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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

>>

Project name: Wuhe Kaidi Biomass Power Project
Version: 01
Date: 27/08/2008

A.2. Description of the project activity:

>>

Wuhe Kaidi Biomass Power Project (hereafter referred to as the proposed project) is a biomass utilization project developed by Wuhe Kaidi Green Energy Development Co., Ltd.(hereafter referred to as the Project Owner), is located in the South of Fine Chemical Industry Area, Mohekou, Bengbu City, Anhui Province, P.R. China.

The proposed project will process about 186,196 tonnes of biomass residue annually, of which rice husk, rice straw, wheat straw and corn straw are the main biomass fuel. 2 sets of 65t/h Circulating Fluidized Bed (CFB) boiler and 2 sets of 12MW steam turbines generator units will be installed. Therefore, the total installed capacity of the Project is 24MW. The annual operation time is estimated to be 6000 hours with a net electricity of 126,720MWh and a net heat generation of 541,602GJ per year. It is estimated that the proposed project will generate GHG emission reductions 158,171 tCO_2e per year.

The electricity generated will be transmitted through a 35kV transformer at the site to Mohekou 110kV substation and then supplied to Wuhe County power grid, which is a sub-grid of the East China Power Grid (ECPG). The proposed project will therefore replace the capacity of power plants on the ECPG, which is predominantly made up of coal fired power plants. The heat generated will be supplied to the plants in Mohekou Chemical Industry Area to meet the process heat demand and replace the small coal-fired boilers.

Additionally, the proposed project will accomplish an extra benefit of greenhouse gas (GHG) mitigation derived from a reduction of methane emissions by utilizing rice husk and straws from the local area which would be dumped or left decay under mainly aerobic conditions and burned uncontrolled outside in the fields.

The baseline scenario of the proposed project is the generation of power in the grid, generation of heat in coal-fired boilers and the biomass residues are dumped or left to decay under mainly aerobic conditions. The latter applies to, for example, dumping and decay of biomass residues on fields or burnt in an uncontrolled manner without utilizing it for energy purposes.

The proposed project will not only supply renewable electricity to grid generating emission reductions, but it will also contribute to sustainable development of the local community and the host country by means of:

- Supply of clean renewable energy to ECPG with improvements to the local energy structure;
- Promoting the comprehensive utilization of resources and mitigating emissions caused by decay or uncontrolled fire of the biomass residues;
- Increasing local incomes and providing 93 job opportunities;
- Decreasing the GHG emission from the fossil-fuel fired power plants as well as the emission of SO_x,

NO_x and dust.

A.3. Project participants:

>>

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)
Peoples' Republic of China (host)	Wuhe Kaidi Green energy Development Co., Ltd.	No
Netherlands	Camco International	No

>>

See Annex 1 for details

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

>>

A.4.1.1. Host Party(ies):

>>

People's Republic of China

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

>>

Anhui Province

A.4.1.3. City/Town/Community etc:

>>

Bengbu City

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

>>

The proposed project activity is located in the South of Fine Chemical Industrial Area, Mohekou, Bengbu City, Anhui Province.

The center of the plant has geographical coordinates of 117°29´42″ east longitude 32°54´18″ north latitude. The figureA-1 shows the location of the proposed project.

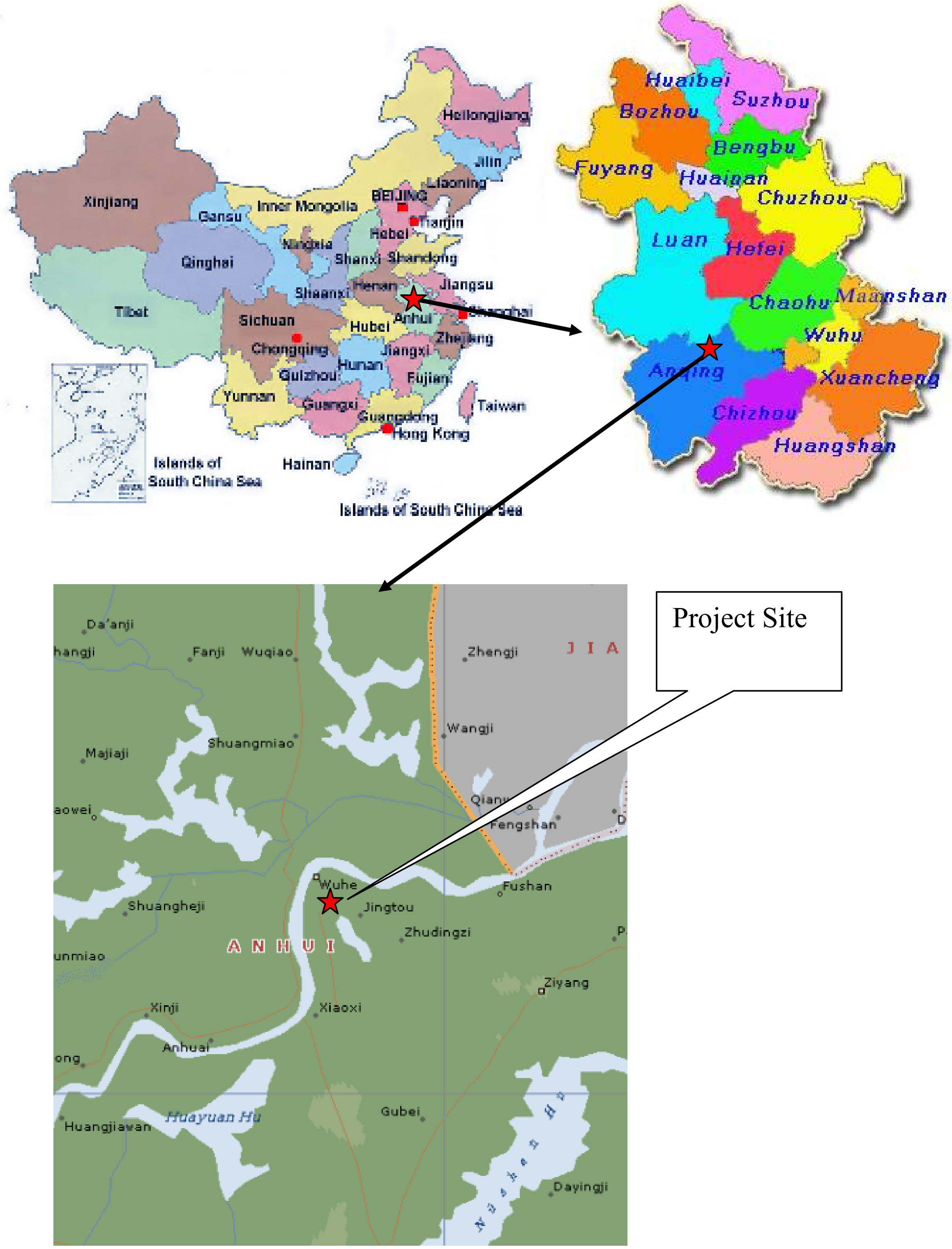

Figure A-1. The location of Wuhe Kaidi Biomass Power Project

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

>>

The proposed project falls into:
Sectoral Scope 1: energy industries (renewable - / non-renewable sources)
Project Activity: Grid-connected renewable power generation

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

>>

Scenario prior to the start of the implementation of the project activity:

The equivalent electricity is supplied by the ECPG, which is dominated by coal-fired power plants. And the heat will be supplied by small coal-fired boilers which is low efficient and will course high pollution to the surroundings. The lifetime of the boilers is about 20 years and if they are operating well, the lifetime can last for about 25 years. Based on the heat supply contract, there will be heat demand in the Chemical Industry Area and the heat demand, and it will be met by the small coal-fired boilers in the absence of the proposed project activity.

The biomass residues which are to be utilized in the proposed power plant are currently dumped or left decay under mainly aerobic conditions and burned uncontrolled outside in the fields.

Baseline Scenario:

The baseline scenario is the same as the scenario existing prior to the start of the implementation of the project activity.

Project Activity Scenario:

The technology employed by the proposed project is advanced domestic technology. The proposed project will install two sets of 65t/h circulating fluid bed (CFB) boilers with medium temperature and medium pressure. At the same time, two 12MW steam turbines and two suited generators (C12-4.90/0.981-12/435℃) will be applied in the proposed project .The steam turbine employed is medium temperature and medium pressure condensing steam turbine. The total installed capacity of the proposed project is 24MW.

The key technical specifications of boiler, turbine and generator are listed in the table below.

Table A-1 Key Equipments Parameters:

STEAM TURBINE and GENERATOR	
Manufacturer	NanJing Steam Turbine(Group) Co., Ltd
Model	C12-4.90/0.981-12/435℃
Type	Medium temperature and medium pressure condensing steam turbine
Rated power	12MW
Rated voltage	6.3KV
Efficiency factor	0.85

Rated rotating speed	3000r/min
Rated frequency	50Hz
Lifetime	30years
Quantity	2
BOILER	
Manufacturer	Jiangxi Jianglian Energy and Environmental Protection Co., Ltd
Model	KG65-450/5.29-FSWZ-Ⅰ
Type	Medium temperature and High pressure Circulating Fluidized Bed
Rated steam pressure	5.29MPa
Rated steam temporary	450℃
Efficiency	≥86 %
Lifetime	30years
Quantity	2

The biomass residues utilized in this proposed project will be mainly rice husk and straws, including rice straw, wheat straw and corn straw. The rice husk will be packed and stored temporarily at the rice mills. Some collection stations will be set up near to the resources for the straws to be processed and stored temporarily. From here the straws will be transported to the plant according to the dispatch schedule. The farthest rice mill for biomass collection is 60 km and the straws collection radius around the site of the power plant is 50km.

After the biomass residues are transported to the storehouse in the plant, they will be weighed by the weighbridge and then fed into fuel entering system to the boiler, and then sent to the boiler for combustion. All the steam entering into the turbine is for power generation, and some is extracted for heat supply. The heat generated by the proposed project will be supply to the local industry users in the Chemical Industry Area.

The boiler smoke will be treated by a high efficiency hop-pocket dust catcher and then carried to the ash storeroom. It is estimated that the annual ash generated from the power plant will be very limited. The ash is expected to be picked up by the local farmers and used as fertilizer.

All of the turbine and generator system will be supplied by Chinese domestic suppliers as well as the other auxiliary equipments installed in the power plant.

A flow diagram showing the power plant operation is provided as below. The monitoring equipments and their location are presented in section B.7.2. Figure B-4.

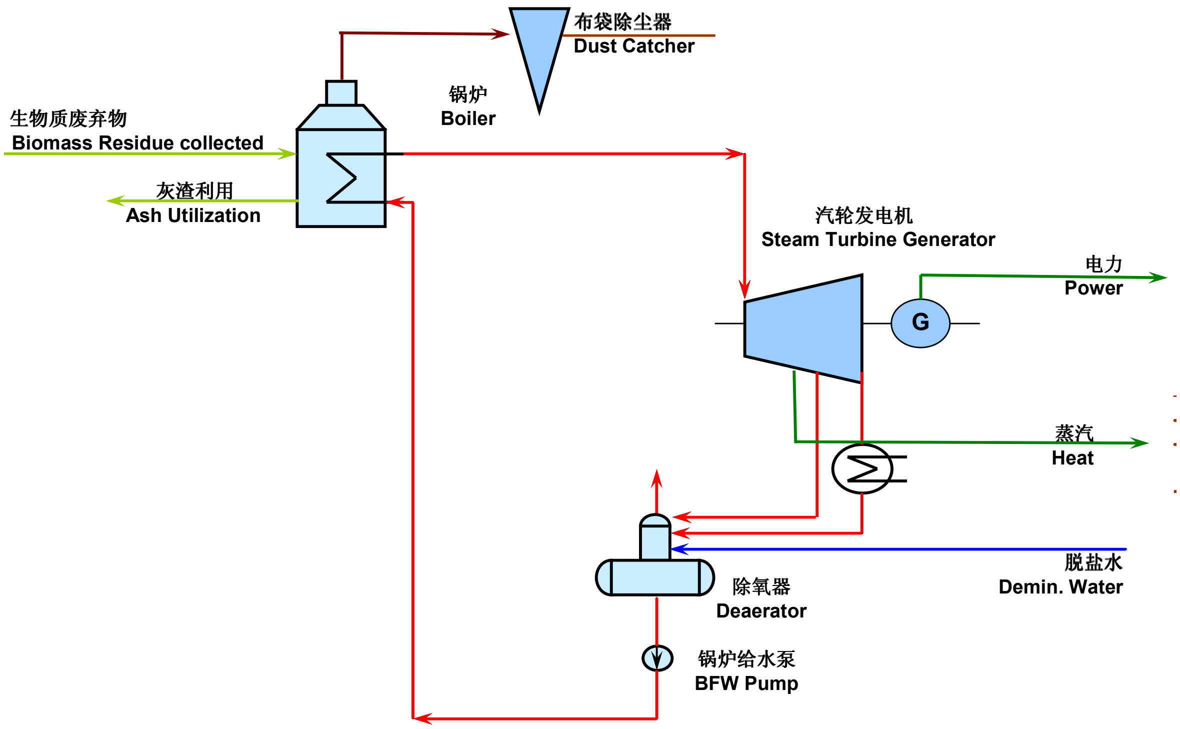

Figure A-2 Flow Diagram of the plant

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

>>

A crediting period of 7 (seven) years (renewable twice) is selected for the project activity. During the first crediting period, 1st July 2009 to 30th June 2016, the proposed project is expected to lead to emission reductions of 1,081,577 tCO_2e. The estimated amount of emission reductions over the chosen crediting period is indicated below[1].

Years	Annual estimation of emission reductions in tones of CO_2 e
01/07/2009-30/06/2010	132,553
01/07/2010-30/06/2011	158,171
01/07/2011-30/06/2012	158,171
01/07/2012-30/06/2013	158,171
01/07/2013-30/06/2014	158,171
01/07/2014-30/06/2015	158,171
01/07/2015-30/06/2016	158,171
Total estimated reductions (tones of CO_2 e)	1,081,577

[1] The proposed project will not supply heat in 2009.

Total number of crediting years in 1st crediting period	7
Annual average over the crediting period of estimated reductions (tones of CO_2e)	154,511

A.4.5. Public funding of the project activity:

>>

There is no public funding for this project.

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:

>>

1. ACM0006 (Version 06.2) – "*Consolidated methodology electricity generation from biomass residues*"
2. *"Combined tool to identify the baseline scenario and demonstrate additionality"*. (Version 02.1)
3. "*Tool for the demonstration and assessment of additionality"*(Version 05)
4. ACM0002 (Version 07) – "*Consolidated baseline methodology for grid-connected electricity generation from renewable sources*"
5. "*Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion*" (Version 01)
6. *"Tool to calculate baseline, project and/or leakage emissions from electricity consumption"* (Version 01)

For more information regarding the methodology, please refer to the link:

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:

>>

The approved methodology ACM0006 is applied here to determine the baseline of the proposed project. The project activity is a newly installed biomass power plant in the East China Power Grid (ECPG). The proposed project activity includes the installation of a new power generation plant at a site where currently no power generation occurs. Therefore, it is a "Greenfield" power project.

The proposed project meets all applicability conditions of methodology ACM0006 which are listed as follows:

- *No other biomass types than biomass residues, as defined in the methodology, are used in the project plant and these biomass residues are the predominant fuel used in the project plant (some fossil fuels may be co-fired);*
  Biomass from local rice husk, rice straw, wheat straw and corn straw, in Wuhe County will be the predominant fuel in the proposed project. Currently these biomass sources are dumped or left to decay under mainly aerobic conditions or burned in an uncontrolled way outside in the fields. A small amount of diesel will be used to help start-up of the boilers.

- *For projects that use biomass residues from a production process, the implementation of the project shall not result in an increase of the processing capacity of raw input or in other substantial changes in this process;*
  The straws and rice husk used by the proposed project are byproducts of agriculture crops, not from a production process.

- *The biomass residues used by the project facility should not be stored for more than one year;*
  The straws are directly bought from the farmers at the temporary storage stations at which the straws should not be stored for more than one year. The rice husks are directly bought from the rice mills and transported to the plant to use.

- *No significant energy quantities, except from transportation or mechanical treatment of the biomass residues, are required to prepare the biomass residues for fuel combustion, i.e. projects that process the biomass residues prior to combustion (e.g. esterification of waste oils).*
  There will be a small amount of energy consumption during the preparation of the biomass residues. This preparation includes mechanical treatment only, such as cutting and sheaving. There will also be fossil fuel consumption during transportation of the biomass residues. Except for these, the proposed project will not have significant consumption of fossil fuels.

Therefore, ACM0006 is applicable to the proposed project.

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

>>

Emission sources:

For the proposed project, the following emission sources shall be included:

- CO_2 emissions from on-site fossil fuel and electricity consumption that is attributable to the project activity. This includes fossil fuel co-fired in the project plant, fossil fuel used for on-site transportation of shredders or other equipment, as well as many other sources that are attributable to the project activity;
- CO_2 emissions due to the combustion of fossil fuel on the off-site transportation of biomass residues
- CO_2 emissions due to the combustion of electricity on the pre-treatment of biomass residues
- CH_4 emissions due to combustion of biomass residues for electricity and heat generation in the project activity

For the baseline emissions determination, following sources shall be included:

- CO_2 emissions from fossil fuel fired power plants at the electricity system, which is East China Power Grid; and
- CO_2 emissions from fossil fuel based heat generation which is displaced by the Project.
- CH_4 emissions due to uncontrolled burning or decay of the biomass residue in the absence of the project activity.

According to the approved methodology ACM0006, the emission sources and GHGs in the project boundary are listed in the following table.

Table B-1 GHGs source included or excluded from the project boundary

	Source	Gas	Included or not	Justification / Explanation
Baseline	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.
	Heat 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	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
		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 by the project activity
		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 by the project activity
		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 and / or heat generation	CO_2	No	It is assumed that CO2 emission from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector.
		CH_4	Yes	Since the CH_4 emissions of biomass residue are included in baseline, according to the methodology, this emission is included in project scenario.
		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 CO_2 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 is stored for not longer than one year, this emission source is assumed to be small.
		N_2O	No	For simplification. This emission source is assumed to be very small.
	Waste water from the treatment of biomass residues	CO_2	No	It is assumed that CO2 emission from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector.
		CH_4	No	No anaerobic treatment is involved in the proposed project.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.

Spatial Extent of the Project Boundary:

The spatial extent of the project boundary encompasses

- The power plant at the project site;

- The consumers of heat supplied by the project
- Transportation of biomass residues to the project site;
- All power plants connected physically to the East China Power Grid (ECPG). The ECPG includes Shanghai City, Jiangsu Province, Zhejiang Province, Anhui Province, and Fujian Province.
- The sites where the biomass residues would have been left for decay or dumped.

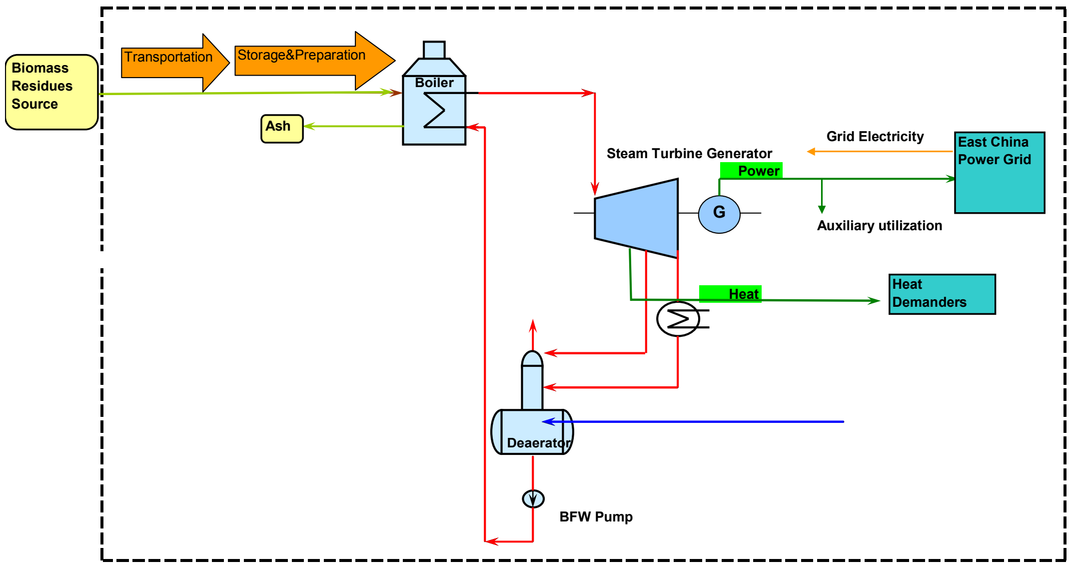

Figure B-1 Project Boundary

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

>>

According to the latest methodology ACM0006, "Combined Tool to identify the baseline scenario and demonstrate additionality"(Version02.1) should be used to identify the most plausible baseline scenario and demonstrate additionality.

This tool applies the following four steps:
STEP 1. Identification of alternative scenarios
STEP 2. Barrier analysis
STEP 3. Investment analysis(If applicable)
STEP 4 Common practice analysis

STEP 1. Identification of alternative scenarios

This step serves to identify all alternative scenarios to the proposed CDM project activity(s) that can be the baseline scenario through the following sub-steps:

Sub-step 1a. Define alternative scenarios to the proposed CDM project activity

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;

- How the heat would be generated in the absence of the project activity.

For **power generation**, the realistic and credible alternatives may include, inter alia:

P1 The Project not undertaken as a CDM project activity.

P2 The continuation of power generation in an existing biomass residue fired power plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as (co-)fired in the Project.

P3 The generation of power in an existing captive power plant, using only fossil fuels.

P4 The generation of power in the grid.

P5 The installation of a **new** biomass residue fired power plant, fired with the same type and with the same annual amount of biomass residues as the Project, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the Project plant and therefore with a lower power output than in the Project case.

P6 The installation of a **new** biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the Project and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the Project. Therefore, the power output is the same as in the Project.

P7 The **retrofitting** of an existing biomass residue fired power, fired with the same type and with the same annual amount of biomass residues as the Project, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the Project plant and therefore with a lower power output than in the Project case.

P8 The **retrofitting** of an existing biomass residue fired power that is fired with the same type but with a higher annual amount of biomass residues as the Project and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the Project.

P9 The installation of a **new** fossil fuel fired captive power plant at the project site.

P2, P7 and P8 are excluded because the proposed project is a Greenfield project; therefore no continuation or retrofitting is plausible. P3 can also be excluded since there is no existing captive power plant, using fossil fuels near the project site.

P5 and P6 are excluded for a number of reasons. Firstly, biomass power plants are not common practice in the local area. Secondly, the installation of a new biomass residue fired power plant that is fired with the same type but with a lower efficiency of electricity generation is not feasible. A lower efficiency technology results in a less financially attractive project than the proposed project not undertaken as a CDM project activity. Also a low efficiency power plant is not encouraged by Chinese government[2].

Scenarios P2, P5, P6, P7 and P8 are therefore eliminated and scenarios **P1, P4 and P9** need further discussion.

For **heat generation**, the realistic and credible alternatives may include, inter alia:

H1 The Project not undertaken as a CDM project activity.

H2 The Project (installation of a cogeneration power plant), fired with the same type of biomass residues but with a different efficiency of heat generation (e.g. an efficiency that is common practice in the relevant industry sector).

H3 The generation of heat in an existing captive cogeneration plant, using only fossil fuels.

---

[2]Energy development 11th five year plan, Page 17, NDRC, April, 2007

H4 The generation of heat in boilers using the same type of biomass residues.
H5 The continuation of heat generation in an existing biomass residue fired cogeneration plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as in the Project.
H6 The generation of heat in boilers using fossil fuels.
H7 The use of heat from external sources, such as district heat.
H8 Other heat generation technologies (e.g. heat pumps or solar energy).

H2 excluded for a number of reasons. Firstly, because at present the technology of biomass cogeneration in China is just started, even if the biomass power plants with lower heat supply efficiency are not common practice in China. Secondly, the installation of a new biomass residue fired power plant that is fired with the same type but with a lower efficiency of heat generation is not feasible. A lower efficiency technology results in a less financially attractive project than the proposed project not undertaken as a CDM project activity. Also a low efficiency power plant is not encouraged by Chinese government[3].

H3 and H5 are excluded because there is no fossil fuel fired cogeneration plant or any other cogeneration plant at or around the project site.

H4 is excluded as there is no heat boiler using biomass residues in the local area and using small coal-fired boiler is common practice in the local area for heating.

H7 is excluded since there is no district heat supply in the local area, heat sources from external sources such as district heating do not exist.

H8 is excluded due to lack of other heat generation resources such as heat pumps or solar energy in and around the project site, The Anhui province where the proposed project located has no identified commercial geothermal resource that could be utilized for heat pump to supply heat. The local region lacks sufficient solar resources, hence, solar energy to heat is not feasible heat supply alternative in the region.

Therefore, scenarios **H1 and H6** need further discussion.

For **the use of biomass residues**, the realistic and credible alternatives may include, inter alia:
B1 The biomass residues are dumped or left to decay under mainly aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields.
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.
B3 The biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes.
B4 The biomass residues are used for heat and/or electricity generation at the Project site
B5 The biomass residues are used for power generation, including cogeneration, in other existing or new grid-connected power plants
B6 The biomass residues are used for heat generation in other existing or new boilers at other sites.
B7 The biomass residues are used for other energy purposes, such as the generation of biofuels
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)

---

[3]Energy development 11^{th} five year plan, Page 17, NDRC, April, 2007

The biomass residues which are to be utilized in the proposed power plant are currently dumped or left to decay under mainly aerobic conditions and burned in an uncontrolled way outside in the fields. For straws, local farmers have to get rid of a huge amount of straw in order to keep the land free for the next season's planting. For the rice husks the rice mills have limited room for the rice husk and they have to burn it or dumped it to leave room for the rice.

B2 is excluded, since there is no deep landfill with more than 5 meters around the site of the proposed project, Moreover, a landfill would result in a large investment and ongoing operation costs and this is therefore unlikely to occur given the current situation of decay and burning.

B5 and B6 can be excluded because using biomass to generate electricity or heat is not common practice in this region. Moreover, near the project site, there are no existing (grid connected) power plants or boilers which can use biomass residues to generate energy.

B7 is excluded, because the biomass residues used in the proposed project cannot be used to produce biofuels.

According to the FSR and biomass availability report, the rice husk and straws (including rice straw, wheat straw and corn straw) consumed by the proposed project are about 109,526 and 76,670 tons respectively, accounting for 63% and 23% of the practical and economical available rice husk and straws (172,800 tons rice husk within 60 kilometers and 335,301 tons straws within 50 km) of the biomass dumped or left to decay or burned in an uncontrolled manner.

Alternative B8 is excluded because the proposed project will not change the use of biomass as fertilizer. Currently, there is no company using biomass residues for non-energy purpose such as fertilizer or as feedstock in processes around the project site.

Therefore, scenarios **B1, B3 and B4** need further discussion.

Outcome of Step 1a:
As described above, the plausible alternative scenarios for the proposed project are **P1, P4** and **P9** for power generation, **H1 and H6** for heat generation and **B1**, **B3 and B4** for the biomass residues.

Sub-step 1b. Consistency with mandatory applicable laws and regulations:
In this sub step, alternative which is not compliance with laws and regulations will be eliminated:

Scenario P9 is not consistent with mandatory applicable laws and regulations. In 2006, the average annual utilization hours of Chinese fuel-fired power equipments are 5612 hours[4]. Considering the same annual electricity generation, the alternative baseline scenario for the proposed project should be a fuel-fired power plant with installed capacity of 26 MW. Furthermore, given that the proposed project is a grid-connected project, the alternative baseline scenario must be a grid-connected fuel-fired power project.

---

[4] China Electric Power Yearbook 2007

According to Chinese power regulations, fuel-fired power plants of less than 135MW[5] are prohibited to construct in the areas covered by large grids. The alternative of building a fossil fuel-fired power plant with installed capacity of 26MW conflicts with Chinese regulations. Therefore, P9 is excluded.

Outcome of Step 1b:
The plausible alternative scenarios are compliance with laws and regulations: P1, P4, H1, H6, and B1, B3, B4. In conclusion, the credible baseline scenarios are as follows:

Combined Scenarios	Baseline alternatives			Descriptions
	Electricty generation	Heat generation	Uses of biomass residues	
a	P1	H1	B4	The Project not undertaken as a CDM project activity
b	P4	H6	B1or B3	Exporting electricity from the grid; generating heat from fossil fuel fired boilers; and dumping biomass residues to naturally decay. This is Scenario 2 in ACM0006

STEP 2. Barrier analysis

This step serves to identify barriers and to assess which alternatives are prevented by these barriers. Apply the following sub-steps:

Sub-step 2a. Identify barriers that would prevent the implementation of alternative scenarios:
The barriers that would prevent the implementation of alternative scenarios are not identified yet.

Outcome of Step 2a:
The barriers that would prevent the implementation of alternative scenarios are not identified yet.

Sub-step 2b. Eliminate alternative scenario which are prevented by the identified barriers:
Neither of the two combined scenarios is eliminated by the alternative scenario

Outcome of Step 2b:
Neither of the two combined scenarios is eliminated by the alternative scenario. The two combined scenarios need to be further discussed in Step 3.

STEP 3. Investment analysis

According to the ACM0006 (Version 06.2), project participants shall identify the most plausible baseline scenario and demonstrate additionality using the latest approved version of the "Combined tool to identify the baseline scenario and demonstrate additionality".
However, Version 02.1 of the aforementioned tool establishes in footnote Nº2 (on the first page) that for project activities in which one or more alternatives are not available options to project participants (such

[5] Notice on Strictly Prohibiting the Illegal Installation of coal-fired Generators with the Capacity of 135MW or below issued by the General Office of the State Council, Guo Ban Fa Ming Dian decree No. 2002-6.

as grid-connected power projects), a different procedure to demonstrate additionality and identify the baseline scenario must be followed. For example, methodologies that involve alternatives that is not under the control of project participants can continue to use, if desired, the additionality tool (provides benchmark and other tools that utilize information about the markets in wich such projects might compete), and provide their own methods to develop and/or assess baseline scenario.
According to the above and considering that the ACM0006 (Version 06.2) in this case applies to a project activity in which not all the alternatives are available options to the project participants, this PDD will use the "step 2 Investment analysis" in the last version of the additionality tool to determine whether the proposed project activity is less economically or financially attractive than the alternatives without the revenue from CER. The investment analysis is conducted in the following steps:

Sub-step 3a. Determine appropriate analysis method

Three options can be applied for the investment analysis: the simple cost analysis, the investment comparison analysis and the benchmark analysis.
The simple cost analysis is not applicable for the proposed project because the project activity will produce economic benefit (from electricity sale) other than the CDM related income. The investment comparison analysis is also not applicable for the proposed project because one of the baseline alternatives, as identified in step1, providing the same electricity output by the East China Power Grid, is not a new investment project. To conclude, the benchmark analysis will be used to identify whether the financial indicators of the proposed project is better than relevant benchmark value.

Sub-step 3b. Apply benchmark analysis.
The financial benchmark rate of return (after tax) of Chinese Power Industries is 8% for the IRR of total investment.[3]

Sub-step 3c. Calculation and comparison of financial indicators.
1) Parameters needed for calculation of IRR
According to the Feasibility Study Report of the proposed project, parameters needed for calculation of IRR are as follows:

Table B-2 Parameters for calculation of IRR

Parameter	Value	Unit	Source
Installed capacity	24	MW	FSR
Project Lifetime	20	Year	FSR
Net Power Generation output	126,720	MWh	FSR
Net Heat Generation output	541,602	GJ	FSR
Static total investment	238.28	Million yuan	FSR
Tariff(Excl. VAT) in first 15 years	0.531	Yuan/ KWh	FSR
Tariff(Excl. VAT) after the 15 years	0.317	Yuan/ KWh	FSR
Annual O&M cost (Fuel cost included)	57.39	Million Yuan	FSR
Heat price (Excl. VAT)	29.85	Yuan / GJ	FSR

[3] State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003

Biomass Purchase Price (Average Price)	240	Yuan / t wet weight	FSR
Income tax	25	%	FSR
VAT	17	%	FSR
Other Tax	10	%	FSR
Depreciation period	15	year	FSR
Residual rate	4	%	FSR
Expected CERs price	8	€	FSR

2) Comparison of the project IRR and the financial benchmark

In accordance with benchmark analysis, if the financial indicators of the proposed project, such as the project IRR, are lower than the benchmark, the proposed project is not considered to be financially attractive.

Table B-3 shows the project IRR with and without the income from CERs sale. Without the sales of CERs, the project IRR is 3.95% which is lower than the financial benchmark. Thus the proposed project is not financially acceptable. Taking into account the CDM revenues, the project IRR is 9.81% and higher than the financial benchmark. Therefore, the CDM revenues enable the project to overcome the investment barrier.

Table B-3 Comparison of IRR with and without the income from CERs sale

Item	Without CDM	Benchmark	With CDM
IRR	3.95%	8%	9.81%

Sub-step 2d. Sensitivity analysis

For the proposed project, five parameters were selected as sensitive factors to check out the financial attractiveness:

1) Static total investment
2) Tariff
3) Heat Price
4) Operational Hours
5) Annual O&M Cost

Assuming the above five factors vary in the range of -10% to 10%, the project IRR (without the income from CERs sales) varies to different extents as shown in Table B-4 and Figure B-2 below.

Table B-4 Sensitivity analysis of the proposed project

	-10%	-5%	0	5%	10%
Static total investment	5.37%	4.64%	3.95%	3.31%	2.71%
Operational Hours	2.25%	3.12%	3.95%	4.75%	5.52%
Annual O&M Cost	6.97%	5.52%	3.95%	2.22%	0.23%
Tariff	0.14%	2.16%	3.95%	5.59%	7.11%
Heat Price	3.06%	3.51%	3.95%	4.38%	4.80%

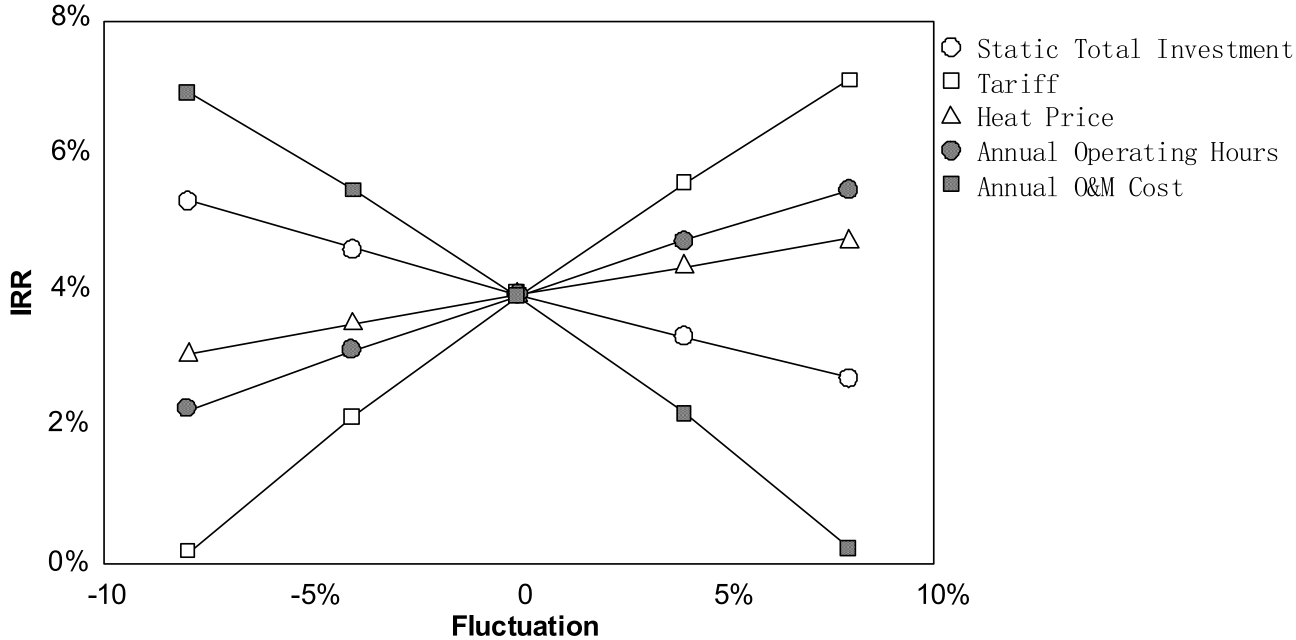

Figure B-2 Sensitivity analysis of the proposed project

Within the reasonable changing range of the 5 key parameters, the IRR of the proposed project is always lower than the investment benchmark, then lack financial attractiveness.

Outcome of Step 3:
Based on the Investment Analysis above, the proposed project is not financially attractive without consideration of CERs sales revenues. Combined Scenario a "the proposed project not undertaken without being registered as a CDM project activity "is not feasible thus not baseline scenario.

So, the baseline scenario combination of the proposed project is Combine Scenario b (which belongs to Scenario 2 in the methodology.

Scenario	Power generation	Heat generation	Use of biomass residues
2	P4	H6	B1 or B3

STEP 4. Common practice analysis

According to the "Combined tool to identify the baseline scenario and demonstrate additionality", the Anhui province could be used for common practice analysis as the geographical area. The biomass power project with similar scale implemented or currently under development in this area includes:

Table B-5 similar projects in Anhui

Name	Installed capacity	Start working	Comments

Anhui Anqing 30MW Biomass Power Generation Project	30MW	2007	Applying for CDM registration
Anhui Anqing 30MW Biomass Power Generation Project	30MW	2007	Applying for CDM registration
Anhui Suzhou Biomass Power Generation Project	25MW	2008	Applying for CDM registration

Source: http://cdm.ccchina.gov.cn/web/main.asp?ColumnId=9

As already described in the table above, the similar biomass power projects with similar scale are all pursuing carbon financing. It can be concluded that the proposed project without CDM is not common practice in Anhui Province.

In conclusion, the proposed project activity passed all criteria of the combined tool to identify the baseline scenario and demonstrate additionality. The baseline scenario 2 in the methodology is the realistic and credible baseline scenario and the proposed project is additional.

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):

>>

ACM0006 requires that the “Combined tool to identify the baseline scenario and demonstrate additionality” is used. Therefore, please refer to the section above where the additionality has been determined.

The CDM consideration and decision making process is presented as follows:

The project owner wanted to invest and develop some biomass projects for a long time but due to the high cost, low profit of biomass power plants in China, the project owner found it is not feasible at that time. Then the project owner learned that some biomass projects were applying for CDM. The project owner began to learn about CDM and consider investing biomass projects. The FSR of other internal similar projects showed that those project would be not financial attractive without CER revenues, and carbon finance is strongly suggested. Thus, he management board decided to develop all their biomass residue projects including this one as CDM projects.

Table B-6 Milestones and Schedule in Project Implementation

September 2007	The FSR of other internal similar projects showed that those project would be not financial attractive without CER revenues, and carbon finance is strongly suggested. Thus, he management board decided
October 2007	EIA was finished
October 2007	FSR was finished
November 2007	EIA was approved by EPC
November 2007	CADA was signed with CAMCO
December 2007	Project was approved by DRC
March 2008	Construction started
August 2008	Contract signed with DOE
March 2009	Estimated Commission date of the project

Based on the analysis in B.4 and the above interpretation, the Project is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

EMISSION REDUCTION

The Project reduces CO_2 emissions through substitution of power and heat generation with fossil fuels by energy generation with biomass residues. The emission reduction ER_y by the project during a given year y is the difference between the emission reductions through substitution of electricity generation with fossil fuels ($ER_{electricity,y}$), the emission reductions through substitution of heat generation with fossil fuels ($ER_{heat,y}$), project emissions (PE_y), emissions due to leakage (L_y) and, where this emission source is included in the project boundary and relevant, baseline emissions due to the natural decay or burning of anthropogenic sources of biomass residues($BE_{biomass,y}$), as equation (1):

$$ER_y = ER_{heat,y} + ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y \quad (1)$$

Where,

ER_y = Emissions reductions of the Project during the year y (tCO_2/yr)

$ER_{heat,y}$ = Emission reductions due to displacement of heat during the year y (tCO_2/yr)

$ER_{electricity,y}$ = Emission reductions due to displacement of electricity during the year y (tCO_2/yr)

$BE_{biomass,y}$ =Baseline emissions due to natural decay or burning of anthropogenic source of biomass residues during the year y(tCO_2/yr)

PE_y = Project emissions during the year y (tCO_2/yr)

L_y = Leakage emissions during the year y (tCO_2/yr)

Lifetime aspects

According to the ACM0006, for the scenario 2, only heat generation facilities in baseline should be considered the lifetime aspects.

The lifetime of the boilers that is about 20 years and if they are operating well, the lifetime can last for about 25 years. In order to keep conservativeness, the lifetime of the newly-built or would be built in the absence of the proposed project is assumed to be 20 years to be conservativeness.

The baseline, project, and leakage emissions are calculated respectively as following:

A. PROJECT EMISION

According the Table B-1 in B.3, the project emissions include:

- CO_2 emissions from transportation of biomass residues to the project site (PET_y),
- CO_2 emissions from on-site consumption of fossil fuels due to the project ($PEFF_y$),
- CO_2 emissions from consumption of electricity ($PE_{EC,y}$)

- Where this emission source is included in the project boundary and relevant: CH_4 emissions from the combustion of biomass residues($PE_{biomass,CH4,y}$)

Project emissions are calculated as follows:

$$\mathbf{PE}_y = \mathbf{PET}_y + \mathbf{PEFF}_y + PE_{\mathbf{EC},\ y} + GWP_{CH4} \times PE_{Biomass,CH4,y} \qquad (2)$$

Where,

PET_y = CO_2 emissions during the year y due to transport of the biomass residues to the project (tCO_2/yr)

$PEFF_y$ = CO_2 emissions during the year y due to fossil fuel consumption at the project site that is attributable to the project (tCO_2/yr)

$PE_{EC,y}$ = CO_2 emissions during the year y due to electricity consumption at the project site that is attributable to the project (tCO_2/yr)

GWP_{CH4}=Global Warming Potential for methane valid for the relevant commitment period

$PE_{biomass,CH4,y}$= CH_4 emissions from the combustion of biomass residues during the year y(tCH_4/yr)

a) Carbon dioxide emissions from combustion of fossil fuels for transportation of biomass residues to the project plant (PET_y)

Because the biomass residues will be transported to the power plant around the project site by trucks, CO_2 emissions from vehicles should be determined. According to the methodology ACM0006, it could be calculated by the following formula based on the distance and vehicle type (option 1):

$$PET_y = \frac{\sum_k BF_{T,k,y}}{TL_y} \cdot AVD_y \cdot EF_{km,CO2,y} \qquad (3)$$

Where,

PET_y = CO_2 emissions during year y due to transport of the biomass residues to the project plant (tCO_2/yr)

$BF_{T,k,y}$ = Quantity of biomass residue type k that has been transported to the Project site during the year y (tons of dry matter or liter)

TL_y = Average truck load of the trucks used (tons or liter) during the year y.

AVD_y = 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 (km)

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

k = Types of biomass residues used in the project plant and that have been transported to the project plant in year y

b) Carbon dioxide emissions from on-site consumption of fossil fuels (PEFF$_y$)

According to the Feasibility Study, the fossil fuels (diesel oil) are only used for boiler start-up, the emissions from combusting fossil fuels are calculated as "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" as following:

$$PEFF_y = PE_{FC,j,y} = \sum_i (FF_{projectplant,i,y} + FF_{projectsite,i,y}) \cdot COEF_{i,y} \quad (4)$$

Where,

$PE_{FC,j,y}$ = CO_2 emissions from fossil fuel combustion in process j during the year y (tCO_2 / yr);

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

$FF_{projectsite,i,y}$=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)

$COEF_{i,y}$ = CO_2 emission coefficient of fuel type i in year y (tCO_2 / mass or volume unit);

i = fuel types combusted in process j during the year y.

The "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" provides two procedures to determine $COEF_{i,y}$. The Option A requires carbon content and density of the diesel oil used in the project, however the data is not available. Therefore the Option B is adopted as follows:

$$\text{COEF}_{i,y} = NCV_{i,y} \times EF_{CO2,i,y} \quad (5)$$

Where,

$NCV_{i,y}$ = weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit);

$EF_{CO2,i,y}$ = weighted average CO_2 emission factor of fuel type i in year y (tCO_2/GJ);

c) CO_2 emissions from electricity consumption (PE$_{EC,y}$)

CO_2 emissions from on-site electricity consumption ($PE_{EC,y}$) should be calculated using the latest approved version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". According to the Feasibility Study, a little electricity would be combusted on the pre-treatment of biomass residue, which could be calculated as:

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \cdot EF_{EL,j,y} \cdot (1 + TDL_{j,y}) \quad (6)$$

Where,

$PE_{EC,y}$ = project emissions from electricity consumption in year y (tCO_2 / yr);

$EC_{PJ,j,y}$ = quantity of electricity consumed by the Project electricity consumption source j in year y (MWh);

$EF_{EL,j,y}$ = emission factor for electricity generation for source j in year y. (tCO_2/MWh)

$TDL_{j,y}$ = average technical transmission and distribution losses for providing electricity to source j in year y.

j = source of electricity consumption in the Project.

In this case, refer to the description of project boundary, the only source of j is the East China Power Grid.

According to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"(Version 01), the proposed project belongs to Scenario A: Electricity consumption from the grid, so, we choose Option A1: Calculate the combined margin emission factor of the applicable electricity system, using the procedures in the latest approved version of the "Tool to calculate the emission factor for an electricity system" ($EF_{EL,j/k/l,y} = EF_{grid,CM,y}$).

d) Methane emission from Biomass residues combustion

Consistent with IPCC Guidelines, CO_2 emissions from biomass combustion at the project site is equal to the release of the CO_2 absorbed on a sustainable basis by plants that is replanted every year. The same treatment is not extended to methane emissions. When biomass is combusted in a well-controlled manner at the project, methane emissions are small in quantity but still not zero.

$$PE_{Biomass,CH4,y} = EF_{CH4,BF} \cdot \sum_{k} BF_{k,y} \cdot NCV_{k}$$

where:

$PE_{biomass,CH4,y}$: Project emissions from biomass controlled burning ($tCH_4eq/year$)

$BF_{k,y}$: Quantity of biomass residue type *k* combusted in the project plant during the year *y* (ton)

NCV_k : Net calorific value of the biomass residue type *k* (GJ/ton)

$EF_{CH4,BF}$; CH_4 emission factor for the combustion of biomass residues in the project plant (tCH_4/GJ)

According to the chosen baseline methodology, the project proponent will monitor the consumption and Net Calorific Values of each type of biomass consumed in the power plant. However, given that the amounts of each type of biomass remain constant in time (homogeneous biomass mix); this PDD will consider applying the biomass mix and the corresponding weighted average Net Calorific Value for emission reduction calculations.

B. EMISSION REDUCTIONS DUE TO DISPLACEMENT OF ELECTRICITY

According to the methodology ACM0006, emission reductions due to the displacement of electricity are calculated by multiplying the net quantity of increased electricity generated with biomass residues as a result of the project activity (EG_y) with the CO_2 baseline emission factor for the electricity displaced due to the project ($EF_{electricity,y}$), as follows:

$$ER_{electricity,y} = EG_{y} \cdot EF_{electricity,y} \quad (7)$$

Where,

$ER_{electricity,y}$ = Emission reductions due to displacement of electricity during the year y (tCO_2/yr)

EG_y = Net quantity of increased electricity generation as a result of the Project (incremental to baseline generation) during the year y (MWh)

$EF_{electricity,y}$ = CO_2 emission factor for the electricity displaced due to the Project during the year y (tCO_2/MWh)

In this case, all the electricity displaced is from the East China Power Grid.

STEP 1: Determination of $EF_{electricity,y}$

The Project has been identified as the scenario 2 of ACM0006, i.e. the baseline of the power generation is P4 – "The generation of power in the grid", the emission factor for the displacement of electricity should correspond to the grid emission factor ($EF_{electricity,y} = EF_{grid,y}$). On the other hand, the installed capacity of the Project is more than 15MW, the $EF_{grid,y}$ shall be determined as a combined margin (CM), following the guidance in the section Baselines" in the "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (ACM0002). Refer to the relevant chapter of ACM0002, the combined margin (CM) should be calculated as the "Tool to calculate the emission factor for an electricity system" (hereafter referred to as the Emission Factor Tool).

Sub-step 1: Identify the relevant electric power system

This is identified in B.3. as the East China Power Grid. For the purpose of determining the operating margin emission factor, the methodology provides following four options to determine the CO2 emission factor for net electricity import from the East China Power Grid:

(a) 0 tCO2/MWh, or

(b) The weighted average operating margin (OM) emission rate of the exporting grid; or

(c) The simple operating margin emission rate of the exporting grid; or

(d) The simple adjusted operating margin emission rate of the exporting grid.

For this project activity, we choose option (b) to calculate the OM emission rate of the East China Power Grid.

Sub-step 2: Select an operating margin (OM) method

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:

a) Simple OM

b) Simple adjusted OM

c) Dispatch data analysis OM

d) Average OM

Option a is used for this project.

Option a is used when low-cost/ must run resources account for less than 50% of the total amount of grid power generation. As shown in table A1 of annex 3, the ECPG is a coal-fired dominated power grid, where the installed capacity of low cost and must run plants account for 35.95%, 43.81%, 37.89%,

38.60% and 35.12% in 2002, 2003, 2004, 2005 and 2006 respectively. The fractions are all below 50%, so this option is applicable.

The simple OM is calculated ex-ante using a 3-year generation weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.

Sub-step 3: Calculate the operating margin emission factor according to selected method

According to the "Tool to calculate the emission factor for an electricity system", the Simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-operating cost and must-run power plants/units. It may be calculated:

- Based on data on fuel consumption and net electricity generation of each power plant/unit (Option A)
- Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit (Option B)
- Based on data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system (Option C)

According to the Tool, option A should be preferred and must be used if fuel consumption data is available for each power plant/unit. In other cases, option B or option C can be used. For the purpose of calculating the simple OM, Option C should only be used if the necessary data for option A and option B is not available and can only be used if only nuclear and renewable power generation are considered as low-cost/ must-run power sources and if the quantity of electricity supplied to the grid by these sources is known.

Data on fuel consumption, power generation and average efficiency of individual power stations is not publicly available in China. Therefore, in the proposed project activity, Option C is used and the following formula is used:

$$EF_{\text{Grid},OM,simple,y} = \frac{\sum_i FC_{i,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{\sum_j EG_y} \quad (8)$$

Where:

$FC_{i,y}$ = amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit),

$NCV_{i,y}$ = net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)

$EF_{CO2,i,y}$ = CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)

EG_y = net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year y (MWh)

i = all fossil fuel types combusted in power sources in the project electricity system in year y,

y = three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex-ante option)

Based on calculation from the China DNA (see Annex 3), the OM Emission Factor of the East China Power Grid is 0.95178 tCO_2e/MWh.

Sub-step 4: Identify the cohort of power units to be included in the build margin (BM)

According to the tool to calculate the emission factor for an electricity system, the sample group of power units m used to calculate the build margin could consist of either:

(a) the set of five power plants that have been built most recently, or

(b) the set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently;

The tool also states that project participants should use the set of power units that comprises the larger annual generation. In this case option (b) is used.

In terms of the vintage of the data, two options are given in the tool. In this case Option 1 is chosen: For the first crediting period, the build margin emission factor is calculated ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Sub-step 5: Calculate the build margin emission factor

According to the tool, the build margin emission factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{Grid,BM,y} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad (9)$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2/MWh)

$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)

$EF_{EL,m,y}$ = CO_2 emission factor of power unit m in year y

m = Power units included in the build margin

y = Most recent historical years for which power generation data is available

Following guidance issued by the CDM Executive Board in response to a request for guidance from an accredited DOE on the determination of the Build Margin in methodology AM0005 in China, $EF_{BM,y}$ is calculated as the capacity weighted average emissions factor of new installed capacity rather than the generation weighted factor. Furthermore, it is suggested in the same guidance note that the efficiency

level of the best technology commercially available in the provincial/regional or national grid of China is used as a conservative proxy for each fuel type in estimating the fuel consumption when calculating the Build Margin. The suggested approach is followed in the determination of the Build Margin for the purposes of this project.

Because capacities of technologies using coal, oil and gas cannot be separated from the total thermal power generation from available statistics, the following method is used for the calculation: first, use the recent one year available energy balance data and calculate percentages of CO_2 emissions of power generation using solid, liquid and gas fuel in the total CO_2 emission. Second, calculate grid thermal power emission factors, using the percentages (as weights) and emission factors of technologies corresponding to best available efficiencies. Lastly, the thermal power emission factor is multiplied by the percentage of thermal power in the newest 20% capacity in the grid, and the result is the Build Margin emission factor of the grid.

The steps and equations are as follows:

1. Calculate percentages of CO_2 emission of power generation using solid, liquid and gas fuel in total CO_2 emission.

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (11)$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (12)$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (13)$$

Where,

$F_{i,j,y}$ = amount of fuel i (tce) consumed by power plants m in year y,

$EF_{co2,i,j\,y}$ = is the CO_2 emission coefficient of fuel *i* , taking into account the carbon content of the fuels used by province *j* and the oxidation ratio of the fuel in year *y*（tCO2/GJ）

$NCV_{i\,y}$ = Net Calorific Value of fuel i in year y (GJ/t)

COAL, OIL and GAS refer to coal fuel, oil fuel and gas fuel in the subscript set.

2. Calculate thermal emission factor

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \quad (13)$$

Where,

$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas, Adv}$ are emission factors corresponding to commercially optimal efficient power generation technology using coal, oil and gas.

3. Calculate the BM of the Grid

$$EF_{\mathrm{Grid},BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \qquad (14)$$

Where,

CAP_{Total} = new added total capacity,

$CAP_{Thermal}$ = new added thermal power capacity.

The data used to calculate OM and BM emission factors are all publicly available. The generation data and average self consumption rate data are from publicly available China Electric Power Yearbooks. The data of fuel consumption per electricity generated and net calorific values of fuels are from the China Energy Statistical Yearbooks. The $OXID_i$ and $EF_{CO2,i}$ data by fuels are from the "2006 IPCC Guidelines for National Greenhouse Gas Inventories," Volume 2 Energy.

According to the announcement "China's Regional Grid Baseline Emission Factors Renewed", the weighted average of coal consumption per kWh supplied of 30 new built 600 MW sub critical units in 2006 is adopted to determine the emission factor of the best advanced coal fired generation technology, which is 329.94gce/kWh. In other word, the efficiency of best advanced coal fired generation technology is 37.28%.

The maximum electricity supplied efficiency of oil and gas fired generation plants are regarded as approximate estimation of commercially optimal efficiency technology. Similarly, the fuel consumption per kWh supplied of best advanced oil and gas fired generation technology is determined to be 252 gce/kWh, which means a generation efficiency of 48.81%.

According to the Chinese DNA[6], the $EF_{Grid,BM,y}$ for the East China Power Grid is 0.8154 tCO_2e/MWh. For the data source and the calculations, please see Annex 3.

Sub-step 6: Calculate the combined margin emissions factor

The combined margin emissions factor is calculated as follows:

$$EF_y = w_{OM} \cdot EF_{\mathrm{Grid},OM,y} + w_{BM} \cdot EF_{Grid,BM,y} \qquad (15)$$

Where,

$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (tCO_2/MWh)

$EF_{grid,BM,}y$ = Build margin CO_2 emission factor in year y (tCO_2/MWh)

W_{OM} = Weighting of operating margin emissions factor (%)

[6] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1875.pdf

W_{BM} = Weighting of build margin emissions factor (%)

The defaults weights are used, i.e. each of the Operating Margin and Build Margin is weighted equally.

$w_{OM} = w_{BM} = 0.5$

In this case, for the first crediting period:

$EF_{grid,CM,y}$=0.5×$EF_{grid,OM,y}$ + 0.5×$EF_{grid,BM,y}$ = 0.88359 tCO_2/MWh

STEP 2: Determination of EG_y

Where scenarios 2 apply, EG_y corresponds to the net quantity of electricity generation in the Project plant ($EG_y = EG_{project\ plant,y}$).

C. EMISSION REDUCTIONS OR INCREASES DUE TO DISPLACEMENT OF HEAT

According to ACM0006, scenario 2 is applicable for the proposed project. As the identified baseline scenario is the generation of heat in boilers using fossil fuels, and then baseline emission can be calculated through the following formula:

$$ER_{heat,y} = \frac{Q_y \cdot EF_{CO2,BL,heat,i}}{\varepsilon_{boiler}}$$

Where:

$ER_{heat,y}$: Emission reductions due to displacement of heat during the year y in tons of CO_2e.

Q_y : Net quantity of heat generated in the proposed plant during the year y in GJ.

ε_{boiler} : Energy efficiency of the boiler that would be used in the absence of the project activity. The efficiency of boilers to be displaced is conservatively estimated as 100%.

$EF_{CO2,BL,heat,I}$: CO_2 emission factor of the fossil fuel type i used for heat generation in the absence the project activity (tCO_2/GJ)

According to the ACM0006, in case of scenario 2, the baseline scenario is that all heat generated by the cogeneration project plant would in the absence of the project activity be generated in fossil fuel fired boilers. Thus: $\boldsymbol{Q_y = Q_{project\ plant,y}}$

D. BASELINE EMISSIONS DUE TO NATURAL DECAY OR UNCONTROLLED BURNING OF BIOMASS RESIDUES

The emissions from avoided disposal of the biomass to be used by the project activity in year *y* can be calculated as:

$$BE_{biomass,y} = GWP_{CH4} \cdot \sum_k BF_{PJ,k,y} \cdot NCV_k \cdot EF_{burning,CHA,k,y}$$

where:

$BE_{biomass,y}$: Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year *y* (tCO_2e/yr)

GWP_{CH4} : Global Warming Potential of methane valid for the commitment period (tCO_2e/tCH_4)

$BF_{PJ,k,y}$: 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)

NCV_k : Net calorific value of the biomass residue type *k* (GJ/ton of dry matter or GJ/liter)

$EF_{burning,CH4,k,y}$: CH_4 emission factor for uncontrolled burning of the biomass residue type *k* during the year *y* (tCH_4/GJ)

E. LEAKAGE

According to the ACM0006, the following three methods could be used to prove that there's no leakage in the project activity:

L1: Showing the current natural decay or open air burning biomass will continue to be uncontrolled dumping without proposed project performance
L2: Demonstrate the amount of biomass surplus is far more than the project biomass demand amount
L3: Showing the biomass suppliers can not sell all their biomass to the project plant

Option L2 (ACM0006, Section Leakage) is used to demonstrate that there is an abundant surplus of the biomass residues in the region of the project activity, and then the leakage can be neglected.

The feasibility study report and the biomass availability report showed that:
The project demand for rice husk is approximately 109,526 t per year, while the quantity of annual rice husk production is 300,000 t within the region covering a radius of 60 km around the proposed project, and the practical and economical available amount is 172,800 t, 58% larger than the quantity of biomass residues utilized, including the project plant.
Similarly, the project demand for straws, which includes rice straw, wheat straw and corn straw, is approximately 76,670 t per year, while the quantity of annual straw production is 1,241,880 t within the region covering a radius of 50 km around the proposed project, and the practical and economical available amount is 335,301 t, 337% larger than the quantity of biomass residues utilized, including the project plant.

Therefore, the utilization of the biomass residues by the project plant is considered to have no influence on the current biomass usage, and therefore the leakage of proposed project is considered 0.

In a conclusion, the Project does not result increase of fossil fuel consumptions, i.e. the leakage is zero ($L_y = 0\ tCO_2e$).

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

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. Shall be updated according to any future COP/MOP decisions.
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	**EG_y**
Data unit:	MWh
Description:	net electricity generated and delivered to the grid by power plant / unit m in year y
Source of data used:	China Electric Statistical Yearbook, 2005-2007
Value applied:	Values depend on specifically fuel, referring to Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the Tool to calculate the emission factor for an electricity system requirement, use accurate and reliable local or national data where available
Any comment:	

Data / Parameter:	**$FC_{i,y}$**
Data unit:	mass or volume unit
Description:	Amount of fossil fuel type i consumed in the project electricity system in year y
Source of data used:	China Electric Statistical Yearbook, 2005-2007
Value applied:	Values depend on specifically fuel, referring to Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the Tool to calculate the emission factor for an electricity system requirement, use accurate and reliable local or national data where available
Any comment:	

Data / Parameter:	**$F_{i,j,y}$**
Data unit:	mass or volume unit
Description:	The fuel consumption of fuel i in power plant j during year y
Source of data used:	China Electric Statistical Yearbook, 2005-2007
Value applied:	Values depend on specifically fuel, referring to Annex 3.
Justification of the choice of data or description of	According to the Tool to calculate the emission factor for an electricity system requirement, use accurate and reliable local or national data where available

measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	**$NCV_{i,y}$**
Data unit:	TJ/t
Description:	Net calorific value (energy content) per mass or volume unit of a fuel i in year y
Source of data used:	China Energy Statistical Yearbook, 2007
Value applied:	Values depend on specifically fuel, referring to Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the Tool to calculate the emission factor for an electricity system requirement, use accurate and reliable local or national data where available.
Any comment:	

Data / Parameter:	**$EF_{CO2,i,y}$**
Data unit:	tC/TJ (tCO_2e/TJ)
Description:	CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
Source of data used:	IPCC 2006 Revised Guidelines
Value applied:	Values depend on specifically fuel, referring to Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the Tool to calculate the emission factor for an electricity system requirement, use IPCC default value.
Any comment:	

Data / Parameter:	**$OXID_{i,y}$**
Data unit:	%
Description:	Oxidation factor of the fuel i in year y
Source of data used:	IPCC 2006 Revised Guidelines
Value applied:	Values depend on specifically fuel, referring to Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the Tool to calculate the emission factor for an electricity system requirement, use IPCC default value.
Any comment:	

Data / Parameter:	**$CAP_{i,y}$**
Data unit:	MW

Description:	Installed capacities of power plant category i of ECPG in years y.
Source of data used:	China Electric Power Yearbook 2005-2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used are from Chinese authorities.
Any comment:	

Data / Parameter:	**$EG_{grid, imported}$**
Data unit:	MWh
Description:	Electricity imported from other grid to Central China Grid.
Source of data used:	China's Regional Grid Baseline Emission Factors Renewed
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used are from Chinese authorities.
Any comment:	

Data / Parameter:	**$TDL_{j,y}$**
Data unit:	%
Description:	average technical transmission and distribution losses for providing electricity to source j in year y.
Source of data used:	Tool to calculate baseline, project and/or leakage emissions from electricity consumption
Value applied:	20
Justification of the choice of data or description of measurement methods and procedures actually applied :	Because the data is not available within host country, the default value (20%) can be adopted for project emission calculation according to the Tool to calculate baseline, project and/or leakage emissions from electricity consumption. This is conservative.
Any comment:	

Data / Parameter:	$EF_{CO2,BL,heat}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor of the fossil fuel type used for heat generation in the absence the project activity
Source of data used:	Default value from IPCC 2006. In the Project, the identified fossil fuel for heat generation is coal.
Value applied:	0.0946
Justification of the	The data is adopted from IPCC, this is conservative.

choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	ε_{boiler}
Data unit:	tCO_2/GJ
Description:	Average net energy efficiency of heat generation in the boiler that would generate heat in the absence of the project activity
Source of data used:	ACM0006
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Because the data is not available, the default value (100%) can be adopted according to the ACM0006. This is conservative
Any comment:	

Data / Parameter:	$EF_{CH4,BF}$
Data unit:	tCH_4 /GJ
Description:	CH_4 emission factor for controlled burning of the biomass residue in the project plant
Source of data used:	IPCC Default Value ; ACM0006
Value applied:	30 for the first commitment period. Considering the conservativeness factor as 1.37, this should be adjusted as: $EF_{CH4,BF}$=30*1.37=41.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC 2006 default value. The conservative factor is applied, as specified in the baseline methodology.
Any comment:	-

Data / Parameter:	$NCV_k \times EF_{burning,CH4,k,y}$
Data unit:	tCH_4/tonne
Description:	CH_4 emission factor for uncontrolled burning of the biomass residue
Source of data used:	IPCC Default Value ; ACM0006
Value applied:	0.001971
Justification of the choice of data or description of measurement methods	The conservative factor is applied, as specified in the baseline methodology

and procedures actually applied :	
Any comment:	This data will be fixed or updated according to the last version of ACM0006 and IPCC guidance

Data / Parameter:	$EF_{km,CO2}$
Data unit:	$kgCO_2e/km$
Description:	Average CO_2 Emission Factor for transportation of biomass with trucks
Source of data used:	IPCC 2006 default value from the Moderate Control index for the US heavy Duty Diesel Vehicle
Value applied:	1.011for the first commitment period
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC 2006 default value from the Moderate Control index for the US heavy Duty Diesel Vehicle
Any comment:	-

Data / Parameter:	$EF_{CO2,diesel}$
Data unit:	$kgCO_2e/TJ$
Description:	Emission Factor of Diesel
Source of data used:	IPCC 2006 default value (Volume2.Chapter2.P16)
Value applied:	74,100 for the first commitment period
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC 2006 default value (Volume2.Chapter2.P16) for diesel
Any comment:	IPCC value from the latest version published will be utilized

Data / Parameter:	*NCVi of fossil fuel combusted in Plant*
Data unit:	TJ/tonne
Description:	Net Calorific Value(NCVi) of fossil fuel combusted in plant
Source of data used:	China Energy Statistical Yearbook
Value applied:	0.042652
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value for Diesel is used for estimation. If other fuels are to be used, the valued will be changed accordingly.
Any comment:	-

B.6.3 Ex-ante calculation of emission reductions:

Project emissions

a) Carbon dioxide emissions from combustion of fossil fuels for transportation of biomass residues to the project plant (PETy)

According to the Feasibility Study Report, the Project is designed to consume 109,526 t rice husk (wet weight) and 76,670 t straws (wet weight; including rice straw, wheat straw and corn straw) annually and these biomass residues are transported by 3t, 5t, 8t,10t -loading diesel trucks.
The farthest distance that the trucks will travel is 60km. In order to keep conservativeness, the longest distance and the smallest loading capacity is chosen, namely: AVD_y is adopted as 100km (2*60) and the loading per truck is adopted as 3t.
The biggest moisture content of the straws (26.9%) is used when calculating the total dry biomass residues, which is conservative. Besides, the biggest NCV (0.013TJ/tone) is used when calculating the methane emission which is conservative.
The CO_2 emission factor for the trucks is 1.011 $kgCO_2e/km$, which is IPCC 2006 default value from the Moderate Control index for the US heavy Duty Diesel Vehicle (assuming the 3t-loading truck is diesel heavy truck). Refer to the equation (3), the emissions from biomass residues transportation can be calculated as follow:

$$PET_y = \frac{\sum_k BF_{T,k,y}}{TL_y} \cdot AVD_y \cdot EF_{km,CO2,y} = 7{,}530 \text{ t } CO_2e$$

The actual emissions from the transportation will be calculated according to monitored data.

b) Carbon dioxide emissions from on-site consumption of fossil fuels (PEFFy)

According to the project owner, the fossil fuel (diesel) is only used for boiler start-up, and the quantity of fossil fuel consumed in the project plant is estimated as 25t per year, and fossil fuel consumed for other purposes is assumed to be 0.

The $NCV_{i,y}$ and $EF_{CO2,I,y}$ are adopted IPCC default value. Therefore the $PEFF_y$ can be calculated as follow:

$$PEFF_y = PE_{FC,j,y} = \sum_i (FF_{projectplant,i,y} + FF_{projectsite,i,y}) \times NCV_{i,y} \times EF_{CO2,i,y}$$

=25 t * 0.042652 TJ/t * 74.1tCO2e/TJ = 79 tCO_2e

The actual emissions will be calculated according to monitored diesel consumptions.

c) ***CO_2 emissions from electricity consumption ($PE_{EC,y}$)***

Based on the Feasibility Study Report, there would be power consumption during the pre-treatment of the biomass residue. For this project, the power consumption is estimated as 1,862MWh. So, the relevant CO_2 emission is:

$$PE_{EC,y} = \sum_{j} EC_{PJ,j,y} \cdot EF_{EL,j,y} \cdot (1 + TDL_{j,y}) = 2{,}228 \text{ t } CO_2e$$

d) Methane emission from Biomass residues combustion($PE_{biomass,CH4,y}$)

According to the Feasibility Study Report, the Project is designed to consume 102,954 t rice husk (dry weight) and 56,046 t straws (dry weight) annually. The Net Calorific Value of rice husk and straws is 3100kal/kg (0.013TJ/tone) and 2775 kal/kg (0.012TJ/tone) respectively. Here, 3100 kal/kg is applied for for conservativeness.

CH_4 emission factor for controlled burning of the biomass residue in the project plant, $EF_{CH4,BF}$=41.1kgCH_4/TJ, Which is adopted IPCC default value.

Therefore,

$$PE_{\text{Biomass},CH4,y} = EF_{CH4,BF} \sum_{k} BF_{k,y} \cdot NCV_{k} = 85 \text{ t } CH_4$$

Therefore the project emissions are calculated as:

PEy = PETy + PEFFy + PEEC,y +GWP_{CH4}* $PE_{biomass,CH4,y}$ = 11,615tCO2e

Emission reductions due to displacement of electricity

Step 1: Determination of $EF_{electricity,y}$

Based on the description in B.6.1 and detailed calculation in Annex 3, the $EF_{electricity,y}$ = $EF_{grid,y}$ = 0.88359 tCO_2e/MWh.

Step 2: Determination of EG_y

According to the Feasibility Study Report, the delivered electricity is 126,720MWh per year, i.e. EG_y = 126,720MWh. Therefore:

$ER_{electricity,y}$ = 126,720MWh * 0.88359tCO_2/MWh =111,969 tCO_2e

Emission reductions or increases due to displacement of heat

According to the Feasibility Study Report, the Project is designed to supply 541,602GJ heat per year. The CO_2 emission factor of the fossil fuel type (coal) used for heat generation in the absence the Project is adopted from IPCC 2006, i.e. $EF_{CO2,BL,heat}$ = 0.0946tCO_2e/GJ. The efficiency of the boiler is assumed to be 100% for conservativeness.

Therefore: $ER_{heat,y}$ = 541,602GJ * 0.0946tCO_2e/GJ / 100% = 51,236tCO_2e

Uncontrolled burning or decay of biomass baseline emission

According to the Feasibility Study Report, the Project is designed to consume 102,954 t rice husk (dry weight) and 56,046 t straws (dry weight) annually. The Net Calorific Value of rice husk and straws is 3100kal/kg (0.013TJ/tone) and 2775 kal/kg (0.012TJ/tone) respectively. CH_4 emission factor for uncontrolled burning of the biomass residue, i.e. $NCV_k*EF_{burning,CH4,k,y}$=0.001971 tCH_4/tonne biomass, which is from IPCC default value.
The biggest moisture content of the straws (26.9%) is used when calculating the total dry biomass residues, which is conservative.
So, Baseline emissions due to natural decay or burning of anthropogenic sources of biomass residues during the year *y,*

$$BE_{biomass,y} = GWP_{CH4} \cdot \sum_k BF_{PJ,k,y} \cdot NCV_k \cdot EF_{burning,CHA,k,y}$$

=21tCH_4/tCO_2*159,000tons*0.001971 tCH_4/tonne=6,581 tCO_2e

Leakage

Based on the description in B.6.1, the leakage of the Project is not taken into account, i.e. L_y = 0tCO_2e

Emission Reductions

Refer to the equation (1), the emission reductions are calculated as:

$ER_y = ER_{heat,y} + ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y$ = 51,236tCO_2e + 111,969tCO_2e +6,581 tCO_2e – 11,615tCO_2e - 0 tCO_2e = 158,171 tCO_2e

The $ER_{heat,y}$ is not claimed in the first half year.

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

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
01/07/2009-30/06/2010	11,615	144,167	0	132,553
01/07/2010-30/06/2011	11,615	169,785	0	158,171
01/07/2011-30/06/2012	11,615	169,785	0	158,171
01/07/2012-30/06/2013	11,615	169,785	0	158,171
01/07/2013-30/06/2014	11,615	169,785	0	158,171
01/07/2014-30/06/2015	11,615	169,785	0	158,171
01/07/2015-30/06/2016	11,615	169,785	0	158,171
Total (tonnes of CO_2e)	**81,302**	**1,162,879**	**0**	**1,081,577**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**$BF_{k,y}$**
Data unit:	Tons *of dry matter*
Description:	Quantity of biomass residue type *k* combusted in the project plant in year *y*.
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	*K=Rice husk: 102,954t* *K=Rice straw:19,806 t* *K=Wheat straw:29,641 t* *K=Corn straw:11,497 t*
Description of measurement methods and procedures to be applied:	Use weight meters. Adjust for the moisture content in order to determine the quantity of dry biomass. The quantity shall be crosschecked with the quantity of electricity generated and any fuel purchase receipts. Continuously, prepare annually an energy balance
QA/QC procedures to be applied:	The meter will undergo calibration/maintenance subject to appropriate industrial standards. Direct measurements at the plant site will be cross-checked with an annual energy balance that is based on purchased quantities and stock changes
Any comment:	The data on quantity of biomass residues combusted in the boiler will be collected separately for all types of biomass residues. The data will be kept for minimum two years after the last crediting period

Data / Parameter:	**$BF_{T,k,y}$**
Data unit:	Tons of dry weight
Description:	Quantity of biomass residue type k that has been transported to the Project site during the year *y* where *k* are the types of biomass residues used in the project plant in year *y*.
Source of data to be used:	Measured data by weighbridge
Value of data applied for the purpose of calculating expected emission reductions in section B.5	*K=Rice husk: 102,954t* *K=Rice straw:19,806 t* *K=Wheat straw:29,641 t* *K=Corn straw:11,497 t*
Description of measurement methods and procedures to be applied:	Each truck will be measured twice, loading weight and empty weight. The transferred biomass residues will be aggregated daily, monthly and yearly.
QA/QC procedures to be applied:	The measuring range of the weightbridge is from 0 to 30 tonnes, the minimum scale is 0.01 tonne. The weightbridge will be calibrated and maintained according to relevant standards and regulars. The biomass residues purchase invoice will be kept for double check.
Any comment:	Dry weight

Data / Parameter:	Moisture content of the biomass residues
Data unit:	% water content
Description:	Moisture content of each biomass residue type k
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	6% for the rice husk 19.4% for rice straw 18.5% for wheat straw 26.9% for corn straw
Description of measurement methods and procedures to be applied:	Continuously monitored by moisture analyzer. Moisture content of the biomass residues will be both measured in collection points and in power plant.
QA/QC procedures to be applied:	The analyzers will be calibrated and undergo maintenance subject to appropriate industry standard annually
Any comment:	The moisture content of the biomass residues are taken into consideration in all the calculations of emission reductions. In case of dry biomass, monitoring of this parameter is not necessary.

Data / Parameter:	NCV_K
Data unit:	KJ/Kg
Description:	Net calorific value of the biomass residue of type k utilized in the project
Source of data to be used:	Feasibility Study Report
Value of data applied for the purpose of calculating expected emission reductions in section B.5	k=rice husk: 12958 k= straws:11613
Description of measurement methods and procedures to be applied:	Measure the NCV based on the dry biomass. This parameter will be measured taking at least three samples(dry matter) for each measurement
QA/QC procedures to be applied:	Measurements will be carried out at reputed laboratories and according to relevant international standards.
Any comment:	-

Data / Parameter:	$\mathbf{AVD_y}$
Data unit:	km
Description:	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
Source of data to be used:	On site records maintained at project site (log books)
Value of data applied for the purpose of calculating expected emission reductions in	*120*

section B.5	
Description of measurement methods and procedures to be applied:	The data is recorded at the central collecting station for it is close to the project plant, based on the information given by the truck driver about the biomass supply site and the distance form the project.
QA/QC procedures to be applied:	The data on distance of fuel supply site from the plant can be verified by cross checking data records on the distances available with information from other sources (e.g. maps)
Any comment:	If the biomass residues are supplied from different sites, this parameter will be taken from the longest distance.

Data / Parameter:	TL_y
Data unit:	Tonne
Description:	Average truck load of the trucks used during the year y
Source of data to be used:	Measured data by weightbridge
Value of data applied for the purpose of calculating expected emission reductions in section B.5	*3*
Description of measurement methods and procedures to be applied:	Each truck will be measured twice, loading weight and empty weight. The loading data will be averaged monthly and yearly.
QA/QC procedures to be applied:	The weighbridge will be calibrated and maintained according to relevant standards and regulars. Check consistency of load records will be done frequently.
Any comment:	-

Data / Parameter:	$FF_{project\ plant,i,y}$
Data unit:	*tons*
Description:	Quantity of fossil fuel type *i* combusted in the project plant during year *y*
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	*25*
Description of measurement methods and procedures to be applied:	Use weight meters.
QA/QC procedures to be applied:	The meter will under go calibration/maintenance subject to appropriate industrial standards. The consistency of metered fossil fuel consumption quantities can be cross checked with fuel purchased quantities and the stock change records

Any comment:	This should include fossil fuels co-fired in the project plant but not any other fuel consumption at the project site that is attributable to the project activity (e.g. for mechanical preparation of the biomass residues). The data on quantity of fossil fuel combusted in the boiler will be collected separately for all types of fossil fuels

Data / Parameter:	$FF_{project\ site,,i,y}$
Data unit:	*tons*
Description:	Quantity of fossil fuel type *i* combusted in the project site for other purposes that are attributable to the project activity during year *y*
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	*0*
Description of measurement methods and procedures to be applied:	Use weight meters.
QA/QC procedures to be applied:	Cross-check the measurements with an annual energy balance that is based on purchased quantities and stock changes
Any comment:	This should not include fossil fuels co-fired in the project plant but any other fuel consumption at the project site that is attributable to the project activity (e.g. for mechanical preparation of the biomass residues)

Data / Parameter:	$EC_{PJ,j,y}$
Data unit:	MWh/yr
Description:	The quantity of electricity consumed by the Project electricity consumption source j in year y
Source of data to be used:	Measured by meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The process of biomass residue pre-treatment will cost a little power, which is estimated as 1,862 MWh in this project.
Description of measurement methods and procedures to be applied:	Hourly measurement and monthly recording; 100% of data will be monitored and electronic archived.
QA/QC procedures to be applied:	The accuracy of the meter is 0.5s and it will be calibrated and maintained according to relevant national regulations and/or standards. The electricity purchased invoice will be kept for double-checking.
Any comment:	

Data / Parameter:	EGy
Data unit:	MWh
Description:	Net quantity of increased electricity generation as a result of the Project (incremental to baseline generation) during the year y
Source of data to be used:	Measured by meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	*126,720*
Description of measurement methods and procedures to be applied:	Hourly measurement and monthly recording; 100% of data will be monitored and electronic archived.
QA/QC procedures to be applied:	The accuracy of the meter is 0.5s and it will be calibrated and maintained according to relevant national regulations and/or standards. The electricity sales invoice will be kept for double-checking.
Any comment:	Double checked by receipt of sales.

Data / Parameter:	Q_y
Data unit:	GJ/yr
Description:	Quantity of increased heat generation in the Project (incremental to heat generation in any existing cogeneration plants) that displaces heat generation in fossil fuel fired boilers during the year y
Source of data to be used:	Thermal meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	*541,602*
Description of measurement methods and procedures to be applied:	The meter is installed on main heat supplying pipe. The meter will measure the flow, temperature and pressure individually and then calculate the supplied heat. The meter will measure the supplied heat continuously.
QA/QC procedures to be applied:	The heat sales invoice will be kept for double-checking.
Any comment:	

Data / Parameter:	-
Data unit:	Tons
Description:	Quantity of biomass residues of type k that are available (eg for energy generation or as feedstock) in the defined geographical region
Source of data to be used:	Feasibility Study Report of the proposed project

Value of data applied for the purpose of calculating expected emission reductions in section B.5	This will only be the amount consumed by the project. k= Rice husk: 172,800 k= Straws: 335,301
Description of measurement methods and procedures to be applied:	Surveys or statistics from local agricultural bureau if national statistics is not availiable
QA/QC procedures to be applied:	This parameter will be reviewed annually according to the project data and official data
Any comment:	This parameter is applicable since approach L2 is utilized to rule out leakage

B.7.2 Description of the monitoring plan:

This monitoring plan is to serve as a guideline for the project owner to monitor the emission reduction of the proposed project. The contents of the Monitoring Plan are highlighted as follows:

1. The Operational and Management Structure for Monitoring

To monitor the project emission reductions and any leakage effects, the project owner will set up a CDM Monitoring Office and designate a qualified staff responsible for all relevant matters, including monitoring of emission reductions, data collection and archiving, QC/QA, and verification. The structure of the CDM Monitoring Office is outlined in Figure B-3.

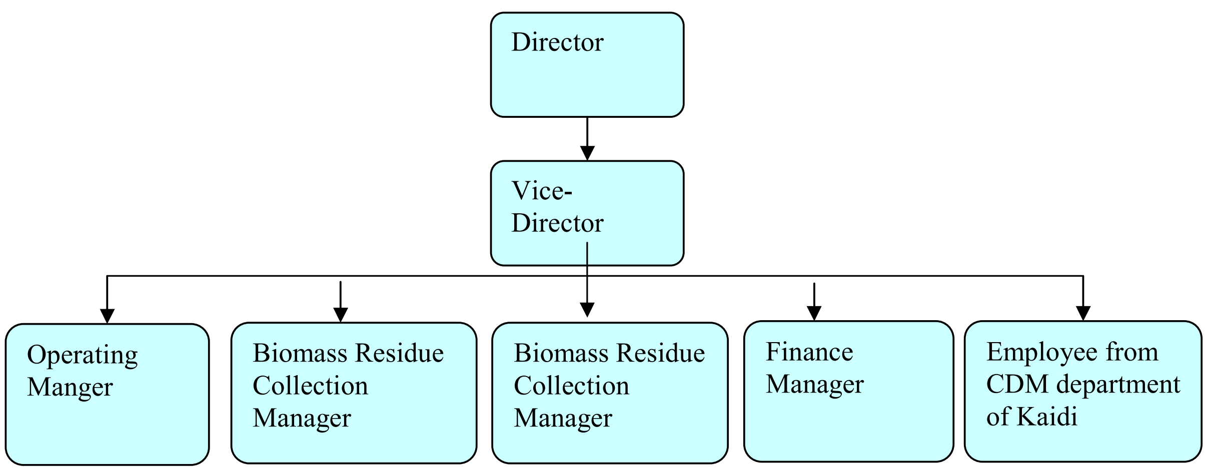

Figure B-3 Organization Chart of the CDM Project Management Office

Wuhan Kaidi Holding Investment Co., Ltd is the investor of Wuhe Kaidi Biomass Power Project. Wuhe Kaidi Green Energy Development Co., Ltd. is as the shareholding company under Kaidi. The staffs of Wuhe Kaidi Green Energy Development Co., Ltd.at the biomass residues collection sites will record the data to be monitored concerning with information of biomass residues purchased from local area.

The manager of the collection sites will be responsible for quality control and summary of this information. When the biomass is transported to the site of the power plant, the data of the biomass residues collection and transportation will be recorded by the staff of Wuhe Kaidi Green Energy Development Co., Ltd. and stored in the power plant. The summary of biomass consumption by the power plant will be calculated by the CDM Project Manager of the proposed project monthly. Another data to be recorded is the fossil fuel consumption by the power plant and on-site electricity consumption. The related responsible operators will record this data, and the CDM manager will collect the data monthly. When the plant starts heat supply to local district, the net heat supply to the users will be collected and recorded by staffs of Wuhe Kaidi Green Energy Development Co., Ltd. Other related data need to be monitored are described in Section 5 below.

The CDM manager will in charge of the implementation of this Monitoring Plan and summarizing the results. The results will be checked by the General Manger of Wuhe Kaidi Green Energy Development Co., Ltd. ensuring the quality and accuracy of the data monitored. The monthly summary will be reported to the headquarter of Wuhan Kaidi Holding Investment Co., Ltd in Beijing. The CDM Manager of the Wuhan Kaidi Holding Investment Co., Ltd will calculate the emission reductions of the proposed project and develop reports with the support from Camco Limited

The responsibilities for carrying out these tasks are broadly elaborated in below.
Responsibilities of the proposed project in Wuhe: Operating Manager of the plant: Overall management of the implementation of the monitoring plan and quality control of data and records.
Head of Staw Collection Stations: straw collection and summarizing the data collected at the collection stations in terms of types, amount, and transportation record, etc of straws. Ensuring the biomass at the sites will not be stored over half year.

Engineering Department of the plant: in charge of the monitoring of ammeters and calibration, biomass consumption of NCV of each kind of biomass, fossil fuel consumption within the power plant including boilers, crashing machines,etc, as well as maintenance of equipments
Procurement Dept. of the plant: cross checking the monitoring records with receipt and procurement records.

2. Calibration of Meters & Metering
2.1 Electricity output ammeter
An agreement should be signed between the project owner and the Grid that defines the metering arrangements and the required quality control procedures to ensure accuracy. The accuracy of the ammeter will be 0.5s. The metering equipment will be properly calibrated and checked annually for accuracy according to Technical Administrative Code of Electric Energy Metering（dl/t448-2000）. The project owner will prepare backup procedures to deal with any errors occurred to the meters. In case of any errors happens, the grid-connected electricity generated by the proposed project shall be determined by the project owner and the Grid jointly according to the error handling procedures.
Calibration is carried out by the Grid with the records being provided to the project owner, and these records will be maintained by the project owner and the third party designated.

All the monitoring equipment installed is indicated in the following figure.

2.2 Heat supply meter

When the proposed project starts heat supply, the heat supply meter including flow meter, pressure meter and temperature meter will be installed at the output of the power plant. The metering equipment will be properly calibrated and checked annually for accuracy. The project owner will prepare backup procedures to deal with any errors occurred to the meters. In case of any errors happens, the heat supplied to the users by the proposed project shall be determined by the project owner and the users jointly according to the error handling procedures.
Calibration is carried out by the project owner, and these records will be maintained by the project owner and the third party designated.

2.3 Electricity input ammeter
Following the same process as listed in 2.1.

2.4 Biomass residues consumption
The project owner will conduct an energy balance analysis to verify the amounts of biomass residues collected at the collection sites, purchased at biomass procurement department of the power plant and combusted by the boilers. If significant difference among the three sources identified, the project developer will conduct further check the original records to find out reasons and correct. If the significant difference can't be resolved, the most conservative value of biomass utilized by the proposed project will be applied as monitoring results.

3. Monitoring
Meters of electricity and heat employed by the proposed project will follow the national measurement standard.
3.1 Net Electricity Generated
Grid-connected electricity generated by the proposed project will be monitored through metering equipment at the substation continuously (interconnection facility connecting the facility to the Grid). The data can also be monitored and recorded at the on-site control center using a computer system. The meter reading will be readily accessible for DOE. Calibration tests records will be maintained for verification.
3.2 Availability of Biomass Residues
The project developer will provide evidence to DOE concerning with the availability of Biomass residues resource in the nearby counties. This will be obtained from official information yearly. If it is not available, the data will be calculated or estimated based on a survey conducted by project developer yearly.

3.3 Biomass Residues Consumption of the Power Plant
The quality and type of biomass residues burned by the power plant will be monitored during the operation of the power plant, including all the necessary parameters of the biomass residues to be monitored according to Section B.7 of this PDD. All relevant records will be maintained for verification.
3.4 Fossil Fuel Consumption by the boiler
Fossil Fuel Consumption by the boiler during the operation will be recorded and monitored during the operation period of the proposed project. All relevant records will be maintained for verification. Flow meter will be equipped in the sucker and return pipe to monitor the quantity of diesel consumption.

3.5 Transportation of Biomass residues
The project developer of the proposed project will structure a recording and monitoring system within the biomass residues supply and management system covering all the biomass collection sites established

by the proposed project. The quantity and type of biomass, transportation vehicle and transportation distance to the collection sites will be recorded by company staffs at the sites. The receipts and records regarding with biomass purchase by the proposed project will be documented and summarized for verification. The transportation of the biomass from the collection sites to the power plant will be monitored and documented by the project developer to determine the fossil fuel consumption by the biomass transportation activity. The transportation records will be documented and maintained for verification.

3.6 Heat supplied

The heat supply monitoring will only start after the proposed project starts heat supply to local users. Heat supplied by the proposed project will be monitored through metering equipments at the end of users continuously. The meter reading will be readily accessible for DOE. Calibration tests records will be maintained for verification.

3.7 Electricity purchased from the grid

When the biomass residues is pretreated, the proposed project needs a certain amount of electricity from grid. This amount will be metered, and the record be kept for examination.

The meter reading will be readily accessible for DOE. Calibration tests records will be maintained for verification.

3.8 Leakage

Amount of biomass types consumed and Quantity of biomass types that is available in surplus in the counties that defined in Project Boundary will be monitored to check the leakage effect brought by the operation of the proposed project. This will be obtained from official information, such as agriculture statistics and survey of Counties defined within Project Boundary that supply biomass residues to the proposed project. If it is not available, the data will be calculated or estimated based on a survey conducted by project developer with the support from governmental entity. If any leakage occurs during the crediting period, the project developer will determine the parameters in terms of leakage effects according the definition in the PDD with the support from local government entity.

The monitoring boundary and management, equipments and its installation position are shown in figure B-4:

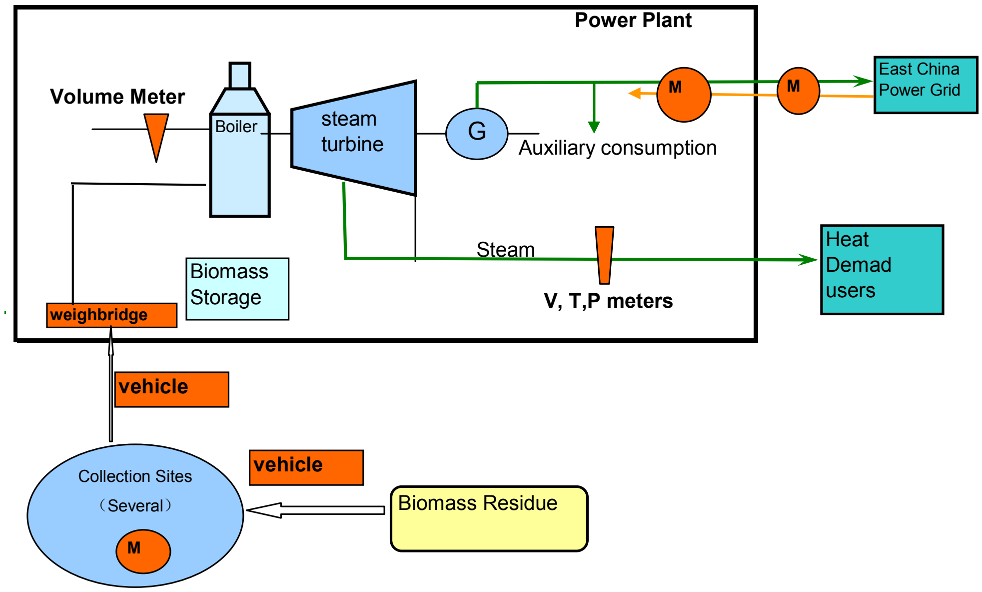

Figure B-4 project boundary and monitoring map

4. Quality Assurance and Quality Control

The quality assurance and quality control procedures for recording, maintaining and archiving data shall be improved as part of this CDM project activity. This is an on-going process that will be ensured through the CDM in terms of the need for verification of the emissions on an annual basis according to this PDD and the CDM manual.

5. Data Management System

This provides information on record keeping of the data collected during monitoring. Record keeping is the most important exercise in relation to the monitoring process. Without accurate and efficient record keeping, project emission reductions cannot be verified. Below follows an outline of how project related records would be managed.

Overall responsibility for monitoring of GHG emissions reduction will rest with the CDM responsible person of the proposed project. The CDM manual sets out the procedures for tracking information from the primary source to the end-data calculations in paper document format. It is the responsibility of the proposed project owner to provide additional necessary data and information for validation and verification requirements of respective DOE. Physical documentation such as paper-based maps, diagrams and environmental assessment will be collated in a central place, together with this monitoring plan. All paper-based information will be stored by the project owner and kept at least one copy.

6. Verification and Monitoring Results

The verification of the monitoring results of the project is a mandatory process required for all CDM projects. The main objective of the verification is to independently verify that the project has achieved the emission reductions as reported and projected in the PDD. It is expected that the verification will be done annually.

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)

>>
Date of completion: 27/8/ 2008
Name of persons determining the baseline study and monitoring methodology:

Contact Information of the responsible person	**Is organisation a Project Participant *Yes/No***
Sun Li, Gong Jing, Liu Yanan Camco International Limited Floor 14, Lucky Tower A, No. 3 North Road, East 3rd Ring Road, Chaoyang District, Beijing, China 100027 Tel: (86 10) 8448 1623 Fax: (86 10) 8448 2432 email:lilian.sun@camcoglobal.com.cn, kerry.gong@camcoglobal.com.cn melody.liu@camcoglobal.com.cn Website: www.camcoglobal.com.cn	Yes

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:

>>
25/01/2008 (Key Equipment Purchase Contract Signed Date, the construction begin date is 18/03/2008)

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

>>
20 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:

>>
1/7/2009

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

>>

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

>>

The EIA of the proposed project was completed by Anhui Science&Technology consultancy center and approved by Anhui Environmental Protection bureau. The summary of this evaluation is as following:

1. Air

In the construction period, the waste gas resource is mainly from, such as the road dust during the transporting process, automobile emission, emissions from excavator and bulldozer, and so on. Some measures will be taken to reduce these negative effects: sprinkling to repress the dust, keep the ground humidity, and clear the soil daggered out in time.

After the project being implemented, there will be waste gas from the boiler. Then, the boiler waste gas will be treated by the bag filter. Furthermore, the waste gas will be out though the high chimney (100m height, 3m internal diameter) to reduce the air pollution by the air diffusion and self-clean ability.

2. Waste Water

During construction, the waste water is mainly from: rainwater, wash water from all kinds of machinery and automobiles, and domestic wastewater. The wash water mainly contains the suspended sediment, and it will be collected by a simple drain, filter by grid, and then recovery and utilization after sedimentation. The domestic wastewater will be transmitted by engineer sewage pipe network to the domestic sewage integration treatment equipment for treating.

When the project is operated, all kinds of waste water will be treated separately and reused after reach discharge standard: (1) acid-alkali wastewater will be neutralized and then reused as industrial water; (2) Oily wastewater will be separated the oil and water by the oil-water separator and then reused as industrial water; (3) Waste water from boiler and other clean system will be regulated PH, and then flocculated, clarified and then reused as industrial water; (4) The domestic waster water will be treated by contact oxidation process and then transmit into the industrial park sewage pipe network.

3. Noise

During construction, the project noise is mainly from: fixed and successive drilling, construction machinery noise, and fluid traffic noise. The noise in the east\west\south\north of the proposed project boundary in the day or night all meets the 3rd standard requirements of <Noise standard of industrial plant boundary>. In additional, there is no resident in the scope of 200m away from the project site, so the noise impact is ignorable.

When the project is operated, the noise source is mainly from machinery noise and gas dynamic noise from the exhaust pipe. The noise control measures include: choosing the equipments with high efficiency and little noise, taking vibration reduction measures when fixing equipments, taking sound proof measures to the noisy equipments, to control the noise in the standard range.

4. Solid Waste

The solid waste produced in the construction period is mainly the construction residues and the domestic waste from workers. The construction residues will be backfilled the site, and the domestic waste will be collected and sent to local environmental protection department for treatment.

During project operation, the solid waste is mainly: boiler ash residues, domestic waste, which are all common solid waste. The ash residues will be separated from the boiler by a clear system, and then transported to Fertilizer Plant for producing compound fertilizer. The domestic waste produce by this project is not so much and will be collected by the local environmental protection department for land filling.

5. Conclusion

After the above measurements performed, the negative impacts on environments will be minimized below the requirements of laws and regulations during the construction and implementation. Furthermore, as renewable power project, the proposed project can reduce the consumption of fossil fuel sources and GHG emission.

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:

>>

According to EIA, no significant environmental impacts are discovered by the project participants or the host party. Anhui Environmental Protection Bureau has approved the EIA in Nov., 5th, 2007.

SECTION E. Stakeholders' comments

>>

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

In Jul., 2007, the project owner carried out the stakeholder comments investigation together with EIA organization in the neighbouring area. The interviewees include the farmer, worker, official and other different occupation persons covering different age levels. Questionnaire was implemented by filling the stakeholder comments investigation form. 100 copies questionnaires were distributed and all of them were collected.

The basic information about the interviewee is described as following table:

Table E-1 Interviewee Statistics

	Number of interviewee	Age				Education			Occupation				
		< 20	20-30	30-50	> 50	Primary school	Middle school	College	official	Students	farmer	worker	other
Number of People	100	5	13	64	18	49	29	22	16	6	56	18	4
Percentage (%)	100.0	5	13	64	18	49	29	22	16	6	56	18	4

The questions in the questionnaire including:
Would you consider the project important?
Do you agree with the construction of the project?
What is the environmental problem associated with the project that you are most concerned about?
What is the effect of the project on local ecologic environment?
Are you satisfied with the methods proposed to alleviate the environment impacts?
Do you think the project will improve the local economy?
Do you think the project will improve local employment opportunities?

E.2. Summary of the comments received:

>>

Among them, 97% interviewees think the proposed project is very important, and 3% think it's important. All of the interviewees agree with the construction of the proposed project.

For the most concerned environmental problem, 3% of them think it's noisy pollution and 97% think there is no significant influence on the environment. 48% think the proposed project can improve the local ecological environment and 52% think it has no impacts on the ecological environment. 96% of the interviewees are satisfied with the methods proposed to alleviate the environment impacts and 4% have no idea about it.

97% think the proposed project can promote local economic development, and 3% think it have no significant impact. 95% of them think the proposed project can supply more employment opportunities, 3% think it can not and 2% have no idea.

The outcome of the survey indicated that it is generally believed that the construction of the project will contribute to the local environment and to the development of local enterprises and improve the local employment situation. The participants said that they wish the project could be put into operation as soon as possible. By participating the meeting, all the participants had a better understanding of both the project and the CDM, and expressed their full support for the development of the project.

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

>>

The residents and local government are all very supportive to the proposed project. No negative comments have been received on the project. However, there are few persons who express some concerns about noise. The project owner will take following measures to reduce the impacts: choosing the equipments with high efficiency and little noise, taking vibration reduction measures when fixing equipments, taking sound proof measures to the noisy equipments, to control the noise in the standard range.

Furthermore, the project owner also make a decision to further the project publication together with local government to eliminates that public concerns. And, the project owner will make best use of the CDM and facilitate the project construction. In the future project operation period, the project owner will keep good contact with the local stakeholders, and invite them to supervise their actions for environmental protection.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Wuhe Kaidi Green Energy Development Co., Ltd.
Street/P.O.Box:	East of Guofang Road, Chengguan Town, Wuhe County, Anhui Province
Building:	2nd Floor of Agriculture Bureau
City:	Bengbu
State/Region:	Anhui Province
Postfix/ZIP:	233300
Country:	P.R. China.
Telephone:	0552-5875232
FAX:	0552-5875231
E-Mail:	Ren_haipo@126.com
URL:	
Represented by:	Haibo Ren
Title:	
Salutation:	Mr.
Last Name:	Ren
Middle Name:	
First Name:	Haibo
Department:	Vice-General Manager
Mobile:	13665522588
Direct FAX:	0552-5875231
Direct tel:	0552-5875232
Personal E-Mail:	Ren_haipo@126.com

Organization:	Camco International Limited
Street/P.O.Box:	Green Street
Building:	Channel House
City:	St Helier
State/Region:	Jersey
Postfix/ZIP:	JE2 4UH
Country:	Channel Islands
Telephone:	+44 (0)20 7665 1865
FAX:	+44 (0)20 7665 1871
E-Mail:	
URL:	www.camcoglobal.com
Represented by:	
Title:	Mrs
Salutation:	Director
Last Name:	Rawlins
Middle Name:	
First Name:	Madeleine
Department:	Qualification
Mobile:	
Direct FAX:	+86 10 8448 1385
Direct tel:	+86 10 8448 2499
Personal E-Mail:	Project.participant.cn@camcoglobal.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding from Annex I a party is involved in this project activity.

Annex 3

BASELINE INFORMATION

According to the approved methodology ACM0002 and the document "China's Regional Grid Baseline Emission Factors Renewed", released at http://cdm.ccchina.gov.cn/ on 18 July 2008, the $EF_{grid,CM,y}$, $EF_{grid,OM,y}$, and $EF_{grid,BM,y}$ of East China Power Grid could be calculated as following:

A. Electricity Generation of East China Power Grid (2002-2006)

Table A1. Electricity Generation of East China Power Grid (2002-2006)

Year	Electricity Generation (Unit: 10^8 KWh)					Split of low-cost/must-run resources
	Total	Hydro	Thermal	nuclear	Others	
2002	3698.13	378.35	3242.04	56.12	1.63	12.33%
2003	4291.27	319.82	3821.12	149.24	1.09	10.96%
2004	4879.86	255.56	4402.92	219.88	1.50	9.77%
2005	5744.67	441.87	5058.55	226.12	18.13	11.94%
2006	6668.20	502.65	5905.41	236.30	23.84	11.44%

Sources: China Electric Power Yearbook 2003-2007

B. Calculation of Operating Margin Emission Factor ($EF_{grid,OM,y}$)

Table B1. Electricity Generation of East China PowerGrid in 2004

	Electricity generation of fuel-fired power plants (MWh)	Auxiliary power ratio (%)	Total Electricity Supplied to the Grid (MWh)
Shanghai	71127000	5.22	67,414,171
Jiangsu	163545000	5.93	153,846,782
Zhejiang	95255000	5.68	89,844,516
Anhui	59875000	6.03	56,264,538
Fujian	50490000	6.07	47,425,257
Total			414,795,263

Sources: China Electric Power Yearbook 2005

Table B2. Electricity Generation of East China PowerGrid in 2005

	Electricity generation of fuel-fired power plants (MWh)	Auxiliary power ratio (%)	Total Electricity Supplied to the Grid (MWh)
Shanghai	74606000	5.05	70,838,397
Jiangsu	211429000	5.96	198,827,832

Zhejiang	108110000	5.59	102,066,651
Anhui	62918000	5.9	59,205,838
Fujian	48600000	4.57	46,378,980
Total			477,317,698

Sources: China Electric Power Yearbook 2006

Table B3. Electricity Generation of East China PowerGrid in 2006

	Electricity generation of fuel-fired power plants (MWh)	**Auxiliary power ratio (%)**	**Total Electricity Supplied to the Grid (MWh)**
Shanghai	72033000	5.06	68,388,130
Jiangsu	251258000	5.69	236,961,420
Zhejiang	140349000	5.62	132,461,386
Anhui	71867000	6.05	67,519,047
Fujian	55580000	4.51	53,073,342
Total			558,403,325

Sources: China Electric Power Yearbook 2007; China Energy Statistical Yearbook 2007

Table B4. Calculation of Operating Margin Emission Factor of East China Power Grid in 2004

Fuel	Unit	Shanghai A	Jiangsu B	Zhejiang C	Anhui D	Fujian E	Total F=A+B+C+D+E	Emission Factor[1] (tC/TJ) G	Oxidation[2] (%) H	Average Low Caloric Value[3] (MJ/t or km³) I	CO_2 Emission (tCO_2e) J=G*H*I*F*44/12/1000 (mass) J=G*H*I*F*44/12/1000 (Volume)
Raw Coal	10^4t	2779.6	7601.9	4008.9	2906.2	2183.7	**19480.3**	25.8	100	20908	385,300,230
Cleaned coal	10^4t						**0**	25.8	100	26344	0
Other Washed Coal	10^4t		5.46			4.63	**10.09**	25.8	100	8363	79,826
Coke	10^4t						**0**	29.2	100	28435	0
Coke Oven Gas	10^8m^3	2.59					**2.59**	12.1	100	16726	192,198
Other Gas	10^8m^3	72.46					**72.46**	12.1	100	5227	1,680,380
Crude Oil	10^4t						**0**	20	100	41816	0
Gasoline	10^4t						**0**	18.9	100	43070	0
Diesel Oil	10^4t	2.69	27.17	6.23			**36.09**	20.2	100	42652	1,140,116
Fuel Oil	10^4t	58.52	55.07	202.89		23.26	**339.74**	21.1	100	41816	10,991,148
PLG	10^4t						**0**	17.2	100	50179	0
Refinery Gas	10^4t	0.77	0.55				**1.32**	15.7	100	46055	34,996
Natural Gas	10^8m^3		0.14				**0.14**	15.3	100	38931	30,576
Other Petroleum Products	10^4t	21.22	1.37	24.89			**47.48**	20	100	38369	1,335,957
Other Coking Products	10^4t						**0**	25.8	100	28435	0

Other Energy	10^4t tce	6.43		15.48			21.91	0	100	0	0
Total CO_2 Emission : 400, 785, 429											

Net electricity imported from Central China Grid (MWh)	**26,933,850**
Total emission of the East China Power Grid(tCO_2e)	**434,068,359**
Fossil power supply of the East China Power Grid(MWh)	**453,378,723**
OM emission factor of the East China Power Grid(tCO_2e/MWh)	**0.95741**

Sources: China Electric Power Yearbook 2005
1,2 2006 IPCC Guidelines for National Greenhouse Gas Inventories， Volume 2 Energy, chapter 1, page 1.21-1.24, table 1.3 and 1.4.
3 China Energy Statistical Yearbook 2007,Page 287

Table B5. Calculation of Operating Margin Emission Factor of East China Power Grid in 2005

Fuel	Unit	Shanghai A	Jiangsu B	Zhejiang C	Anhui D	Fujian E	Total F=A+B+C+D+E	**Emission Factor[1]** (tC/TJ) G	**Oxidation[2]** (%) H	**Average Low Caloric Value[3]** (MJ/t or km^3) I	CO_2 Emission (tCO_2e) J=G*H*I*F*44/12/1000 (mass) J=G*H*I*F*44/12/1000 (Volume)
Raw Coal	10^4t	2847.31	9888.06	4801.52	3082.9	2107.69	**22727.48**	25.8	100	20908	449,526,100
Cleaned coal	10^4t						**0**	25.8	100	26344	0
Other Washed Coal	10^4t						**0**	25.8	100	8363	0
Coke	10^4t			0.03			**0.03**	29.2	100	28435	913
Coke Oven Gas	10^8m^3	1.68	1.38		1.71		**4.77**	12.1	100	16726	353,971
Other Gas	10^8m^3	83.72	24.97	0.06	30		**138.75**	12.1	100	5227	3,217,676
Crude Oil	10^4t			27.01			**27.01**	20	100	41816	828,263
Gasoline	10^4t						**0**	18.9	100	43070	0
Diesel Oil	10^4t	1.25	16	4.52		1.67	**23.44**	20.2	100	42652	740,491
Fuel Oil	10^4t	59.39	13.22	153.22		7.45	**233.28**	21.1	100	41816	7,546,992
PLG	10^4t						**0**	17.2	100	50179	0
Refinery	10^4t	0.57	0.83				**1.4**	15.7	100	46055	37,117

Gas											
Natural Gas	10^8m^3	1.09	1.85	0.62			**3.56**	15.3	100	38931	777,514
Other Petroleum Products	10^4t	21	8.38	34.8			**64.18**	20	100	38369	1,805,850
Other Coking Products	10^4t						**0**	25.8	100	28435	0
Other Energy	10^4t tce	12.36		15.29			**27.65**	0	100	0	0
Total CO_2 Emission : 464,834,887											
Net electricity imported from Central China Grid (MWh)							**27,039,000**				
Total emission of the East China Power Grid(tCO_2e)							**496,303,757**				
Fossil power supply of the East China Power Grid(MWh)							**515,638,698**				
OM emission factor of the East China Power Grid(tCO_2e/MWh)							**0.96250**				

Sources: China Electric Power Yearbook 2006

Table B6. Calculation of Operating Margin Emission Factor of East China Power Grid in 2006

Fuel	Unit	Shanghai A	Jiangsu B	Zhejiang C	Anhui D	Fujian E	Total F=A+B+C+D+E	**Emission Factor**[1] (tC/TJ) G	**Oxidation**[2] (%) H	**Average Low Calorific Value**[3] (MJ/t or km^3) I	CO_2 Emission (tCO_2e) J=G*H*I*F*44/12/1000 (mass) J=G*H*I*F*44/12/1000 (Volume)
Raw Coal	10^4t	2744.45	10945.42	6065	3455.2	2369.63	**25579.7**	25.8	100	20908	505,940,068
Cleaned coal	10^4t						**0**	25.8	100	26344	0
Other Washed Coal	10^4t		150.54		23.06		**173.6**	25.8	100	8363	1,373,419

Coke	10^4t			39.07			**39.07**	29.2	100	28435	1,189,463
Coke Oven Gas	10^8m^3	1.71	3.13	0.23	0.71		**5.78**	12.1	100	16726	428,920
Other Gas	10^8m^3	84.64	106.54	3.28	25.12		**219.58**	12.1	100	5227	5,092,160
Crude Oil	10^4t			20.3			**20.3**	20	100	41816	622,501
Gasoline	10^4t						**0**	18.9	100	43070	0
Diesel Oil	10^4t	2.13	3.7	4.11	1.21	1.11	**12.26**	20.2	100	42652	387,305
Fuel Oil	10^4t	44.51	3.77	71.98	0.02	4.5	**124.78**	21.1	100	41816	4,036,838
PLG	10^4t						**0**	17.2	100	50179	0
Refinery Gas	10^4t	0.29	0.4		2.95		**3.64**	15.7	100	46055	96,505
Natural Gas	10^8m^3	3.2	13.5	9.18			**25.88**	15.3	100	38931	5,652,267
Other Petroleum Products	10^4t	18.82	3.57				**22.39**	20	100	38369	629,993
Other Coking Products	10^4t						**0**	25.8	100	28435	0
Other Energy	10^4t tce	6.66	2.8	27.45	3.21		**40.12**	0	100	0	0
Total CO_2 Emission : 525,449,440											

Net electricity imported from Central China Grid (MWh)	**24,029,150**
Total emission of the East China Power Grid(tCO_2e)	**556,873,456**
Fossil power supply of the East China Power Grid(MWh)	**593,583,295**
OM emission factor of the East China Power Grid(tCO_2e/MWh)	**0.93816**

Sources: China Electric Power Yearbook 2007; China Energy Statistic Yearbook 2007

Table B7. Weighted-average OM emission factor of East China Power Grid (2004-2006)

	2004	2005	2006	Weighted-average OM emission factor
Total Emission, tCO2	434,068,359	496,303,757	556,873,456	
Total power supply, MWh	453,378,723	515,638,698	593,583,295	
OM emission factor, tCO2/MWh	0.95741	0.96250	0.93816	**0.95178**

Therefore, the $EF_{grid,OM,simple}$ could be calculated as:

$EF_{grid,OM,simple}$ = （434,068,359 + 496,303,757 + 556,873,456） / (453,378,723 + 515,638,698 + 593,583,295) = **0.95178** tCO_2e/MWh

C. Calculation of the Build Margin Emission Factor ($EF_{grid,BM,y}$)

Table C1 Emission Factor of Best Technology

	Variable	Electricity supply efficiency	Emission factor of fuel (tC/TJ)	Oxidation rate	Emission factor (tCO_2/MWh)
		A	B	C	D=3.6/A/1000*B*C*44/12
Coal-based power plants	$EF_{Coal,Adv}$	37.28%	25.8	1	0.9135
Gas-based power plants	$EF_{Gas,Adv}$	48.81%	15.3	1	0.4138
Oil-based power plants	$EF_{Oil,Adv}$	48.81%	21.1	1	0.5706

Sources: China's grid baseline BM calculation progress, NRDC

Table C2 The Proportion Of CO_2 Emission From Solid、Liquid、Gas Fuel For Generating Electricity

Fuel	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total	Caloric	Emission	Oxidatio	Emission
		A	B	C	D	E	F=A+…+E	G (KJ/kg)	H	I	J=F*G*H*I*44/12/100
Raw Coal	10^4 t	2744.45	6065	10945.4	3455.2	2369.63	25579.7	20908	25.8	1	505,940,068
Cleaned Coal	10^4 t	0	0	0	0	0	0	26344	25.8	1	0
Other Washed	10^4 t	0	0	150.54	23.06	0	173.6	8363	25.8	1	1,373,419
Briquette	10^4 t	0	0	0		0	0	20908	26.6	1	0
Coke	10^4 t	0	39.07	0	0	0	39.07	28435	29.2	1	1,189,463
Subtotal											**508,502,949**
Crude Oil	10^4 t	0	20.3	0	0	0	20.3	41816	20	1	622,501
Gasoline	10^4 t	0	0	0	0	0	0	43070	18.9	1	0
Kerosene	10^4 t	0	0	0	0	0	0	43070	19.6	1	0
Diesel Oil	10^4 t	2.13	4.11	3.7	1.21	1.11	12.26	42652	20.2	1	387,305
Fuel Oil	10^4 t	44.51	71.98	3.77	0.02	4.5	124.78	41816	21.1	1	4,036,838
Other Petroleum	10^4 t	18.82	0	3.57	0	0	22.39	38369	20	1	629,993
Other Coking	10^4 t	0	0	0			0	28435	25.8	1	0
Subtotal											**5,676,637**
Natural Gas	10^7 m^3	32	91.8	135	0	0	258.8	38931	15.3	1	5,652,267
Coke Oven Gas	10^7 m^3	17.1	2.3	31.3	7.1	0	57.8	16726	12.1	1	428,920
Other Gas	10^7 m^3	846.4	32.8	1065.4	251.2	0	2195.8	5227	12.1	1	5,092,160
PLG	10^4 t	0	0	0	0	0	0	50179	17.2	1	0
Refinery Gas	10^4 t	0.29	0	0.4	2.95	0	3.64	46055	15.7	1	96,505
Subtotal											**11,269,853**
Total											**525,449,440**

Sources: China Energy Statistical Yearbook 2007

Calculate with relevant data and formulae, the value for λ_{Coal} is 96.78%the value for λ_{Oil} is 1.08% and the value for λ_{Gas} is 2.14%.
Therefore,
$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv}$ =0.8991 tCO_2e/MWh.

Table C3 Installed capacity of the East China Power Grid in 2004

Installed Capacity	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total
Fuel-fired	MW	12014.9	28289.5	21439.8	9364.5	8315.4	79424.1
Hydro	MW	0	126.5	6418.4	692.8	7180.1	14417.8
Nuclear	MW	0	0	3056	0	0	3056
Wind & Others	MW	3.4	17.5	39.7	0	12	72.6
Total	MW	12018.3	28433.5	30953.9	10057.3	15507.5	96970.5

Sources：China Electric Power Yearbook 2005

Table C4 Installed capacity of the East China Power Grid in 2005

Installed Capacity	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total
Fuel-fired	MW	13113.5	42506.4	27688.1	11423.2	9345.4	104076.6
Hydro	MW	0	142.6	6952.1	749.8	8224.9	16069.4
Nuclear	MW	0	0	3066	0	0	3066
Wind & Others	MW	253.3	58.8	37.2	0	52	401.3
Total	MW	13366.8	42707.8	37743.4	12173	17622.3	123613.3

Sources：China Electric Power Yearbook 2006

Table C5 Installed capacity of the East China Power Grid in 2006

Installed Capacity	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total
Fuel-fired	MW	14526	51776	35391	14134	13001	128828
Hydro	MW	0	136	8369	1001	8957	18463
Nuclear	MW	0	0	3066	0	0	3066
Wind & Others	MW	253	162	43	0	89	547
Total	MW	14550	51927	46863	15135	22047	150522

Sources：China Electric Power Yearbook 2007

Table C6. Calculation of BM Emission Factor of East China Power Grid (2004-2006)

	New Capacity 2004	New Capacity 2005	New Capacity 2006	New Capacity 2005-2006	Percentage of New Capacity Additions

	A	B	C	D=C-B	
Fuel-fired (MW)	79424.1	104076.6	128828	24751.4	90.70%
Hydro (MW)	14417.8	16069.4	18463	2393.6	8.77%
Nuclear (MW)	3056	3066	3066	0	0.00%
Wind and others(MW)	72.6	401.3	547	145.7	0.53%
Total	96970.5	123613.3	150904	27290.7	100.00%
Percentage of Year 2006	64.26%	81.92%	100%	–	–

$EF_{grid,BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal}$ =0.8991×90.70%=0.8154 tCO_2/MWh。

D. Calculation of the Baseline Emission Factor （$EF_{grid,CM,y}$）

$EF_{grid,CM,y}$=0.75×$EF_{grid,OM,y}$ + 0.25×$EF_{grid,BM,y}$ = 0.5 × 0.95178 + 0.5 × 0.8154 = 0.88359 tCO_2/MWh

Annex 4

MONITORING INFORMATION

No Supplement Information.