CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

CONTENTS

Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

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Zhongjieneng Suqian 2*12MW Biomass Direct Burning Power Plant Project
Revision number: 04 version,
Revision date: 22/11/2006

A.2. Description of the project activity:

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Zhongjieneng Suqian Biomass Power Plant Project (hereafter, the Project) developed by ZHONGJIENENG Biomass Energy Investment Company (hereafter referred to as the Project Developer) is a biomass collection and comprehensive utilization project in Suqian City, Jiangsu Province, P.R.China. The main purpose of the proposed project is to generate electricity from biomass resource to East China Power Grid and solve the severe environmental problem due to uncontrolled burning of massive dumped biomass residues. Furthermore, the proposed project will also improve the local economic development.

The project is for establishing a biomass fired power plant with a rated capacity of 24MWe. The estimated annual electricity connected to public grid will be 132.6Gwh. The supplying of electricity from biomass power plant currently implemented is an alternative to replace the equivalent power generated from coal fired based power plant connected to the same grid system which will avoid the CO_2 emission. The total emission reduction is 123055tonnes$CO_{2e.}$

The annual production of biomass residue in Suqian area, Jiangsu province is approximately 1,690,000 tonnes, and the majority of the biomass are dumped or burnt uncontrolled which ended up with heavy atmosphere pollution locally and regionally. Approximately 200,000 tonnes biomass residues will be utilized in the proposed biomass power plant, which will replace the power generated from the coal firing plants.

The electricity produced in this biomass power plant is sent to East China Grid Network directly and be distributed as the priority electricity resource. The heat generated in this biomass power plant will also be prepared as well when the local heating system is established in the future. But the heating supplying is not taken into the consideration in the proposed project activity for the purpose of conservative calculation.

The proposed project utilizes the local innovation biomass boiler technology co-developed by China Energy Conservation Investment Corporation (CECIC) and Zhejiang University.

The proposed project will:

- Create a lot of direct and indirect working opportunities in the area where this project located
- Avoid the uncontrolled burning or dumping of biomass residues
- Less the power generation burden based on coal fired power plans which often result in heavy air pollution
- Encourage the clean and renewable energy technology
- Construct as the pilot renewable resource utilization project, and will be shown as demonstration project on biomass fuel utilizing as a sustainable way for energy production

- Avoid the uncontrolled bio resources management and optimizing the natural resources

A.3. Project participants:

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Please list project participants and Party(ies) involved and provide contact information in Annex 1. Information shall be in indicated using the following tabular format.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
P.R.China	• ZHONGJIENENG Biomass Energy Investment Corporation	No
United Kingdom of Great Britain and Northern _Ireland	• Carbon Resource Management (CRM) Co.,Ltd	No

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public
at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

Note: When the PDD is filled in support of a proposed new methodology (forms CDM-NBM and CDM-NMM), at least the host Party(ies) and any known project participant (e.g. those proposing a new methodology) shall be identified.

Host country: P.R.China was ratified under United Nations Framework Convention on Climate Change in 5th January 1993 and approved Kyoto Protocol on 30 August 2002.

Project entity: ZHONGJIENENG Biomass Energy Investment Corporation was established in 2005 with the registered capital of 30million RMB Yuan. The main business scope is the biomass utilization project development, investment, construction, implementation, operation and management. The core industrial area is the biomass energy utilization, which are mainly biomass energy to power generation, bio-ethanol production, biomass pellet and new type construction material. The proposed Suqian biomass direct burning project is one the demonstration projects invested and developed by ZHONGJIENENG Biomass Energy Investment Corporation.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

>> P.R.China

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

>> Jiangsu Province

A.4.1.3. City/Town/Community etc:

>> Suqian

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

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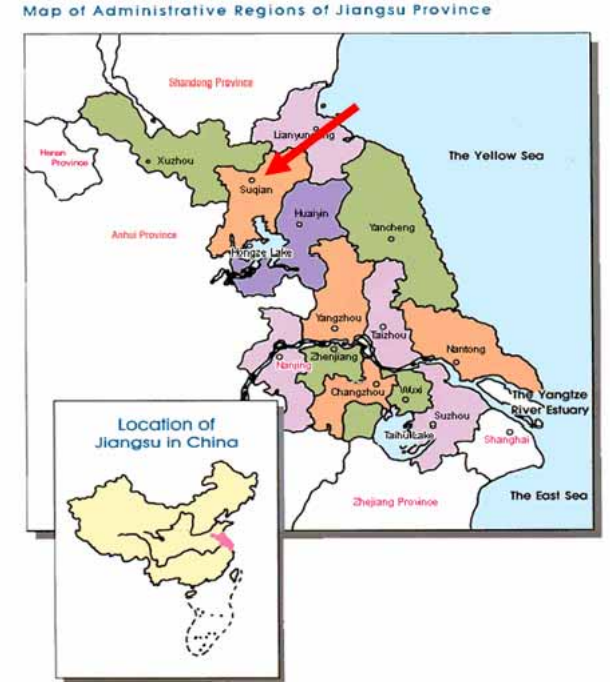
The proposed project activity is located in the south east of Suqian city; west north of Jiangsu province, P. R. China, and it can be seen in the following maps. The proposed project site is located in the east area of economic development zone in Suqian. The east is Fuchunjiang road, the north is Yandangshan road and the west is Jiangshan road. It is about 800m away from Great Canal of Beijing-Hangzhou.

Suqian is a newly developed city in Jiangsu province, and it is also an agricultural production region with rich grain, cotton and forest base. The natural environmental is very good locally; it belongs to the warm monsoon climate area, with average annual temperature around 14^{o}C and 913mm annual precipitation in the area.



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

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According to the UNFCCC website about the sectors and categories (http://cdm.unfccc.int/DOE/scopes.html#11), the corresponding scope for this project is:
Sectoral Scope: Energy Industries (renewable / non-renewable sources)
Category: Renewable electricity in grid connected applications

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

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The proposed project utilizes the local innovation biomass boiler technology co-developed by CECIC and Zhejiang University, which is Circulating Fluid Bed process. The proposed project system consists of an extraction stream turbine and a condensing turbine with each rated power capacity of 12MWe.

Meanwhile, system is together with a 2*75t/h vibrating chain type middle-temperature, middle-pressure boiler, and stream circulation by forced-air cooling. The annual power generation is 156GWh, and the power plant own consumption is 15%, therefore the power connected to the grid will be 132.6GWh per year. The biomass power plant will be connected to the public electric transmission grid, and electricity will be used as priority level. The heating supplying component is not considered in this project emission reduction calculation due to the conservative principle.

All the engineers working for the proposed project plant were participating in 45 days training of power plant theory and 30 days training on site after the construction of the proposed project. The training included plant operation regulations, safety regulations, electronic principle, fluid mechanics, thermal engineering, CFB boiler operation and emergency measurements, turbine operation principle and thermal power plant theory, etc. This combination of theory, onsite modeling and study tour will guarantee a robust plant operation process.

Regarding the corrosion in CFB such as chlorine corrosion, the following measures are undertaking in order to minimize problems:

- By using alkaline dust in the Circulating Fluid Bed to absorb dissociative ionic chlorine, the chlorine concentration in the waste gas can be reduced.
- Medium temperature and pressure boiler, and heating tube surface temperature would be designed to avoid the high and low temperature which would cause chlorine corrosion.
- The use of anti-corrosion and anti-abrasion alloy can increase the resisting capacity of the equipments themselves.
- The alloy would be painted on the surface of heating tubes to reduce the direct corrosion and abrasion by flue gas and dust passing by.
- The soot blower installation could minimize the accumulation of dust and to prevent the second corrosion.

The proposed biomass power plant is designed to handle various types of biomass resources but only the wheat and patty rice straws would be utilized as biomass fuel in the power plant. The collected biomass residues will be stored in the collection points first, and then transported to the power plant by the trucks in bales. The biomass bales will be cut in pieces of a maximum length of 50mm inside the plant site and feeding into the boiler directly. They will be collected by the other biomass trading agency and delivered to the plant. Consequently the biomass fuel will be unloaded in a receiver bunker and from there the handling will be automatically controlled.

First the biomass fuel will be stored in a large storage building and from there automatically reclaimed and transported to two small buffer silos in the boiler building. The buffer silos will control the feeding to the boiler. The burning system will be a vibrating water cooled grate. The boiler is a three pass stream boiler designed to generate stream at 450^{o}C and 3.82MPa. The air pre-heating will be done with hot feed water which will be reheated in a flue gas cooler and returned to the feed water tank. By doing this an outlet temperature of 130 ^{o}C and a boiler efficiency over 90% will be achievable. The flue gas cleaning will be by a fabric filter for particles. Due to low content of sulphur in the flue gas, no scrubber is needed in this project.

The sub contract with independent logistics company will be selected through a public bidding process but is at the time for validation not selected. There are approximately 20 collection points are going to be selected surrounding the power plant.

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. After the heavy metal testing of the biomass ash from power plant, it is found that these heavy amounts are much lower than the allowed values in the relative environmental standard requirement, accordingly it is thought to be safe to be used as fertilizers.

There are going to build $20m^3$ storage tank for storing the diesel which is the light fuel oil grade 0, for starting up the power plant. The hourly consumption of this type of diesel is 300kg. But the amount of diesel used will be quite tiny in this plant since the biomass is comparatively easy to get start burning.

All 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.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed CDM project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

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China is one of the counties in the world with the richest coal resources. The proposed project will be connected to the East China Power Grid, and it is found that more than 85% of the new power capacity in East China Power Grid are from coal firing power plants. The information is based on the China Power Yearbook statistics 2001 to 2005. Thus Chinese economic development will also in the future heavily rely on the power generation from coal firing plants. To reduce the power generation reliance on the non renewable fuels such as coal utilization, Chinese central government issued the Renewable Energy Law January 1st, 2006. However the specific implementation rules have not established yet.

Suqian is a new developed city in Eastern China with very rich biomass resources and economic labor force. Most of the biomass residues have been dumped and burnt uncontrolled in the field which resulted in greenhouse gas emission and severe air pollution, since the majority of local residents have been utilizing natural gas for the cooking and heating purpose. The proposed biomass power plant will collect and utilize the current dumped biomass residues and generate power to replace the electricity generated by coal fired plants and avoid biomass residues uncontrolled burning, thus reduce the anthropogenic emissions of GHG accordingly.

Comparing to the investment in the proposed biomass project with normal coal firing plant, it is found that the unit investment cost of building biomass power plant is much higher. And without CERs revenues, the IRR is only around 2.05% which is lower than the attractive investment benchmark. Therefore the proposed project is not considered financial viable without CER,

Moreover, as one of the first few biomass power plants implemented with domestic technology as the pilot project, the proposed project confronts the severe technology risks.

In conclusion, the proposed project activity would not occur in the baseline scenario, and the emission reduction is additional.

A.4.4.1. Estimated amount of emission reductions over the chosen crediting period:

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Please indicate the chosen crediting period and provide the total estimation of emission reductions as well as annual estimates for the chosen crediting period. Information on the emission reductions shall be in indicated using the following tabular format.	
Years	**Annual estimation of emission reductions in tonnes of CO_2 e**
Year 2007,March	102546
Year 2008	123055
Year 2009	123055
Year 2010	123055
Year 2011	123055
Year 2012	123055
Year 2013	123055
Year 2014, March	20509
Total estimated reductions (tonnes of CO_2e)	861385
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	123055

A.4.5. Public funding of the project activity:

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No public funding is provided in this project.

SECTION B. Application of a baseline methodology

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

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ACM0006" Consolidated Baseline Methodology for grid-connected electricity generation from biomass residues" (Version 03, 19 May 2006), in conjunction with "Consolidated monitoring methodology for grid-connected electricity generation from biomass residues". And also this methodology ACM0006 refers to the ACM 0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"(Version 06, 19 May 2006) and the latest version of the "Tool for the demonstration and assessment of additionality". More information about the methodology can be found on the website: http://cdm.unfccc.int/methodologies/approved.

B.1.1. Justification of the choice of the methodology and why it is applicable to the project activity:

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There are generally four project activities included in this methodology application area which are followings:

- The installation of a new biomass power plant at a site where currently no power generation occurs (**Greenfield power projects**);
- The installation of a new biomass power generation unit, which is operated next to existing power generation capacity fired with either fossil fuels or the same type of biomass residue as in the project plant (**Power capacity expansion projects);**
- The improvement of energy efficiency of an existing power generation plant (**Energy efficiency improvement projects);**
- The replacement of fossil fuels by biomass in an existing power plant (**Fuel switch projects).**

As previously described, the Project is mainly based on two complementary activities as following:

- The collection and acted as biomass resources for power generation
- The generation and supplying of electricity to the regional grid system, thus displacing a certain amount of fossil fuels used for electricity generation.

Therefore, this Suqian Biomass power plant project obviously belongs to the **Greenfield Power Projects** which listed in the first of the four activities.

The methodology ACM0006 allows for development of projects falling under 4 conditions:

- Condition 1: No other biomass types than biomass residues (Defined as biomass that is a by-product, residue or waste stream from agriculture, forestry and related industries), as defined above, are used in the project plant and these biomass residues are the predominant fuel used in the project plant;
- Condition 2: For projects that use biomass residues from a production process, the implementation of the project should not result in an increase of the processing capacity of raw input or in other substantial changes in process;
- Condition 3: The biomass used by project facility should not be stored for more than one year;
- Condition 4: No significant energy quantities, except from transportation of the biomass, are required to prepare the biomass residues for fuel combustion.

The situations of proposed Suqian biomass direct burning power plant are as following:

- The biomass which will be utilized in the proposed power plant are mostly from the dumped or uncontrolled burning in the field, and only the biomass straws are utilized as the predominant fuel supplying for the power plant. Therefore, this is fulfilling the condition 1;
- The biomass residues are directly from the agriculture, but not the production process, therefore it fulfils the condition 2;
- Since there would be a professional logistics company responsible for the biomass transportation, and mainly based on the requirements of moisture and ash contents, the storage time of the biomass residues will not be over 1 year, therefore , it fulfils the condition 3;
- There is not significant energy quantities, except from transportation of the biomass are required to prepare the biomass residues for fuel combustion, which also fulfils the condition 4.

Based on the above analysis, it can be conclude that the project therefore fulfils all the conditions as defined above, hence ACM0006 was thought to be the most appropriate methodology for this project.

In this case a baseline methodology for electricity and or thermal energy displaced shall be an approved one used which is ACM 0006 as explained before, including the ACM 0002 "Consolidated Methodology for Grid-Connected Power Generation from Renewable Sources".

The proposed project can meet the applicability criteria of the baseline methodology (ACM0002), therefore, the methodology is applicable to the proposed project.

- The proposed project is not an activity that involves switching from fossil fuels to renewable energy at the proposed project site.
- The power grid (the East China Power Grid) which the proposed project is to be connected to is clearly identified and information on the characteristics of this grid is publicly available.
- The additionality of the proposed project can be verified using “Tools for the demonstration and assessment of additionality” requested by the baseline methodology (ACM0002).

B.2. Description of how the methodology is applied in the context of the project activity:

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The methodology will be applied using **Green Field Power Project** activity and all the four conditions listed under the ACM 0006 are fulfilled.

Based on the ACM0006, realistic and credible alternatives should be separately determined regarding:

- How **Power** would be generated in the absence of the CDM project activity;
- What would happen to the **Biomass** in the absence of the project activity;
- In case of cogeneration projects: how the **Heat** would be generated in the absence of the project activity.

Baseline Scenario

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

P5 The continuation of power generation in an existing power plant, fired with the same type of biomass as (co-)fired in the project activity, and implementation of the project activity, not undertaken as a CDM project activity, at the end of the lifetime of the existing plant;
P6 The continuation of power generation in an existing power plant, fired with the same type of biomass as (co-)fired in the project activity and, at the end of the lifetime of the existing plant, replacement of that plant by a similar new plant.

It can be found that in proposed Suqian biomass direct burning project:

P2 The proposed project is the first biomass direct burning power plant in Jiangsu province, therefore there is no other power plant fired with the same type of biomass but with a lower efficiency of electrical generation, so P2 is not suitable alternative;
P3 There is no existing plant onsite or nearby the project site only using fossil fuels generating power currently, so P3 is not suitable alternative;
P5 There is no continuation of power generation in an existing power plant, fired with same type of biomass as in the project activity, and implementation of the project activity not undertaken as a CDM project activity at the end of the lifetime of the exiting plant, so P5 is not suitable alternative;
P6 There is no replacement of the existing power plant at the end of the lifetime, by a similar new plant, the existing power plant would continue generate power, fired with the same type of biomass as fired in the project activity, so P6 is not suitable alternative.

First, during the identification of the baseline scenario for power generation, the realistic and credible alternative was chosen as **P1 The proposed project activity not undertaken as a CDM project activity and P4: The generation of power in a new grid connected power plant.**

For the use of biomass, the realistic and credible alternative(s) may include, inter alia:
B1 The biomass is dumped or left to decay or burned in an uncontrolled manner without utilizing it for energy purposes
B2 The biomass is used for heat and/or electricity generation at the project site
B3 The biomass is used for power generation, including cogeneration, in other existing or new grid connected power plants;
B4 The biomass is used for heat generation in other existing or new boilers at other sites
B5 The biomass is used for other energy purposes, such as the generation of biofuels
B6 The biomass is used for non-energy purposes, e.g. as fertilizer or as feedstock in processes

Similar analysis would be done for the biomass alternatives as power generation for the proposed Suqian project:
B1 The biomass straws would be utilized in the proposed power plant are mainly from the currently dumping residues and uncontrolled burning ones. Since local farmers have to get rid of huge amount of biomass residues for keep the land available for next season of agriculture planting, therefore they burn the biomass residues a lot sometimes, which pollutes local environment severely. Another important reason is that almost all the households have been using natural gas for cooking purposes during the last decade, therefore these biomass could not utilized in the kitchens. Therefore these biomass have not been utilized as the energy purpose currently, so B1 is the suitable alternative;
B2 As analyzed above, the biomass is not utilized for heat or electricity generation at the project site currently, so B2 is not suitable alternative;
B3 The biomass is not used for power generation currently, so B3 is not suitable alternative;
B4 The biomass is not used for heat generation in other existing or new boilers at other sites, so B4 is not suitable alternative;
B5 the biomass is not used for other energy purposes, so B5 is not suitable alternative;

B6 There is only very small percentage of biomass is used for non-energy purposes, so B6 is not suitable alternative.

In conclusion, for the use of biomass, the realistic and credible was chosen as **B1: The biomass is dumped or left to decay or burned in an uncontrolled manner without utilizing it for energy purposes.** According to the biomass resource investigation study done by ZHONGJIENENG BEIC and local authority, the current biomass utilization structure will not change after the proposed project operation.

If the proposed project activity is the cogeneration of power and heat, project participants shall define the most plausible baseline scenario for the generation of heat. For heat generation, realistic and credible alternative(s) may include, inter alia:
H1 The proposed project activity not undertaken as a CDM project activity
H2 The proposed project activity (installation of a cogeneration power plant), fired with the same type of biomass 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 cogeneration plant, on-site or nearby the project site, using only fossil fuels
H4 The generation of heat in boilers using the same type of biomass residues
H5 The continuation of heat generation in an existing cogeneration plant, fired with the same type of biomass as in the project activity, and implementation of the project activity, not undertaken as a CDM project activity, at the end of the lifetime of the existing plant
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)

The heating part in the proposed project is not considered in the emission reduction calculation based on the conservative principle.

Therefore, we could find that **Scenario 2** which is listed in ACM 0006 Table 1: **Combinations of project types and baseline scenarios applicable to this methodology, is the right scenario for this project.** It is described like following:

- The project activity involves the installation of a new power plant at a site where currently no power generation occurs;
- The power generated by the project plant is fed into grid and would in the absence of the project activity be purchased from the grid;
- The biomass would be in the absence of the project activity be dumped or left decay or burned in an uncontrolled manner without utilizing for energy purposes;

Scenario	Project Type	Baseline Scenario		
		Power Generation	Use of biomass	Heat Generation
2	Power Greenfield Project	P4	B1	No Heat now

Table 1 Identification of Scenario combined with Power, use of biomass and heat generation method for Suqian 2*12MW biomass power plant

Both building margin (BM) and operation margin (OM) have to be combined during the calculation of emission factor, following the guidance in the section of "Baselines" in the "ACM 0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources" that if the power generation of biomass power plant is of more than 15 MW, $EF_{grid,y}$ should be calculated as a combined margin (CM).

Emission Reduction

As described in the accompanying baseline methodology, the emission from grid electricity generation is considered for the baseline.

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

where:

$ER_{electricity,y}$ are the emission reductions due to displacement of electricity of heat during the year y in tons of CO_2;

$BE_{biomass,y}$ are the baseline emissions due to natural decay of biomass during the year y in tons of CO_2 equivalents;

PEy are the project emissions during the year y in tons of CO_2

Ly are the leakage emissions during the year y in tons of CO_2

Project emissions

It includes:

- CO_2 emissions from transportation of biomass to the project site (PET_y),
- CO_2 emissions from on-site consumption of fossil fuels due to the project activity ($PEFF_y$) and, where this emission source is included in the project boundary and relevant,
- CH_4 emissions from the combustion of biomass ($PE_{Biomass,CH4,y}$)

GHG resources formulae	Factors	Explanations
$PE_y = PET_y + PEFF_{co2,y}$ $+ GWP_{CH4} \times PE_{BiomassCH4,y}$	**PET$_y$** are the CO_2 emissions during the year y due to transport of the biomass to the project plant in tons of CO_2, **PEFF$_{CO2,y}$** are the CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility in tons of CO_2, **GWP$_{CH4}$** is the Global Warming Potential for methane valid for the relevant commitment period, **PE$_{Biomass, CH4,y}$** are the CH_4 emissions from the combustion of biomass during the year y.	
$PET_y = \frac{\sum_i BF_{i,y}}{TL_y} *$ $AVD_y * EF_{km,CO2}$	**PET$_y$:** Project emissions from biomass transportation to the power plant(tCO_2/year) **BF$_{i,y}$:** Biomass type I utilized in power plant (tonnes/year) **TL$_y$:** Average truck load of transportation biomass(tonnes) **AVD$_y$:** Average transportation distance from collection point to power plant (km) **EF$_{km,CO2}$:** CO_2 emission factor for the fuel used for the transportation(tCO_2/km)	The transportation from the collection points to power plant is monitored both the distance and emission factor for fuel consumption for the transportation.
$PEFF_y = \sum_i FF_{i,y} * COEF_{CO2,i}$	**PEFF$_y$:** Project CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility (tCO_2/year) **FF$_{i,y}$:** Fossil fuel utilized in power plant (kg/year) **COEF$_{CO2,i}$:** CO_2 emissions from type I fossil fuels utilized in power plant (tCO_2/kg)	Very small amount of additional auxiliary fossil fuel is needed for the boiler starting up, and this will not happen very frequently after the first starting up phase.
$PE_{Biomass,CH4} = EF_{CH4}$ $\bullet \sum_i BF_{i,y} \bullet NCV_i$	**PE$_{Biomass,CH4}$:** methane emissions from the combustion of biomass during the year y (tCO_{2e}/year) **EF$_{CH4}$:** Biomass methane emission factor (tCH4/TJ) **BF$_{i,y}$:** Biomass type I utilized in power plant (tonnes/year) **NCV$_i$:** Net Calorific Value of type I biomass (TJ/tonnes)	According to IPCC guidelines, the CO_2 emissions from the biomass combustion process are thought to the neutral carbon as the CO_2 absorbed in the planting when planting. However, methane emission can not be ignored although the quantity is not large amount.

Emission reductions due to displacement of electricity

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

Where:
ERelectricity,y are the emission reductions due to displacement of electricity during the year y in tons of CO_2,
EGy is the net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year y in MWh,
EFelectricity,y is the CO_2 emission factor for the electricity displaced due to the project activity during the year y in tonsCO_2/MWh.

Step 1: Determination of EFelectricity,y
The project activity displaces electricity from other grid-connected sources (P4) or from less efficient plants fired with the same type of biomass (P2). Apart from co-firing fossil fuels in the project plant, where relevant, electricity is not generated with fossil fuels at the project site. The emission factor for the displacement of electricity should correspond to the grid emission factor (EFelectricity,y = EFgrid,y) and EFgrid,y shall be calculated as a combined margin (CM) consisting of operating margin (OM) and building margin (BM) factors, following the guidance in the section "Baselines" in the "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (ACM0002), because the power generation capacity of this proposed biomass power plant is more than 15 MW.

Sub step1a Calculation of Operating Margin Emission factor $EF_{OM,y}$
Calculation of OM emission factor should be based on one of the following four methods:
(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch Data Analysis OM, or
(d) Average OM.

The method (c). If the dispatch data is available, method (c) should be the first methodological choice. This method requires the dispatch order of each power plant and the dispatched electricity generation of all the power plants in the power grid during every operation hour period. And it truly depicts the substitution relation between proposed CDM project activity and the operation of baseline grid, and also the corresponding emission reduction. This method requires the detailed operation and dispatch data of power plants in the grid. Because of the institutional reform of "separating the plant operation from the grid operation" in China, there is no publicly available information for the grids and power plants at all levels. As the East China Grid is a very large regional grid covering several provinces, it would certainly be difficult and costly to obtain the hourly dispatch data. Therefore, the method (c) is not applicable.

The method (b), simple adjusted OM, requires the annual load duration curve of the power grid and the load data of every hour data during the whole year on the basis of the time order. Based on the same reason stated in the above paragraph, the necessary data for the method (b) are difficult to obtain, so the method (b) is not applicable.

The method (d), average OM, is used when low-cost/must run resources[3] constitute more than 50% of total amount of power generation in the grid. According to the data from China Power Yearbook 2004, the total installed capacity of the East China Grid in 2003 is 96970.6MW, in which coal-fired installed capacity is 79424.1MW, accounting for 81.9%. Therefore, the East China Grid generation system is dominated by coal-fired power, and this fact will not change in a quite long time ahead. So the method (d) is not applicable.

The Simple OM method (a) is used when low-cost/must run resources constitute less than 50% of total amount of power generation in:
(1) Average of the five most recent years, or
(2) Based on long-term normal for hydroelectricity production.
Low operating cost and must run resources typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants. From the description of method (d), the share of the low cost/must run resources in the East China Grid from 2002 to 2004 are 19.6%, 19.8%, 18.1% from the annually China Power Yearbook, which meets the requirements of method(a). Therefore, it is reasonable to select the method (a) to calculate the OM emission factor.

Therefore, method (a) is applicable for the proposed project.

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y} * COEF_{i,j}}{\sum_{j} GEN_{j,y}} = \frac{\sum_{i,j} F_{i,j,y} * NCV_i * EF_{CO2,i} * OXID_i}{\sum_{j} GEN_{j,y}}$$	**$F_{i,j,y}$**: is the amount of fuel I consumed by relevant power sources j in year y. The index j runs over all power sources including imports, but excludes low and must run power plants in the connected grid system selected in the proposed project activity. **$COEF_{i,j,y}$**: is the CO2 emission coefficient of fuel I, taking into account the carbon content of fuels used by relevant power sources j and the percentage osidation of the fuel I in year y **$GEN_{j,y}$**: is the electricity delivered to the grid by source j in year y **NCV_i:** Net Calorific Value of type I of fuel utilized (TJ per mass) **$OXID_i$:** IPCC default values of oxidation factor of type I fuel utilized **$EF_{CO2,i}$:** CO2 emission factor per unit of energy of the fuel i(tCO_2/TJ)

For the reason that project monitoring is using ex ante method, power data from the past recent three years are necessary to obtain from the China electric yearbook 2003, 2004 and 2005 which are statistics for power situation from 2002 to 2004. Since it is not available to get the power statistics data for the individual power plants serving the grid network, fuel consumption data for each relevant type of generating source is calculated as the average generation by included fuel sources in East China Grid multiplied by the average fuel consumption for each MWh power generated. Consequently, from the fuel consumption from relevant sources in East China Grid and the electricity generation by these sources, the average emissions from 2002 to 2004 could be obtained. These are divided by the total amount of energy generated, to give the emission rate per MWh.

Based on the Chinese National Development and Reformation Commission Climate Change Office Notice of Chinese Regional Grid Emission Factor, the simple OM emission factor of East China Grid is calculated as 0.9448tCO2/MWh, to see Annex 3 for details.

Sub Step 1b Calculation of Building Margin Emission Factor $EF_{BM,y}$

According to ACM0002, the BM calculation is defined as generation weighted average emissions factor of a sample of power plants. However, the data of individual power plant generation and fuel consumption is not available in China at present time.

ACM0002 provides two options for sample group m:
(1) The five power plants that have been built most recently, or
(2) The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

The one with larger annual generation should be used.

Due to the reason that the information of the North China Grid on the five power plants built most recently is not available. Therefore, the most recently built, equal or bigger than 20% of the system generation of the new power plants capacity addition, will be chosen as the sample group m to calculate BM. Based on the DNV deviation request[1] on this issue for Chinese projects, the use of capacity additions for estimating the BM emissions factor for grid electricity and the use of weights estimated using installed capacity to replace annual power generation in China are acceptable.

$EF_{BM,simple,y} = \frac{\sum_{i,m} F_{i,m,y} * COEF_{i,m}}{\sum_{m} GEN_{m,y}}$	**$F_{i,m,y}$**: is the amount of fuel I consumed by relevant power sources m in year y. The index m runs over all power sources including imports, but excludes low and must run power plants in the connected grid system selected in the proposed project activity. And the index m is over specific group of power plants rather than all types of power plants, and that low cost or must run sources are excluded. **$COEF_{i,m,y}$**: is the CO2 emission coefficient of fuel I, taking into account the carbon content of fuels used by relevant power sources j and the percentage osidation of the fuel I in year y **$GEN_{m,y}$**: is the electricity delivered to the grid by source j in year y

Therefore, instead of using data on fuel consumption and generation for individual sample power plants which are not available in China currently, the BM emission factor is calculated by using aggregate data by technology type to get the capacity additions to the connect grid in the past recently three years.

Combining the methodology ACM0002 and calculation announced by NDRC, this proposed project uses a conservative alternative method to calculate $EF_{BM,Y}$, and the formula is:

$$EF_{BM,y} = \frac{EF_{Thermal,y} \times CAP_{fire,y-n,y}}{\sum_j CAP_{j,y-n,y}}$$

$CAP_{fire,y-n,y}$ is the incremental installed capacity of fuel-fired power (MW) in y year compared to that of y-n year;

[1] http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM

$\sum_j CAP_{j,y-n,y}$ is the total incremental installed capacity of various power sources in the grid during the years from y to y-n year;

$\frac{CAP_{fire,y-n,y}}{\sum_j CAP_{j,y-n,y}}$ represents the share of incremental installed capacity of fuel-fired power in the whole incremental installed capacity.

Where, n is fixed by:

Starting from y year, the differences of installed capacity between y year and y-1 year, y year and y-2 year,…y year and y-n year, y year and y-n-1 year, …are calculated respectively, and then divided by the installed capacity of y year. The year that can make the left side of the following formula more than 20% will be regarded as n. The formula is as follows:

$$\frac{\sum_j CAP_{j,y-n}}{\sum_j CAP_{j,y}} \approx 20\%$$

$EF_{Thermal,y}$ is the emission factor of fuel-fired power with Best Practiced Commercialized Technology (BPCT). It can be calculated as following equation:

$$EF_{Thermal} = \lambda_{COAL} \bullet EF_{COAL,Adv} + \lambda_{OIL,Adv} \bullet EF_{OIL,Adv} + \lambda_{GAS} \bullet EF_{GAS,Adv}$$

$$\lambda_{COAL} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \bullet COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \bullet COEF_{i,j}}$$

$$\lambda_{OIL} = \frac{\sum_{i \in OIL,j} F_{i,j,y} \bullet COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \bullet COEF_{i,j}}$$

$$\lambda_{GAS} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \bullet COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \bullet COEF_{i,j}}$$

$F_{i,j,y}$ is the amount of fuel I consumed by relevant power sources j province in year y（tce）;

$COEF_{i,j,y}$ is the CO2 emission coefficient of fuel I, taking into account the carbon content of fuels used by relevant power sources j province and the percentage oxidation of the fuel I in year y.

$EF_{COAL,Adv}$，$EF_{OIL,Adv}$ and $EF_{GAS,Adv}$ is the emission factor of COAL, OIL, GAS-fired power with Best Practiced Commercialized Technology. These variables can be calculated as following table:

	Variables	Power Supplying Efficiency	Fuel combustion factor（tc/Tj）	Oxidation Rate	Emission Factor
		A	B	C	D=3.6/A/1000 *B*C*44/12
Coal-fire power plant	$EF_{COAL,Adv}$	36.53%	25.8	0.98	0.9136
Gas-fire power plant	$EF_{GAS,Adv}$	45.87%	15.3	0.995	0.4381
Oil-fire power plant	$EF_{OIL,Adv}$	45.87%	21.1	0.99	0.6011

In addition, there is an assumption in this substitute calculation method: the average annual operational hours of non fuel-fired power plants are same as those of fuel-fired power plants. But the fact in China is, except nuclear power, the former is much less than the latter. Therefore, this substitute calculation method is conservative.

Based on the China National Development and Reformation Commission Climate Change Office Notice of Chinese Regional Grid Emission Factor, the average BM emission factor of East China Grid is calculated as 0.7869 tCO2/MWh, to see Annex 3 for details.

Sub Step 1c Calculation of Baseline Emission Factor EF_y

The baseline emission factor is calculated as a Combined Margin, using a weighted average of the Operating Margin and Building Margin.

$$EF_y = \omega_{OM} \bullet EF_{OM,y} + \omega_{BM} \bullet EF_{BM,y} \Rightarrow 0.5 \times EF_{OM,y} \oplus 0.5 \times EF_{BM,y}$$

$$= \frac{(0.9448 + 0.7869)}{2} = 0.866\, tCO_2 / MWh$$

The detailed calculation is in Annex 3.

It is noticed that the data used for calculation of combined margin is shown in Annex 3 and section D. The main source of data is China electric yearbook 2002, 2003, 2004 and 2005. The default values utilized for the calculations of calorific values of fuel types and fuel oxidation rate are from the IPCC GHG Gas Inventory Reference Manual 1996.

The baseline scenario for the proposed project is that electricity would have been generated, and the electricity demand met, by the operation of grid connected thermal power plants and by the addition of new fossil fuel based power generating. In the proposed project scenario the same power demand is met with the project power generation. Because the project uses a renewable source to produce electricity, and there are no additional emissions from the proposed project activity.

Step 2: Determination of EGy

According to the scenario identified for this proposed project as showed before, EGy corresponds to the net quantity of electricity generation in the project plant ($EG_y = EG_{project\ plant,y}$).

Baseline emissions

This methodology assumes that the biomass would have been burned in an uncontrolled manner for both baseline scenarios, natural decay or uncontrolled burning. The baseline emissions are calculated by multiplying the quantity of biomass that would not be used in the absence of the project activity with the net calorific value and an appropriate emission factor as following:

$$BE_{Biomass,y} = GWP_{CH_4} \bullet \sum_i BF_{i,y} \bullet NCV_i \bullet EF_{burning,CH_{4,i}}$$

According to the local biomass resource investigation conducted in the Suqian, to see detailed in the Section E2, it is found that more than 60% of the total produced biomass are left natural decay or burned in open air.

There is no evident indication that large portion of the biomass resource would be reduced in the foreseeable future, the selected methodology uses the baseline emission as unused biomass open air burning which equals to the amount of biomass consumed in the proposed power plant. The baseline emission calculation is considered to be conservative because the methane emission from the natural decay processing of those equivalent biomass residues would cause greater GHG effect than CO_2 emissions GHG effect from open air burning process.

The more detailed calculation of baseline emission of unused biomass residues is in Annex 3.

Leakage Estimation

Based on the ACM0006, the following two alternatives are shown to estimate the leakage of the proposed project:

<table>
<tr><td rowspan="3">Alternative 1: Demonstrate that the biomass consumption of power plant will not result in increased fossil fuel consumption elsewhere.</td><td>• Showing the current natural decay or open air burning biomass will continue to be uncontrolled dumping without proposed project performance</td><td rowspan="3">$L_y = 0$</td></tr>
<tr><td>• Demonstrate the amount of biomass surplus is far more than the project biomass demand amount</td></tr>
<tr><td>• Showing the biomass suppliers can not sell all their biomass to the project plant</td></tr>
<tr><td colspan="2">Alternative 2: If it can not be able to demonstrate that the biomass consumption in the proposed project will not ended up in other more carbon intensive fuel increasing consumption else where, the leakage emissions must be measured and deducted from the net project emission reductions.</td><td>$L_y = COEF_{CO2,j} * \sum_i BF_{i,y} * NCV_i$ (tCO_2)
The leakage emissions during the year y equals to the CO2 emission coefficient per energy unit of the most carbon intensive fuel utilized in the county multiply by the amount of type I bio mass used as fuel in the project plant during the year y and multiply by the Net Calorific Value of biomass type i(per volume or mass).</td></tr>
</table>

The biomass resources losts and percentages（%）

	Rainy season lost	Harvesting lost	Family own utilization	Industrial materials	Dumping and uncontrolled burning	Total
Percentages for different purposes	8%	14%	38%	3%	37%	100%
Biomass amount （10000tonnes）	14	24	63	5	63	169

Biomass resources	Total biofuel1
Net Calorific Value (MJ/Kg)	14.81
Total production (50km from plant)	1,690,000
Total available production (50km from plant)	540,000
Project Demand (t/year)	195,000
Project Demand of total available production (%)	36.1%

It is investigated that the biomass residues from wheat and paddy rice field in Suqian is more than enough to supply the proposed biomass power plant. The biomass amount is around 1,690,000 tonnes annually with the 50km diameter distance from plant site, and which maximum 195,000 tonnes biomass will be utilized in the power plant. And it is found that the amount of biomass utilized in the proposed power plant is only around 36.1% of the biomass available in the region, which means that the proposed power plant will not influence the present biomass utilization. Without the new biomass utilization technology, there would not be a significant increase of biomass demand in the proposed area.
Therefore, there is no leakage in the proposed project.

Project emission reduction estimation

<table>
<tr><th>Total baseline emissions (+)</th><th>Total project emissions (-)</th><th>Project Emission Reduction(=)</th></tr>
<tr><td>Unused biomass baseline emission</td><td>GHG emission from biomass combustion in the power plant</td><td rowspan="3">Total baseline emissions - Total project emissions</td></tr>
<tr><td rowspan="2">Electricity generation baseline emission</td><td>GHG emission from fossil fuel combustion in the boiler</td></tr>
<tr><td>GHG emission from biomass transportation</td></tr>
</table>

B.3. 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:

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Approved Tool for the Demonstration and Assessment of Additionality applied in ACM0002(Version 06, 19/05/2006) is used to demonstrate and assess the additionality of the proposed project in the following steps:

Step 0 Preliminary screening based on the starting date of the project activity

The crediting period of the proposed project will not start before the registration of the project activity because the starting date of project does not fall between January 1st 2000 and the date of registration as CDM project.

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

Two alternatives are selected as the power generation options in the following table, and the analysis of these alternatives whether consistent with current laws and regulations are shown as well.

Sub Step 1a. Define alternatives to the project activity

Alternatives to power generation:

1. Construction of a coal firing plant with the same power generation capacity equivalent to the proposed project activity	Based on this scenario assumed, the dominating newly installed power generation is coming from the thermal firing plants which are the normal project behavior at present time in East China Power Grid system. From the new addition power capacity from 2002 to 2004 which are the most present statistics, the new addition power generation is over 90% from thermal plants. Furthermore, it is not possible to build the power plant with the same scale under the current Chinese existing new power addition regulatory framework. Since it is not allowed to build the coal firing power plant smaller than 135MW or less in large grid system under the current Chinese legislations. Therefore, the alternative fossil fuel power plant building with the same power generation capacity is not possible to happen under the current Chinese laws and legislations for power plants.
2. Supply of equivalent annual power output by the Grid where the proposed project is connected to	There is power addition annually from 2002 to 2004 in East China Grid Network; therefore it is mostly from the thermal generation. The alternative is a feasible scenario to be selected as the baseline for the proposed project.

Alternatives to biomass usage:

The proposed project utilizes the current dumping biomass straws in the agriculture field. The detailed quantity of biomass resources analysis is in Section E 2 for the leakage estimation of the proposed project. Therefore, according to the identified baseline scenario for the biomass resource utilized in the proposed power plant, the alternative biomass usage is that the equivalent amount of biomass would be used in uncontrolled way such as dumping, left to decay or burned in the open air firing.

Sub Step 1b. Enforcement of applicable laws and regulations:
For the scenario 1, it will not occur under the current applicable laws and regulations in force. Detailed reference is the China Power Yearbook 2003, 2004 and 2005 and relative rules for the new establishing power plants.

For the scenario 2, it is obviously consistent with the prevailing laws and regulations. Since in East China Grid, there is demanding for the new power addition to ensure the growing industrial and commercial purposes in this area.

Step 2 Investment analysis
According to the identified Additionality Assessment Tool for the proposed project, this step has to determine whether it is financially less attractive than other alternatives without the revenues deriving from CERs payment.

Sub Step 2a Determine appropriate analysis method
The three analysis methods suggested by Tool for the demonstration and assessment of additionality are:

Option I simple cost analysis	Since there are both revenues of power price and CERs payment, this option is not appropriate to calculate.
Option II investment comparison analysis	This option is only applicable to the case that alternative baseline scenario is similar to the proposed project, so that the comparative analysis can be conducted. However, the proposed baseline scenario is East China Grid other than a new investment project.
Option III benchmark analysis	When both benchmark IRR and total investment IRR of proposed project are available, this method can be used.

Sub Step 2b Apply benchmark analysis
It is very commonly use the financial benchmark rate of return (after tax) of Chinese power industry which is 8% of the total investment in the feasibility study report. This threshold value of project financial assessment is based on the Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects.

Sub Step 2c Calculation and comparison of financial indicators

Power generation capacity	24MW
Annual power net output	132,600 MWh
Project lifetime	Total 22 years including 1year construction time
Total project investment	241,340,000 RMB
Tariff	0.644 RMBYuan/kWh (without VAT)
Biomass purchasing price	300 RMB/tonne
Annual Operating hours	6500 hours/year
Tax	33% income tax
Emission reduction crediting period	21 Years
Expected CERs price	9 Euro/tCO_{2eq}

	NPV million RMB	IRR (Total investment, benchmark = 7%)

With CERs revenue	33	8.71%
Without CERs revenues	-84	2.05%

Data used in financial analysis:

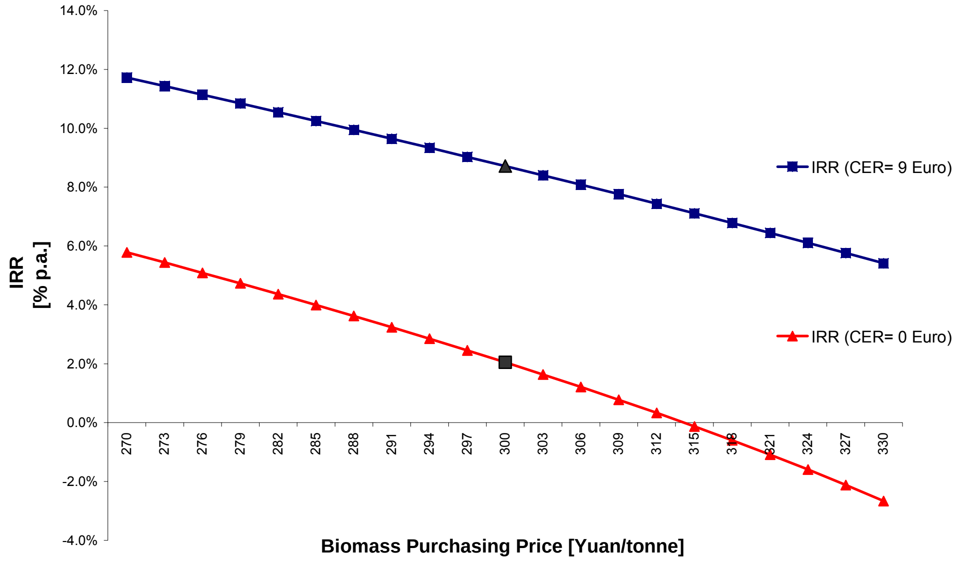
Capacity	24	MW	
Operation hours	6,500	hours/year	
Own consumption	15%		
Total production	132,600	MWh/year	
Tariff	0.394	RMB/kWh	without tax
Tariff Subsidy	0.250	RMB/kWh	
Income from power sale	85,394,400	RMB/year	
CERs from power	114,832	CERs	
Unused biomass basel.	13,273	CERs	
Total project emissions	5,049	CERs	
CER per year	123,055	CERs	
Price per CER	0.00	Euro/tons	
Exchange rate	10.00	RMB/Euro	
Income from CERs	0	RMB/year	
Biomass demand	195,000	tons/year	
Biomass price	300	RMB/tons	
Expense from purchase	58,500,000	RMB/year	
Staff and maintenance	5%	of investment	
Other O&M	12,067,000		
Total Investment	241,340,000	RMB	
Biomass consumption	30	tons/hour (25MWe)	
Emission Factor	0.866	tons CO2/MWh	

The above table showed the critical financial indicators under situations with and without CERs revenues. It should be noticed that this calculation is based on the feasibility study total investment flow chats and the current actual financial situation from site office during the PDD preparation. The real data might be change under the real circumstance during the construction and implementation.

It is very clear that the proposed project confronts great financial barriers without CDM revenues according to Chinese benchmark indicators for power project investment. Therefore, it is thought that CDM revenues gives the additional incentive that makes the proposed project financial viable for investors.

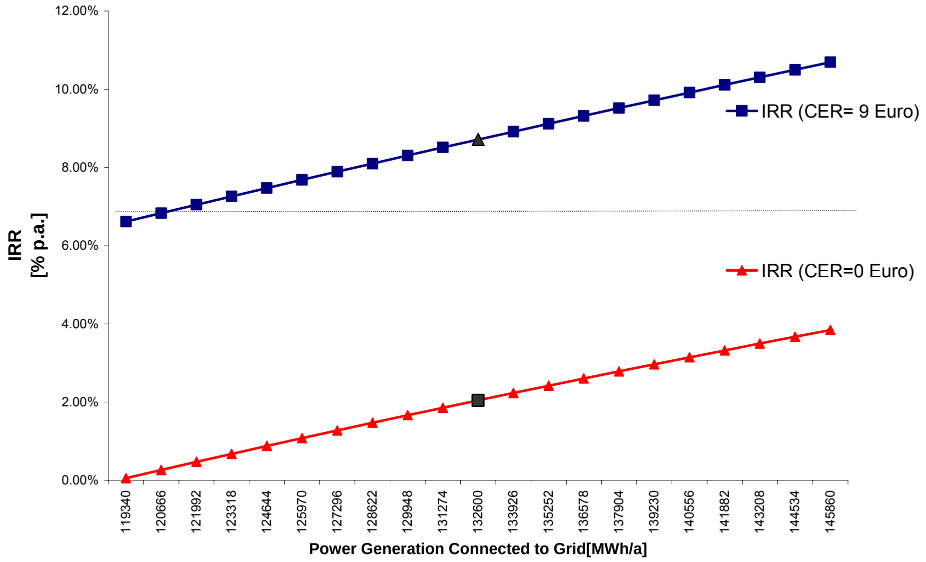
Sub Step 2d Sensitivity analysis
The sensitivity analysis is conducted in order to measure the influence on the IRR and NPV due to the changes of key financial parameters such as biomass purchasing price, power generation connected to grid amount etc. Based on the biomass utilization technology experience from Denmark mainly, these two parameters are most critical factors to ensure a financial sound operation of the proposed power plant.

The distinction of the two parameters will be change from -10% to 10% with 1% variation changing trend in the following figures.



Based on the different but reasonable variations of these critical financial indicators, the sensitivity analysis would influence the financial investment situation of the proposed project activity. In the proposed Suqian project, the biomass purchasing price is approximately 300RMB/Tonne and so the different biomass price from 270 to 330 RMB per tonne is made in the sensitivity analysis.

From the datat it can be found that unless the price is lower than 90% of the biomass price in the feasibility , the IRR will not be higher than 8% which means financial attractive. However, the biomass purchasing price in the proposed project will probably be higher than 300RMB per tonne, which results in a financially non-attractive solution for the project investor.



As showing in the following figure about sensitivity analysis of power generation connected to grid, unless there is CERs revenues, IRR will never higher than 8%.

Therefore, the above figure shows clearly that CERs revenues will make the proposed project activity financial attractive.

Step 3 Barrier analysis

Sub Step 3a Identify barriers that would prevent the implementation of type of the proposed project activity

Investment barriers:
Compared with a low cost and well proven Chinese coal fired power plant, it is much more expensive and risky to build and operate a biomass plant with same power generation capacity.

The uncertainties of green electric price policy in China prevent the development of the biomass technology. Furthermore, the high risks associated with this brand new technology implementation in China would in large scale influence the investment return payment. Especially for the first demonstration project under the national scope, there are even higher financial risks to the project developers. With reference to the same unit investment cost of coal firing power plant investment return time, it takes much longer investment returning time for building same scale biomass power plant.

Technology barriers:

- To decide whether a biomass power plant is successful or not mainly depends on the availability of biomass materials. For the main reason that the availability of the biomass highly depends on seasonal fluctuations due to the vagaries of the nature environment. It is clear that the viability of the biomass power plant is much less certain than that of fossil fuel plants, which are assured a regular and safe supply of fuels;
- Biomass resource is widely dispersed in small quantities in the project site. Therefore, the collection and transportation work of the huge amount of biomass materials to the project site or closest collection point becomes a constraint. Apart from this, the expense of collection and transportation charges will increase every year due to the increasing trend in the cost of labour and transportation cost;
- Another big problem is the storage of biomass. Unlike the normal thermal power plant, biomass firing plant has to consume much higher quantity of fuel which is rather difficult to maintain in plant lifetime operation period. The characteristics of biomass fuels change quickly within very short period of time. Most critical parameter is the calorific value decreases due to the loss of volatiles and deterioration of biomass, which affects the performance of the plant equipments. For this reason, biomass materials can not be stored for long periods. Biomass fuels that enter the plant premises must be consumed on a first come first burned basis. It is not possible for seasonable stocking of biomass. In addition, the low bulk density (weight per unit volume) makes it difficult to handle and store;
- Due to the long time storage of huge amount of biomass residues, there existed high risks of fire. Comparing with the coal firing, biomass has lower burning point which might cause fire easily while storage.
- Since biomass power generation is a relatively young technology comparing to the common fossil fuel power plants technology and none of biomass power plants have been operated yet, the effects of combusting biomass fuels on the life cycle of the plant equipment are not yet established;
- The biomass conversion efficiency is very low compared to fossil fuel energy conversion efficiencies comparing to the coal firing power plants;

Sub Step 3b Show that the identified barriers would not prevent the implementation of at least one of the alternatives except the proposed

As stated in the Sub Step 1a, alternative 2 could be the alternative scenario since the power generated are major from the coal firing power plants connected to the grid network in the proposed project. And the coal firing technology is well developed, fully commercialized and mature technology. And China is one of the countries with very rich coal sources; hence the previous technology and investment barriers of the proposed project activity will not be applicable in the coal firing plants.

Step 4 Common practice analyses
The main purpose of this analysis is to compare the proposed project activity with the current common practice and to analyze whether the proposed project is not the common practice in China.

Sub Step 4a Analyze other activities similar to the proposed project
There is currently no biomass direct burning power plant or biomass cogeneration power plant built in China., Another biomass plant in Shandong - Shanxian biomass direct burning power plant - will in December 2006 be the first biomass direct burning power plant in operation in China. Therefore it is concluded that the proposed project is obviously not common practice in China.

Sub Step 4b Discuss any similar options that are occurring
As already described in the above statement, it is seen that there are very few similar common project practice as proposed project in China. And for these first few demonstration biomass direct burning power plants, it can be found that they are also applying for CDM projects currently[2].

Step 5 Impact of CDM registration

Biomass power generation and cogeneration technology is totally a new energy utilization method in China until very recently, the first successful implementation of this new project activity can not avoid the big challenging coming from both investment and technology.

The brand new biomass utilization technology implementation process involves necessary training in the project development, plant operation, and maintenance and biomass resource supplying chain. The CDM revenues will contribute to overcoming these barriers through the development of proposed project activity. These revenues would guarantee the biomass supplying to the power plant in Suqian.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity:

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Project grid boundary

There are three options available for choosing which portion of the electricity grid system is appropriate to include in the calculation of baseline grid emissions: China as a whole, East China Grid system, or Jiangsu Provincial Grid system.

[2] http://cdm.unfccc.int/Projects/Validation/DB/HSY6SD0BIBG9VP40XHCDJLXAYALKTL/view.html，
http://cdm.unfccc.int/Projects/Validation/DB/GQ2NUQA6LMC3MRC76ESSETBPSFTH50/view.html

The electricity system of China is one of the largest and most complicate systems in the world. And electricity generation is under the purview of both central and provincial jurisdictions. Hence, electricity generation is being handled both at the central level and provincial level. China whole grid system is divided into six regions, which are East China, North-eastern, central China, North China, north-western and southern regions. These regions have independent load dispatch centers that manage the flow of power within their jurisdictions. Jiangsu provincial grid system which this project located in belongs to East China grid system region, but without very minor portion of export and import power to the regional grid system.
Therefore, **East China Grid system** is chosen as the proposed project grid boundary.

Project Concept and Boundary
The definition of Project Concept and Boundary in the related applicable baseline methodology is demonstrated clearly in the following table which comprises two aspects depending on the different sources.

The baseline for the replacing power generation of the proposed project is the East China Power Grid which project plant and other normal power plants connected to. East China power grid includes Shanghai, Jiangsu, Zhejiang, Anhui and Fujian, and the amount of power exchange between Central China power grid and East China Grid[3] and the power delivered to Jiangsu province from Yangcheng, Shanxi province consist of approximately 10% of the total power generation from East China Power Grid. Therefore, it is necessary to taken into the consideration of power exchange between the two grids and power amount from Yangcheng, Shanxi province.
The **Project Boundary** is set at the proposed project location, as it is showed before. The whole power plant site is the boundary where it is clear and simply for both project emissions calculation and grid connection selection.

[3] China Power Yearbook 2005, P490-491, The electricity exchange amount between Central China power grid and East China Power grid is less than 5% of the total grid electricity production of East China power grid.

Overview on emissions sources included in or excluded from the project boundary				
	Source	Gas		**Justification / Explanation**
Baseline	Grid electricity generation	CO_2	Included	Main emission source
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
	Uncontrolled burning or decay of surplus biomass	CO_2	Excluded	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	Included	Project participants decide to include this emission source, since the case B1 has been identified as the most likely baseline scenario.
		N_2O	Excluded	Excluded for simplification. This is conservative. Note also that emissions from natural decay of biomass are not included in GHG inventories as anthropogenic sources.
Project Activity	On-site fossil fuel consumption due to the project activity (stationary or mobile)	CO_2	Included	An important emission source.
		CH_4	Excluded	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.
	Off-site transportation of biomass	CO_2	Included	An important emission source.
		CH_4	Excluded	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.
	Combustion of biomass for electricity and / or heat generation	CO_2	Excluded	It is assumed that CO_2 emissions from surplus biomass do not lead to changes of carbon pools in the LULUCF sector.
		CH_4	Included	This emission source must be included because CH_4 emissions from uncontrolled burning or decay of biomass in the baseline scenario are included.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.
	Biomass storage	CO_2	Excluded	It is assumed that CO_2 emissions from surplus biomass do not lead to changes of carbon pools in the LULUCF sector.
		CH_4	Excluded	Excluded for simplification. Since biomass is stored for not longer than one year, this emission source is assumed to be small.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.

B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity (ies) determining the baseline:

>>

SEE ANNEX 1.

The date of completion of Baseline Study is April 30th, 2006.

Name of project entities to determine the baseline calculations:

Ms MA Jingjing
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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:

>>
18/12/2005

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

>>
22 years including 1 year construction

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

C.2.1. Renewable crediting period

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

>>
01/03/2007

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. Application of a monitoring methodology and plan

The monitoring methodology applied for this project activity is one of the approved methodologies which is ACM 0006 "Consolidated Monitoring methodology for grid-connected electricity generation from biomass residues".
This monitoring methodology could be found: http://cdm.unfccc.int/methodologies/approved.

D.1. Name and reference of approved monitoring methodology applied to the project activity:

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Approved consolidated monitoring methodology ACM0006, "Consolidated monitoring methodology for grid-connected electricity generation from biomass residues" is selected as the monitoring methodology in UNFCCC EB website.

Option D.2.1 will be selected as option in this project.

All the data collected for monitoring purpose are consist of generated power billing records, baseline emission parameters, and project emissions etc will be archived electronically and be kept at least 2 years after the end of the last crediting period of time.

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

>>
The proposed project activity will generate electricity connecting with public grid network, using surplus and sustainable collected biomass. Emission reduction due to the project activity is proportional to the power fed to the grid and the baseline emission rate. Further, it is necessary to ensure that only surplus biomass residues are used for the proposed power plant. Official data based on actual investigation/measurements or commercial data should be used for this purpose.

The monitoring methodology of ACM0006 is applicable for biomass fired power generation project activities displacing grid electricity.

The proposed project activity meets all of the criteria listed in the ACM0006 (same as the analysis in the section B 1.1). Therefore, this monitoring methodology is applicable to this project.

Therefore, this monitoring approach is anticipated as the most appropriate and accurate one for the proposed project when all the required monitoring parameters are possible to obtain and calculate. And all the collected data needed for the monitoring report will be archived electronically and be kept at least for 2 years until the end of the last crediting period of time. See Annex 4 for detailed reports quality assurance requirements, etc.

D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated I or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1. $BF_{i,y}$	Quantity of biomass type i combusted in the project plant during the year y	Project Records from Project Procurement department of plant	t biomass fuel	m	Monthly (aggregate), Continuousl y	100%	Electronic and paper	Minimal of two years after last issuance of CERs. The quantity of biomass type i combusted in the project plant is recorded equal as the quantity of biomass purchased. The different types of biomass combusted will be collected separately. The accuracy of the meter is ±20kg.
2. NCV_i	Net Calorific Value of type i biomass utilized in power plant	Project Records from Project Procurement department of plant	GJ/tonne	m	Annually	100%	Electronic and paper	Minimal of two years after last issuance of CERs NCV of different type of biomass utilized in the plant will be measured based on reliable authorized data nationally or locally. Otherwise the default values from IPCC will be utilized.
3.	Methane	Latest	Kg CH4/TJ	m and c	Annually	100%	Electronic	Minimal of two years after last

$EF_{CH4,i.}$	emission from biomass combustion in power plant	version of IPCC default values					and paper	issuance of CERs IPCC value from the latest version published will be utilized.
4. FF_y	Fossil fuels utilized for boiler	Project Records from Project Procurement department of plant	m^3 fossil fuel	m and c	Continuousl y	100%	Electronic and paper	Minimal of two years after last issuance of CERs The amount of fossil fuels utilized in the power plant will be based on purchase receipts from relative plant office and storage volume in the beginning and end of verification period.
5 AVD_y	Average transport distance as a return trip from collection point to power plant site	Transport operator records	km	m	Monthly (aggregate), and Continuousl y	100%	Electronic and paper	Minimal of two years after last issuance of CERs Distance traveled will be continuously recorded by the sub-contracting logistics company by the project entity.
6. N_y	Number of trucks for the transportatio n of biomass	Transport operator records	-	m	Continuousl y	100%	Electronic and paper	This parameter is not taken into consideration based on the formula we choose for calculating the emission from transportation process.
7. TL_y	Average truck load of the trucks used for transportatio n of biomass	Transport operator records	tonne	m	Regularly	100%	Electronic and paper	This parameter is not taken into consideration based on the formula we choose for calculating the emission from transportation process.

8. $EF_{km,co2}$	Average CO_2 emission factor for transportation of biomass with trucks	Latest version of IPCC default values	tCO2/km	c	Annually	100%	Electronic and paper	Minimal of two years after last issuance of CERs Local or national data should be preferred. Default values from the IPCC may be used alternatively and should be chosen in a conservative manner.
9. $F_{Trans, I,y}$	Fuel consumption of fuel type I used for transportation of biomass	Transport operator records	tonne	m	Continuously	100%	Electronic and paper	Not applicable due to the calculation formula selected for transportation emission.
10.$COEF_{co2, i}$	CO_2 emission factor for the fuel type I	Latest version of China Energy Statistics	tCO_2/tonne	m	Annually	100%	Electronic and paper	This parameter is not taken into consideration. Because for the onsite fuel consumption calculation the Net Calorific Value and carbon content are utilized instead, and furthermore for biomass transportation emission calculation the Emission Factor per kilometer is utilized instead. Detailed calculation in Annex 3.
11. $FF_{project\ plant,I,y}$	Onsite fossil fuel consumption of fuel type I for co-firing in the project plant	Latest version of IPCC values	GJ/tonne	m	Annually	100%	Electronic and paper	This parameter is not applicable since it is not planned to co-firing other types of fossil fuel in the proposed project.
12.	Quantity of steam diverted from		MWh			100%	Electronic and paper	Not applicable due to no heating utilization in the proposed project activity.

	other boilers to the project plant							
13	Average net efficiency of steam generation in the plant(s) from where steam is diverted to the project plant.		-			100%	Electronic and paper	Not applicable due to no heating utilization in the proposed project activity.

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>

The Emission Factor of the proposed project in year y ($EF_{P,y}$) comprise three GHG sources such as the following formulae:

$$PE_y = PET_y + PEFF_{CO2,y} + GWP_{CH4} \times PE_{Biomass,CH4,y} \quad (tCO_2/year)$$

As it is illustrated above, the total project activity emissions are from three individual emission resources listed above espectively, which represents the emissions from biomass combustion in power plant, biomass transportation from collection points to plant and the fossil fuel consumption in the boiler onsite.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated I, estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

14. $EGproject,plant,_y$	Electricity generated and supplied to the grid by project	Project Records	Mwh	m	Monthly	100%	Electronic and paper	Minimal of two years after last issuance of CERs $EGproject,plant,_y$ is the net electricity generation from the project activity (Electricity produced - Electricity consumed)
15. $Q_{project\ plant,\ y}$	Net quantity of heat generated from firing biomass in the project plant	Project Records	MWh	m	Continuously	100%	Electronic and paper	Not applicable since there is no heat planned to utilize in the proposed project.
16. $BF_{i,y}$	Quantity of biomass type I combusted in the project plant during the year y	Project purchasing department record	tonne	m	Continuously, prepared annual energy balance	100%	Electronic and paper	The biomass combusted is assumed to be equal to the biomass purchased for the power plant, but also an annual energy balance will be undertaken in order to check the biomass to power efficiency. And each type of the biomass will be measured separately or the individual default values from China Energy Statistics or IPCC latest version will used.
17.NCV_i	Net calorific value of biomass type i	China energy statistics or IPCC latest values	Mwh/kg	c	Annually	100%	Electronic and paper	The net calorific values of different type of biomass utilized in the power plant will be determined by the China Energy Statistics or latest IPCC values based on the most conservative principle for emission reduction calculation.

The electricity measured above is only the displacing power generation from fossil fuel combustion which would be occurred in the absence of proposed project activity. Moreover, the CO_2 emissions associated with extraction, transportation and storage of fossil fuels, other non-GHGs emitted through the life cycle of the fossil fuel would have taken for power generation are not taken into consideration of the estimated project emission reduction. This monitoring for the emission reduction is thought to be conservative.

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>

The current all types of biomass would be utilized in the power plant will be left natural decay or open-air burning in the absence of the proposed project activity. The collection and controlled burning of biomass in plant avoids the emissions both from the dispatched power in same grid system generated from fossil fuel combustion and avoided biomass disposal. The following formulae illustrate this respectively quoted with1 and 2 which stands for the grid electricity displacement emissions and avoided biomass disposal emissions.

$ER_{electricity,y} = EG_y * EF_{electricity,y}$ $= EG_y * \frac{EF_{OM,y} + EF_{BM,y}}{2}$	**$ER_{Electricity,y}$:** Project emissions from avoided biomass disposal (tCO_2/year) **EG_y**: is the power generated and connected to the grid which is supplied by the proposed power plant **$EF_{electricity,y}$:** is the emission factor in the year y of the selected power grid, simplified calculation is made based on the above formulas.
$BE_{Biomass,y} = GWP_{CH4} \bullet EF_{Burning,CH4,j}$ $\bullet \sum_i BF_{i,y} \bullet NCV_{Biomass,CH4,j}$	**$BE_{Biomass,y}$**: is the baseline emission of East China Power Grid in year y **GWP_{CH4}:** Global Warming Potential of methane (21 tCO_{2eq}/tCH4) **$EF_{Burning,CH4,y}$:** Biomass controlled burning methane emission factor (tCH4/TJ) **$BF_{i,y}$:** Biomass type I utilized in power plant (tonnes/year) **$NCV_{Biomass,i}$:** Net Calorific Value of type I biomass (TJ/tonnes)

D. 2.2. Option 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated I, estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

>>

This option is not chosen in the proposed project.

D.2.3. Treatment of leakage in the monitoring plan

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated I or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
18	Amount of all types of biomass fired in all grid connected power plants in the region	Official data	tonne	e	annually	100%	Electronic	Minimal of two years after last issuance of CERs This will be estimated from the available official data from the host country relative statistics, otherwise the data from local agriculture bureau could offer the related information about agricultural production information.
19	Surplus all types of biomass supply in the region.	Project Records or official data	tonne	e	annually	100%	Electronic	Minimal of two years after last issuance of CERs This will be estimated from the available official data from the host country relative statistics, otherwise the data from local agriculture bureau could offer the related information about agricultural production information.
20.$COEF_{co2,j}$	CO_2 emission factor of the most carbon intensive fuel in the calculation of CM with the	Latest version of China Energy Statistics	tCO_2/tonne	m	Annually	100%	Electronic and paper	Minimal of two years after last issuance of CERs whenever the leakage exist. Local or national data should be preferred. Default values from the China Energy Statistics or IPCC will be used alternatively and should be chosen in a most

	ACM0002							conservative manner. Otherwise, this parameter is not taken into the leakage calculation.

The leakage emissions in the proposed project will be taken into consideration of emission deduction from total project emission reduction only when the utilization of current amount of biomass drives the more carbon intensive fuel consumption due to insufficient amount of biomass straw resources. If there is enough evidence to show the sufficient amount of biomass, which far more than the biomass taken for proposed power plant, the leakage effect can be thought to be zero. In this case, the index of biomass surplus resource has to be measured and monitored annually to judge whether leakage effect should be taken into the calculations. Otherwise, the leakage should be calculated as: $L_y = COEF_{CO2,j} * \sum_i BF_{i,y} * NCV_i$ (tCO_2)

Apart from leakage effect analysis in the applied monitoring approach, other leakage emission factors are very tiny due to the project boundary made for the proposed project. Because all the other significant emissions within the project boundary which are taken into the calculation in the project activity emissions already.

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>
The critical judgment for whether should estimate the leakage emissions are depending on the driving force of more carbon intensive fuel will be consumed in the project area. Otherwise the leakage emission has to be monitored and calculated to deduct in the net project activity emission reduction.

See the detailed leakage estimation analysis in Section B 2.Therefore, it can be found that the proposed project has no leakage effect as the **alternative 1** in the table above: $\mathbf{L_y = 0}$.

Otherwise, the leakage should be calculated as: $L_y = COEF_{CO2,j} * \sum_i BF_{i,y} * NCV_i$ (tCO_2)

The leakage emissions during the year y equals to the CO_2 emission coefficient per energy unit of the most carbon intensive fuel utilized in the county multiply by the amount of type I biomass used as fuel in the project plant during the year y and multiply by the Net Calorific Value of biomass type I (per volume or mass).

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>
As it is already calculated and explained in the sections D.2.1.2, D2.1.4 and D2.3.2, the total net project emission reduction is showing in the following formulae:

$$Net\ ProjectActivityEmissionReduction = BaselineEmissions - ProjectActivityEmissions - Leakage$$

$$\Rightarrow ER_y = ER_{electricity,y} + BE_{Biomass,y} - PE_y - L_y \quad (tCO_2/year)$$

$$= \left(EG_y \times EF_{electricity,y} + BE_{Biomass,y}\right) - \left(PET_y + PEFF_{co2,y} + GWP_{CH4,y} \times PE_{Biomass,CH4,y}\right)$$

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored		
Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1	*Low*	*Trucks carrying biomass will be weighed twice, upon entry and exit. Meters at the weighing station will undergo maintenance subject to national standard JJG907-2003. Any direct measurement with mass or volume meters at the plant site should be cross checked with an annual energy balance that is based on purchased quantities and stock changes.*
2	*Low*	*Official local or national data or IPCC default values will be used. If the values differ significant, additional information is necessary to collect and provide in a more feasible method.*
3	*Low*	*Official local or national data or IPCC default values will be used. If the values differ significant, additional information is necessary to collect and provide in a more feasible method.*
4	*Low*	*The receipts from the fuel suppliers for the on site fossil fuel consumption will be checked with the data form the accounting department. The Volume indicator will be manually checked.*
5	*Low*	*The records submitted by the trucks will be compared to the average distance between the plant and the biomass collection point.*
8	*Low*	*This involves the use of official data such as IPCC latest version values for the host country.*
14	*Low*	*Meters will undergo maintenance/calibration subject to national power industry standard DL/T 448-2000. The accuracy of the meter readings will be verified by receipts issued by the purchasing power company, a national or regional authority in most cases. And the local technical and supervision bureau will calibrate and issue the authorized reports annually. Quality control of this data is beyond the control of the project operators. This involves the use of official data released by the power generating company.*
16	*Low*	*An annual energy balance will be undertaken with the biomass purchasing records onsite by the project operator.*
17	*Low*	*This involves the use of official data nationally such as China Energy Statistics and international official such as IPCC latest version values for the host country.*
18	*Low*	*This involves the use of official data nationally and regionally released by the power generating companies all over the country. And quality control of this data is beyond the control of the project operators.*
19	*Low*	*An independence third party will perform this activity. Quality control of this data is beyond the control of the project operators. However, this data, if considered unreasonable, maybe supplanted by more accurate data according to methods verified by the DOE. The survey will include quantifications of biomass resources, biomass collected, biomass consumption for electricity generation, and an analysis of project impacts on carbon stocks.*
20	*Low*	*This involves the use of official data such as IPCC latest version values for the host country.*

D.4 Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

>>
ZHONGJIENENG Suqian Biomass Energy Investment Co.,Ltd is the daughter company of ZHONGJIENENG Biomass Energy Investment Co.,Ltd. And the staff from this onsite subsidy company will conduct the monitoring procedures work based on the monitoring methodology chosen for the proposed project activity. The chosen monitoring methodology is thought to be most accurate and conservative that guaranteed the recording of the emission reductions and leakages is valid and verifiable.

The monitoring data such as all kinds of tables for different monitoring parameters, reports will be processed and stored first in the plant office, and will be sent periodically to the ZHONGJIENENG Biomass Energy Investment Co.,Ltd headquarter in Beijing for Quality Assurance and final processing.

The following table shows the responsibilities for carrying out the monitoring plan after the operation of proposed power plant.

Main technical supervision	Contact person: Xin Fuhua Address: Yuyuan Villa C266, Suyu District, Suqian City, Jiangsu Province Phone: 0527-4456683/13852806455 Email:xbh@beips.com.cn
Data acquisition (Continuously, monthly and annually)	Contact Person: Lv Gang Address: Yuyuan Villa C266, Suyu District, Suqian City, Jiangsu Province Phone:0527-4456682/13773999770 Email:sczb@beips.com.cn
Emission Reduction calculation (monthly and annually)	Contact Person: Zhao Yanan Address: 804 A, Zhongjieneng Tower, No 42 Xizhimen Beidajie St, Haidian District, Beijing, P.R.China 100036 Phone:010-6226 9659/13810008347 Email:zhaoyanan7445@163.com
Main monitoring supervision (Continuously)	Contact Person: Wu Xiaohua Address: 804 A, Zhongjieneng Tower, No 42 Xizhimen Beidajie St, Haidian District, Beijing, P.R.China 100036 Phone:010-6226 9659/13501368536 Email:wuxiaohua@cecic.cn

D.5 Name of person/entity determining the monitoring methodology:

>>

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SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

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As described in the baseline information in Annex 3, the following greenhouse gas emissions are considered for the project activity:

1) Methane emissions from biomass utilized in the power plant
2) Biomass transportation emissions from collection points to power plant site
3) Emission from start-up/auxiliary fuel combustion in the boiler of the power plant onsite

The above project emissions are calculated using the algorithms provided in the baseline methodology. An illustration of calculation methods is given in the following context.

$$PE_y = PET_y + PEFF_{co2,y} + GWP_{CH4} \times PE_{BiomassCH4,y} \ \ (tCO2/year)$$

The total Project emissions PE_y are sum of project emissions from biomass combustion, transportation emissions and auxiliary fuel utilization in boiler as listed in the above equation. The detailed calculation explanation is demonstrated individually in the following sector.

Project emission from transportations process

There are around 14 days storage capacity for biomass in the power plant, and around 20 collection points are selected surrounding the site depending on the best balance between distance and resource availability. The transportation of biomass from collection point to power plant ended up in the direct emission from the fuel combustion in trucks.

To make the calculation of emissions from transportation process simple and conservation, the longest transportation distance which is 50km, is chosen and the return trip of transportation trucks without picking out other loadings. The truck load is 8 tonnes as the most conservative value. The carbon emission factors for large heavy load transportation truck in IPCC guideline is 1.011kg/km, which is selected from the Moderate Control Index for the US Heavy Duty Diesel Vehicle.

The estimated GHG emissions from biomass transportation are **2464 tCO_2** annually. Detailed calculation tables are in Annex 3.

Project emission from diesel combustion in the boiler in plant

It is planned that no more than 30 tonnes additional diesel per year would be required for the boiler burning starting up or winter time on site. Based on the IPCC default values for diesel combustion such as fossil fuel carbon content and carbon oxidation fraction, the estimated emission from auxiliary diesel utilization on site are **94 tCO_2** annually. Detailed calculation tables are in Annex 3.

The quantity of auxiliary diesel is limited in the power plant mainly due to high heating value of biomass and high cost of diesel in market. The emission from diesel combustion is quite small amount comparing to other project emissions, but it is still taken into the calculations to keep it most conservative.

Project emission from biomass combustion

It is estimated that approximate 26 to 30tonnes biomass residues will be combusted in the boiler per hour, and annual combustion amount reaches around 195,000tonnes maximum with a Net Calorific Value of 0.0148TJ/tonne for the mix fuel. Therefore, the assumed biomass combustion in the proposed power plant will result in the methane emissions of **2491 tCO_2** annually.

Methane emission factor is chosen same of wood/wood waste as biomass residues combustion in industrial stoker boiler is 30 Kg/TJ as IPCC default value. For the conservative calculation purpose, the correction of the methane emission factor was set at 1.37 which is the highest and most conservative value in the baseline methodology.

E.2. Estimated leakage:

>>
The most critical aspect of estimated leakage issues in the proposed biomass power plant is whether it replaces current use of biomass as a fuel. If this replacing performance or intention to replacing is happening, and makes the more carbon intensive fuel would be utilized instead, the corresponding emission have to be deducted from the proposed project emission reduction carbon quotes.

In the feasibility study, the project developer made a biomass resource investigation in Suqian, Jiangsu province to make the operation of proposed plant possible. Although it is not official database, it is authorized as reliable survey approved by the local Development and Reformation Commission. And the biomass resource supplying and demanding flow will be investigated and analyzed in the individual different baseline calculation period and monitoring methodologies applied to the project activity.

As it is illustrated in the previous section that from the biomass resource investigation report the biomass burned in the proposed project will not influence the current biomass utilization structure from the above biomass supplying and demanding resource analysis table in Suqian. The project demand for biomass residue only consist approximately one third of the total available supplying, which is thought to be no influence on the biomass fuel switch into more carbon intensive driving. Consequently, it is considered to be no significant leakage of the proposed project activity. Accordingly, the leakage of the proposed project equals to 0: $\mathbf{L_{p,y} = 0}$.

E.3. The sum of E.1 and E.2 representing the project activity emissions:

>>
According to the methodology selected,

$$\Pr ojectActivityEmissions_y = EM_{p,y} + L_{p,y}$$

It is estimated that there is no leakage of the project,

$\mathbf{L_{p,y} = 0}$

Therefore,

$$\Pr ojectActivityEmissions_y = EM_{p,y} = \mathbf{5049\ tCO_2\ per\ year}$$

E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

>>
Although there is abundance of biomass residues resources all over China, the mature commercialized biomass technology has not been well developed until recently due to many reasons. The present normal biomass dealing methods by the local farmers are mostly natural decay and open air burning in the fields with few percentage of them utilized for self cooking, fertilizing and forage purposes. Based on the fact that most portion of the uncontrolled dumping biomass is natural decaying and open air firing, the open air burning was selected as the alternative baseline for the conservative baseline calculation in the applicable methodology chosen.

The natural decaying process of the biomass will emit more carbon intensive gas which causes higher

GHG effects comparing to the open air burning. To keep the baseline calculation of proposed project conservative, assumption of all the uncontrolled dumping biomass is direct burnt in open air ensures the lowest baseline emission effect. By the time PDD is prepared and submitted, the calculated methane amount emitted to the atmosphere due to open air burning of the biomass residues in the absence of the proposed project is **13,273 tCO_2/year**. To see detailed in Annex 3.

The power generation annually connected to the East China Grid is **132,600 MWh**

The combined baseline emission factor of the East China Grid network is estimated as **0.866 tCO_2/MWh,**

therefore the baseline emissions of equivalent power generation is: **114,832tCO_2.**
Dispatched power generation baseline emissions summary:
The annual total baseline emissions are **128,104tCO_2**

E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity:

>>
Net proposed project emission reduction=Total baseline emissions - Total project emissions
The annual total baseline emissions are **128,104 tCO_2**
The annual total project emissions are **5049 tCO_2**
The annual net emission reductions are **123,055 tCO_2**
The total net emission reductions in the first crediting period are: **861,385 tCO_2**

E.6. Table providing values obtained when applying formulae above:

>>

The ex post calculation of baseline emission rates may only be used if proper justification is provided. Notwithstanding, the baseline emission rates shall also be calculated ex ante and reported in the CDM-PDD. The result of the application of the formulae above shall be indicated using the following tabular format.

Year	**Estimation of Project activity Emission (tonnes of CO2e)**	**Estimation of baseline emission (tonnes of CO2 e)**	**Estimation of leakage (tonnes of CO2e)**	**Estimation of Emission reductions (tonnes of CO2 e)**
2007	4207	106753	0	102546
2008	5049	128104	0	123055
2009	5049	128104	0	123055
2010	5049	128104	0	123055
2011	5049	128104	0	123055
2012	5049	128104	0	123055
2013	5049	128104	0	123055
2014	842	21351	0	20509
Total (t CO2e)	35343	896728	0	861385

SECTION F. Environmental impacts

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

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The Environmental Impact Assessment report was approved in January 2006 by the Jiangsu Provincial Environmental Protection Agency.

The main social and environmental impacts of the project are obviously positive both in economical and human healthy aspects. The current direct burning of small percentage of straws make the local atmosphere heavily polluted, meanwhile most of discarded remaining straws are without any other utilization other than just dumping roadsides and crop fields. This would apparently affect the local environment consequently.

Air:
The implemented new advanced soot reduction technology can reduce 99.6% of the soot emissions generated in this project power plant. The output concentration of the soot emissions from the soot reduction equipment is only 1.15% that of the allowed State Standard Emission. Furthermore, it is not needed to treat the flue gas before emitted to the air due to its low sulfur content. The sulfur dioxide output concentration is only one forth of the allowed State Standard together with much lower emission amount. The domestic technology guaranteed that the output soot emissions can meet the national environmental standard well without any additional treatments.

Water:
The major waste water generations are from the cooling tower water, boiler-washing water and households living onsite. There are separate piping system for household wastewater, industrial wastewater and rain water. The household wastewater will be used for irrigation after the treatment in wastewater treatment plant.

Noise:
The main noise resources are within the power plant due to all the equipments and machines operation vibrations and transportation for biomass delivering. The low noise equipments are selected during the plant designing, and the necessary noise-reducing measurements are implemented as well. The noise inside the power plant and outside plant bordering can meet the National Standards GB 3096-93 and GB12348-90 I level respectively.

Solid Waste:
The ash from the boiler is the main resource for solid waste generation in the power plant and all of them will be treated comprehensively and returns back to the field as fertilizers.

All the environmental factors such as listed above will be monitored in the power plant, and the specified staffs are planned to in charge of those emissions monitoring individually. The total environmental investment ratio is up to 10% of the whole project investment amount as indicated in the project feasibility study report.

F.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:

>>

The environmental impacts of Jiangsu Suqian 2*12 MW Biomass power plant is considered low.

SECTION G. Stakeholders' comments

>>

According to the requirement by the Measures for Operation and Management of Clean Development Mechanism Projects in P.R.China, a proposed project survey has been conducted for the local villagers and residents representatives. The local municipality and related stakeholders were invited to submit the comments on the proposed biomass power plant.

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

>>

Comments on the construction of the proposed biomass power plant are required by local municipality and the construction company through a serious of means of informal discussions, hearing of witnesses, public consultations and visits to guarantee a successful implementation of the proposed project with the interests of stakeholders being taken into account. The socio-economic aspects and environmental aspects are both taken into the consideration in the survey.

The questionnaire is designed as following table and easy to be filled as the main purpose:

	Yes	No	Other opinions
Is the proposed project generally good in the socio-economic and environmental aspects for their life?			
Do you think its harmful to the local ecological environment and social life?			
Are there any negative impacts on their livelihoods during the plant construction period?			
Do you have positive attitude for the local transportation after the proposed project implementation?			
Do you have positive attitude for the local ecosystem harmonization?			
Do you think the project site is a good location or not?			
Do you support the proposed project in general idea?			
Do you think it's beneficial to your income consequently?			
Do you think the proposed project is good for local environment improvement in general?			
Signature of questionnaire:		Filling Date:	

G.2. Summary of the comments received:

>>

The local project developer ZHONGJIENENG-Suqian biomass energy investment Co.,Ltd had sent out 100 questionnaires to the surrounding relative stakeholders, and most of them are local residents living in the project area. And all the questionnaires are received under the support of local municipality. It is found that more than 90% of the stakeholders answering the questionnaires showing the positive altitude to the proposed biomass power plant.

- The majority of the local residents have been aware that the biomass resource to some extent, and they think it's a good idea to construct a biomass power plant
- The proposed power plant will bring extra revenues to their life
- They don't need to burn the current excessive amount of biomass residue in the field any more in the future and they will deliver the biomass to plant site or closest collection point instead.
- They can find some temporary jobs in the construction and operation phase of the biomass power plant which will improve the local economic development
- In general, most of them think the proposed power plant is good to improve the local air quality and environmental conditions due to the heavy smokes caused by the open air burning of biomass residue at the present time
- They think the local transportation situation will not worse after the construction of the power plant due to the systematic project designing phase and strong support from local government
- They think the proposed project activity will not cause negative impacts on their life and local ecological system and biodiversity
- They think the location of the proposed project plant is suitable to both local residents and environment

It is found that the quite few negative comments are due to the misunderstanding of the questionnaires, and misreading reasons. Therefore it is thought to be quite positive impacts to the local relative stakeholders generally.

Therefore, it is fully approved that the construction of the proposed project activity in Suqian and ZHONGJIENENG-Suqian biomass energy investment Co.,Ltd will develop the project successfully to promote the energy, economic and environmental development of Suqian.

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

>>
All the comments received had been integrated into the project feasibility study phase and designing, which are strongly showing the positive altitude of supporting the construction and implementation of the project.

Moreover, the local municipality and all stakeholders agreed that the proposed project would improve the local economic development.

Consequently, there will be no reason to modify the proposed project planning due to the comments received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Project Owner:

Organization:	ZHONGJIENENG Biomass Energy Investment Corporation
Street/P.O.Box:	No 42 Xizhimen Beidajie St
Building:	804 A, Zhongjieneng Tower
City:	Beijing
State/Region:	Haidian District
Postfix/ZIP:	100036
Country:	P.R.China
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	Ms Wu Xiaohua
Title:	
Salutation:	Vice President
Last Name:	Wu
Middle Name:	
First Name:	Xiaohua
Department:	
Mobile:	
Direct FAX:	0086 10 6226 9659
Direct tel:	0086 10 6226 6055
Personal E-Mail:	wuxiaohua@cecic.cn

CER Buyer:

Organization:	Carbon Ressource Management Co.,Ltd
Street/P.O.Box:	16-18 Whiteladies Road Bristol BS 40 6HU, UK
Building:	/
City:	Bristol
State/Region:	/
Postfix/ZIP:	/
Country:	UK
Telephone:	+44 1179809441
FAX:	+44 1179809401
E-Mail:	n.clarke@netcomuk.co.uk
URL:	/
Represented by:	Nicholas A Clarke
Title:	Managing Director
Salutation:	Mr
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding for this project.

Annex 3

BASELINE INFORMATION

Table A1 All the commercialized best practise technology emission factors						
	Variable	Power Supplying Efficiency	Fuel Emission Factor	Oxidation Rate	Emission Factor	CO2 Emission amount of 2004 comparing to total emission amount
		A	B	C	D=3.6/A/1000*B*C*44/12	λi
Coal Firing power Plants	EFCOal,Adv	36.53%	25.8	0.98	0.9136	96.08%
Gas Firing Power Plants	EFGaS,Adv	45.87%	15.3	0.995	0.4381	0.53%
Oil Firing Power Plants	EFOIl,AdV	45.87%	21.1	0.99	0.6011	3.39%
Thermal Emission Factor (tCO2/MWh)	EFThermal	0.9004861				

Table A2 Installed Capacity 2004 in East China							
Installed Capacity	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total
Coal	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
Nucler	MW	0	0	3056	0	0	3056
Wind Force and Others	MW	3.4	17.6	39.7	0	12	72.7
Total	MW	12018.3	28433.6	30953.9	10057.3	15507.5	96970.6

Table A 3 Installed Capacity 2003 in East China							
Installed Capacity	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total
Coal	MW	11092.6	22245	15321.2	9284.9	7092.8	65036.5
Hydro	MW	0	137.8	6054.5	649.1	6761.1	13602.5
Nucler	MW	0	0	2406	0	0	2406
Wind Force and Others	MW	0	0	39.7	0	12	51.7
Total	MW	11092.6	22382.8	23821.4	9934	13865.9	81096.7

Table A4 Installed Capacity 2002 in East China

Installed Capacity	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total
Coal	MW	11382.6	20599	13082.4	9056.3	6999.9	61120.2
Hydro	MW		137.2	5866.8	649.1	6512	13165.1
Nucler	MW	0	0	1678	0	0	1678
Wind Force and Others	MW	0	0	50.2	0	12	62.2
Total	MW	11382.6	20736.2	20677.4	9705.4	13523.9	76025.5

Table A5 EastChina Building Margin Calculation

	Installed Capacity in 2002	Installed Capacity in 2003	Installed Capacity in 2004	1998-2004 Incremental Capacity Installation	New Installed Capacity Percentages in the total Capacity Incrementation
	A	B	C	D=C-A	
Coal	61120.2	65036.5	79424.1	18303.9	87.39%
Hydro	13165.1	13602.5	14417.8	1252.7	5.98%
Nucler	1678	2406	3056	1378	6.58%
Wind Force and Others	62.2	51.7	72.7	10.5	0.05%
Total	76025.5	81096.7	96970.6	20945.1	100.00%
Installed capacity comparing to 2004 capacity	78.40%	83.63%	100.00%		
Thermal Emission Factor (tCO2/MWh)	0.9004861	East China Grid BM(tCO2/MWh)	0.786933819		

Table A 6 EastChina Power Grid OM in 2002											
fuel	**Unit**	**Shang hai**	**Jiangs u**	**Zhejiang**	**Anhui**	**Fujian**	**Total of Fuel**	**Emission Factor**	**Oxidation Rate**	**Average low Caloric Value(MJ7t,m3,tce)**	**CO2 emisson(tCO2e)**
								(tc/TJ)	**(%)**	**(MJ/t,km3)**	**H=G*D*E*F*44/12/10000（Mass Unit）**
		A	**B**	**C**	**D**	**E**	**F=A+B+C+D+E**	**G**	**H**	**I**	**J=I*F*G*H*44/12/1000 (Volume Unit)**
raw coal	Mtons	2386	5674.69	2923.66	2025.05	1336.49	**14345.89**	25.8	98	20908	278071961.3
cleaned coal	Mtons						**0**	25.8	98	26344	0
other washed coal	Mtons						**0**	25.8	98	8363	0
coke	Mtons						**0**	29.5	98	28435	0
coke oven gas	1010m3	2.23	0.02				**2.25**	13	99.5	16726	178489.4183
other coal gas	1010m3	66.82					**66.82**	13	99.5	5227	1656520.577
crud oil	Mtons						**0**	20	99	41816	0
Gasoline	Mtons		0.07				**0.07**	18.9	99	43070	2068.432443
Diesel	Mtons	1.21	13.45	30			**44.66**	20.2	99	42652	1396741.747
fuel oil	Mtons	53.2	1.19	91.38	1.09	12.6	**159.46**	21.1	99	41816	5107205.431
LPG	Mtons						**0**	17.2	99.5	50179	0
Refinery gas	Mtons	0.84					**0.84**	18.2	99.5	46055	25687.50785
Natural gas	1010m3						**0**	15.3	99.5	38931	0
other petroleum products	Mtons	10	3.47				**13.47**	20	99	38369	3752188.922
Other coke products	Mtons						**0**	25.8	98	28435	0
other energy	Mtons-tce	3		10.4			**13.4**	0	0	0	0
Data Source: China Energy Statistical Yeakbook (2000-2002)										Total	290190863.3

Table A 7 2003 East Power Grid OM											
fuel	**Unit**	**Shanghai**	**Jiangsu**	**Zhejiang**	**Anhui**	**Fujian**	**Total of Fuel**	**Emission Factor**	**Oxidation Rate**	**Average low Caloric Value(MJ7t,m3,tce)**	**CO2 emisson(tCO2e)**
								(tc/TJ)	**(%)**	**(MJ/t,km3)**	**H=G*D*E*F*44/12/10000**
		A	**B**	**C**	**D**	**E**	**F=A+B+C+D+E**	**G**	**H**	**I**	**J=I*F*G*H*44/12/1000 (Volume Unit)**
raw coal	Mtons	2618	6417.74	3442.4	2669.67	1754	**16901.81**	25.8	98	20908	327614351.9
cleaned coal	Mtons						**0**	25.8	98	26344	0
other washed coal	Mtons						**0**	25.8	98	8363	0
coke	Mtons						**0**	29.5	98	28435	0
coke oven gas	1010m3	1.99	0.06				**2.05**	13	99.5	16726	162623.6922
other coal gas	1010m3	66.34					**66.34**	13	99.5	5227	1644620.998
crud oil	Mtons						**0**	20	99	41816	0
Gasoline	Mtons	1.26	14.71	13.99			**29.96**	20.2	99	42652	936999.1654
Diesel	Mtons	95.49	0.76	174.48		18.89	**289.62**	21.1	99	41816	9275986.686
fuel oil	Mtons						**0**	17.2	99.5	50179	0
LPG	Mtons	0.49	0.96				**1.45**	18.2	99.5	46055	44341.5314
Refinery gas	Mtons						**0**	15.3	99.5	38931	0
Natural gas	1010m3	18.91	5.3	15.04			**39.25**	20	99	38369	1093343.84
other petroleum products	Mtons						**0**	25.8	98	28435	0
Other coke products	Mtons	5.68		7.08			**12.76**	0	0	0	0
other energy	Mtons-tce									total	340772267.9

Table A7 2003 East China Grid Coal Firing Power Generation				
Province	Electricity Generation	Electricity Generation	Plant own consumption	Power Supplying to Grid
	(10^10 kWh)	(MWh)	(%)	(MWh)
Shanghai	694.44	69444000	5.14	65874578.4
Jiangsu	1332.77	133277000	5.9	125413657
Zhejiang	830.89	83089000	5.31	78676974.1
Anhui	541.56	54156000	6.06	50874146.4
Fujian	421.46	42146000	5.07	40009197.8
Total				360848553.7
Data Source: China Power Yearbook 2004				

Table A8 2003East China Grid OM					
Middle China Grid delivered power(MWh)	13756040	East China Grid power supplying	360848553.7	Total Power supplying	385310463.7
Middle China average EF	0.8422447	East China emission	340772267.9	Total emission	362526436.0
Yangcheng delivered power	10705870				
Yangcheng average EF	0.94977955	2003East China Grid OM	**0.940868391**		

Table A9 2004 East Power Grid OM

fuel	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total of Fuel	Emission Factor	Oxidation Rate	Average low Caloric Value(MJ7t,m3,tce)	CO2 emisson(tCO2e)
								（tc/TJ）	(%)	（MJ/t,km3）	H=G*D*E*F*44/12/10000（Mass Unit）
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J=I*F*G*H*44/12/1000 (Volume Unit)
raw coal	Mtons	2779.6	7601.9	4008.9	2906.2	2183.7	19480.3	25.8	98	20908	377594225.7
cleaned coal	Mtons						0	25.8	98	26344	0
other washed coal	Mtons		5.46			4.63	10.09	25.8	98	8363	78229.4857
coke	Mtons						0	29.5	98	28435	0
coke oven gas	1010m3	2.59					2.59	13	99.5	16726	205461.1526
other coal gas	1010m3	72.46					72.46	13	99.5	5227	1796340.631
crud oil	Mtons						0	20	99	41816	0
Gasoline	Mtons	2.69	27.17	6.23			36.09	20.2	99	42652	1128714.949
Diesel	Mtons	58.52	55.07	202.89		23.26	339.74	21.1	99	41816	10881236.51
fuel oil	Mtons						0	17.2	99.5	50179	0
LPG	Mtons	0.77	0.55				1.32	18.2	99.5	46055	40366.08376
Refinery gas	Mtons		0.14				0.14	15.3	99.5	38931	30423.52536
Natural gas	1010m3	21.22	1.37	24.89			47.48	20	99	38369	1322597.847
other petroleum products	Mtons						0	25.8	98	28435	0
Other coke products	Mtons	6.43		15.48			21.91	0	0	0	0
other energy	Mtons-tce									Total	393077595.9
Data Source: China Power Yearbook 2005											

Table A10 2002 East China Grid Coal Firing Power Generation				
Province	Electricity Generation	Electricity Generation	Plant own consumption	Power Supplying to Grid
	(10^10 kWh)	(MWh)	(%)	(MWh)
Shanghai	616.48	61648000	5.44	58294348.8
Jiangsu	1167.16	116716000	6.09	109607995.6
Zhejiang	692.87	69287000	5.95	65164423.5
Anhui	457.03	45703000	6.36	42796289.2
Fujian	308.5	30850000	6.68	28789220
Total				304652277.1
Data Source: China Power Yearbook 2003				

Table A11 2002 EastChina Grid OM					
Middle China Grid delivered power(MWh)	7883000	East China Grid power supplying	304652277.1	Total Power supplying	312535277.1
Middle China average EF	0.737631	East China emission	290190863.3	Total emission	296005608.5
2004 East China Grid Network OM	0.947111031				

2004 A12 East China Grid Coal Firing Power Generation				
Province	Electricity Generation	Electricity Generation	Plant own consumption	Power Supplying to Grid
	(10^10 kWh)	(MWh)	(%)	(MWh)
Shanghai	711.27	71127000	5.22	67414170.6
Jiangsu	1635.45	163545000	5.93	153846781.5
Zhejiang	952.55	95255000	5.68	89844516
Anhui	598.75	59875000	6.03	56264537.5
Fujian	504.9	50490000	6.07	47425257
Total				414795262.6
Data Source: China Power Yearbook 2005				

2004 A13 East China Grid Network OM					
Middle China Grid delivered power(MWh)	26933850	East China Grid power supplying	414795262.6	Total Power supplying	453378722.6
Middle China average EF	0.93054602	East China emission	393077595.9	Total emission	429140827.8
Yangcheng delivered power	11649610				
Yangcheng average EF	0.94424148	2004 East China Grid Network OM	**0.946539408**		

Table A 14 Calculation of combined emission factor	
OM factor (tCO2/MWh)	0.945
BM factor (tCO2/MWh)	0.787
Combined Emission Factor (tCO2/MWh)	**0.866**

Table A15. Electricity generation baseline emissions				
	Parameter	**Unit**	**Amount**	**Source of Equation**
A	Project installed capacity	MW	24	Feasibility Study
B	Annual power generation	MWh	132,600	Feasibility Study
C	Baseline Emissions Factor	tCO2/MWh	0.866	Table A8
D	Electricity generation baseline emissions	tCO2/year	114,832	D=B*C

Table A 16 GHG emissions from biomass combustion in the power plant				
	Parameter	**Unit**	**Amount**	**Source or Equation**
A	Biomass burned	tonne/year	195,000	Feasibility Study
B	Biomass Net calorific Factor (NCV)	TJ/tonne	0.0148	Feasibility Study
C	Methane Emission Factor (controlled Burning)	KgCH4/TJ	30	IPCC deafult value
D	Conservativeness factor		1.37	Baseline Methodology page 34
E	Global Warming Potential of CH_4		21	IPCC deafult value
F	GHG emissions from biomass combustion	tCO_2/year	2,491	**F=A*B*C*D*E/1000**

Table 17 GHG emissions from fossil fuel				
	Parameter	**Unit**	**Amount**	**Source or Equation**
A	Fossil fuel (diesel) used in the boiler	tonne/year	30	Feasibility Study
B	Fossil fuel Net Calorific Value (NCV)	TJ/tonne	0.0427	Feasibility Study
C	Fossil Fuel carbon content	tC/TJ	20.2	IPCC deafult value
D	Fraction of carbon oxidized		0.99	IPCC deafult value
E	CO2/C conversion factor		3.67	IPCC deafult value
	GHG emissions from fossil fuel combustion	tCO_2/year	94	**F=A*B*C*D*E**

Table A 18 GHG emissions from biomass transportation to the power plant				
	Parameter	**Unit**	**Amount**	**Source or Equation**
A	Biomass Demand	tonne/year	195,000	**Feasibility Study**
B	Average load per trip	tonne	8	**Project Developer**
C	Longest distance between storage site and the power plant	km	50	**Project Developer**
D	Emission Factor of truck transportation	kg/km	1.011	**IPCC default value from the Moderate Control index for the US heavy Duty Diesel Vehicle**
	GHG emissions from biomass transportation	**tCO_2/year**	**2,464**	**E=(A/B)*50*2*D/1000**

Table A 19 Total Project Emissions				
	Parameter	**Unit**	**Amount**	**Source or Equation**
A	GHG emissions from biomass combustion	tCO_2/year	2,491	Calculation
B	GHG emissions from fossil fuel combustion	tCO_2/year	94	Calculation
C	GHG emissions from biomass transportation	tCO_2/year	2,464	Calculation
	Total Project emissions	tCO_2/year	5,049	**D=A+B+C**

Table A 20 Unused biomass baseline emissions				
	Parameter	**Unit**	**Amount**	**Source or Equation**
A	Biomass burned	tonne/year	195,000	Feasibility Study
B	Biomass Net calorific Factor (NCV)	TJ/tonne	0.0148	Project Developer
C	Methane Emission Factor in agriculture or forestry	KgCH4/TJ	300	IPCC default value
D	Conservativeness factor		0.73	Baseline Methodology page 34
E	Global Warming Potential of CH_4		21	IPCC deafult value
F	Unused biomass baseline emissions	tCO_2/year	13,273	**F=A*B*C*D*E/1000**

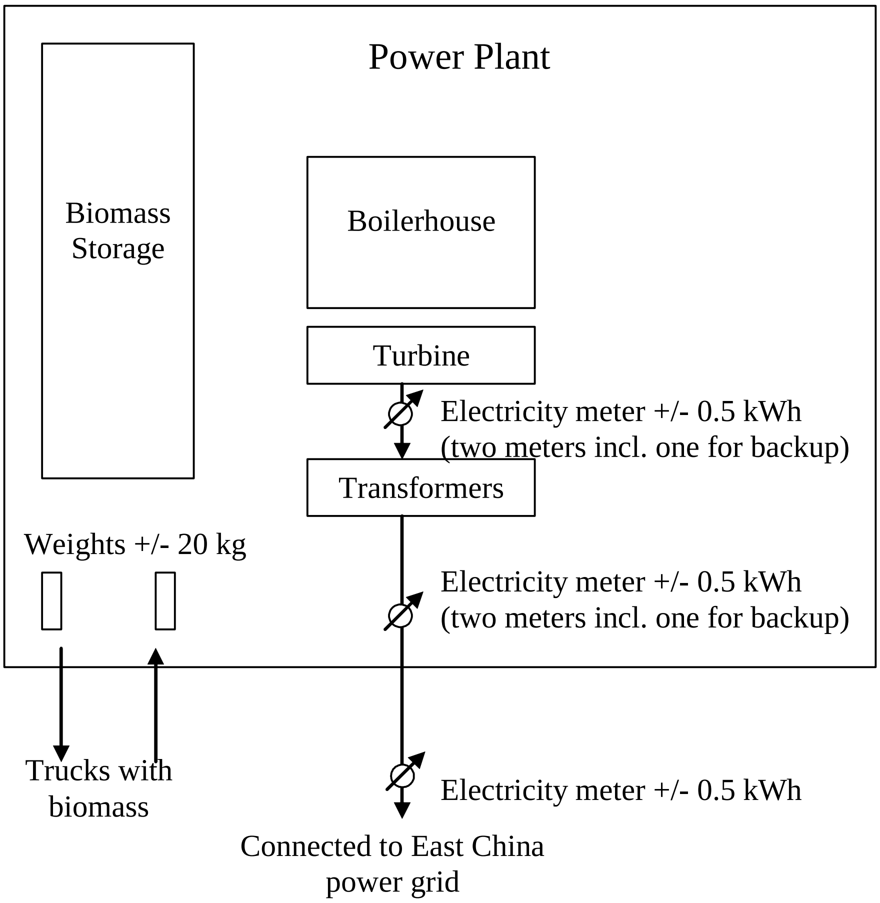
Table A 21 Total Baseline emissions				
	Parameter	**Unit**	**Amount**	**Source or Equation**
A	Unused biomass baseline emissions	tCO_2/year	13,273	Calculations
B	Electricity generation baseline emissions	tCO_2/year	114,832	Calculations
C	Total Baseline emission	tCO_2/year	128,104	**C=A+B**

Table A 22 Project emission reduction				
	Parameter	**Unit**	Amount	**Source or Equation**
A	Total Baseline emission	tCO_2/year	128,104	Calculations
B	Total Project emissions	tCO_2/year	5,049	Calculations
C	Project Emission Reduction	tCO_2/year	123,055	**C=A-B**

Annex 4

MONITORING PLAN

The monitoring plan is designed for the2*12MW Suqian Biomass Power Plant in Jiangsu Province, P.R.China. This monitoring plan, which will be registered with the CDM EB as a part of Project Design Document, describes the parameters and variables, monitoring practices, QA and QC procedures, data storage and archiving etc. Project participants should implement this monitoring plan right from starting day of the proposed project.



Quantity of biomass purchased

The quantity of biomass fuel purchased will be measured, recorded and monitored from starting point in the project i.e. at the entry of the project premises. The biomass fuel truck details shall also be noted as mentioned in the format. The plant should have a computerized weighing system through which each truck of the biomass fuel will pass through. No truck with biomass fuel will be able to enter into the plant without weighing the biomass fuel. The weighing system will be calibrated and sealed regularly as per the prevailing practices.

Total power generated

The total power generated by the plant will be measured in the plant premises to the best accuracy and will be recorded and monitored on the continuous basis. And all instruments will be calibrated at regular intervals.

Quality Assurance and Quality Control

The quality assurance and quality control process for recording, maintaining and archiving data should be ensured through the CDM mechanisms in terms of the need for verification of the emissions on an annual basis according to Project Design Document and Monitoring Report.

All the above parameters monitored under monitoring plan will be kept for 2 years after the end of the crediting period or the last issuances of CERs for this project activity, whichever occurs later.

The monitored data will be presented to the verification agency or DOE to whom verification of emission reduction is assigned.

Necessary formats / tables / log sheets etc will be developed by the project participants for monitoring and recording of the data and will be made part of the registered monitoring protocol.