollutants into atmosphere , and thus will prevent the negative influences improve local environment;
- To reduce the coal consumption and increase the supply of local power generation, which will alleviate power shortage and coal supply pressure in local area;

[1] Due to debugging failure in May of 2007, PO replaced the 25MW power generation unit (PGU) to be a new unit of capacity 30MW and re-installed in July.2007.

- To increase the income of local farmers because the biomass residues as fuel can be sold and bunt ash can be returned to cropland or produce fertilizer with positive environment effects;
- to create new 123 job opportunities for the generation plant operation and maintenance , and other job opportunities for the activities of straws collection, storage and transportation;
- To be helpful for advanced technology transfer to China since the key equipment of straw boiler will be made in China authorized by Denmark BWE Company; and the air cooled technology and high efficiency hop-pocket dust catcher are also introduced, which will promote such technology diffusion in China.

The project was put into trial operation in May of 2007, but the debugging is failing due to purchased 25 MW power generation unit, so, PO and Wuhan Steam Turbine Group Corporation agreed to replace the 25MW PGU to be a new unit of capacity 30MW and re-installed in July.2007. The new power generation unit was commissioned successfully on Sep 3rd.2007 and in normal operation status since the 2nd half of 2008.The project was registered at UNFCCC on 01/04/2008.

Two major permanent changes occurred during the project actual implementation.

Change 1: Seven types of biomass residues (wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw) have been applied to the project.

Before the project plant put into trial operation in May of 2007, the change 1 occurred, thus PO knew the change 1 prior to the registration of the project activity, but investor was not aware that the two major changes would happen in the future when investment decision was made on December 2005 because there is few referenced biomass projects and lacks of experience.

The reason for the added types of biomass residues are:

(1): According to registered PDD, the project will utilize local surplus cotton straw for generating electricity. In the project design stage, PO can not decide which kind of biomass residues can also be a stable fuel source for the project apart from cotton straw. During the actual project implementation, PO found that abundant biomass residues are wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw, which have been finally identified and the boiler has ability of combusting these biomass fuels.

(2): Actual moisture content of all the biomass residues (33.84%/27.06%/22.89%/30.57%/22.81%/ 23.38%/19.18%)for wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately) were much higher than that of cotton straw in the registered PDD(10%) as PO could not collect ideal biomass residues which was out of PPs' control. So, the actual biomass fuel consumption was high and the total biomass consumption is re-calculated to be 268,859 tons per year according to operation records of the power plant in 2009/2010, which is 118% more than the value in registered PDD.

Change 2: Capacity change and higher power generation.

When the final version (3.3) PDD submitted to EB requesting registration on 20/07/2007, PO did not know if the replaced 30MW steam turbine can work because of the failing debugging of 25MW steam turbine in May.2007. Either, PO did not know the higher power generation because the project was under final assembly stage. After 1 and a half years' operation, PO found that the operation hours is higher than 5500 hours under-estimated in registered PDD and is re-calculated to be 7050 hours according to actual operation data in 2009/2010 and plan for following years.

The reasons for the higher power generation:

(1) The installed capacity was changed from 25MW to 30MW in July.2007, so the added capacity lead to higher power generation.

(2) Conservative operation hours 5500 hours was made in FSR because few referenced biomass projects in China and lacks of experience when the FSR finished in Mar.2006 and approved by Jiangsu Development and Reform Commission in June, 2006.

(3) Good performance of boiler with advanced technology imported from Denmark BWE Company and sound onsite maintenance service to the power generation equipments.

(4) As the "Biomass resource statistical reports" stated, the available wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw in local region around the project site is 209%/262%/469%/197%/263%/177%/307% more than the total biomass utilized separately. This stated that these abundant biomass residues enabled unconstrained operation of the boiler.

Conclusion：

The two major changes occurred in project implementation stage have no impact on scale of project activity and the applicability/application of the baseline methodology. The baseline scenario still remains the same as the registered PDD. And emission reduction method also remains the same as the registered PDD and ACM0006 versin04.

As for additionality: Although the 49.00%[2] higher power exported than that in registered PDD, but the 118%[3] increased biomass residues consumption lead to substantially increase on O&M cost. The result showed that the 2 major changes will not alter the conclusion of additionality in the registered PDD. Please see sectionB.5 for detailed re-assessment and relevant data source.

A.3. Project participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
P.R. China	National Bio Energy Co., Ltd., project owner and operator.	No
United Kingdom	Climate Change Capital Carbon Fund II s.à r.l. , CER buyer	No
United Kingdom	Climate Change Capital Carbon Managed Account Limited, CER buyer.	No

[2] 188,488.80MWh electricity was estimated to be exported according to actual operation records. (188,488.80-126,500)/126,500=49.00%.

[3] 268,859 tons biomass residues consumption was estimated according to actual operation records. (268,859-123,100)/123,100=118%.

National Bio Energy Co., Ltd. is a shareholding company established with a registered equity capital of 500 million RMB (55% from the Shenzhen State Power Scientech Development Co., Ltd and 45% from Dragon Power Co. Ltd.). Its business focuses on investment, development and operation of biomass power generation plants in China.

Climate Change Capital Carbon Fund II s.à r.l. (C4F2)

C4F2 is the second private carbon fund managed by Climate Change Capital, and is currently the world's largest carbon fund. C4F2 partners with CDM and JI project developers around the world, purchasing carbon credits and providing finance for projects which reduce greenhouse gas emissions. C4F2's investors include two of the world's largest pension funds, ABP and PGGM of the Netherlands, as well as Standard Chartered Bank and the UK-based international energy company Centrica.

Climate Change Capital Carbon Managed Account (C4MA)

C4MA is a UK limited company, established for the purpose of procuring carbon credits for British Gas Trading, the trading arm of UK-based utility Centrica.

For detailed information, please refer to Annex I.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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P.R. China

A.4.1.2. Region/State/Province etc.:

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Jiangsu province

A.4.1.3. City/Town/Community etc:

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West Economic Development Zone of Sheyang County, Yancheng city

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

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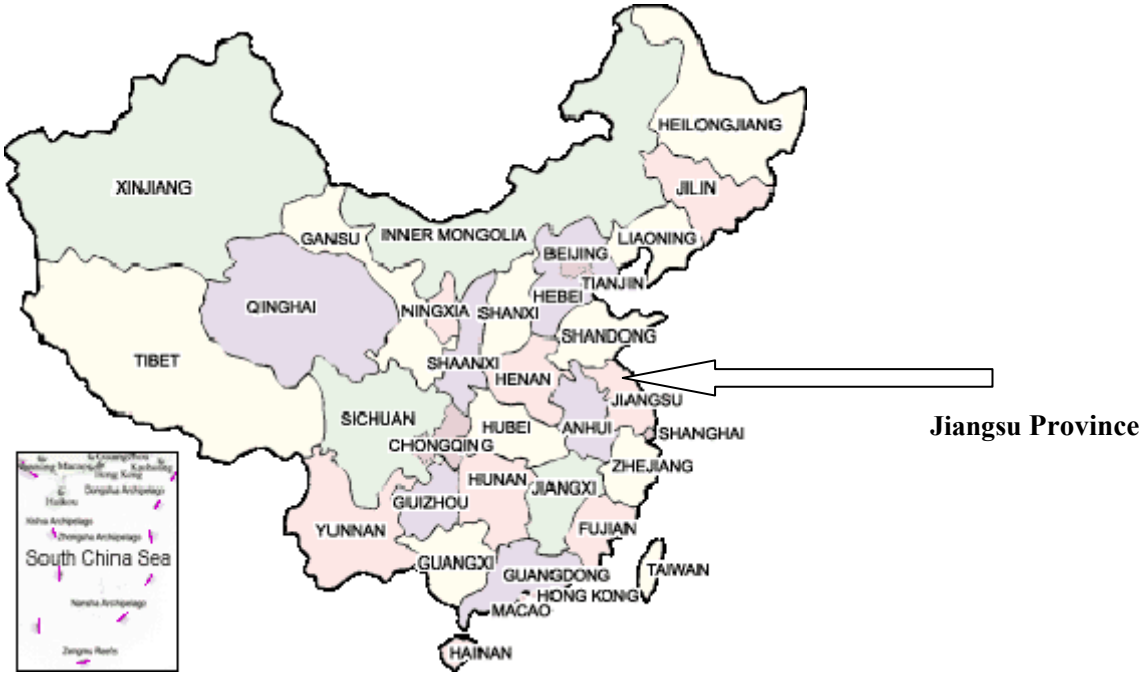
The proposed project is located in West Economic Development Zone of Sheyang County, 3 kilometres to Sheyang county centre, 50 meters of its north is Xiaoyang River, and 6 kilometres to its west is the "Tongsan" free way under building.

The Sheyang County is located in Yancheng city, Jiangsu province. South of Sheyang County is bordered to Dafeng city, Yandu County and Yancheng city, west is adjoined to Jianhu county and Fuling County, north is Binhai County, east is Huang sea with 103 kilometres of coastline. The detailed location of the project is shown in figure 1.

The proposed project is located 33°46′03″ of north latitude and 120°10′57″ of east longitude.



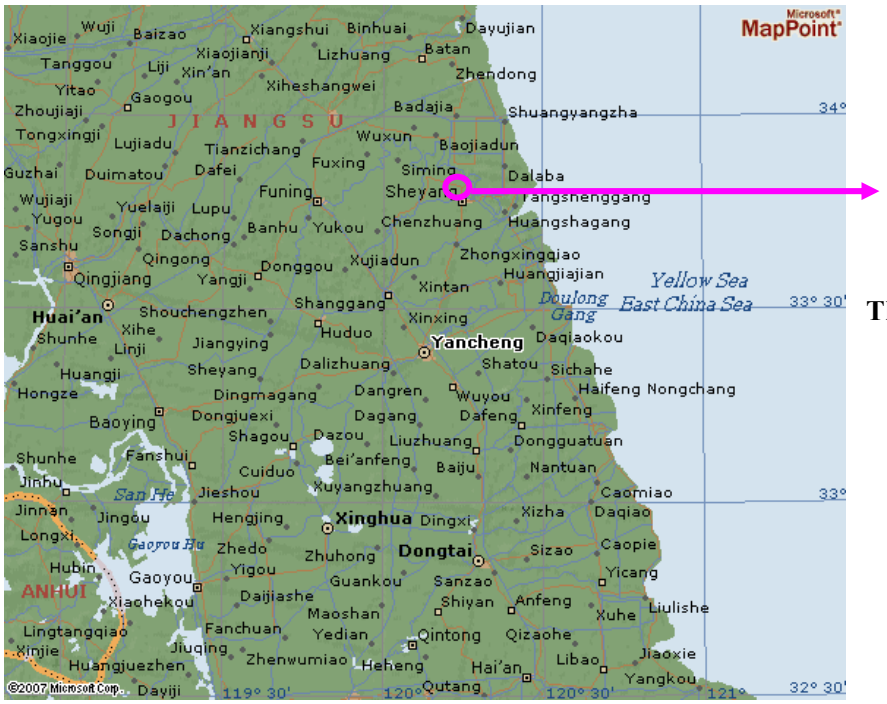


Figure 1: project location (Sheyang County, Yancheng city, Jiangsu province, P R. China)

A.4.2. Category(ies) of project activity:

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Category 1, energy industries (renewable sources)

A.4.3. Technology to be employed by the project activity:

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The proposed project makes good use of the biomass residues as fuels and has installed a 130 t/h water-cooling librated boiler with high temperature and high press made in China authorized by Denmark BWE Company, which has been operated successfully in Denmark for more than ten years. It can solve the boiler's knot residue problem, and won't block the smoke channel and will facilitate the boiler to carry heat.

At the same time in July.2007, the proposed project is assembled with replaced a N30-8.83-2 steam turbine and QF-30-2 generator domestically made in China, with the install capacity of 30MW.

The process of the proposed project is as follows: the biomass residues from the region's farmers or fodder brokers or collection stations will be collected. The biomass residues are transported to the power plant by trucks, then through the conveyer belt to the boiler, then biomass residues will be combustion and steam will be produced to generated electricity.

The boiler smoke will be treated by a high efficiency hop-pocket dust catcher, its removal rate will not less 99.5 percent. The ash residues will be returned to cropland as fertilizer.

The implement of the proposed project will facilitate to the related advanced technology transfer from developed countries to China.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

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Annual GHG emission reductions of the proposed project are estimated to be 148,695 tCO_2e. For detailed calculation please refer to section B.6.4. During the first crediting period (01 Apr 2008-31 Mar 2015), the total GHG emission reductions of the proposed project are estimated to be 1,040,865 tCO_2e.

The crediting period is expected to be renewed to 21 years in total. As the project was registered on 01/04/2008, the emission reductions during the first crediting period are estimated as:

month /Year	**Annual estimation of emission reductions in tonnes of CO_2e**
01/04/2008-31/03/2009	148,695
01/04/2009-31/03/2010	148,695
01/04/2010-31/03/2011	148,695
01/04/2011-31/03/2012	148,695
01/04/2012-31/03/2013	148,695
01/04/2013-31/03/2014	148,695
01/04/2014-31/03/2015	148,695
Total estimated reductions (tonnes of CO_2e)	1,040,865
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	148,695

Note: 7*3 renewable crediting periods are chosen.

A.4.5. Public funding of the project activity:

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No public funding is involved in this project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

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Version 04 of ACM0006: "Consolidated baseline methodology for grid-connected electricity generation from biomass residues".

Referred as the methodology, version 06 of ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable source and Version 03 of "Tool for the Demonstration and Assessment of Additionality".

More information about the methodology can be found on the website:

http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

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The proposed project is a newly built power plant fuelled with biomass residues, then a grid-connected renewable energy power generation project, which is fully consistent with the applicability conditions of version 04 of ACM0006. Detailed information is listed in the following:

1. The project is a grid-connected and biomass residue fired electricity generation project and is greenfield project.
2. The project activity is an independent plant supplied by biomass residues purchased from local Yancheng area, Jiangsu province.

   And:

3. Predominant fuel used by the proposed project are wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw, and no other type of biomass was used in the power plant, this can be validated in the detailed biomass residues purchase records. All these files have been archived for CDM validation and verification stage;

4. The six types of biomass residues, i.e., cotton straw/cole straw/maize straw/rice straw/reed/wheat straw used by the proposed project are by-products of agriculture crops, not from a production process (e.g. production of sugar or wood panel boards); only some of the wood residues is collected from local woodwork factories through agents. According to the biomass residues purchase records, wood residues which is forestry waste is sold by 334 agents and the rest of wood residues comes from local woodwork factories is sold by 139 agents. All of the 139 agents who sold wood residues that comes from local woodwork factories have provided statement to prove that all the wood residues supplied by them is the biomass resides and do not result in any increase of processing capacity of raw input or in other substantial changes in the wood plate production process;

5. The biomass residues are bought from the farmers or agents, and stored at the stations. The biomass residues are stored, desiccated, and loaded at the stations. The biomass residues are transported to the power plant everyday for power generation. The biomass residues should not be stored for more than one

year, because the NCV would be lower and the amount would be smaller for long time storage. Since the project is a newly installed power plant, all biomass residues for the project activity were collected at the 4th quarter of last year. In other words, the biomass stored currently has not exceeded the limitation of 1 year. In the entire crediting period, the biomass stored will not be exceeded the limitation of 1 year. From the view of net calorific value (NCV) of the biomass residues and the usual consideration of economics, the biomass used in the plant will also not stored above 1 year. First, the biomass stored above 1 year will be decay and its NCV will decrease. From the energy utility, the owner prefers to use new biomass to the decay biomass. Secondly, the longer the biomass is stored, the more storehouses and workers needed, and more cost are needed. In fact the owner uses the biomass by "early bought biomass is used early". This strategy will save cost and storehouse, need smaller amount of active capital, and improve the energy efficiency.

6. Except from transportation and crash of the biomass residues in the power plant site, the proposed project has no significant consumption of fossil fuels.

7. Further noted the scenario of the combinations of project activities and baseline scenarios is scenario 2 identified in ACM0006 V04,please turn to section B.4 and B.5 of this PDD for details.

As described above, the proposed project activity is fully consistent with the applicability conditions of ACM0006. ACM0006 is applicable for the proposed project.

Conclusion: By apply seven biomass residues, the project is still in line with methodology ACM0006, version 04, changes in the implementation of the project activity do not have influence on the applicability of baseline methodology.

B.3. Description of the sources and gases included in the project boundary

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According to the version 04 of ACM0006, the project boundary encompasses the power plant at the project site, the means (both land and waterway) for transportation of biomass to the project power plant, all power plants connected physically to the local grid (East China Power Grid) that the CDM project power plant is connected to, and the site where the biomass residues would have been left for decay or dumped.

In this PDD, CH_4 emissions will be included for both project and baseline emissions.

According to ACM0006, the GHGs included in or excluded from the project boundary are listed as follows:

	Source	Gas	Included?	Justification/Explanation
Baseline	Grid electricity generation	CO_2	Yes	Main emission source
		CH_4	No	Excluded for simplification. This is conservative
		N_2O	No	Excluded for simplification. This is conservative
	Uncontrolled burning or decay of surplus biomass residues	CO_2	No	It is assumed that CO_2 emissions from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector.

		CH_4	Yes	Main emission source as B1 is identified as the most likely baseline scenario in this PDD.
		N_2O	No	Excluded for simplification, this is conservative.
Project Activity	On-site fossil fuel and electricity consumption due to the project activity	CO_2	Yes	May be an important emission source
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Off-site transportation of biomass residues	CO_2	Yes	May be an important emission source
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Combustion of biomass residues for electricity	CO_2	No	It is assumed that CO_2 emissions from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector.
		CH_4	Yes	Main emission source as B1 or B3 is identified as the most likely baseline scenario in this PDD.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Storage of biomass residues	CO_2	No	It is assumed that CO2 emissions from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector.
		CH_4	No	Excluded for simplification. Since biomass residues are stored for not longer than one year, this emission source is assumed to be small.
		N_2O	No	Excluded for simplification. This emissions source is assumed to be very small.

Conclusion：As a result of the implementation of project activity, the greenhouse gases emission source in the project boundary still remain the same as the registered PDD.

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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The proposed project only generates electricity, then the alternatives of the proposed project activity should be determined as follows:

1. Power generation

In ACM0006, six realistic and credible alternatives for power generation may be included, *inter alia*:

- P1: The proposed project activity not undertaken as a CDM project activity
- P2 :The proposed project activity (installation of a power plant), fired with the same type of biomass residues but with a lower efficiency of electrical generation (e.g. an efficiency that is common practice in the relevant industry sector)
- P3: The generation of power in an existing plant, on-site or nearby the project site, using only fossil fuels
- P4: The generation of power in existing and/or new grid-connected power plants
- P5 :The continuation of power generation in an existing power plant, fired with the same type of biomass residues as (co-)fired in the project activity, and implementation of the project activity, not undertaken as a CDM project activity, at the end of the lifetime of the existing plant
- P6: The continuation of power generation in an existing power plant, fired with the same type of biomass residues as (co-)fired in the project activity and, at the end of the lifetime of the existing plant ,replacement of that plant by a similar new plant

As for P1, if the proposed project activity is not undertaken as a CDM project activity, it will be faced with investment barriers and technological barriers and can't be run commercially. Therefore, P1 can't become the most realistic baseline alternative for power generation.

As for P2, at present, the technology of biomass power generation just starts, even if the biomass power plants with lower power generation efficiency are not common practice in China. Therefore, P2 can't become the most realistic baseline alternative for power generation.

As for P3, there are none of fossil fuel fired power plants around the project site, so P3 is excluded.

As for P4, the current installed capacity and newly added capacity of the Eastern China Power Grid that the proposed project is connected will meet the requirement of national laws and regulations, also financially viable. The same electricity generation with the proposed project is likely to be from existing and/or new grid-connected power plants.

As for P5 and P6, there are none of biomass power plants in the local areas. Therefore, P5 and P6 are excluded.

In conclusion, the most realistic and credible alternative for power generation is P4.

The proposed project is not a cogeneration project, then there is no need to define the baseline scenario for the generation of heat.

2. Use of biomass

According to ACM0006 version 04, "where the project activity uses different types of biomass residues, the baseline scenario should be identified for each type of biomass residue separately", so PO have re-identified the baseline scenario for use of the seven biomass residues separately.

The project mainly uses biomass residues: wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw for power generation, without the project activity, the baseline scenario is that a huge amount of wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw are left in the field to natural decay or burnt in an uncontrolled manner.

Detailed analyses on each alternative for each type of biomass residues are summarized in following table:

Table B-1 Identifying the most plausible baseline scenario for biomass use

Series	Alternative	Included?	Justification/Explanation
B1	The biomass residues are dumped or left to decay under mainly aerobic conditions. This applies for example, to dumpling and decay of biomass residues on fields.	Yes	Around the site of the project, a certain number of surplus wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw would be dumped or left to decay. Alternative B1 is a realistic baseline alternative for unused wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately.
B2	The biomass residues are dumped or left to decay under clearly anaerobic conditions. This applies, for example, to deep landfills with more than 5 meters. This does not apply to biomass residues that are stock-piled or left to decay on fields.	No	Cotton straw/cole straw/maize straw/rice straw/reed/wheat straw: Entire of these six types of biomass residues comes from country site and there is no disposing model with clearly anaerobic conditions. Wood residues: Wood residue which is forestry waste is sold by 334 agents and the rest of wood residues comes from local woodwork factories is sold by 139 agents. All of the 139 agents who sold wood residues that comes from local woodwork factories have provided statement[4] to prove that all the wood residues supplied by them is the biomass resides and do not result in any increase of processing capacity of raw input or in other substantial changes in the production process. All of the suppliers stated that there is no disposing mode for these wood residues, so, it is obviously that there is no opportunity for the suppliers to dump or decay these wood residues and wheat bran under clearly anaerobic conditions. Therefore, B2 is excluded for wood residues/ cotton straw/ cole straw/ maize straw/ rice straw/ reed/wheat straw separately
B3	The biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes.	Yes	Around the site of the project, a certain number of surplus wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw would be burnt in an uncontrolled manner without utilizing it for energy purposes.

[4] Jointed statements from the 139 agents have been provided to the audit team.

			Therefore, Alternative B3 is one realistic baseline alternative for unused wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately.
B4	The biomass residues are used for heat and/or electricity generation at the project site	No	There is no similar heat and/or electricity generation project which use wood residues / cotton straw/cole straw/maize straw / rice straw /reed /wheat straw as fuel, and other place plant will not use the biomass residues resource due to the cost consideration. Therefore, B4 is excluded for the seven types of biomass residues separately.
B5	The biomass residues are used for power generation, including cogeneration, in other existing or new grid connected power plants	No	There is no similar power generation, including cogeneration which use wood residues / cotton straw/cole straw/maize straw / rice straw /reed /wheat straw as fuel, and other place plant will not use the biomass residues resource due to the cost consideration. Therefore, B5 is excluded for the seven types of biomass residues separately.
B6	The biomass residues are used for heat generation in other existing or new boilers at other sites	No	There is no similar heat generation projects which use wood residues / cotton straw/cole straw/maize straw / rice straw /reed /wheat straw as fuel, and other place plant will not use the biomass residues resource due to the cost consideration. Therefore, B6 is excluded for the seven types of biomass residues separately.
B7	The biomass residues are used for other energy purposes, such as the generation of bio-fuels	No	There is no project that use wood residues /cotton straw/cole straw / maize straw / rice straw /reed/ wheat straw for other energy purposes, such as the generation of bio-fuels. And other place plant will not use the biomass residues resource due to the cost consideration. Therefore, B7 is excluded for the seven types of biomass residues separately.
B8	The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper industry)	No	The biomass residues consumed by the proposed project is: 170,194.67tons/25,175.05tons/1.01tons/19,386.04 tons/27,212.57tons/16,392.39tons /10,497.07tons for wood residues/cotton straw/cole straw/maize

			straw/rice straw/reed/wheat straw separately. According to the "Biomass resource statistical reports"[5], although there is a little biomass residues has been used for non-energy purpose around the project site, such as fertilizer or raw chemical materials, but these small amounts are only accounting for a very small ratio of the biomass residues available around 50 kilometers. So the biomasses used by the proposed project will not impropriate the biomass as fertilizer or raw chemical materials. In other words, the proposed project will not change the use of biomass as fertilizer or raw chemical materials. Therefore, B8 is excluded for the seven types of biomass residues separately.

As analyzed above, the most realistic and credible alternative for use of wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw all belong to B1 or B3, the baseline use of biomass residues remain the same as that in registered PDD.

Then the scenario 2 is the most realistic baseline scenario.

Scenario	**Project type**	**Baseline scenario**		
		Power generation	Heat generation	Biomass use(for the seven types of biomass residues separately)
2	Greenfield power project	P4	NA	B1 or B3

Conclusion：As analysis above, baseline scenarios for the use of seven biomass residues have been identified separately and all of the seven types of biomass residues (wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw) can claim the baseline emissions due to natural decay or uncontrolled burning of anthropogenic source of biomass residues.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality) :

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According to the version 04 of ACM0006 and version 03 of "Tools for the demonstration and assessment of additionality", the following steps are used to define the baseline scenario:

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

[5] "Biomass resource statistical reports" issued byYancheng city government in year 2009/2010 have been provided to the audit team.

Sub-step 1a. Define alternatives to the project activity.

In the "Identification of the baseline scenario" of ACM0006, realistic and credible alternatives should be separately determined regarding:

- how power would be generated in the absence of the CDM project activity;
- what would happen to the biomass residues in the absence of the project activity; and
- In case of cogeneration projects: how the heat would be generated in the absence of the project activity.

Detailed description of each alternative above-mentioned are carried out in Section B.4.

As it is discussed in Section B.4, the plausible baseline scenario for power generation is the alternative P4 (The generation of power in existing and/or new grid-connected power plants); the plausible baseline scenario for unused biomass residues is the Alternative B1 (biomass residues are dumped or left to decay) and Alternative B3 (biomass residues are burnt in an uncontrolled manner).

Sub-step 1b. Enforcement of applicable laws and regulations

As for power generation, P1 (The proposed project activity not undertaken as a CDM project activity) and P4 (The generation of power in existing and/or new grid-connected power plants), are consistent with related laws and regulations in China.

As for biomass use, related policies and regulations have been issued, such as *Renewable Energy Promotion Law and Renewable Energy*. But the related regulations don't compel to use biomass. Major parts of wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw have been dumped or left to decay or burned in an uncontrolled manner in the proposed project. Therefore, B1 or B3 is a common scenario in the real world.

Step 2 Investment analysis

The purpose of this step is to determine whether the proposed project activity is economically or financially less attractive than other alternatives without an additional revenue/funding, possibly from the sale of certified emission reductions (CERs). The investment analysis was conducted in the following steps:

Sub-step 2a. Determine appropriate analysis method

In the *Tools for the demonstration and assessment of additionality,* there are three options for investment analysis: simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III).

Since the proposed project will earn the revenues not only from the CDM activity but also from electricity sales, the simple cost analysis method is not applicable. Because the proposed project owner only has two choices: building/ not building the proposed project, if the proposed project activity is not undertaken as a CDM project activity, therefore option 2 is not applicable. The proposed project will use benchmark analysis based on the consideration that benchmark IRR or equity IRR of the power sector are available.

Sub-step 2b. Benchmark Analysis Method (Option3)

According to ***Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects（2003）***, the financial benchmark rate of return (after tax) of Chinese power industry is 8% of the total investment, which has been used widely for Feasibility Studies of the power project investments. So, the

proposed project adopts this benchmark, and NPV (Net Present Value) is also chosen as the financial indicator because the actual project becomes so financially unattractive that it can not calculate the result of the IRR. If the NPV of the project is lower than zero, the project is considered not financially attractive.

On the basis of above benchmark, calculation and comparison of financial indicators are carried out in sub-step 2c.

Sub-step 2c. Calculation and comparison of financial indicators

There are two major changes between the registered PDD and the actual operation status: the total estimated power generation by the project is increased to 188,488.80MWh/year (Original PDD: 126,500 MWh/y) which lead to an increase in sales revenues and total biomass consumption in this project has been re-estimated to be 268,859 tons (original PDD123,100 tons), which lead to substantially increase on O&M cost.

The result showed that the 2 major changes will not alter the conclusion of additionality in the registered PDD. Please see following sections for detailed re-assessment and relevant data source.

Estimated power exported has been increased by 49.00%, so PO re-calculated the financial indicators of the power plant bellow with these two changed key parameters considering two minor different issues (total investment and biomass residues price are a little different compared to value in registered PDD) under guidelines provided by Annex 66/67, EB48[6].

(1) Basic parameters for calculation of financial indicators

Table B-2 **Key parameters for the calculation of financial indicators**

Item	Unit	Data in registered PDD	Data in actual situation	Sources
Capacity	MW	25	30	Feasibility Study/ contract of PGU re-placed signed in May.2007 and Post assessment report issued by Shandong Electronic Power Engineering Consulting Institute Corp.,Ltd. in Feb.2011
Total Investment	Million Yuan	276.09	281	Feasibility Study/project audit report issued on July.2008
Annual electricity output	GWh/year	126.5	188.4888	Feasibility Study/ estimated by PO according to power generation in passed 2009 and 2010.And

[6] Paragraph 8 of Annex 66/67, EB48: "The re-assessment of additionality shall be based on all original input data, thereby – in case of investment analysis – in principle only modifying the changed key parameters in the original spreadsheet calculations"

				use average self electricity consumption rate of 2009/2010.
Electricity Tariff (including VAT)	Yuan/kWh	0.636/0.386	The same	0.636(in the first 15 operation years); 0.386(the rest years)
Biomass residue consumption	Tonnes/year	123,100(cotton straws, wet base))	170,194.67 tons /25,175.05 tons /1.01 tons /19,386.04 tons /27,212.57 tons /16,392.39 tons /10,497.07 tonne for wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately (wet base)	From Feasibility Study /Actual operation statistics in 2009/2010
straw price	Yuan/t	240	245.1	From Feasibility Study/ Average biomass residues price indicated in the sales receipts
Value Added Tax (VAT)	%	17	The same	Feasibility Study
Income tax	%	33 (minus 25% for the first three years, minus 12.5% for the second three years, 33% for the other years)	The same	Feasibility study
Project life time	Year	26(1 year construction, 25 years operation)	The same	Feasibility Study
Expected CERs Price	Euro/t CO_2e	10	The same	
Exchange Rate	Yuan/Euro	10	The same	
CERs crediting time	year	7*3	The same	

(2) Comparison of IRR and NPV for the proposed project and the financial benchmark

In accordance with benchmark analysis, if the financial indicators, the internal rate of return (IRR) of the proposed project are lower than the benchmark, or the NPV of the project is lower than zero the proposed project is not considered as financially attractive.

The following table shows the IRR and NPV of the proposed project, with and without CDM revenues. Without CDM revenues, the IRR of total investment is lower than the benchmark 8%,and the NPV is far lower than zero, thus financially unattractive. With CDM/CERs revenue, the IRR will be significantly improved to 4.68% and NPV is significantly improved.

Financial indicators of the proposed project (total investment)

Item	NPV for total investment (10000 yuan) （i0＝8%）	IRR (%)
Without CDM	-9867.98	Below 0%
With CDM	-3472.17	4.68%

Sub-step 2d. Sensitivity analysis

PP also does sensitivity analysis under actual operation situation here to examine whether the conclusion of financially attractive still exists when the key assumptions change reasonably. If the investment analysis could provide efficient arguments that the project has additionality, under the situation that the key assumption changes in a reasonable range, the result of analysis result will necessary support the following conclusion: the project activity is still not possible to be an attractive one financially under actual operation.

For this project, the following 2[7] indicators will be used as uncertain factors to make sensitivity analysis of financial attraction:

1) Electricity delivered to grid

2) Biomass residues Price[8]

With the assumption that the 2 indicators vary in the range of -10%～+10%, the corresponding results of project IRR are all far lower than the benchmark and NPV are far lower than zero[9], as shown in following table B-3.

Table B-3. **Sensitivity analysis for different financial parameters (without CDM)**

[7] As for the total investment, note that there is no need to analyse the impact of total investment because the investment was completed prior to the commercial operation in Sep.2007,and thus prior to the time the higher power generation occurred.

As for the tariff, the tariff is not considered in the sensitivity analysis of re-assessment of additionality because:
1.The tariff of power units is regulated by the regulating entity which is out of PO's control.

2. From the actual electricity transaction notes and invoices since April.2008 to November.2011, the settled tariff between PO and local power grid was 0.636 Yuan/KWh (including VAT), so, the tariff is not considered in the sensitivity analysis in accordance with guidelines of Annex 66&68, EB48.

As for the O&M cost, O&M cost is not considered in the sensitivity analysis because the major component of O&M cost is fuel cost, and the biomass residue prices is selected to be an analyzed indication rather than O&M, which is in line with the selection in registered PDD.

[8] Prices for each type of biomass residues are turbulent due to different seasons/moisture content/NCV/sources, and this is out of PO's control, so, it is not representative to select a price of some batches in re-assessment of additionality. PO has selected a more accurate and logical price- the average biomass price calculated from biomass purchase records in 2009 and 2010, which is provided by financial department of PO. The average biomass price (including VAT) in 2009/2010, which is normal operation years, was 245.1 RMB Yuan/ton including VAT, which is just a little higher than that of price for cotton stalk adopt in registered PDD(240 RMB Yuan/ton including VAT).

Please see "IRR comparison and Emission Reduction Calculation Spreadsheet" for detail calculation process.

[9] Please see "IRR comparison and Emission Reduction Calculation Spreadsheet" for detail calculation process.

variance range/NPV sensitive	-10%	-5%	0%	5%	10%
Electricity delivered to grid	-19443.58	-14655.78	-9867.98	-5080.18	-292.39
Biomass residues Price	-3202.12	-6535.05	-9867.98	-13200.91	-16533.85

Conclusion: Although the 49.00% higher power exported than that in registered PDD, which lead to 49.00% increase in sales revenues, but the 118% increased biomass residues consumption and 2.13% higher biomass residues price lead to lead to 98.74% increase on O&M cost. The result showed that the re-assessed IRR and NPV is still much lower than that in registered PDD considering the two major changes' impact on financial analysis. So, the two major changes will not alter the conclusion of additionality in the registered PDD.

Furthermore, with the CERs revenues, the project IRR is 4.68%, which is still lower than the financial benchmark, and the NPV is -3472.17 (10000 yuan), which is significantly improved.

Project owner need CERs revenue to improve poor financial situation.

Step 3. Barrier analysis

This step is used to determine whether the proposed project activity faces real barriers that prevent the implementation of this type of proposed project activity; and do not prevent the implementation of at least one of the alternatives. Step 3 uses the following sub-steps:

Sub-step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity:

List the barriers that would prevent the implementation of the type of proposed project activity from being carried out if the proposed project activity was not registered as a CDM activity, those barriers include:

- **Investment barriers**

Firstly, the biomass power generation is a green-field project activity and its initial investment is much higher than the normal coal-fired power generation project, and the financial institutions lack necessary information about it, so the bank is reluctant to provide a loan for such project activity. Next, the capital market in China is not perfect, so the financing channels are too limited. Therefore, the financing is a key barrier to the commercialization of biomass power generation. Furthermore, because the biomass power generation projects haven't been in the list of the national tax favourable inventory, which increases the risk to invest biomass power generation projects. Although the biomass power generation projects are encouraged by local government in the levy of income tax, the internal rate of return (IRR) of the proposed project is lower than the benchmark and financially attractive.

The total investment of the proposed project is RMB 281.00 million yuan and 9,367 yuan per kW, due to the key burning boiler will be imported which is much higher than that of conventional coal-fired power plants and gas-fired power plants.

Although prospective tariff policy and other incentives with respect to biomass power projects are currently in place, financial indicators of this kind of projects have not fundamentally changed and the loan repayment capability remains weak.

- **Technological barriers**

The key technology adopted by the proposed project is the biomass boiler imported from Denmark BWE Company. With this technology, the proposed project is possible to acquire higher efficiency and more advanced technology, but also bear technological risk. Since the technology of biomass power generation in China has not been commercialized, skilled and/or trained staffs are lacked to operate and maintain the facility, and there are no education/training institutions in China providing such training activities. At the same time, it is the first time for BWE in China. The proposed project owner is lack of experiences to operation and maintenance, without similar project for reference, the there are many uncertain risks during the operation. The CDM revenue can be used as a guarantee fund for the operation and maintenance and technical staffs train thus enable the project to overcome the technological barriers.

- **The risk for biomass collection**

The agriculture is still a small-scale peasant economy in Jiangsu province and China. Due to the biomass distribution is relatively dispersed and the project sponsor has to collect household by household which will increase the collection cost. Most important, the dispersed small-scale peasant economy means it will be impossible to hedge the straw price though a long-term contract. The lack of price hedge mechanism will greatly increase the risk of the proposed project.

Sub-step 3 b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

As mentioned in step 1, the scenario of the proposed project is scenario 2 of ACM0006. In the absence of the proposed project activities, the most plausible and credible alternative available to the proposed project is as follows: P4 (the generation of power in existing and/or new grid-connected power plants); B1 or B3. As for the power generation, because the fossil fuel fired power plants are dominated in Eastern China Power Grid, the same electricity generation with the proposed project can be provided from grid. As for biomass, it is common practice in the local area that the biomass is dumped or left to decay or burned in an uncontrolled manner without utilizing it for energy purposes. In all, the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity).

In all, the combinations of project types and baseline scenarios for the proposed project are as follows:

Combinations of project types and baseline scenarios

Scenario	Project type	Baseline scenario		
		Power generation	Heat generation	Biomass use
2	Greenfield power project	P4	NA	B1 or B3

Step 4. Comment practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity.

There are some similar scale project activities used straw as fuel in Jiangsu province until Oct. 31, 2006. such as Rudong straw power generation project (25MW), Jiangsu Suqian straw power generation project (2×12MW); Jiangsu Jurong straw generation project (2×12MW); Jiangsu Guoxin Huaian straw power generation project (2×15MW), etc.

Sub-step 4b. Discuss any similar options that accruing.

These project activities will not lead to change the additionality of the proposed project. The reasons are following:

Rudong straw power generation project, Jiangsu Suqian straw power generation project, Jiangsu Jurong straw power generation project, Jiangsu Guoxin Huaian straw power generation project, have the same barriers as the proposed project. They are also to endeavour to become CDM projects to mitigate the financial risk.

Because the proposed project has been successfully registered by EB, the CERs sales revenue will help the project owner to gain the investment return equivalent to that of the benchmark or more, and to reduce the risks associated with the uncertainty of the electricity tariff and biomass price. Furthermore, the CDM revenue, which will be in foreign currency, can reduce foreign exchange risk associated with the purchase of foreign equipment and relieve the pressure of repayment. All of these are important insurances for the proposed project's successful implement. In addition, because the operation and maintenance cost is high, the CER revenue can be one of the fund sources for the technical maintenance.

To summarize, it can be proved that the proposed project meets the additionality criteria in the aspects of environment, investment and technology.

In conclusion, the proposed project is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Step 0: Grid Boundary Selection

According to the ACM0006, the capacity of the project plant (25MW) is of more than 15MW and the baseline scenario has been identified as scenario 2, then the CO_2 emission factor for the electricity displaced can be calculated as a combined margin following the guidance of ACM0002 and the net quantity of electricity generation in the project plant is adopted.

According to the version 06 of ACM0002, for the purpose of determining the build margin (BM) and operating margin (OM) emission factor, a (regional) project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. Similarly, a connected electricity system, e.g. national or international, is defined as a (regional) electricity system that is connected by transmission lines to the project electricity system and in which power plants can be dispatched without significant transmission constraints. In determining the project electricity system, project participants should justify their assumptions. When the application of this methodology does not result in a clear gird boundary, the following choices could be adopted:

(a) Use the delineation of grid boundaries as provided by the DNA of the host country if available; or

(b) Use, where DNA guidance is not available, and the following definition of boundary: In large countries with layered dispatch systems (e.g. state/provincial/regional/national) the regional grid definition should be used. A state/provincial grid definition may indeed in many cases be too narrow given significant electricity trade among states/provinces that might be affected, directly or indirectly, by a CDM project activity; In other countries, the national (or other largest) grid definition should be used by default.

The Chinese DNA has given its guidance for the grid boundary selection (see also: http://cdm.ccchina.gov.cn), the Eastern China Power Grid (ECPG) is selected as the grid boundary.

Step 1: Baseline Emission Calculation

Sub-step 1a: Calculate the Operating Margin emission factor ($EF_{OM,y}$)

According to The Methodology, four alternatives could be used to calculate the OM:
a) Simple OM
b) Simple adjusted OM, or
c) Dispatch Data Analysis OM, or
d) Average OM.

Dispatch data analysis should be the first methodological choice. Where this option is not selected project participants shall justify why and may use the simple OM, the simple adjusted OM or the average emission rate method taking into account the provisions outlined hereafter.

The Simple OM method (a) can only be used where low-cost/must run resources constitute less than

50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term normals for hydroelectricity production.

The average emission rate method (d) can only be used where low-cost/must run resources constitute more than 50% of total grid generation and detailed data to apply option (b) is not available, and where detailed data to apply option (c) above is unavailable.

The Simple OM, simple-adjusted OM, and average OM emission factors can be calculated using either of the two following data vintages for years(s) y:

- (ex-ante) the full generation-weighted average for the most recent 3 years for which data are available at the time of PDD submission, if or,
- the year in which project generation occurs, if $EF_{OM,y}$ is updated based on ex-post monitoring.

For The Project, the simple Operating Margin emission factor was chosen based on the following two reasons:

1. In China, the State Grid Corporation run the interregional dispatch system and each regional grid corporation run the intraregional dispatch system. The dispatch information is regarded as business secrets and not available to the public.
2. For the most recent 5 years (2000-2004), the low-cost/must run resources constitute less than 50% of total: 10.47%, 11.49%,11.86%, 10.9% and, 9.77% for 2000, 2001, 2002, 2003 and 2004.

As a result, the simple OM method can be used.

The OM in this PDD is also calculated ex-ante based on the most recent 3 years data.

The Simple OM emission factor is calculated as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants:

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}}{\sum_{j} GEN_{j,y}} \quad (1)$$

Where,

$F_{i,j,y}$ is the amount of fuel *i* consumed (ton for solid and liquid fuel, m^3 for gas fuel) by relevant power sources *j* in years *y*,

j refers to the power sources delivering electricity to the grid, not including low-operating cost and must-run power plants, and including imports to the grid.

$COEF_{i,j,y}$ is the CO_2 emission coefficient of fuel *i* (tCO_2/t for solid and liquid fuel, tCO_2/m^3 for gas fuel), taking into account the carbon content of the fuels used by relevant power sources *j* and the percent oxidation of the fuel in years *y*, and

$GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source *j*. In the China Electric Power Year Book and other data resources, only generation data is available.

Sub-step 1b. Calculate the Build Margin emission factor ($EF_{BM,y}$)

According to The Methodology, the BM is calculated as the generation-weighted average emission factor of a sample of power plants *m*, as follows:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \times COEF_{i,m,y}}{\sum_{m} GEN_{m,y}} \quad (2)$$

Where

$F_{i,m,y}$ is the amount of fuel *i* (tce) consumed by plant *m* in year *y*.

$COEF_{i,m,y}$ is the CO_2 emission coefficient (tCO_2/tce) of fuel *i*, taking into account the carbon content of the fuels used by plant *m* and the percent oxidation of the fuel in year *y*.

$GEN_{m,y}$ is the electricity (MWh) delivered to the grid by plant *m*, equals to generation minus plant self consumption:

Project participants shall choose between one of the following two options. The choice among the two options should be specified in the PDD, and cannot be changed during the crediting period.

Option 1. Calculate the Build Margin emission factor $EF_{BM,y}$ *ex-ante* based on the most recent information available on plants already built for sample group *m* at the time of PDD submission. The sample group *m* consists of either the five power plants that have been built most recently, or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. Project participants should use from these two options that sample group that comprises the larger annual generation.

Option 2. For the first crediting period, the Build Margin emission factor $EF_{BM,y}$ must be updated annually *ex-post* for the year in which actual project generation and associated emissions reductions occur. For

subsequent crediting periods, $EF_{BM,y}$ should be calculated *ex-ante*, as described in option 1 above. The sample group *m* consists of either the five power plants that have been built most recently, or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. Project participants should use from these two options that sample group that comprises the larger annual generation.

In this PDD, the BM is determined ex-ante based on option 1.

Sub-step 1c. Calculate the Baseline emission factor ($EF_{electricity,y}$)

The baseline emission factor is calculated as the weighted average of the OM ($EF_{OM,y}$) and the BM ($EF_{BM,y}$):

$$EF_{\text{electricity},y} = w_{OM} \times EF_{OM,y} + w_{BM} \times EF_{BM,y} \quad (3)$$

Where the weight w_{OM} and w_{BM} by default, are 50%.

Sub-step 1d. Calculate the Baseline emission ($BE_{electricity,y}$)

The baseline emissions are the product of the baseline emissions factor ($EF_{electricity,y}$ in tCO_2/MWh) times the electricity supplied by the project activity (EG_y in MWh), then

$$BE_{electricity,y}=EG_y \times EF_{electricity,y} \quad (4)$$

Step2 Baseline Emission due to natural decay or uncontrolled burning of anthropogenic sources of biomass residues

According to ACM0006, scenario 2 is applicable. Baseline emissions due to uncontrolled burning of biomass residues are determined in two steps:

Step 2a Determination of the quantity of biomass residues used as a result of the project activity.
As the baseline scenario has been identified as scenario 2, the total quantity of biomass residues used in the project plant is attributable to project activity and hence $BF_{PJ,k,y}=BF_{k,y}$.

Step 2b Estimation of methane emissions, consistent with the baseline scenario for the use of biomass residues.

As the baseline scenario for biomass residue use has been identified as B1 and B3, then the methane emissions can be calculated by multiplying the quantity of biomass that would not be use in the absence of the project activity with the net calorific value and an appropriate emission factor:

$$BE_{biomass,y} = GWP_{CH_4} \times \sum_k BF_{PJ,k,y} \times NCV_k \times EF_{burning,CH4,k,y} \quad (5)$$

Where:

GWP_{CH4} is the Global Warming Potential for methane valid for the relevant commitment period which is equal to 21 in this PDD.

$BF_{PJ,k,y}$ is the incremental quantity of biomass residue type *k* used as fuel in the project plant during the year y in tons, *k*= wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw .Based on the actual operation statistics in 2009/2010, the annual used biomass residues (wet base) will

be.170,194.67tons/25,175.05tons/1.01tons/19,386.04tons/27,212.57tons/16,392.39tons /10,497.07 tons for wood residues/ cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately.

Further more, according to the actual operation statistics in 2009/2010, the moisture content for these seven types of biomass residues are: 33.84%/27.06%/22.89%/30.57%/22.81%/ 23.38%/19.18% for wood residues/ cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately. So, the annual used biomass residues (dry base) are figured out to be: 112,607.84 tons /18,363.38 tons /0.78 tons /13,459.60 tons /21,004.52 tons /12,560.49 tons /8,484.10 tons for wood residues/ cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately.

NCV_k is the net calorific value of the biomass residues type *k* in TJ per tons in dry matter, k=wood residues/ cotton straw/cole straw/maize straw/rice straw/reed/wheat straw.

$EF_{burning,CH4,k,y}$ is the CH_4 emission factor for uncontrolled burning of the biomass residues in tCH_4/TJ.

As there is no accurate information about the CH_4 emission factor, the default value of 0.0027 tCH_4/tons is adopted in the PDD according to ACM0006. Considering the uncertainty is greater than 100%, a conservativeness factor of 0.73 is used in this PDD, thus the CH4 emission factor of 0.001971 tCH_4/t biomass should be used. (2006 IPCC Guidelines, Volume 4, Table 2.5, default value for agricultural residues.)

Step3 Project Emissions

As described in ACM0006, the project emissions include CO_2 emissions from transportation of straws to the project site (PET_y), CO_2 emissions from on-site consumption of fossil fuels due to the project activity ($PEFF_y$), CO_2 emissions from consumption of electricity ($PE_{EC,y}$) and CH_4 emission from the controlled combustion of straw ($PE_{biomas,CH4,y}$).
Then the project emission can be calculated as:

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH_4} \times PE_{Biomass,CH4,y} \quad (6)$$

Where:

GWP_{CH4} is the Global Warming Potential for methane valid for the relevant commitment period, which is equal to 21 in the PDD.

***Sub-step3a* Methane emissions from combustion of straws ($PE_{biomass,CH4,y}$)**

Methane emissions from combustion of straws can be calculated as follows:

$$PE_{Biomass,CH4,y} = EF_{CH4,BF} \times \sum_k BF_{k,y} \times NCV_k \quad (7)$$

where:

$BF_{k,y}$ is the quantity of straw type k used as fuel in the project plant during the year y in tons in dry matter, k=wood residues/ cotton straw/cole straw/maize straw/rice straw/reed/wheat straw. Based on the actual operation statistics in 2009/2010, the annual used straw will be 186,480.70 tons.

NCV_k is the net calorific value of the straw type k in TJ per tons, k=wood residues/ cotton straw/cole straw/maize straw/rice straw/reed/wheat straw. Based on NCV reports issued by certificated institutes, NCV_k=0.01908/0.01772/0.01856/0.01739/0.01661/0.01734/0.01639TJ/t for wood residues/ cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately.

$EF_{CH4,BF}$ is the CH_4 emission factor for controlled burning of the straw in tCH_4/TJ. 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 (Values are based on the 2006 IPCC Guidelines, Volume 2, Chapter 2, Tables 2.2 to 2.6).

Sub-step 3b **Carbon dioxide emissions from combustion of fossil fuels for transportation of straws (*PET_y*)**

The straws will be transported by trucks to the project plant from collecting stations. The emissions from diesel consumed for transportation are a major source of project emission which can be calculated as follows:

$$PET_y = N_y \times AVD_y \times EF_{km,CO2,y} \quad (8)$$

Where:

Ny: Number of truck trips during the year y.

AVD_y is the average round trip distance (from and to) between the biomass residue fuel supply sites and the site of the project plant during the year y.

$EF_{km,CO2,y}$ is the average CO_2 emission factor for the trucks measured during the year y (tCO_2/km).

Since the truck applied in the project has the truck load of 1 ton, the IPCC default of 0.001011 for the Heavy Duty Diesel Vehicle is applied[10]

Sub-step 3c **Carbon dioxide emissions from on-site consumption of fossil fuels (*$PEFF_y$*)**

The only fossil fuel used in the proposed project site is diesel. Then the carbon dioxide emissions from on-site consumption of fossil fuels can be calculated as follows:

$$PEFF_y = \sum_i (FF_{projectplant,i,y} + FF_{projectsite,i,y}) * NCV_i * COEF_i \quad (9)$$

where:

$FF_{project\ plant,i,y}$ = Quantity of fossil fuel type *i* combusted in the biomass residue fired power plant during the year *y* (mass or volume unit per year)

$FF_{project\ site,i,y}$ = Quantity of fossil fuel type *i* combusted at the project site for other purposes that are attributable to the project activity during the year *y* (mass or volume unit per year)

NCV_i = Net calorific value of fossil fuel type *i* (GJ / mass or volume unit)

$COEF_i$ = CO_2 emission factor for fossil fuel type *i* (tCO_2/GJ)

Sub-step 3d **Carbon dioxide emissions from electricity consumption (*$PE_{EC,y}$*)**

CO_2 emissions from on-site electricity consumption (*$PE_{EC,y}$*) are calculated by multiplying the electricity consumption by an appropriate grid emission factor, as follows:

$$PE_{EC,y} = EC_{PJ,y} * EF_{grid,y} \quad (10)$$

[10] Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual, Moderate Control index for US Heavy Duty Diesel Vehicles in Table 1-32, page 1.75.

where:
$PE_{EC,y}$ = CO_2 emissions from on-site electricity consumption attributable to the project activity (tCO_2/yr)
$EC_{PJ,y}$ = On-site electricity consumption attributable to the project activity during the year *y* (MWh)
$EF_{grid,y}$ = CO_2 emission factor for grid electricity during the year *y* (tCO_2/MWh)

Step4 Leakage.

This version of notification PDD use option L2 (ACM0006, Section Leakage) to demonstrate that there is an abundant surplus of the straws in the region of the project activity, and then the leakage can be neglected.

A detailed survey of the biomass supply/demand situation in Yancheng areas was raised by investigation group constituted by Yancheng Municipal Bureau of Statistics, and the following table shows the result:

Table B-4 Statistics of local biomass resource

Parameters	Wood residues 10^4tons per year	Cotton straws 10^4tons per year	Cole straw 10^4tons per year	Maize straw 10^4tons per year	Rice straw 10^4tons per year	Reed 10^4tons per year	Wheat straw 10^4tons per year
Available biomass within 50 kilometres away around the site of the proposed project	116.66	57.09	19.15	6.91	115.82	112.99	66.57
Biomass that used for other purposes than gird-connected electricity generation	38.78	19.27	4.08	1.56	41.34	62.04	20.68
Biomass that are expected to be utilized in the project	17.02	2.52	0.0001	1.94	2.72	1.64	1.05
Total biomass utilized, including the project	55.80	21.78	4.08	3.50	44.06	63.68	21.73
Available biomass/Total biomass utilized	209%	262%	469%	197%	263%	177%	307%

From the above-mentioned background, it is known that all the seven type of biomass supply in 50km range is far more than the demand by the proposed project. The conclusion is the biomass supply to the proposed project is sufficient. Project owner will monitored biomass resource annually.

If for a certain type of biomass residue *k* used in the project activity, leakage effects cannot be ruled out with one of the approaches above, leakage effects for the year *y* shall be calculated as follows:

$$L_y = EF_{CO2,LE} * \sum_k BF_{PJ,k,y} * NCV_k \quad (11)$$

where:
L_y = Leakage emissions during the year *y* (tCO_2/yr)
$EF_{CO2,LE}$ = CO_2 emission factor of the most carbon intensive fuel used in the country (tCO_2/GJ)
$BF_{PJ,k,y}$ = Incremental quantity of biomass residue type *k* used as a result of the project activity in the

project plant during the year *y* (tons of dry matter or liter)
k = Types of biomass residues for which leakage effects could not be ruled out with one of the approaches L_1, L_2 or L_3 above
NCV_k = Net calorific value of the biomass residue type *k* (GJ/ton of dry matter or GJ/liter)

Step5 Emission Reduction

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

$$ER_y = ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y \quad (12)$$

Where:

ER_y is the emission reduction in year y in tCO_2e.

$BE_{biomass,y}$ is the emission due to uncontrolled burning of straws in tCO_2e.

$ER_{electricity,y}$ is the emission reduction due to the displacement of electricity in tCO_2.

PE_y is the project emission in tCO_2e.

L_y is the leakage in tCO_2e.

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	**$EF_{OM,y}$**
Data unit:	tCO_2/MWh
Description:	Operation Margin Emission Factor of ECPG
Source of data used:	Chinese DNA
Value applied:	0.9411
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 ECPG
Source of data used:	Chinese DNA
Value applied:	0.7869
Justification of the choice of data or description of measurement methods and procedures actually	This build margin emission factor is calculated and recommended by Chinese DNA, see also http://cdm.ccchina.gov.cn .

applied :	
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 2006 default value
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>>

As described in the previous section, the OM and BM are ex-ante determined as: 0.9411 tCO_2/MWh and 0.7869 tCO_2/MWh, then the baseline emission factor is the weighted average of OM and BM:

$EF_{electricity,y}$=0.5×0.9411+0.5×0.7869=0.864 tCO_2/MWh.

The annual electricity supply is expected to be EG_y=188,488.80 MWh, then the baseline emission for electricity generation is :

$BE_{electricity,y}=EG_y \times EF_{electricity,y}$=162,854 tCO_2.

According to the actual operation statistics in 2009/2010, the combusted biomass residues are wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw and the annual consumption is re-calculated to be 112,607.84 tons /18,363.38 tons /0.78 tons /13,459.60 tons /21,004.52 tons /12,560.49 tons /8,484.10 tonne separately(in dry matter). Then the baseline emission due to uncontrolled burning of biomass can be calculated as follows:

$BE_{biomass,y}$=21×186,480.7 ×0.001971=7,718 tCO_2e.

According to the actual operation statistics in 2009/2010, NCV of these seven types of biomass residues are: 0.01908/0.01772/0.01856/0.01739/0.01661/0.01734/0.01639 TJ/t for wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately.

The methane emissions from combustion of biomass residues can be calculated as follows:
$PE_{biomass,CH4,y}$=0.0411×(112,607.84* 0.01908+18,363.38*0.01772+0.78*0.01856+13,459.60*0.01739+21,004.52*0.01661+12,560.49*0.01734+8,484.10*0.01639)×21=2,947 tCO_2.

PET_y=186,481*100*0.001011= 18,854 tCO_2.

The carbon dioxide emissions from on-site consumption of fossil fuels can be calculated as:
$PEFF_y$=24×0.042652×74.1=76 tCO_2.

The CO_2 emissions from on-site electricity consumption ($PE_{EC,y}$) are calculated as follows:

Electricity consumption by straw crackers have already been deducted in EGy(Annual electricity delivered to the grid by the proposed project),and there is no straw crackers in the two biomass collection stations.

So $EC_{PJ,y}$ is 0 and fix in the whole crediting period.

$PE_{EC,y}$ =0*0.864=0 tCO_2.

Then the project emissions can be calculated as:

PE_y=2,947+18,854+76+0=21,877 tCO_2e.

The emission reduction can be calculated as:

ER_y= 162,854+7,718-21,877=148,695 tCO_2e.

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

The crediting period is expected to be renewed to 21 years in total. As the project has been successfully registered by EB on 01/04/2008, so, with the renewable crediting periods, the emission reductions during the first crediting period are estimated as:

day/month /Year	Estimation of Project activity Emission (tonnes of CO2e)	Estimation of baseline emission (tonnes of CO2 e)	Estimation of leakage (tonnes of CO2e)	Estimation of Emission reductions (tonnes of CO2 e)
01/04/2008-31/03/2009	21,877	170,572	0	148,695
01/04/2009-31/03/2010	21,877	170,572	0	148,695
01/04/2010-31/03/2011	21,877	170,572	0	148,695
01/04/2011-31/03/2012	21,877	170,572	0	148,695
01/04/2012-31/03/2013	21,877	170,572	0	148,695
01/04/2013-31/03/2014	21,877	170,572	0	148,695
01/04/2014-31/03/2015	21,877	170,572	0	148,695
Total(t CO2e)	153,139	1,194,004	0	1,040,865

B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Note:

1.There is a revision to the monitoring plan of the project approved by EB on 22 Apr 09, and in section B.7 of this notification PDD, PO revised again according to actual project implementation status and in line with ACM0006 V04.

2. Section B.7 in this notification PDD is revised based on the approved version of Monitoring Plan Revision (MPR), not the section in registered PDD.

Data / Parameter:	EGy
Data unit:	MWh
Description:	Annual electricity delivered to the grid by the proposed project
Source of data to be used:	Electricity meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	188,488.80 MWh calculated from actual operation statistics in 2009/2010.
Description of measurement methods and procedures to be applied:	This parameter will be hourly measured and monthly recorded. The relevant data will be kept during the crediting period and two years after. The electricity meter will be operated by the power distribution company and adjusted according to relevant national standard including "Technical administrative code of electric energy metering" DL/T 448-2000, "Verification regulation of electric energy metering appliance" SD 109-83, "Electricity Law", "Metrology law of the PR China". The accuracy of the metering equipment is 0.5s. The metering equipment will be calibrated annually. The net electricity delivered to the grid by the proposed project will be calculated as follows: EGy=A-A'-B, where A is the electricity delivered to the grid by the unit of the proposed project, measured by main ammeters. A' is the electricity consumed by the units from the grid, also measured through electricity meter. B is measured by an ammeter connected with an emergence line to measure the electricity consumed by the proposed projects in case of emergence.
QA/QC procedures to be applied:	The data is monitored through the electricity meter, and rechecked by comparing with the electricity sales receipt from power corporation monthly.
Any comment:	

Data / Parameter:	BFk,y
Data unit:	tons
Description:	Quantity of biomass residue type k combusted in the project plant during the year y(k= wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw)
Source of data to be used:	Power plant and the department who is responsible for the straw collection and transportation.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	BFk,y =112,607.84 tons /18,363.38 tons /0.78 tons /13,459.60 tons /21,004.52 tons /12,560.49 tons /8,484.10 tonne for wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately(in dry matter). Calculated from actual operation statistics in 2009/2010.
Description of measurement methods and procedures to be applied:	The electrical weight (SCS/ZCS Electrical Weight) will be operated by staffs appointed by the project company to be responsible for the record and monitor of biomass residues 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. The electrical weight will be calibrated annually according to related national standards

	(JJG555-96, or JJG539-1997, or JJG14-1997, or JJG13-1997 etc). The accuracy of weight will be class of Ⅲ, or be subject to the above national standards.
QA/QC procedures to be applied:	The amount of cotton straws consumed will be recorded continuously and crosschecked by an annual energy balance that is based on purchased quantities and stock changes.
Any comment:	

Data / Parameter:	Moisture content of the biomass residues
Data unit:	% water content
Description:	Moisture content of each biomass residue type k.(k= wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw)
Source of data to be used:	On-site measurements
Value of data applied for the purpose of calculating expected emission reductions in section B.5	33.84%/27.06%/22.89%/30.57%/22.81%/ 23.38%/19.18% for wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately. Calculated from database of moisture content of biomass residues in the 1st monitoring period.
Description of measurement methods and procedures to be applied:	The moisture should be measured continuously and mean values will be calculated at least annually. PO use electric blast ovens and electronic balances to monitor the moisture content of the biomass residues, following the national standard for moisture content monitoring, GB/T211-2007.
QA/QC procedures to be applied:	Three samples should be analyzed at the same time and reported. And the average of moisture content of these samples should be used. .
Any comment:	

Data / Parameter:	**$Density_d$**
Data unit:	t/L
Description:	Density of diesel used for biomass residues transportation
Source of data to be used:	National standard value：GB/T19147-2009
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.00084
Description of measurement methods and procedures to be applied:	The national standard GB/T19147-2009 and will be updated with the lastest version of GB/T19147.
QA/QC procedures to	

be applied:	
Any comment:	

Data / Parameter:	$FF_{project,plant,d,y}$
Data unit:	Tons
Description:	Quantity of diesel combusted in the straw-fired boiler during the year y
Source of data to be used:	Power plant
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	The power plant will build diesel account for each boiler and will be reported and documented monthly.
QA/QC procedures to be applied:	The amount of diesel consumed will be recorded monthly and crosschecked by an annual energy balance that is based on purchased quantities and stock 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 to be used:	Power plant and straw brokers
Value of data applied for the purpose of calculating expected emission reductions in section B.5	24
Description of measurement methods and procedures to be applied:	The power plant will collect diesel purchase receipt from fuel station and will document these data monthly. The quantity of diesel combusted is equal to the quantity of stock at the start of the year plus the purchased amount and then minus the stock at the end of the year.
QA/QC procedures to be applied:	The amount of diesel consumed will be recorded monthly and crosschecked by an annual energy balance that is based on purchased quantities and stock changes of different straw brokers.
Any comment:	

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 to be used:	Calculate
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Electricity consumption by straw crackers have already been deducted in EGy (Annual electricity delivered to the grid by the proposed project),and there is no straw crackers in the two biomass collection stations. Further more, Linhai biomass collection station has been disused since 31/08/2010,Yangma biomass collection station has been disused since 16/06/2010.. If new biomass collection station(s) are to be constructed and put into use, PO will use calibrated electricity meter(s) with accuracy of no less than class 2.0 to monitor the power consumption in the station(s), following the national standards.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	**AVD_y**
Data unit:	km
Description:	Average round trip distance between biomass fuel supply sites and the project site
Source of data to be used:	Power plant and the department who is responsible for the straw collection and transportation.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100
Description of measurement methods and procedures to be applied:	A staff will be appointed by the project company to be 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:	**Ny**
Data unit:	-
Description:	Number of truck trips for the transportation of biomass.
Source of data to be used:	Power plant and the department who is responsible for the straw collection and transportation.
Value of data applied	186,481

for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Whenever the truck arrives in the power plant, the statistician puts down the number in the data collection system for calculating project emissions.
QA/QC procedures to be applied:	Check consistency of the number of truck trips with the quantity of biomass combusted, e.g. by the relation with previous years.
Any comment:	

Data / Parameter:	**---**
Data unit:	Tons
Description:	Quantity of available biomass residues of type *k* in the region.(k= wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw)
Source of data to be used:	Official surveys or statistics
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See Table B-4 "Statistics of local biomass resource" for details.
Description of measurement methods and procedures to be applied:	The data come from official information should be applied. If the data is not available, the calculation and estimation based on official information should be adopted. The quantity of surplus supply is the difference between available biomass and biomass used for other purposes than generation.
QA/QC procedures to be applied:	Uncertainty level of data is low, which can be rechecked by the planting area and output of cotton.
Any comment:	

Data / Parameter:	**---**
Data unit:	Tons
Description:	Quantity of biomass residues of type k that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region. (k= wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw)
Source of data to be used:	Official surveys or statistics
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See Table B-4 "Statistics of local biomass resource" for details.
Description of measurement methods and procedures to be applied:	The data come from official information should be applied. If the data is not available, the calculation and estimation based on official information should be adopted. The quantity of surplus supply is the difference between available biomass and biomass used for other purposes than generation.

QA/QC procedures to be applied:	Uncertainty level of data is low, which can be rechecked by the planting area and output of cotton.
Any comment:	

Data / Parameter:	$EF_{CH4,BF}$
Data unit:	tCH4/TJ
Description:	CH4 emission factor for controlled burning of the straw.
Source of data to be used:	Version 04 of ACM0006
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.0411
Description of measurement methods and procedures to be applied:	This data will be collected from latest methodology or IPCC guidelines.
QA/QC procedures to be applied:	Uncertainty level of data is low,
Any comment:	

Data / Parameter:	$EF_{km,CO2,y}$
Data unit:	tCO_2/km
Description:	Average CO2 emission factor for the trucks during the year y.
Source of data to be used:	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual, Moderate Control index for US Heavy Duty Diesel Vehicles in Table 1-32, page 1.75
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.001011
Description of measurement methods and procedures to be applied:	Shall be updated according to IPCC latest version. Minimal of two years after last issuance of CERs.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	NCV_d
Data unit:	TJ/t
Description:	Net calorie value of diesel used for on-site fuel use
Source of data to be used:	National default value

Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.042652
Description of measurement methods and procedures to be applied:	The net calorific value of diesel should be collected from the latest China Energy Statistical Yearbook.
QA/QC procedures to be applied:	As a national specific value, the uncertainty is low.
Any comment:	

Data / Parameter:	**EF_d**
Data unit:	tCO_2/TJ
Description:	Emission factor of diesel used for on-site fuel use
Source of data to be used:	IPCC default value
Value of data applied for the purpose of calculating expected emission reductions in section B.5	74.1
Description of measurement methods and procedures to be applied:	This data will be fixed or updated according to IPCC guidelines.
QA/QC procedures to be applied:	Uncertainty level of data is low,
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 biomass residues.
Source of data to be used:	Version 04 of ACM0006
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.001971 (This value will be fixed in the entire crediting period.)
Description of measurement methods and procedures to be applied:	This data will be fixed or updated according to IPCC guidelines.
QA/QC procedures to be applied:	Uncertainty level of data is low,

Any comment:	

Data / Parameter:	NCVk
Data unit:	TJ/t
Description:	Net calorific value of biomass residue type k consumed by the proposed project. (k= wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw)
Source of data to be used:	Power plant and the department who is responsible for the biomass residue collection and transportation.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	According to the actual operation statistics in 2009/2010, NCV of these seven types of biomass residues are: 0.01908/0.01772/0.01856/0.01739/0.01661/0.01734/0.01639 TJ/t for wood residues/cotton straw/cole straw/maize straw/rice straw/reed/wheat straw separately.
Description of measurement methods and procedures to be applied:	The net calorific value of biomass residues should be measured and reported by qualified test institution per six months. For each test, at least three samples should be measured and the average NCV should be used.
QA/QC procedures to be applied:	Three samples (dry matter) should be analyzed at the same time by the test institution and reported. And the average of NCV of these samples should be used in the emission reduction calculation. The analysis will be made every six months. NCV of all types of biomass residues should be tested.
Any comment:	

Data / parameter:	$EF_{CO2,LE}$
Data unit:	tCO_2/GJ
Description:	CO2 emission factor of coal is the most carbon intensive fuel used in the country
Source of data to be used:	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: workbook", Chapter 1, table 1-2.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.092708 (coal) 25.8tC/TJ * 44/12tCO2/tC * 0.001TJ/GJ *0.98=0.092708 tCO2/GJ
Description of measurement methods and procedures to be applied:	This data will be fixed or update according to IPCC guidelines..
QA/QC procedures to be applied:	Uncertainty level of data is low,
Any comment:	

B.7.2 Description of the monitoring plan:

>>

The proposed project adopted the approved baseline methodology Version 04 of ACM0006: Consolidated baseline methodology for grid-connected electricity generation from biomass residues. According to the description in B.7, the relative monitoring methodology Version 04 of ACM0006 is adopted, which is consolidated monitoring methodology for grid-connected electricity generation from biomass residues.

1. The requirements of monitoring plan

The project owner should build up a monitoring system. The system should be able to estimate, measure, collect and track data. When the emission abatement is verified by DOE, the system can show the monitoring process and supply the credible, transparent and true results. It ensures that the carbon dioxide emission abatement is verified to the CERS buyers.

The proposed project substitutes some electricity generated by general fossil fuels, and avoids the relative carbon dioxide emission. So the electricity amount supplying to grid is the key data what should be monitored. Besides the electricity amount, all the data relative to baseline emission, emission by the proposed project and leakage should be monitored.

2. Principal of the monitoring plan

The proposed project owner is responsible the monitoring plan. Moreover some relative people are needed. The project owner should appoint a Chinese CDM project director and a monitoring manager. Their respective responsibilities are as follows：

Chinese CDM project director：Receive the report from monitoring manager; manage the CDM project jointly with CERs buyer; Coordinate with the Chinese Government and stakeholders; submit the monitoring report to DOE and deliver to CERs.

Monitoring manager: Based on monitoring manual guideline, records the net electricity supplied monthly and aggregately annually, prepares the monitoring report, etc. Monitoring manager is responsible to the Chinese CDM project director.

The two managers should audit interior reports regularly in order to offer high quality data. The audit interiorly is helpful to find some operational false and adjust in time.

If one person changes his work in project life-time, the new must be qualified and be trained before going to post.

In case deviations in the monitoring data are found, the Monitoring manager should study the operating parameters to identify the reason for the deviation and take remedial measures.

Monitoring report will be prepared by the monitoring manager and submit to Chinese CDM project director for final review, who will submit the report to the DOE.

3. Meters installation

The meters installed at transformer substation are used to monitor net electricity delivered to the grid. There are two systems for meters operation and maintenance. One is hold by ECPG, the other is hold by project owner. The two instruments system can record data from long distance and record accumulated electricity amount. The two sides have the right to record the two meters data. ECPG should provide the main meters system data to the project owner every month.

The meters are installed as following figure. They can record the electricity amount from two directions. They are 0.2S level. Once the project activities are halted, the grid will supply electricity to the plant. .

4. Calibration and measure

The project owner will sign an agreement with ECPG, which stipulate the process of quality control in measure and calibration in order to make the data more precise.

The meters should be enough precise so that any error using these meters is not larger than +0.2% of the whole scale.

The two meters installed system should be inspected and enclosed by project owner and ECPG.

The calibration is implemented by ECPG, and the relative record should provide to project owner. These records are holds by Project Owner or the appointed third side.

5. Monitoring

The monitoring plan will supervise the following data:

5.1 straw weight and humidity

The trucks conveying straws should be weighted every time. The humidity instrument is also used to measure biomass residues.

5.2 electricity delivered

Power delivered to grid is measured by the meter installed on project site, and recorded by computer system at control centre.

It should ensure DOE to gain conveniently the records of meters and calibration records.

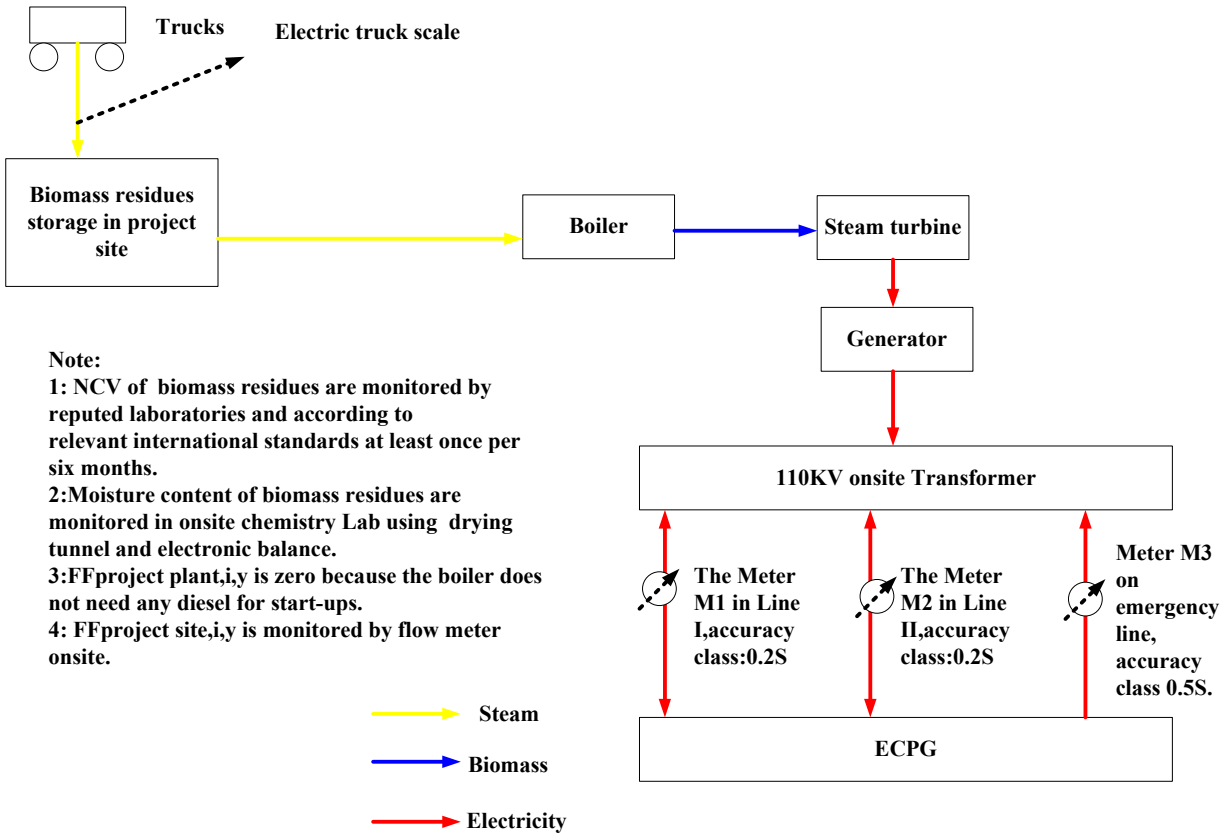


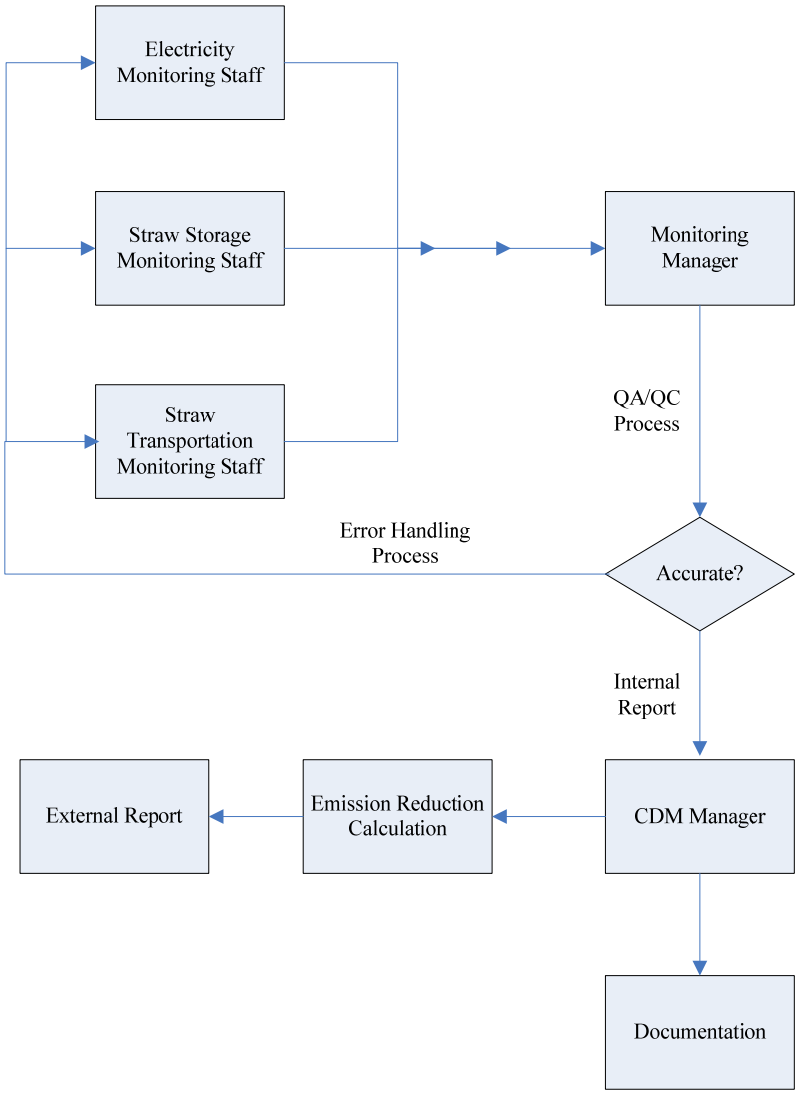
Figure: Line diagrams

5.3 quality ensure and quality control

The quality assurance and quality control for data records, maintenance and document should revised and improved according to the requirements of CDM project and the actually operation.

As B.7.1, the net electricity output will be continually measured and monthly recorded which will be rechecked by electricity sale invoice. Record frequency for other data could be found in B.7.1

This monitoring plan will be implemented by professional staff authorized by the project sponsor. The management structure is illustrated as follows:



6. Disposal of urgency

If the fossil fuel is needed, the species and amount of the fossil fuel should be recorded in detail. The leakage led by this scenario should be calculated precisely and clearly.

7. Data management system

The proposed system is used to collect the data from monitoring process and keep them in paper archives and in the electric archives.

All the information and data collected in the whole process should be kept in archives with paper documents and in the electric archives, from original data source to final calculation data. These relevant data should be kept during the crediting period and two years later. Some hand recorded data should be also kept.

If the DOE asks some requirements in verification, the project owner has the responsibility to provide extra and necessary data to DOE in time.

8 verification

The verification is a necessary part of all CDM projects. The main object of verification is to check independently the PDD report finished and greenhouse gas emission abatement estimated. The frequency of verification is one time per year.

A person especially assigned by the project owner for contact with DOE will be charge of monitoring and verification.

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

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The baseline re-studies and monitoring methodology of the project was completed on 24/10/2011. The persons involved in baseline and monitoring study is Guo zhigang. Email: gzg13066@hotmail.com.

The above person is not the project participants listed in Annex 1.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>

Aug. 10, 2006(start construction date)

C.1.2. Expected operational lifetime of the project activity:

>>

25 years

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>

01/04/2008

C.2.1.2. Length of the first crediting period:

>>

7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

Not applicable

C.2.2.2. Length:

>>

Not applicable

SECTION D. Environmental impacts

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D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

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The environmental impact assessment (EIA) for this project has been approved by Jiangsu Provincial Environmental Protection Bureau. Please refer to "environment impact assessment report on NBE Sheyang county biomass generation project"

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

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Conclusions of the EIA report are summarized as follows:

Environmental impact during the construction period:

The environment impact during the construction is temporary with little negative effect on surroundings, which will be summarized as follows:

1. Exhaust gas： Exhaust gas and fly dust will be generated due to the project construction and transportation activities, which will be minimized through rational management and spraying water and setting up enclosure.

2. Waste water: The waste water, including living sewage and production wastewater, will be collected and disposed by the wastewater treatment facility to meet the standard.

3. Solid waste: include the solid waste due to construction activity and the worker staff living waste, which will be collected and disposed by the project owner regularly.

4. Noise: the noise sources are mechanic running, vehicle movement, equipment install, etc. which will be minimized through rational work time arrangement and installing noise elimination and sound insulation and other measures.

Environmental impact during the operation period:

1. Exhaust gas

The soot, SO_2 and NOx at the flue of the proposed project will be treated by a high efficiency hop-pocket dust catcher, its removal rate will not less 99.5 percent, then emitted into atmosphere to meet the requirement of GB-13233-2003(fossil plant air pollutants emission standard). At the same time, Dust emission of the straw collection sub-stations will also meet the requirement of GB16297-1996 (air pollutants emission standard). the smoke and flue gas by-produced by the project activity shall be monitored and shall not exceed the upper limit of the relevant national standards: the dust, SO_2 and NOx emission will be less than 12.44 tons, 157.63 tons and 255.4 tons per year respectively.

2. Waste water: The waste water, including residential drainage and production wastewater, will be collected and disposed by the wastewater treatment facility to meet the standard, then emitted into

Xiaoyang River. The waste water, COD,SS discharge will be less than 216901 tons, 1.3 tons and 0.87 tons per year respectively.

3. Solid waste

The solid waste of the proposed project includes ash residues and living waste. The ash residues is rich in kalium and can be returned to cropland as fertilizer or proceed further into composite fertilizer. The living waste will be collected and disposed by the Sanitation sector. Therefore, the solid waste has little negative on the local environment.

4. Noise

The noise sources of the proposed project are from fan, steam generator and pumps, etc. Installing noise elimination and sound insulation and other measures will be carried out to effectively, which will decrease the noise effect on the surroundings, such as the equipment with intensive noise will be installed in the plant centre, trees will be planted.

5. Storage and transportation of biomass

Storage and transportation of biomass may be an important factor to the environment. Dispersed biomass storage can be adopted, and through setting up awning in the storage site and bundles in time, the showering, damping, decomposition and flying of the biomass will be prevented. The biomass transportation should keep away from county centre, and transportation in the evening should be avoided

In a word, the proposed project will use the renewable cotton resources with little SO_2 emission, and the pollution treatment measures are carried out effectively with little negative effect on the surroundings. Therefore, the proposed project is feasible from the environment aspect.

SECTION E. Stakeholders' comments

>>

The project owner has carried out investigation on the public's comments and suggestions of local stakeholders on this project by the following two approaches:

- Round table discussion
- Questionnaires

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

1. Round table discussion

On the afternoon of November 22, 2006, the project owner carried out a round table discussion among the local stakeholders on the NBE Sheyang biomass generation project in the third floor conference room at the Sheyang County Economic Development Zone. The discussion is fruitful basing on the local government the authorities, such as the officials and experts from the local SDRC, the development zone, the water bureau, agricultural Bureau , the Construction Bank, the environment protect bureau, etc., the conclusions are summarized as follows :

1). the proposed project is consistent with the national industrial policy and environmental policy, which can facilitate the eco-agriculture, increase farmer income, and reduce the farmer labour intensity.

2). the project will use the waste cotton straw, which will prevent the pollution from the burning of straw or pushing the straw into the river, and improve the ecological environment.

3). compared with the conventional coal-fired power project, .The project can greatly reduce the SO2.NOX and CO2 emissions, and play a positive role in protecting and improving the local environment.

4). the proposed project will have little negative impact on local residents.

5). the proposed project is help to local energy structure adjustment, environmental protection, economic development and, farmers increase income. The local stakeholder showed strong support to proposed project building and put into operation as soon as possible.

2. Questionnaire

According to China's environmental protection laws and regulatory requirements, public participation investigations of environmental impact assessment should be carried out, collect the suggestions of local residents, to improve the environmental and social benefits.

Survey Formats

Public participation investigations have been carried out on the local stakeholder of the surrounding areas by questionnaires, which reflect the public views on the present environment in the region and their suggestions and demands on environmental protection of the proposed projects.

Investigation scope by questionnaires

Questionnaires have been distributed to varied local residents in the project location in a fair and all-sided manner. The Investigated stakeholders are mainly residents from several villages nearby, such as those of development zone near the project site, ChenYang town, ChengYang town, Tongyang town and Linhai town..

110 questionnaires were distributed and all of them had been returned. The investigation had taken fully account into the public advice of different ages, civilizations and occupations to make the investigated stakeholders more representative. Of all the investigated stakeholders, 83 are men, accounting for 75%; 27 are women, 25%; there are also some local government officers ,workmen, peasants and other occupations, including 8 leaders, accounting for 7%;42 are government officers, 38%;32 are workmen, 29%; 28 are peasants, 26%.

Major investigated issues

For detailed information, please refers to E.2: Comments from the questionnaires

E.2. Summary of the comments received:

>>

Comments from the questionnaires are summarized below：

Issues		Stat. Result		
view on environment	options	Care very much	care	don't care
	persons	67	40	3
	%	61	36	3
The degree of knowing about the project	options	know	Generally know	Don't know
	persons	53	45	12
	%	48	41	11

The economic benefits of the project	options	promote	decrease	Generally promote
	persons	104	0	6
	%	95	0	5
Impact on residents' living	options	Good than bad	Bad than good	General impact
	persons	86	0	24
	%	78	0	22
Location reasonable?	options	reasonable	unreasonable	Not care
	persons	101	0	9
	%	92	0	8
Attitude to the project	options	support	Not support	Not care
	persons	110	0	0
	%	100	0	0

(1) The public understanding of the environment

From the returned questionnaires, it can be concluded that the local stakeholders are very concerned about environmental issues, accounting for 97% concerned about environmental issues, which indicates that with the state environmental protection laws and regulations strengthening and improving, also with the environmental protection propagandise , the local residents pay more an more attention to their own living environment.

(2) The public opinion to the proposed project

As shown above, the local public know much about the project, the majority of respondents support the project and they think the project can promote local economic development and improve living conditions of local residents. For the project site, the public in general agree and think it is reasonable. And the public will also support the proposed project construction.

In short, from the round table discussion and the questionnaires feedback, both the local authorities and the public strongly support the proposed project.

E.3. Report on how due account was taken of any comments received:

>>

As power plant construction will make some certain effect on the local environment, the public participant also made some rational recommendations. For example, "choose efficient pollution control facilities, and to ensure its stable operation," "strengthen the management of transport vehicles." and so on. Therefore, project owner should give sufficient attention to the public suggestions and strengthen environmental protection facilities maintenance and management in their day-to-day operation, and strengthen the management of transport vehicles, avoiding impact on residents.

Annex 1

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is involved in this project activity.

Annex 3

BASELINE INFORMATION

Table A3-0 Share of fossil-fuel fired generation in East China Power Grid from 2000-2004

Year		Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total	Share of fossil-fuel fired plant	Share of low-cost/must run
	Unit	TWh	TWh	TWh	TWh	TWh	TWh	%	%
2000	Total Generation	55.83	97.26	69.73	36.81	40.37	300.03	89.53	10.47
	Generation from fossil fuel plant	55.83	97.19	58.65	36.08	20.85	268.59		
2001	Total Generation	57.70	104.12	78.82	41.74	44.64	327.02	88.51	11.49
	Generation from fossil fuel plant	57.70	104.06	65.69	40.82	21.17	289.44		
2002	Total Generation	61.65	116.88	88.92	47.06	53.31	367.81	88.14	11.86
	Generation from fossil fuel plant	61.65	116.72	69.29	45.70	30.85	324.20		
2003	Total Generation	69.44	133.68	109.22	55.72	61.07	429.13	89.04	10.96
	Generation from fossil fuel plant	69.44	133.28	83.09	54.16	42.15	382.11		
2004	Total Generation	71.13	163.90	125.88	61.10	65.97	487.99	90.23	9.77
	Generation from fossil fuel plant	71.13	163.55	95.26	59.88	50.49	440.29		

Data source：Chinese Power Yearbook 2001～2005.

Table A3-1. Calculation of the Combined Margin Emission Factor

	Emission factor A	Value and Source B	Weight C	Weighted value D = B * C
1	EF_{OM}	0.9411 Table A3-2	0.5	0.4706
2	EF_{BM}	0.7869 Table A3-5	0.5	0.3935
3	CM			0.864

Table A3-2. Calculation of the Operating Margin Emission Factor

	Variable	2002 A	2003 B	2004 C	Total D
1	Supply of thermal power to Eastern China grid (MWh)	304652277	360848554	414795263	1080296094
		Table A3-3c	Table A3-3b	Table A3-3a	D1 = A1 + B1 + C1
2	Imports of power from other grids (MWh)	7883000	24461910	38583460	70928370
		Files cited above[11]	Files cited above	Files cited above	D2 = A2 + B2 + C2
3	Total power supply for calculation EF_{OM} (MWh)	312535277.1	385310463.7	453378722.6	1151224463.4
		A3 = A1 + A2	B3 = B1 + B2	C3 = C1 + C2	D3 = D1 + D2
4	CO2 emissions associated with thermal power generation on Eastern China grid (tCO2)	290190863.3	340772267.9	393077595.9	1024040727.1
		Table A3-4c	Table A3-4b	Table A3-4a	D4 = A4 + B4 + C4
5	CO2 emissions associated with power imports from other grids (tCO2)	5733968.2	20741911.1	32843329	59319208.3
		Files cited above	Files cited above	Files cited above	D5 = A5 + B5 + C5
6	Total CO2 emissions for calculation EF_{OM} (tCO2)	295924831.5	361514179	425920924.9	1083359935.4
		A6 = A4 + A5	B6 = B4 + B5	C6 = C4 + C5	D6 = D4 + D5
7	EFOM (tCO2/MWh)	0.94685	0.93824	0.93944	0.94105
		A6 / A3	B6 / B3	C6 / C3	D6 / D3

Table A3-3a. Calculation of thermal power supply to Eastern China Grid, 2004

	Grid	Thermal Power generation (MWh) A	Self-consumption (%) B	Thermal power supply (MWh) C = A * (100 - B) / 100
1	Shanghai	71127000	5.22	67414171
2	Jiangsu	163545000	5.93	153846782
3	Zhejiang	95255000	5.68	89844516
4	Anhui	59875000	6.03	56264538
5	Fujian	50490000	6.07	47425257
	Total			414795263

Source: Files mentioned above. Original data are from China Electric Power Yearbook 2005.

Table A3-3b. Calculation of thermal power supply to Eastern China Grid, 2003

	Grid	Thermal Power generation (MWh)	Self-consumption (%)	Thermal power supply (MWh)

[11] Original data are from China Electrical Power Yearbook, 2005, 2004 and 2003.

		A	B	C = A * (100 - B) / 100
1	Shanghai	69444000	5.14	65874578
2	Jiangsu	133277000	5.9	125413657
3	Zhejiang	83089000	5.31	78676974
4	Anhui	54156000	6.06	50874146
5	Fujian	42146000	5.07	40009198
6	Total			360848554

Source: Files mentioned above. Original data are from China Electric Power Yearbook 2004.

Table A3-3c. Calculation of thermal power supply to Eastern China Grid, 2002

	Grid	Thermal Power generation (MWh) A	Self-consumption (%) B	Thermal power supply (MWh) C = A * (100 - B) / 100
1	Shanghai	61648000	5.44	58294349
2	Jiangsu	116716000	6.09	109607996
3	Zhejiang	69287000	5.95	65164424
4	Anhui	45703000	6.36	42796289
5	Fujian	30850000	6.68	28789220
6	Total			304652277

Source: Files mentioned above. Original data are from China Electric Power Yearbook 2003.

Table A3-4a. Calculation of CO2 emissions from fuels for thermal power production, Eastern China Grid, 2004.

Fuel	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Eastern China Grid	Carbon coefficient (TC/TJ)	Oxidation factor (Fraction)	NCV (TJ/unit)	CO2 emissions (tCO2)
							A	B	C	D	E = A*B*C*D*44/12
Raw coal	10^4 Tons	2779.6	7601.9	4008.9	2906.2	2183.7	19480.3	25.8	98	20908	377594225.7
Clean coal	10^4 Tons						0	25.8	98	26344	0
Other washed coal	10^4 Tons		5.46			4.63	10.09	25.8	98	8363	78229.4857
Coke	10^4 Tons						0	29.5	98	28435	0
Coke oven gas	10^8 m^3	2.59					2.59	13	99.5	16726	205461.1526
Other gas	10^8 m^3	72.46					72.46	13	99.5	5227	1796340.631
Crude oil	10^4 Tons						0	20	99	41816	0
Diesel	10^4 Tons	2.69	27.17	6.23			36.09	20.2	99	42652	1128714.949
Fuel oil	10^4 Tons	58.52	55.07	202.89		23.26	339.74	21.1	99	41816	10881236.51
LPG	10^4 Tons						0	17.2	99.5	50179	0
Refinery gas	10^8 m^3	0.77	0.55				1.32	18.2	99.5	46055	40366.08376
Natural gas	10^8 m^3		0.14				0.14	15.3	99.5	38931	30423.52536
Other petroleum products	10^4 Tons	21.22	1.37	24.89			47.48	20	99	38369	1322597.847
Other coking products	10^4 Tons						0	25.8	98	28435	0
Other E (standard coal)	10^4 Tce	6.43		15.48			21.91	0	0	0	0
Total											393077595.9

Data source: Fuel consumption data are from China Energy Statistical Yearbook 2005. Net calorific values are from the files mentioned above and crosschecked against China Energy Statistical Yearbook, 2004; Oxidation factors are from the files mentioned above and crosschecked against IPCC default values, see Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Workbook, p. 1.8; fuel emission coefficients are from the files mentioned above and corsschecked against IPCC default values, see Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Workbook, p. 1.6.

Table A3-4b. Calculation of CO2 emissions from fuels for thermal power production, Eastern China Grid, 2003.

Fuel	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Eastern China Grid	Carbon coefficient (TC/TJ)	Oxidation factor (Fraction)	NCV (TJ/unit)	CO2 emissions (tCO2)
							A	B	C	D	E = A*B*C*D*44/12
Raw coal	10^4 Tons	2618	6417.74	3442.4	2669.67	1754	16901.81	25.8	98	20908	327614351.9
Clean coal	10^4 Tons						0	25.8	98	26344	0
Other washed coal	10^4 Tons						0	25.8	98	8363	0
Coke	10^4 Tons						0	29.5	98	28435	0
Coke oven gas	10^8 m^3	1.99	0.06				2.05	13	99.5	16726	162623.6922
Other gas	10^8 m^3	66.34					66.34	13	99.5	5227	1644620.998
Crude oil	10^4 Tons						0	20	99	41816	0
Diesel	10^4 Tons	1.26	14.71	13.99			29.96	20.2	99	42652	936999.1654
Fuel oil	10^4 Tons	95.49	0.76	174.48		18.89	289.62	21.1	99	41816	9275986.686
LPG	10^4 Tons						0	17.2	99.5	50179	0
Refinery gas	10^8 m^3	0.49	0.96				1.45	18.2	99.5	46055	44341.5314
Natural gas	10^8 m^3						0	15.3	99.5	38931	0
Other petroleum products	10^4 Tons	18.91	5.3	15.04			39.25	20	99	38369	1093343.84
Other coking products	10^4 Tons						0	25.8	98	28435	0
Other E (standard coal)	10^4 Tce	5.68		7.08			12.76	0	0	0	0
Total											340772267.9

Data source: Fuel consumption data are from China Energy Statistical Yearbook 2004. Net calorific values are from the files mentioned above and crosschecked against China Energy Statistical Yearbook, 2004; Oxidation factors are from the files mentioned above and crosschecked against IPCC default values, see Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Workbook, p. 1.8; fuel emission coefficients are from the files mentioned above and corsschecked against IPCC default values, see Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Workbook, p. 1.6.

Table A3-4c. Calculation of CO2 emissions from fuels for thermal power production, Eastern China Grid, 2002.

Fuel	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Eastern China Grid	Carbon coefficient (TC/TJ)	Oxidation factor (Fraction)	NCV (TJ/unit)	CO2 emissions (tCO2)
							A	B	C	D	E = A*B*C*D*44/12
Raw coal	10^4 Tons	2386	5674.69	2923.66	2025.05	1336.49	14345.89	25.8	98	20908	278071961.3
Clean coal	10^4 Tons						0	25.8	98	26344	0
Other washed coal	10^4 Tons						0	25.8	98	8363	0
Coke	10^4 Tons						0	29.5	98	28435	0
Coke oven gas	10^8 m^3	2.23	0.02				2.25	13	99.5	16726	178489.4183
Other gas	10^8 m^3	66.82					66.82	13	99.5	5227	1656520.577
Crude oil	10^4 Tons						0	20	99	41816	0
Gasoline	10^4 Tons		0.07				0.07	18.9	99	43070	2068.432443
Diesel	10^4 Tons	1.21	13.45	30			44.66	20.2	99	42652	1396741.747
Fuel oil	10^4 Tons	53.2	1.19	91.38	1.09	12.6	159.46	21.1	99	41816	5107205.431
LPG	10^4 Tons						0	17.2	99.5	50179	0
Refinery gas	10^8 m^3	0.84					0.84	18.2	99.5	46055	25687.50785
Natural gas	10^8 m^3						0	15.3	99.5	38931	0
Other petroleum products	10^4 Tons	10	3.47				13.47	20	99	38369	3752188.922
Other coking products	10^4 Tons						0	25.8	98	28435	0
Other E (standard coal)	10^4 Tce	3		10.4			13.4	0	0	0	0
Total											290190863.3

Data source: Fuel consumption data are from China Energy Statistical Yearbook 2000-2002. Net calorific values are from the files mentioned above and crosschecked against China Energy Statistical Yearbook, 2004; Oxidation factors are from the files mentioned above and crosschecked against IPCC default values, see Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Workbook, p. 1.8; fuel emission coefficients are from the files mentioned above and corsschecked against IPCC default values, see Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Workbook, p. 1.6.

Table A3-5. Calculation of the BM Emission Factor, Eastern China Grid

$EF_{thermal}$ (tCO2/MWh)	Share of thermal power in added capacity, 2004-2001	EF_{BM} (tCO2/MWh)
A	B	C = A * B
0.9004	87.39%	0.7869
Table A3-6	Table A3-9	

Table A3-6. Calculation of EF thermal

		λ A	EF_{adv} B	$EF_{thermal}$ calculation C = A * B
1	Coal	96.08%	0.9136	0.87779
		Table A3-8	Table A3-7	
2	Gas	0.53%	0.4381	0.00232
		Table A3-8	Table A3-7	
3	Oil	3.39%	0.6011	0.02038
		Table A3-8	Table A3-7	
4	$EF_{thermal}$[12]			0.9004

Table A3-7. Calculation of Emission factors of fuel using advanced technologies

Fuel	Efficiency (%) A	Carbon coefficient (tc/TJ) B	Oxidation factor C	EF_{adv} (tCO2/MWh) D=(3.6/(A*1000))*B*C*44/12
Coal	36.53%	25.8	0.98	0.9136
Gas	45.87%	15.3	0.995	0.4381
Oil	45.87%	21.1	0.99	0.6011

Source: Files downloaded and mentioned above.

[12] Rounded downward.

Table A3-8. Calculation of λs for the calculation of the BM, Eastern China Grid.[13]

Fuel	Unit	Eastern China Grid	NCV	Carbon coefficient	Oxidation factor	CO2 emissions
			(TJ/unit)	(TC/TJ)	(Fraction)	(tCO2)
		A	B	C	D	E = A*B*C*D*44/12
Raw coal	10^4 Tons	19480.3	20908 kJ/kg	25.80	0.98	377,594,226
Clean coal	10^4 Tons	0	26344 kJ/kg	25.80	0.98	0
Other washed coal	10^4 Tons	10.09	8363 kJ/kg	25.80	0.98	78,229
Coke	10^4 Tons	0	28435 kJ/kg	29.50	0.98	0
Other coking products	10^4 Tons					377,672,455
Coal, total		0	41816 kJ/kg	20.00	0.99	0
Coke oven gas	10^8 m^3	0	43070 kJ/kg	18.90	0.99	0
Other gas	10^8 m^3	0	43070 kJ/kg	19.60	0.99	0
LPG	10^4 Tons	36.09	42652 kJ/kg	20.20	0.99	1,128,715
Refinery gas	10^8 m^3	339.74	41816 kJ/kg	21.10	0.99	10,881,237
Natural gas	10^8 m^3	47.48	38369 kJ/kg	20.00	0.99	1322598
Gas total						13,322,550
Crude oil	10^4 Tons	1.4	38931 kJ/m^3	15.30	0.995	30,424
Gasoline	10^4 Tons	25.9	16726 kJ/m^3	13.00	0.995	205,461
Diesel	10^4 Tons	724.6	5227 kJ/m^3	13.00	0.995	1,796,341
Fuel oil	10^4 Tons	0	50179 kJ/kg	17.20	0.995	0
Other petroleum products	10^4 Tons	1.32	46055 kJ/kg	18.20	0.995	40,366
Oil total						2,072,591
Total						393,077,596

λcoal	96.08%
λgas	0.53%
λoil	3.39 %

Note that λ is calculated as the share of coal, gas, oil respectively in total CO2 emissions.

[13] Data are from Table A4a.

Table A3-9. Calculation of the share of thermal power in recently added capacity

Installed capacity	2002 A	2003 B	2004 C	Capacity added in 2002-2004 D=C-A	Share in added capacity
Thermal (MW)	61120.2	65036.5	79424.1	18303.9	87.39%
Hydropower (MW)	13165.1	13602.5	14417.8	1252.7	5.98%
Nuclear (MW)	1678	2406	3056	1378	6.58%
Other (MW)	62.2	51.7	72.7	10.5	0.05%
Total (MW)	**76025.5**	**81096.7**	**96970.6**	**20945.1**	**100.00%**
Percentage of 2004 capacity	78.40%	83.63%	100%		

Source: China Electric Power Yearbook 2005, p. 472-474; China Electric Power Yearbook 2004, p. 670, p.709; China Electric Power Yearbook 2003, p. 591-592.

Annex 4

MONITORING INFORMATION

Seen as B.7.2

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