CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

National Bachu Biomass Power Generation Project
Version: 01
Date: 28/04/2011

A.2. Description of the small-scale project activity:

The proposed National Bachu Biomass Power Generation Project (hereafter referred to as the Project) is located in Bachu County, Xinjiang Uygur Autonomous Region, P. R. China. Bachu County has rich agricultural resources, which are not utilized. The implementation of the proposed project will realize biomass comprehensive utilization in the region and serve as a demonstration project.

The project will utilize local surplus biomass residues (cotton stalks and wood residues) for generating electricity. The install capacity is 12 MW. The proposed project has installed a boiler, turbine and generator, which are produced domestically. Further details on the equipments are provided in A.4.3. The proposed project will contribute to transferring advanced biomass technology to Xinjiang Uygur Autonomous Region. It is estimated that the Project can deliver 79,200 MWh of electricity to the China Northwest Power Grid (NWPG) per year, which consumes nearly 110,000 tons biomass residues.

The Northwest China Grid is dominated by fossil fuel fired power plants. The proposed project will accomplish greenhouse gas (GHG) mitigation by replacing the same amount of the electricity generated by fossil fuel fired power plants and reduction of methane missions from biomass dumping or uncontrolled burning of biomass. The estimated emission reduction will be 62,774 tCO_2e per year in the first crediting period.

For the proposed project,

(a) Prior to the start of implementation of the project activity, there is no power generation unit at the site of the proposed project, and the electricity was supplied by the NWPG, which is dominated by fossil fuel-fired power plants. And the unused biomass residues are dumped or left to decay under mainly aerobic conditions.
(b) The project scenario is the implementation of the proposed project, involving the installation of a biomass combustion boiler and a 12MW power generator driven by steam turbine, which will supply an average annual net generation of 79,200 MWh to NWPG and replace the same amount of electricity generated by fossil fuel-fired power plants connected to NWPG.

The proposed project is consistent with China's national energy policy and sustainable development strategy, which will be shown specifically as follows:

(1). GHG emission reduction
The proposed project activity will achieve obvious greenhouse gas (GHG) emission reductions by replacing the same amount of the electricity generated by fossil fuel fired power plants and reduction of methane missions from biomass dumping or uncontrolled burning of biomass. The estimated emission reduction will be 62,774 tCO_2e per year in the first crediting period.

(2). Comprehensive utilization of resources

Cotton is one of the major produce of Bachu County. Large volume of cotton stalks would be dumped or left to decay in the absence of the proposed project. The implementation of the proposed project will realize biomass comprehensive utilization in the region.

(3). Providing job opportunities and increasing income of local residents
The proposed project will directly benefit the local region by creating new jobs and investment opportunities, simulating economic development.

(4). Contribution to environment protection
Meanwhile, the proposed project will reduce not only GHG emissions, but also SO_2 emissions to abate air pollution. Furthermore, the proposed project will avoid uncontrolled burning of biomass in the region, which avoids air pollution. Economic growth, social benefits and environmental improvement will be achieved in the region by conducting the project.

The proposed project is consistent with China's national energy policy and the sustainable development strategy.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	**Private and/or public entity (ies) project participants (*) (as applicable)**	**Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)**
Peoples' Republic of China (host)	National Bio Energy Co., Ltd.	No
Switzerland	Swiss Carbon Value 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.		

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

People's Republic of China

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

Xinjiang Uygur Autonomous Region

A.4.1.3. City/Town/Community etc:

Bachu County

A.4.1.4. **Details of physical location, including information allowing the unique identification of this small-scale project activity :**

The proposed project activity is located in Bachu County, Xinjiang Uygur Autonomous Region, P. R. China. The geographical co-ordinates of the site transformer are east longitude 77°49′26″ and north latitude 39°18′10″. Geographical location of the project is shown in Figure A1 and A2.

Figure A1. The proposed project in the map of P. R. China

Figure A2. The proposed project in the map of Xinjiang Uygur Autonomous Region

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

According to Appendix B of the simplified procedures for small-scale activities, the type and category of the proposed project as follows:

TYPE I - Renewable Energy Project
CATEGORY I.D. - Grid Connected Renewable Electricity Generation

Prior to the start of implementation of the project activity, there is no power generation unit at the site of the proposed project, and the electricity was supplied by the NWPG, which was dominated by fossil fuel-fired power plants. And the unused biomass residues are dumped or left to decay under mainly aerobic conditions. The baseline scenario of the proposed project is the same as the scenario prior to the start of the implementation of the project activity.

The proposed project involves the installation of a 48t/h biomass combustion boiler and a 12MW power generator driven by steam turbine. The installed capacity of the proposed project is 12 MW and the annual net power supply is 79,200 MWh per year. The electricity output will be transmitted through an 110kV transformer at the site to Bachu 110kV substation, and then connected to Xinjiang Uygur Autonomous Regional Power Grid that is an integral part of NWPG.

The annual operational hours are expected to be 7,500 h. The residues will be transported to the plant according to dispatch scheme. After the residues are transported into the storehouse in the plant, they will be fed into the fuel entering system and sent to the boiler for combustion. The steam generated is used for power generation.

The equipments used in the proposed project are specified as follow:

Boiler	
Rated steam capacity	48t/h
Rated steam pressure	9.2 MPa
Rated steam temperature	540℃
Boiler efficiency	90%
Lifetime	20 years
Manufacturer	Jinan Boiler Group Co., Ltd.
Steam Turbine	
Rated power	12MW
Rated rotation speed	3000r/min
Lifetime	20 years
Manufacturer	Qingdao Jieneng Steam Turbine Group Co., Ltd.
Generator	
Rated power	12MW
Rated voltage	10.5 kV
Rated rotation speed	3000r/min
Lifetime	20 years
Manufacturer	Shandong Jinan Power Equipment Factory

The implement of the proposed project will not involve technology transfer from developed countries to China.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

A crediting period of 7 (seven) years (renewable twice) is selected for the project activity. An estimation of emissions reductions expected over the crediting period is provided in the table below.

Years	Estimation of annual emission reductions in tonnes of CO_2e
01/08/2011-31/07/2012	62,774
01/08/2012-31/07/2013	62,774
01/08/2013-31/07/2014	62,774
01/08/2014-31/07/2015	62,774
01/08/2015-31/07/2016	62,774
01/08/2016-31/07/2017	62,774
01/08/2010-31/07/2011	62,774
Total estimated reductions (tonnes of CO_2e)	439,418
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	62,774

A.4.4. Public funding of the small-scale project activity:

There is no public funding for the proposed project and there is no involvement of the public development funding in Annex I.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

According to "Guidelines on assessment of debundling for SSC project activities (version 03)", a proposed small-scale project activity is considered a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology;
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small scale Activity.

The participants of the proposed project will not construct another small scale projects similar with the proposed project within 1 km of the proposed project boundary. Thus, the proposed project is not a debundled component of a large project activity.

SECTION B. Application of a baseline and monitoring methodology

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

The approved methodology employed for the proposed project will be AMS-I.D. (version 17.0) – "Grid connected renewable electricity generation". The methodology can be found from:
http://cdm.unfccc.int/methodologies/DB/RSCTZ8SKT4F7N1CFDXCSA7BDQ7FU1X

In line with the application of the methodology the project draws on element of the following tools and methodologies:
Version 02.2.1 of Tool to calculate the emission factor for an electricity system
Version 06.0.0 of Tool for the demonstration and assessment of additionality

B.2 Justification of the choice of the project category:

The proposed project satisfies the applicable conditions of methodology AMS-I.D. which are listed as follows:

Applicability of AMS-I.D.:
The applicability conditions for simplified baseline methodology category AMS-I.D are:
(1) Installed capacity limit is 15 MW;
(2) The methodology is applicable to renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal, and renewable biomass that supply electricity to a national or regional grid;
(3) This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition1; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement3 of (an) existing plant(s);
(4) In the case of biomass power plants, no other biomass types than renewable biomass are to be used in the project plant;
(5) Combined heat and power (co-generation) systems are not eligible under this category.
For the proposed project:
The proposed project activity is a 12 MW renewable biomass project delivering electricity to the NWPG, which is still remain the same capacity and will not change in future. Thus, the proposed project activity satisfies the requirements of (1) the capacity of a project should be less than 15 MW; (2) the project should concern renewable power generation; and the electricity generated from the proposed project supply to a grid, which is predominantly fossil fuel fired. (3) The project will utilize local surplus biomass residues (cotton stalks and wood residues) for generating electricity. (4) There are no other biomass types than renewable biomass to be used in the project plant; (5) The project is a power generation plant rather than combined heat and power systems.

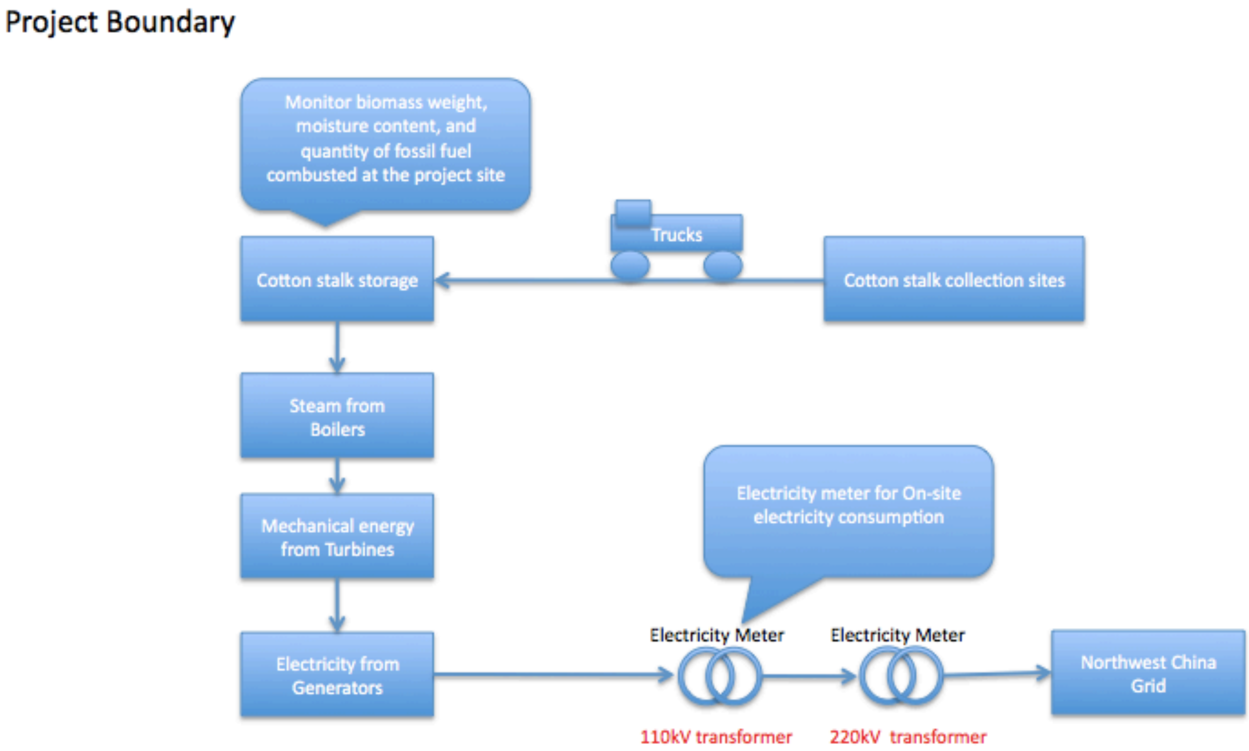
Therefore, all applicability conditions for the use of simplified baseline methodology category I.D. have been satisfied.

B.3. Description of the project boundary:

As per the methodology AMS-I.D (version 17), the physical, geographical site of the renewable generation source delineates the project boundary.

As for the proposed project, the project boundary covers the cotton stalk fired power plant, which starts from the biomass storage to the point of power supply to grid. Thus, project boundary includes the area from where the biomass is extracted, biomass storage, biomass fired boiler, steam turbine generator, power plant auxiliaries consumption units and all power plants connected physically to the NWPG (including Shanxi Province, Gansu Province, Qinghai Province, Ningxia Autonomous Region and Xinjiang Autonomous Region).

The GHG emission source and GHG included in the project boundary was illustrated in the following diagram, where the main monitoring equipment and their location are presented simultaneously.



B.4. Description of baseline and its development:

According to the methodology AMS-I.D. (version 17.0), if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid- connected power plants and by the addition of new generation sources. The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor. The Emission Factor can be calculated in a transparent and conservative manner as follows: A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system (version 02.2.1)".

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

The Feasibility Study Report was carried out by Shandong Luneng Electric Power Design Institute in December 2006. Based on the information from the Feasibility Study Report and the increasing trends for the costs of the proposed project, such as the price of biomass residue, the project developer learnt that the Project NPV would be negative. The proposed developer had to seek for additional financial support from carbon finance to make the proposed project feasible. The project developer held a board meeting and decided to propose the project as a CDM activity in December 2006. The project owner was aware of the potential of CDM income to support its project activities at an early stage. It is clear that the project owner has fully considered the revenues from CDM when making the decision to implement the project.

The timeline of milestone of the proposed project is shown in the table below:

Time	Milestones
12/2006	Feasibility Study Report finalized
15/12/2006	Board Meeting: discussion on the project development and application for carbon financing. Investment decision was made.
20/12/2006	Boiler Purchase Contract signed
03/2007	Construction service contract signed
14/01/2007	Turbine Purchase Contract signed
15/01/2007	Generator Purchase Contract signed
17/04/2007	Board Meeting: project development and carbon financing progress updates
24/05/2007	Project construction started
03/2008	Carbon financing due diligence
04/12/2008	Project operation started
16/03/2009	Board Meeting: discussions on accelerating the application for carbon financing.
26/11/2009	Meeting with South Pole Carbon Asset Management Ltd
25/10/2010	Emission Reduction Purchase Agreement (ERPA) signed

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

Sub-Step1a. Define alternatives to the project activity

Realistic and credible alternatives available to the project participants that provide outputs or services comparable with the proposed CDM project activity include:

1. The proposed biomass project activity undertaken without being registered as a CDM project activity;
2. Thermal power generation with equivalent annual power generation;
3. Other renewable energy power generation with equivalent annual power generation;
4. The equivalent annual electricity is supplied by the China Northwest Power Grid.

For Alternative 1, the proposed project not undertaken as a CDM project activity satisfies China's current regulations.

For Alternative 2, it does not comply with Chinese regulations. Please refer to analysis in Sub-step 1b.

For Alternative 3, it is consistent with all current applicable laws and regulations. But it is still not a realistic and credible scenario for the following reasons: As for solar photovoltaic, its cost is eleven to eighteen times that of coal-fired electric energy, six to ten times that of wind electric energy, according to a quoted article from China Climate Change website[1], and is therefore higher than the cost of biomass electric energy. Wind power plant is not an option to substitute the proposed project since there is rare wind resource in Tarim basin for wind power development according to article from China Geography and New Energy[2]. Hydro power plant is not an option to substitute the proposed project since there is rare water resource in Tarim basin, where the biggest desert of China is located. As for wave and tidal power plants, usually they are located in coastal cities. While the proposed project is located in desert and gobi

[1] Data source: Author: Zong Wenchun. Title: *The Current situation and the Existing Problems of Solar Power Generation in China*. http://www.ccchina.gov.cn/cn/NewsInfo.asp?NewsId=5884

[2] Data source: Wind resource published on China Geography and New Energy: Detailed information can be found by:

http://www.showchina.org/zgdl/sylm/200701/t104908.htm

http://www.newenergy.org.cn/html/0039/2003991.html area in Xinjiang Uygur Autonomous Region, thus tidal and wave energy is unavailable; As a region of rare geothermal resource, there is no enough high temperature geothermal resource in Xinjiang Uygur Autonomous Region to develop electricity[3]. There is no solar energy, wind resources, hydro energy, tidal, wave energy and geothermal energy except abundant biomass resources at the project site. Thus, alternative 3 is not realistic and credible option.

For *Alternative 4*, Continuation of the current situation, electricity would continue to be generated by the existing mix of power plants in the grid. This situation accords with applicable laws and regulations in China and will not face large technical or financial barriers. Thus, *Alternative 4* is feasible.

Sub-step 1b: Consistency with mandatory laws and regulations:

According to Guidance on Industrial Structural Adjustment of 2005issued by National Development & Reform Commission[4], the construction of a conventional fossil fuel power unit with a single capacity below 300MW is strictly restricted. In addition, as stipulated in Notice on Shutdown of Small Capacity Fossil Fuel Fire Plants issued by State Council, the newly built plant should install at least two generation units, which means the minimum capacity requirement for a newly built thermal power plant is 600MW. Therefore, constructing a fossil fuel power plant with capacity below 12MW as a baseline scenario alternative is therefore not in line with national regulation and alternative (2) is therefore not feasible.

Therefore, alternative 1 and alternative 4 is in compliance with current laws and regulations.

Step 2: Investment analysis

Sub-step 2a. Determine appropriate analysis methodt

The Project may select one of the investment analysis methods below:

Option I: Simple cost analysis;
Option II: Investment comparison analysis;
Option III: Benchmark analysis.

Since this project will generate financial/economic benefits other than CDM-related income, through the sale of generated electricity, Option I (Simple Cost Analysis) is not applicable.

The investment comparison analysis (Option II) is also not applicable for the proposed project because investment comparison analysis method is only applicable to projects whose alternatives are similar investment projects. The Central China Power Grid is not a new investment project; therefore Option II is not appropriate.

Therefore the benchmark analysis (Option III) is chosen for assessing the financial attractiveness of the project activity.

Sub-step 2b. Option III. Apply benchmark analysis

The proposed project adopts the benchmark analysis according to the "Tool for the demonstration and assessment of additionality (version 06.0.0)", and NPV as the financial indicator. With reference to Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects, the financial benchmark rate of return (post tax) of Chinese power industry is 8% of Project IRR, which has been used widely for Feasibility Studies of the power project investments, including biomass power generation projects. Based on the above-mentioned benchmark, 8% is used as the discount rate in the calculation and comparative analysis of financial indicators for the proposed project.

[3] Title: *Geothermal Resource Distribution and Utilization in Mainland of China,* http://info.energy.hc360.com/2008/04/11135236822.shtml

[4] http://www.ndrc.gov.cn/zcfb/zcfbl/zcfbl2005/t20051222_54304.htm

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

Key parameters for the calculation of financial indicators

Basic parameters	Value	Data source
Installed capacity (MW)	12	Feasibility study report
Annual power supply (MWh)	79,200	Feasibility study report
Tariff (Yuan/kWh)	0.5 (Inc. VAT)	Feasibility study report
Total static investment (million Yuan)	135.25	Feasibility study report
Depreciation period (year)	15	Feasibility study report
Construct period (year)	1	Feasibility study report
Operation period (year)	20	Feasibility study report
Residue of investment (%)	5	Feasibility study report
Tax		
VAT of electricity sale (%)	17	Feasibility study report
Input tax for fuel (%)	13	Feasibility study report
Input tax for raw material (%)	17	Feasibility study report
Input tax for water rate (%)	6	Feasibility study report
Withholding tax rate for repair charge (%)	11.9	Feasibility study report
Income tax (%)	33	Feasibility study report
Cotton stalk consumption (tonnes/year)	112,500	Feasibility study report
Cotton stalk Price (Yuan/t)	240	Feasibility study report

In accordance with the benchmark analysis (Option III), the proposed project will not be considered as financially attractive if its financial indicators (such as NPV) are lower than the benchmark rate.

Table B1 shows the fluctuating situation of Project NPV based on current status under the condition of with and without carbon finance revenues. Without the carbon finance revenue, the Project NPV is negative. Thus the proposed project does not look financially attractive to the investors. However, with the carbon finance revenue, Project NPV is significantly improved and exceeds zero. Therefore, the proposed project with the carbon finance revenue can be considered as financially viable to the investors.

Table B1. Financial indicators of the Proposed Project

	Post-Tax Project NPV (benchmark=8%)
Without carbon finance revenue	-142,951,400 CNY
With carbon finance revenue	155.96 CNY

Sub-step 2d. Sensitivity analysis

The purpose of the sensitivity analysis is to assess the impact of uncertainties in the input values of the financial model on the calculated NPV. Total static investment accounts for more than 20% of the total investment, and moreover the project revenue is decided by the annual O&M cost, tariff and annual power output. Therefore, these four financial parameters including: total static investment, annual O&M cost, tariff and net electricity generation were identified as the main variable factors for sensitive analysis of financial attractiveness.

(a) Total static investment

The total static investment was estimated in the Feasibility Study Report by a qualified third party, Shandong Luneng Electric Power Design Institute and is reasonable. According to the statistics released by National Bureau of Statistics of China, the Consumer Price Index has kept growth in these five years (2003-2007)[5]. Considering economical development in China and the price rising of materials during construction, the total static investment of the proposed project is impossible to be decreased so much to make the project NPV reach positive.

(b) Annual O&M cost

The project NPV will become positive, only when the annual O&M cost decreases by 44.92%. According to the FSR, the annual O&M costs include material expenses, wages and welfare, repair cost, insurance premium and miscellaneous cost, each of the above cost is calculated by some fixed parameters such as the installed capacity, the normal standard for utilization of equipments etc. Therefore, annual O&M Cost is relatively fixed and is not likely to decrease. Furthermore, the actual O&M cost is higher than expectation.

(c) Tariff

The project NPV begins to exceed zero, if there is an increase in tariff by 52.67%. In China, the tariff of the project power generation is determined by the Chinese government according to *Interim Regulation for Tariff of Renewable Energy Power Generation and Appointment of Expenses* under *Chinese Renewable Energy Law*[6]. The guide tariff constituted by the tariff of coal fired power plants in the year 2005 in the province and the tariff subsidy of 0.25 Yuan/kWh. The tariff subsidy will be enjoyed by the proposed project during the first 15 operating years, and the will be abolished. According to the *Notice on adjustment of the electricity tariff in Northwest China Power Grid* issued by NDRC[7], the tariff of coal fired power plants in Xinjiang is 0.25Yuan/kWh. The tariff of the proposed projects is 0.5Yuan/kWh from year 2 to year 16 and 0.25Yuan/kWh from year 17 to year 21 respectively, according to the *Interim Regulation for Tariff of Renewable Energy Power Generation and Appointment of Expenses*. The tariff the proposed project applied is 0.5 Yuan/kWh throughout the whole operational period according to the Feasibility Study Report, which is much conservative. Therefore, the tariff is impossible to increase to make the project financially attractive.

(d) Annual power supply
When the power generation increases by 52.67%, the project NPV begins to exceed zero. The power generation is decided mainly by annual utilization hours. The proposed project has an operating hour of 7,500h already in the FSR. And the project NPV begins to exceed zero when the annual operating hours of the project plant is 52.67% higher than expected, which reaches 11,450 hours. This is impossible to reach.

After above sensitive analysis, when financial indicators change within reasonable range, the proposed project is not financially feasible without carbon finance support.

Step 4 Common practice analysis

---

[5] Consumer Price Index (CPI) by Region (2007.12)

[6] Notice on *Interim Regulation for Tariff of Renewable Energy Power Generation and Appointment of Expenses* issued by NDRC, on 4 January 2006.

[7] http://www.sdpc.gov.cn/zcfb/zcfbtz/2009tz/t20091120_314509.htm

As per *Tool for the Demonstration and Assessment of Additionality* (version 06.0.0), projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory frame-work, investment climate, access to technology, access to financing, etc. And according to paragraph 47 of the additionality tool, the proposed project activity is one of the measures in paragraph 6, i.e. (b) switch of technology with change of energy source (use of renewable energies), common practice analysis is identified and discussed through the following 4 steps:

Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

The installed capacity of this proposed project is 12MW. Based on this indicator, biomass projects with installed capacity between 6MW and 18MW are considered as similar size

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and projects activities undergoing validation shall not be included in this step

China is a very large country in which the economic development level, the industrial structure, the fundamental infrastructure, development strategy and the policy framework is different. As such a number of key economic factors vary from province to province. These include tariff rates of products, the cost of materials, the cost of electricity and other utilities such as water, the cost of labor and services and the types of loan that can be obtained. These factors all vary among provinces. Xingjiang Uygur Autonomous Region, where the project is located, with an area of 1.6649 million km^2, is comparatively and considerably larger than many countries. According to the requirements of common practice, the projects with similar conditions, such as investment conditions and natural conditions (including geographical conditions, climate conditions, development conditions and so on), are necessary to be analyzed. Projects located in different provinces of China Northwest Power Grid have not the similar investment conditions (e.g. feed in tariff mechanism, GDP) and natural conditions[8]. Therefore, the PDD selects geographical area, i.e. Xingjiang Uygur Autonomous Region, as a common practice. Projects located in Xingjiang Uygur Autonomous Region with the installed capacity of 12MW to 18MW, have started commercial operation before the start date of the project, were selected for further analysis.

Actually, there are two biomass projects in Xingjiang Uygur Autonomous Region. One is the proposed project, another is Xinjiang Awati Biomass Power Generation Project, which is under CDM validation[9].

the N_{all} is 0.

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

Hence N_{all} is 0, N_{diff} is 0 too

---

[8] http://www.sdpc.gov.cn/zfdj/jggg/dian/t20111201_448625.htm

[9] http://cdm.unfccc.int/Projects/Validation/DB/4H4JQH4VJ6VH6BDCBX4MF8C52ZTIN3/view.html

Step 4: Calculate factor F=1-Ndiff/Nall representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

Hence both N_{all} and N_{diff} are 0, factor F is not available.

The proposed project activity is a "common practice" within a sector in the applicable geographical area if both the following conditions are fulfilled:

(a) the factor F is greater than 0.2, and
(b) N_{all}-N_{diff} is greater than 3.

N_{all}-N_{diff} = 0, which is below 3 and the project is not common practice.

Conclusion of the assessment and demonstration of additionality:

In conclusion, it can be proved that the proposed project activity is additional. Without CDM revenues, the project activity would not be implemented smoothly and the reduction of GHG emissions would not be realized.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to the methodology of AMS-I.-D.(Version 17), the GHG emission calculation from electricity generation of the proposed project was based on the instruction of "Tool to calculate the emission factor for an electricity system (version 02.2.1)", which determines the CO_2 emission factor for the displacement of electricity generated by power plants in NWPG, by calculating the "combined margin" emission factor (CM) of the electricity system. The CM is the result of a weighted average of two emission factors pertaining to the electricity system: the operating margin (OM) and the build margin (BM). The operating margin is the emission factor that refers to the group of existing power plants whose current electricity generation would be affected by the proposed CDM project activity. The build margin is the emission factor that refers to the group of prospective power plants whose construction and future operation would be affected by the proposed CDM project activity.

The following steps are applied to calculate the emission factor of NWPG:

Step 1: Identify the relevant electric system

Based on "Tool to calculate the emission factor for an electricity system" (Version 02.2.1), the "project electricity system" is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints. Furthermore, if the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used.

In this specific case, the project finally displaces the power generated by the China Northwest Power Grid. According the notification from China DNA, the delineation of NWPG cover Shanxi, Gansu, Qinghai provincial grids and Ningxia, Xinjiang Autonomous regional grids. The electricity generated by the project will be transferred to the NWPG. The baseline emissions factor ($EF_{grid,CM,y}$) is calculated as the average of the operating margin emissions factor and the build margin emissions factor. The data used to calculate the grid emissions factor comes from reliable and publicly accessible statistics e.g. China Energy

Statistic Yearbook and China Electric Power Yearbook, as well as Chinese DNA.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation

Option II aims to reflect that in some countries off-grid power generation is significant and can partially be displaced by CDM project activities, e.g. if off-grid power plants are operated due to an unreliable and unstable electricity grid. In China off-grid power generation is not significant[10]. So Option I will be used.

Step3: Select a method to determine the operating margin (OM)

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

(a) Simple OM, or

(b) Simple adjusted OM, or

(c) Dispatch data analysis OM, or

(d) Average OM

As per the *Tool to calculate the emission factor for an electricity system*, with reference to the *China's Regional Grid Baseline Emission Factors* (renewed on October 20th, 2011), method (a) simple OM is employed for calculation of the operating margin emission factor(s) ($EF_{grid,OM,y}$) of the Project.

As per the *Tool to calculate the emission factor for an electricity system*, the simple OM method only can be used when low-cost/must run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. Among the total electricity generation of the Northwest China Power Grid which the Project is connected to, the amount of low-cost/must run resources accounts for about 27.44% in 2005, 24.71% in 2006, 26.72% in 2007, 21.80% in 2008 and 27.65% in 2009, all less than 50%. Thus, the method (a) simple OM can be used to calculate the baseline emission factor of operating margin ($EF_{grid,OM,y}$) for the Project.

The emission factors were determined ex ante (A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation) and will not be updated during the first crediting period.

Step4: Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants. It may be calculated:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit, or

---

[10] The statistical data in 2006 of state grid

Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:

(a) The necessary data for Option A is not available; and

(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and

(c) Off-grid power plants are not included in the calculation (i.e., if Option I has been chosen in Step 2).

For the proposed project, the data on fuel consumption, net electricity generation and the average efficiency of each power unit are unavailable, thus option A cannot be used. Nevertheless, the data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system are available, and, nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known, therefore, Option B can be used.

On Option B, the simple OM emission factor is calculated based on the total net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OM,simple,y} = \frac{\sum_i (FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y})}{EG_y} \quad (1)$$

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO2 emission factor in year y (tCO2/MWh)
$FC_{i,y}$	Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO2,i,y}$	CO2 emission factor of fossil fuel type i in year y (tCO2/GJ)
EG_y	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)
i	All fossil fuel types combusted in power sources in the project electricity system in year y
y	The relevant year as per the data vintage chosen in step 3

The simple operating margin CO_2 emission factor ($EF_{grid,OMsimple,y}$) of NWPG is 1.0001tCO_2/MWh. The detailed data is listed in the annex 3.

$EF_{grid,OMsimple,y}$ =1.0001tCO_2/MWh

Step 5: Calculate the build margin (BM) emission factor

According to the *Tool to calculate the emission factor for an electricity system*, the sample group of power unit m was used to calculate the build margin consists of either: (a) The set of five power units that have been built most recently, or (b) The set of power capacity additions in the electricity system that comprise

20% of the system generation (in MWh) and that have been built most recently.

It is suggested that project participants should use the set of power units that comprises the larger annual generation.

Considering data availability, CDM EB accepts the following deviation in application of methodology[11]: 1) Use of capacity additions during the last 1~3 years for estimating the build margin emission factor for grid electricity. 2) Use of weights estimated using installed capacity in place of annual electricity generation.
And it is suggested to use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy.

Therefore for the Project: First, calculate the share of different power generation technology in recent capacity additions. Second, calculate the weight for capacity additions of each power generation technology. And finally calculate the emission factor using the efficiency level of the best technology commercially available in China.

According to "Tool to calculate the emission factor for an electricity system", project participants shall choose between one of the following two options to calculate the Build Margin Emission Factor ($EF_{grid,BM,y}$).

Option 1: For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex-post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

For the proposed project, option 1 is chosen to calculate Build Margin emission factor.

According to "Tool to calculate the emission factor for an electricity system", capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.

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

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} * EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (2)$$

Where:

[11] http://cdm.unfccc.int/Projects/deviations/87512.

$EF_{grid,BM,y}$	Build margin CO2 emission factor in year y (tCO2/MWh)
$EG_{m,y}$:	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO2 emission factor of power unit m in year y(tCO2/MWh)
m	Power units included in the build margin
y	Most recent historical year for which power generation data is available

Since the data of installed capacity can not be separated into coal fired, oil fired and gas fired currently, BM is calculated by the following steps and formula:

Step a. Calculate the power generation emissions of solid fuel, liquid fuel and gas fuel and each share in the total emissions based on the *Energy Balance Table* of the most recent year.

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \tag{3}$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \tag{4}$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \tag{5}$$

Where:

$F_{i,j,y}$	The total amount of fuel i (in a mass or volume unit) consumed by Province j in NWPG for power generation in year y
$NCV_{i,y}$	The Net Calorific Value of fuel i (GJ/t or GJ/m^3)in year y
$EF_{CO2,i,j,y}$	The emission factor of fuel i (tCO_2/ GJ)

COAL, *OIL*, *and GAS* is the aggregation of various kinds of coal, oil, and gas as fossil fuels.

Step b. Calculate the emission factor for thermal power of the grid based on the result of Step a and the efficiency level of the best technology commercially available in China.

The EF thermal power is calculated as a weighted emission factor as the following formula:

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y}$$ s(6)

Where:

$EF_{Coal,Adv,}, F_{Oil,Adv,y}$ *and* $EF_{Gas,Adv,y}$ are the emission factors for the best commercially available technology of coal fired power generation, oil fired power generation, and gas fired power generation respectively.

Step c. Calculate BM of the grid based on the result of Step b and the share of thermal power of recent 20% capacity additions.

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} \qquad (7)$$

Where:

$CAP_{Thermal,y}$ Is the incrementally installed capacity of thermal power capacity (MW) in year y

$CAP_{Total,y}$ Is the aggregate incrementally installed capacity of all kind of power generation capacity (MW) in year y

$EF_{Thermal,y}$ Is the emission factor of thermal power generation capacity of the applicable electricity system with the efficiency level of the best commercially available technology in China in the previous three years.

The data on different fuel consumptions for power generation and the net caloric values of the fuels are obtained from the *China Energy Statistical Yearbook* from 2008 to 2010. The emission factors of the fuels employed are obtained from Table 1.3 and Table 1.4 on page 1.21-1.24 of volume 2 of 2006 *IPCC Guidelines for National Greenhouse Gas Inventories*.

With reference to the *China's Regional Grid Baseline Emission Factors* (renewed on October 20th, 2011), the Build Margin emission factor ($EF_{grid,BM,y}$) of the Northwest China Power Grid is 0.5851 tCO_2e/MWh.

Step 6: Calculate the combined margin emission factor

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

(a) Weighted average CM;or

(b) Simplified CM.

CHPP is located in China, which is not a Least Developed Country (LDC), The number of registered projects in China is more than 10 projects. And the data requirements for the application of step 5 above could be met. Thus the Option (A) is chosen to calculate the combination margin (CM).

To calculate $EF_{grid, CM, y}$ with the combination margin (CM), the following equation is used:

$$EF_{grid,CM,y} = \omega_{OM} \times EF_{grid,OM,y} + \omega_{BM} \times EF_{grid,BM,y} \qquad (8)$$

Where:

$EF_{grid,CM,y}$ baseline emission factor (tCO_2 / MWh)

$EF_{grid,OM,y}$ Operational Margin emission factor (tCO_2/MWh)

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

ω_{OM} Weighting of operating margin emission factor (%)

ω_{BM} Weighting of build margin emission factor (%)

The baseline emission factor EF_y should be calculated as the weighted average of the Operating Margin emission factor ($EF_{grid,OM,y}$) and the Build Margin emission factor($EF_{grid,BM,y}$), where the weight of Operating Margin, ω_{OM} is 0.5 and Build Margin, ω_{BM} is 0.5 by default.

Applying the default weights for the proposed project, a Baseline Emission Factor is calculated as follows:

$EF_{grid,CM,y} = 1.0001 \times 0.5 + 0.5851 \times 0.5 = 0.7926$ tCO_2/MWh

Baseline emissions

The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

$$BE_y = EG_{BL,y} \times EF_{CO_2,grid,y} \quad (9)$$

Where:

BE_y	Baseline Emissions in year *y* ($t\ CO_2$)
$EG_{BL,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
$EF_{CO_2,grid,y}$	CO_2 emission factor of the grid in year y ($t\ CO_2/MWh$)

Project Emissions

According to the methodology of AMS- I.D. (version 17.0), for the proposed project activities, PE_y=0.

Leakage

According to the methodology of AMS-I.D (version 17) paragraph 20, if the energy generating equipment is transferred from another activity, leakage is to be considered.

Therefore the leakage of this proposed project is zero.

Emission Reductions

The annual emission reductions ER_y for the project activity are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (10)$$

Where:

ER_y = Emission reductions in year *y* (tCO_2/year)

BE_y = Baseline emissions in year *y* (tCO_2/year)

PE_y = Project emissions in year *y,* project emissions of this proposed project is zero. (tCO_2/year)

LE_y = Leakage emissions in year *y,* the leakage of this proposed project is zero. (tCO_2/year)

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

Data / Parameter:	$CAP_{j,y}$
Data unit:	MW
Description:	Installed capacity in each province of NWPG
Source of data used:	*China Electric Power Yearbook* 2008 ~ 2010 edition
Value applied:	See annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Electric Power Yearbook (2008 ~ 2010)
Any comment:	-

Data / Parameter:	$GEN_{j,y}$
Data unit:	MWh
Description:	Total electricity generation of province j in year y
Source of data used:	*China Electric Power Yearbook* 2008~2010 edition
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Electric Power Yearbook (2008~2010)
Any comment:	-

Data / Parameter:	$r_{j,y}$
Data unit:	%
Description:	Auxiliary electricity consumption rate of province j in year y
Source of data used:	*China Electric Power Yearbook* 2008~2010 edition
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the *China Electric Power Yearbook issued by* authorized entity in China are reliable.
Any comment:	-

Data / Parameter:	$F_{i,j,y}$
Data unit:	**t or m^3**
Description:	Amount of fossil fuel type *i* consumed in the project electricity system in year *y* (mass or volume unit)
Source of data used:	*China Energy Statistical Yearbook* 2008~2010 edition
Value applied:	See Annex 3
Justification of the choice of data or	The data obtained from the *China Energy Statistical Yearbook* issued by authorized entity in China are reliable.

description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	***$NCV_{i,y}$***
Data unit:	**MJ/t, kJ/m^3**
Description:	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data used:	P285 of *China Energy Statistical Yearbook* 2010 edition
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the *China Energy Statistical Yearbook* issued by authorized entity in China are reliable.
Any comment:	

Data / Parameter:	***$EF_{CO2,i,y}$***
Data unit:	**tCO_2/TJ**
Description:	CO_2 emission factor of fossil fuel type *i* in year *y*
Source of data used:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from *2006 IPCC Guideline for National Greenhouse Gas Inventories* are reliable.
Any comment:	

Data / Parameter:	$FC_{adv,coal}$
Data unit:	gce/kWh
Description:	weighted average fuel consumption for power generation of top 30 sets of 600 MW coal fired power generation units built in 2009(taken as efficiency level of the best technology commercially available in China)
Source of data used:	*China's Regional Grid Baseline Emission Factors(renewed on 20/10/2011)*.
Value applied:	311.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the *China's Regional Grid Baseline Emission Factors* made publicly available by China's DNA are reliable.
Any comment:	**-**

Data / Parameter:	FC *adv,oil/gas*
Data unit:	gce/kWh
Description:	weighted average fuel consumption for power generation of 200 MW oil/gas fired combined cycle power generation units in 2009 (taken as efficiency level of the best technology commercially available in China)
Source of data used:	*China's Regional Grid Baseline Emission Factors(renewed on 20/10/2011)*
Value applied:	237.4
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the China's Regional Grid Baseline Emission Factors made publicly available by China's DNA are reliable.
Any comment:	-

B.6.3 Ex-ante calculation of emission reductions:

According to the analysis in section B.6.1, Project emission and leakage of the proposed project are 0, then PE_y=0 tCO_2, L_y=0 tCO_2.

The baseline emissions are the product of the baseline emission factor ($EF_{grid,CM,y}$ in tCO_2/MWh) times the electricity supplied by the project activity ($EG_{PJ,y}$ in MWh). The annual electricity delivered by the proposed project is estimated as 79,200MWh/year and will be monitored ex-post.

Then the baseline emissions are:

$BE_y=EG_{PJ,y}\times EF_{grid,CM,y}$ (3)

= 79,200×0.7926 = **62,774** tCO_2

The emission reduction is:

$ER_y=BE_y-PE_y$ (13)

=**62,774**tCO_2e -0 tCO_2e =**62,774** tCO_2e

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

The total emission reductions of the project are 439,418 tCO_2e during the 1st 7 years crediting period.

Table B.4 Estimate of Emission Reductions Due to the Project

Years	Estimation of project activity emissions (tCO_2e)	Estimation of baseline Emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
Year 1	0	62,774	0	62,774
Year 2	0	62,774	0	62,774
Year 3	0	62,774	0	62,774
Year 4	0	62,774	0	62,774
Year 5	0	62,774	0	62,774
Year 6	0	62,774	0	62,774

Year 7	0	62,774	0	62,774
Total (tCO_2e)	0	439,418	0	439,418

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

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{PJ\ to\ NWPG,\ y}$
Data unit:	MWh
Description:	Electricity exported to the grid in the year y
Source of data to be used:	Measured by the meter in the proposed project
Value of data	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis using monitoring personnel.
QA/QC procedures to be applied:	Meters will be calibrated periodically. Sales receipts will be used for cross checking purpose.
Any comment:	

Data / Parameter:	$EG_{NWPG\ to\ PJ,\ y}$
Data unit:	MWh
Description:	The amount of electricity imported by the project activity from the grid in the year y
Source of data to be used:	Measured by the meter in the proposed project
Value of data	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis using monitoring personnel.
QA/QC procedures to be applied:	Meters will be calibrated periodically. Sales receipts will be used for cross checking purpose.
Any comment:	

Data / Parameter:	$EG_{PJ,y}$
Data unit:	MWh
Description:	$EG_{PJ,y} = EG_{PJ\ to\ NWPG,\ y} - EG_{NWPG\ to\ PJ,\ y}$
Source of data to be used:	Calculated
Value of data	79,200 MWh/year
Description of measurement methods and procedures to be applied:	To monitor electricity exported and electricity imported with meters synchronously, calculated through subtracting electricity imported from electricity exported by the CDM team of proposed project.
QA/QC procedures to be applied:	Meters will be calibrated periodically. Data measured by meters will be cross checked by electricity sales receipts.
Any comment:	

Data / Parameter:	BF_y
Data unit:	tonne of dry matter
Description:	Quantity of biomass fuel type *k* combusted in the project plant during the year y
Source of data to be used:	Procurement Department of the power plant.

Value of data applied for the purpose of calculating expected emission reductions in section B.5	112,950
Description of measurement methods and procedures to be applied:	Use weight meters. The quantity of biomass combusted will be collected separately for each fuel type of biomass. Adjust for the moisture content in order to determine the quantity of dry biomass. Data will be archived 2 years following the end of the crediting period.
QA/QC procedures to be applied:	Any direct measurements with mass or volume meters at the plant site should be cross-checked with an annual energy balance that is based on electricity generated and any fuel purchase receipts.
Any comment:	

Data / Parameter:	$BF_{available}$
Data unit:	tonne
Description:	Quantity of total available biomass residues of in the region
Source of data to be used:	Public survey documentation in the region, if not available, project participants shall voluntarily appoint a third party to conduct the assessment study.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	389,900
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Where possible, supplementary data sources and expert judgment should be used to support findings.
Any comment:	

Data / Parameter:	Moisture content of the biomass residues
Data unit:	% water content
Description:	Moisture content of each biomass residue type k（k= cotton stalks）
Source of data to be used:	On-site measurements by moisture analyzer (HMT2) with the accuracy of 8%-45%
Value of data applied for the purpose of calculating expected emission reductions in section B.5	25% for biomass residues
Description of measurement methods and procedures to be applied:	Continuously monitored by moisture analyzer (HMT2), and the way to use moisture analyzer (HMT2) is according to the description in user's manual provided by the supplier. Moisture content of the biomass residues will be both measured in collection point and in power plant, and the mean value will be determined annually.
QA/QC procedures to be applied:	As per the methodology no QA/QC procedures are specified for this parameter.
Any comment:	In case of dry biomass, monitoring of this parameter is not necessary

Data / Parameter:	NCV_k（k=cotton stalks）
Data unit:	GJ / ton of dry matter
Description:	Net Calorific Value of biomass type *k*

Source of data to be used:	Measurements
Value of data applied for the purpose of calculating expected emission reductions in section B.5	NCV_k= 11.06 GJ/ton of dry matter
Description of measurement methods and procedures to be applied:	Measurements shall be carried out at reputed laboratories and according to relevant international standards at least every six months, taking at least three samples for each measurement. Measure the NCV based on dry biomass.
QA/QC procedures to be applied:	Check consistency of measurements by comparing the measurement results with the relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC. If the measurement results differ significantly from previous measurements or other relevant data sources, conduct additional measurements. Ensure that the NCV is determined on the basis of dry biomass.
Any comment:	

B.7.2 Description of the monitoring plan:

1. Introduction of Monitoring Plan

This Monitoring plan will set out a number of monitoring tasks in order to ensure that all aspects of projected greenhouse gas (GHG) emission reductions for the proposed project are controlled and reported. This requires an on going monitoring of the project to ensure performance according to its design and that claimed Gold Standard VERs are actually achieved.

The monitoring plan of the proposed project is a guidance document that provides the set of procedures for preparing key project indicators, tracking and monitoring the impacts of the proposed project. The monitoring plan will be used throughout the defined crediting period for the project to determine and provide documentation of GHG emission impacts from the proposed project. This monitoring plan fulfils the requirement set out by the Kyoto Protocol that emission reductions projects under the CDM have real, measurable and long-term benefits and that the reductions in emissions are additional to any that would occur in the absence of the certified project activity.

The monitoring plan provides the requirements and instructions for:

- Establishing and maintaining the appropriate monitoring systems for electricity generated by the project;
- Quality control of the measurements;
- Procedures for the periodic calculation of GHG emission reductions;
- Assigning monitoring responsibilities to personnel;
- Data storage and filing system;
- Preparing for the requirements of an independent, third party auditor or verifier.

2 Users of the Monitoring Plan & Procedure

2.1 Staffs training

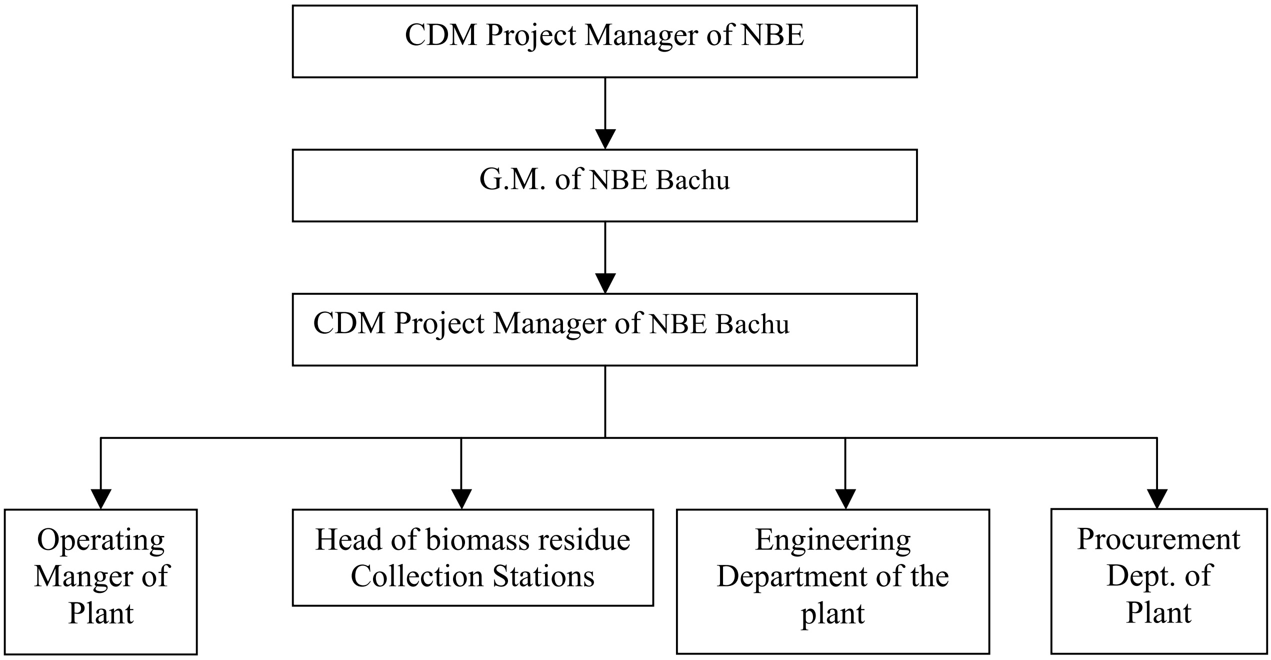
To ensure the successful implementation of the monitoring plan, the staffs responsible for equipments operation, data recording, documents storage and etc should be trained to meet their positions. All of them will be trained by a training programme before the project becomes operational. This programme includes the operational training, the equipment maintenance training, the data management training, the examining and repairing training and etc, which is able to ensure the successful operation and the data & documents management. When the relevant staffs succeed to finish this training programme, they will be issued a license before they take the responsibility for their position.

2.2 Monitoring structure

National Bio Energy Co., Ltd. (NBE) will conduct monitoring procedures according to the monitoring methodology chosen for this project activity. This monitoring methodology will enable the recording of emission reductions and leakage effects in an accurate and conservative manner.

National Bachu Bio Energy Co., Ltd., who is the subsidiary of National Bio Energy Co., Ltd., appoints on-site personnel (at the project activity site), who will be in charge of gathering and registering all the required information described in the monitoring plan. Such duties will be included into the routine work of the operators to ensure continuity and high-quality standards. The information will be partially processed and stored there, and will be sent periodically (monthly) to National Bio Energy Co., Ltd. headquarter in Beijing for final processing (table formats, reports, etc.).

The responsibilities for carrying out these tasks are broadly elaborated in below.



Responsibilities of departments at power plant:

Operating Manager of the plant: overall management of the implementation of the monitoring plan and quality control of data and records.

Head of Staw Collection Stations: residue collection and summarizing the data collected at the collection stations in terms of types, amount, and transportation record, etc of residues. Ensuring the biomass at the sites will not be stored over half year.

Engineering Department of the plant: in charge of the monitoring of electricity meters and calibration, biomass consumption and NCV of each kind of biomass, fossil fuel consumption within the power plant including boilers, crashing machines, etc, as well as maintenance of equipments.

Procurement Dept. of the plant: cross checking the monitoring records with receipt and procurement records.

3. Meter Installation

3.1 Electricity meter
The electricity meters installed at transformer substation are used to monitor net electricity delivered to the grid. There are two meters to monitor the net electricity. One is held by the grid company (main meter), the other is held by the project owner (cross-check meter).

The third electricity meter installed at the project site is used to monitor on-site electricity consumption attributable to the project activity.

3.2 Weighing system
The electrical weight meter will be installed in the plant to monitor the quantity of each type of biomass residues that has been transported to the project site and combusted in the project plant.

4. Calibration of Meters & Metering

4.1 Electricity meter

An agreement should be signed between the project owner and the Grid that defines the metering arrangements and the required quality control procedures to ensure accuracy. The accuracy of the electric meter will be no lower than 0.5s.The metering equipment will be properly calibrated and checked annually for accuracy according to Technical Administrative Code of Electric Energy Metering（DL/T448-2000）. The project owner will prepare backup procedures to deal with any errors occurred to the meters. In case of any errors happen, the grid-connected electricity generated by the proposed project shall be determined by the project owner and the Grid jointly according to the error handling procedures.

Calibration is carried out by the Grid with the records being provided to the project owner, and these records will be maintained by the project owner and the third party designated.

4.2 Weighing system

The electrical weight meter will be checked by National Bachu Bio Energy Co., Ltd., Ltd and reputed Metrological Service before operation. The electrical weight will be properly configured and checked annually according to the national standard to ensure accuracy.

5. Monitoring

5.1 Monitoring of each data

All relevant parameters listed in Section B 7.1 will be monitored according to the methodology requirements and description of measurement methods and procedures to be applied. The results and data will be recorded and well documented. The data and meter readings will be readily accessible for DOE. Calibration tests records will be maintained for verification.

5.2 Quality Assurance and Quality Control

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

The project employs high accuracy monitoring and control equipment that will measure, record, report, and monitor and control various key parameters like generation by the project, auxiliary consumption and net energy exported to the grid, biomass purchased, fossil fuel purchased etc. Necessary standby meters or check meters will be installed, to operate in standby mode when the main meters are not working. All meters will be calibrated and sealed as per the industry practices at regular intervals. Hence, high quality is ensured with the above parameters. Sales records (including electricity supplied and biomass purchased, etc) will be used and kept for checking consistency of the recorded data.

6. Data Management System

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

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

7. Verification and Monitoring Results

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

The responsibilities for verification of the project are as follows:

- Sign a verification service agreement with specific DOE and agree to a time framework set by the GS for carrying out verification activities while taking into account the buyer’s schedule. The proposed project owner will make the arrangements for the verification and will prepare for the audit and verification process to the best of its abilities.
- The proposed project owner will facilitate the verification through providing the DOE with all required necessary information, before, during and, in the event of queries, after the verification.
- The project owner will fully cooperate with the DOE and instruct its staff and management to be available for interviews and respond honestly to all questions from the DOE.
- DOE must be an Accredited Entity with a proven track record in environmental auditing and verification, experience with GS projects and work in developing countries. The DOE should be accredited by the UNFCCC Executive Board.
- If the proposed project owner deems that requirements of DOE go beyond the scope of verification, they should contact the GS VER consultant to determine whether the requirements of DOE are reasonable. If considered unreasonable, a rejection letter in a written format should be provided to the DOE with justifiable reasons. If the project owner and the DOE cannot reach an agreement, the matter will be submitted to GS for arbitration.

The project owner should designate GS VER responsible person for the overall responsibility for the monitoring and verification process and act as the focal point for DOE.

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

Date of completion: 25/01/2011

Name of persons determining the baseline and monitoring methodology:

Yi Lin
South Pole Carbon Asset Management Ltd.
Technoparkstrasse 1
8005 Zurich
Switzerland
E-mail: y.lin@southpolecarbon.com
Tel.: +41 44 633 78 90

Dafei Huang
South Pole Carbon Asset Management Ltd.
Technoparkstrasse 1
8005 Zurich
Switzerland
E-mail: f.huang@southpolecarbon.com
Tel.: +41 44 633 78 90

Caspar Chiquet
South Pole Carbon Asset Management Ltd.
Technoparkstrasse 1
8005 Zurich
Switzerland
E-mail: c.chiquet@southpolecarbon.com
Tel.: +41 44 633 78 91

South Pole Carbon Asset Management Ltd. is a participant of the project listed in Annex I of the PDD.

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:

24/05/2007 (the date construction started)

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

20 years 0 months

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:

01/06/2012 or date after registration whichever is later

C.2.1.2. Length of the first crediting period:

7 years 0 months

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not applicable

SECTION D. Environmental impacts

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

The Environment Impact Assessment Report of the proposed project was completed by Environmental Scientific Institution of Xinjiang Shengchan Jianshe Bingtu. The conclusions of the analyses and measures to be taken to mitigate the environment impacts have been demonstrated in the following:

Air
The major air pollution sources in construction phase are dust and soot generated from constructing building foundations, leveling ground, exhaust gas from vehicles and smoke stack emission from ordinary workers' activities. In order to control and reduce the air pollution, several measures will be taken. Water should be sprinkled on the mounds of soil exposed in the wind under the sunshine to prevent the dust blowing. The soil dug from groundwork should be transported without delay. No overloading of the vehicles should be permitted to avoid any material fell down along the way.

The dust, SO_2 and NO_x emission are the major atmospheric pollutants during operation phase. Low nitrogen inflamers will be adopted in boiler to reduce the NO_x emission. Soot and dust emissions generated from every potential sources such as furnace fuel hopper, cutters, ash storehouse and residues bin will be treated by bag-type dust removers, which can be reduced 99.6% of dust emission. All process design and output concentrations of emission are consistent with State Environment Standard. Comparing to the operational practices of soot and dust treatments in other electricity plants, the proposed project will not produce much air pollution.

Water
The major wastewater emissions are mainly from cooling system, industrial wastewater and domestic sewage. The domestic sewage both in construction phase and operation phase will be led to Wastewater

Treatment Factory through the civic wastewater pipe network. The treated water combined with cooling water can be recycled for watering the vegetation in project district. Acid and kali wastewater, as well as wastewater with oils will be collected respectively and sent to treatment factory. Then the treated water gathering with supply water for boilers will discharge into the river. All industrial waters come from Yunju River. No water comes from groundwater resource.

Noise
Noise produced by machines is the major noise pollution source. Several measures have been taken to control and reduce the noise impact. Noise reduction equipments have been installed to minimize the noise impacts. All construction works will be arranged in daytime as far as possible. Noise protection measures will be taken for workers.

Solid waste
The major solid waste generate by the proposed project are the ash from the boilers and some construction residue. The ash has high kalium content and can be served as good fertilizer for agriculture. All the ash will be used as fertilizer in local farmland, which will realize the comprehensive utilization. The construction waste will be transport into a designated dumping site for backfill road foundation. Domestic garbage will be transported periodically to the garbage disposal plant and treated uniformly.

The research concluded that the proposed project would not have significant negative environment impact. Air pollution caused by the biomass burning can be avoided by the comprehensive utilization of biomass residues.

Kashi Region Environment Protection Bureau has approved the development of the proposed project.

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

The environment impacts of National Bachu Biomass Power Generation Projectare not considered significant.

SECTION E. Stakeholders' comments

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

Comments on the construction of the proposed National Bachu Biomass Power Generation Projectare required by local government and the construction company through a series of means of informal discussion, hearing of witnesses and visits to guarantee a successful implementation of the proposed project with the interests of stakeholders being taken into account. In April 2006, the proposed project developer held a meeting with the stakeholders and sent out questionnaires to the surrounding area of the proposed project in Bachu for the comments of the proposed project construction. 50 copies of the questionnaires were distributed and 47 pieces of reply were received.

E.2. Summary of the comments received:

The summary of the survey is listed as following:

Item				
Gender of the interviewee	Male		Female	
	37		10	
Age of the interviewee	18-35	36-50		≥50
	13	29		5

Occupation of the interviewee	Governmental official	General official	worker	Farmer	Others
	1	4	12	26	4
Education of the interviewee	College or above	High school	Middle school	Elementary school or below	
	0	11	27	9	
Considerations on the environment issues at the project site	Very concerned	Concerned		ignore	
	37	10		0	
Understand level of interviewee to the project	Well	Normal		poor	
	38	6		3	
The impacts of the project on the local economic development	Promotion	Decline		No effect	
	47	0		0	
The impacts of the project construction to living quality	Increase	Decrease		No effect	
	47	0		0	
Rationality of the project site	Reasonable	Not reasonable		Ignore	
	47	0		0	
Attitude to the project	Necessary	Unnecessary		Ignore	
	47	0		0	

As shown above, the interviewees considered that local social, economic and environmental development would be beneficial from the proposed project. The response was overall supportive to the project implementation.

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

It can be learned from the summary that the residents investigated fully support the construction of the project. The improvement for local economy and living condition is considered rather positive. However due to the low understanding level of local people to the proposed project, interviewees are very concerned about the environment issues related to the proposed project. The residents are not familiar with the advanced technology and environment protection measures applied in the proposed project. Whereas, they have seen the practice of biomass burning in the fields in the past, which caused serious air pollution to local environment. This is why they are worried about the proposed project on the issue of air pollution. Actually, the advanced biomass combustion technology applied in the project can mitigate the emission significantly, and will reach the National Environment Standard, which has been clearly illustrated in the Section D1. In conclusion, the local community possesses strong positive comments on the effects that the project activity will make on the local economy and living quality. There consequently has no reason to modify the plans due to comments received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

The Project Owner

Organization:	National Bio Energy Co., Ltd
Street/P.O.Box:	No. 5, West Fifth Street, Sanlitun Chaoyang District
Building:	-
City:	Beijing
State/Region:	-
Postfix/ZIP:	100027
Country:	P. R. China
Telephone:	+86 10 58681566
FAX:	+86 10 58681588
E-Mail:	mfq@nbe.cn
URL:	www.nbe.cn
Represented by:	ZHAO Hui
Title:	Deputy General Manager of CDM Department
Salutation:	Mr.
Last Name:	ZHAO
Middle Name:	-
First Name:	Hui
Department:	-
Mobile:	-
Direct FAX:	+86 10 58681588
Direct tel:	+86 10 58681566
Personal E-Mail:	zhaohui@nbe.cn

The CER Buyer:

Organization:	Swiss Carbon Assets Co. Ltd.
Street/P.O.Box:	Technoparkstr. 1
Building:	/
City:	Zurich
State/Region:	Zurich
Postfix/ZIP:	8005
Country:	Switzerland
Telephone:	+41 44 633 78 70
FAX:	+41 44 633 14 23
E-Mail:	info@southpolecarbon.com
URL:	www.southpolecarbon.com
Represented by:	Renat Heuberger
Title	/
Salutation:	Mr.
Last Name:	Heuberger
Middle Name:	/
First Name:	Renat
Department:	/
Mobile:	/
Direct FAX:	+41 44 633 14 23
Direct tel:	+41 44 633 78 70
Personal E-Mail:	r.heuberger@southpolecarbon.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding for the Xinjiang Bachu 12MW Biomass Power Project.

ANNEX 3

BASELINE INFORMATION

To determine the simple OM emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$) for the Project, data recommended in the *China's Regional Grid Baseline Emission Factors* issued on October 20[th], 2011 for the Northwest China Power Grid are adopted.

The following tables summarise the numerical results from the equations listed in the *Tool to calculate the emission factor for an electricity system*. Information provided by the tables includes data, data sources and the underlying calculations.

Table 1. Thermal power generation of the Northwest China Power Grid in 2007

Province	Electricity Generation (MWh)	Auxiliary electricity consumption (%)	Supplied Electricity (MWh)
Shaanxi	59,100,000	6.77	55,098,930
Gansu	42,400,000	5.89	39,902,640
Qinghai	9,700,000	7.19	9,002,570
Ningxia	43,500,000		43,500,000
Xinjiang	34,600,000	9.2	31,416,800
Total			178,920,940

Data Source: China Electric Power Yearbook 2008.

Table 2. Thermal power generation of the Northwest China Power Grid in 2008

Province	Electricity Generation (MWh)	Auxiliary electricity consumption (%)	Supplied Electricity (MWh)
Shaanxi	71,500,000	6.95	66,530,750
Gansu	46,800,000	6.4	43,804,800
Qinghai	10,700,000	7.14	9,936,020
Ningxia	44,000,000	7.57	40,669,200
Xinjiang	39,700,000		39,700,000
Total			200,640,770

Data Source: China Electric Power Yearbook 2009.

Table 3. Thermal power generation of the Northwest China Power Grid in 2009

Province	Electricity Generation (MWh)	Auxiliary electricity consumption (%)	Supplied Electricity (MWh)
Shaanxi	77,400,000	7.24	71,796,240

Gansu	44,100,000	6.88	41,065,920
Qinghai	10,700,000	7.01	9,949,930
Ningxia	44,700,000	7.76	41,231,280
Xinjiang	45,200,000	5.16	42,867,680
Total			206,911,050

Data Source: China Electric Power Yearbook 2010.

Table 4. Calculation of the OM emission factor of the Northwest China Power Grid in 2007

Fuel	**Unit**	**Shaanxi A**	**Gansu B**	**Qinghai C**	**Ningxia D**	**Xinjiang E**	**Total F=A+B+C+D+E**	**Carbon Content (tc/TJ) G**	**Emission Factor ($kgCO_2/TJ$) I**	**NCV (MJ/t,km^3) J**	**Emission[12] (tCO_2e) K**
Raw Coal	10^4 t	3303.44	1969.03	470.85	2165.8	1762.11	**9671.23**	25.8	87,300	20,908	176,525,905
Cleaned Coal	10^4 t						**0**	25.8	87,300	26,344	0
Other Washed Coal	10^4 t	3.73			124.31	7.73	**135.77**	25.8	87,300	8,363	991,243
Briquette	10^4 t	3.53					**3.53**	26.6	87,300	20,908	64,432
Coke	10^4 t						**0**	29.2	95,700	28,435	0
Coke Oven Gas	10^8 m^3	0.52	0.65			0.26	**1.43**	12.1	37,300	16,726	89,215
Other Gas	10^8 m^3	14.14	0.71				**14.85**	12.1	37,300	5,227	289,526
Crude Oil	10^4 t					0.09	**0.09**	20	71,100	41,816	2,676
Gasoline	10^4 t	0.02					**0.02**	18.9	67,500	43,070	581
Diesel	10^4 t	1.12	0.26	0.42		1.77	**3.57**	20.2	72,600	42,652	110,546
Fuel Oil	10^4 t	0.01	1.05	0.04		0.05	**1.15**	21.1	75,500	41,816	36,307
Liquefied petroleum gas	10^4 t						**0**	17.2	61,600	50,179	0
Refinery Gas	10^4 t					5.99	**5.99**	15.7	48,200	46,055	132,969
Natural Gas	10^8 m^3	1.68	0.49	1.93		8.66	**12.76**	15.3	54,300	38,931	2,697,404
Other Petroleum Products	10^4 t						**0**	20	75,500	41,816	0
Other Coking Products	10^4 t						**0**	25.8	95,700	28,435	0
Other Energy	10^4 t	94.36	9.73				**104.09**	0	0	0	0
Total emissions of the Northwest China Power Grid in 2007(tCO_2e)											**180,940,805**

Data source: China Energy Statistical Yearbook 2008.

Table 5. Calculation of the OM emission factor of the Northwest China Power Grid in 2008

Fuel	**Unit**	**Shaanxi A**	**Gansu B**	**Qinghai C**	**Ningxia D**	**Xinjiang E**	**Total F=A+B+C+D+E**	**Carbon Content (tc/TJ) G**	**Emission Factor ($kgCO_2/TJ$) I**	**NCV (MJ/t,km^3) J**	**Emission (tCO_2e) K**

[12] If the unit of the fuel is 10^4 t, then K=F×I×J/100000; if the unit of the fuel is 10^8 m^3, then K=F×I×J/10000. The calculation of J in Table A5 and Table A6 is same.

Raw Coal	10^4 t	3620	2216.9	507.44	2330.72	1924.9	**10599.96**	25.8	87,300	20,908	193,477,720
Cleaned Coal	10^4 t						**0**	25.8	87,300	26,344	0
Other Washed Coal	10^4 t	9.22			53.85	8.2	**71.27**	25.8	87,300	8,363	520,335
Briquette	10^4 t						**0**	26.6	87,300	20,908	0
Coke	10^4 t						**0**	29.2	95,700	28,435	0
Coke Oven Gas	10^8 m^3	0.35	0.74			0.13	**1.22**	29.2	37,300	16,726	76,113
Other Gas	10^8 m^3	18.38	0.2				**18.58**	12.1	37,300	5,227	362,249
Crude Oil	10^4 t						**0**	12.1	71,100	41,816	0
Gasoline	10^4 t	0.05				0.01	**0.06**	20	67,500	43,070	1,744
Diesel	10^4 t	1.03	0.44	0.26	0.05	1.64	**3.42**	18.9	72,600	42,652	105,902
Fuel Oil	10^4 t		0.86	0.04		0.02	**0.92**	20.2	75,500	41,816	29,045
Liquefied petroleum gas	10^4 t						**0**	21.1	61,600	50,179	0
Refinery Gas	10^4 t					7.25	**7.25**	17.2	48,200	46,055	160,939
Natural Gas	10^8 m^3	0.94	0.24	2.99		7.2	**11.37**	15.7	54,300	38,931	2,403,565
Other Petroleum Products	10^4 t					0.01	**0.01**	15.3	72,200	41,816	302
Other Coking Products	10^4 t						**0**	20	95,700	28,435	0
Other Energy	10^4 t	93.67	10.58		21.24		**125.49**	25.8	0	0	0
Total emissions of the Northwest China Power Grid in 2008(tCO_2e)											**197,137,915**

Data source: China Energy Statistical Yearbook 2009.

Table 6. Calculation of the OM emission factor of the Northwest China Power Grid in 2009

Fuel	**Unit**	**Shaanxi A**	**Gansu B**	**Qinghai C**	**Ningxia D**	**Xinjiang E**	**Total F=A+B+C+D+E**	**Carbon Content (tc/TJ) G**	**Emission Factor ($kgCO_2$/TJ) I**	**NCV (MJ/t,km^3) J**	**Emission (tCO_2e) K**
Raw Coal	10^4 t	3949.22	2060	467.05	2350.13	2380	**11206.4**	25.8	87,300	20,908	204,546,878
Cleaned Coal	10^4 t						**0**	25.8	87,300	26,344	0
Other Washed Coal	10^4 t	8.34			56.01	6.66	**71.01**	25.8	87,300	8,363	518,437
Briquette	10^4 t						**0**	26.6	87,300	20,908	0
Coke	10^4 t						**0**	29.2	95,700	28,435	0
Coke Oven Gas	10^8 m^3	0.49	0.8			0.12	**1.41**	12.1	37,300	16,726	87,967
Other Gas	10^8 m^3	18.37	0.44				**18.81**	12.1	37,300	5,227	366,733
Crude Oil	10^4 t						**0**	20	71,100	41,816	0
Gasoline	10^4 t	0.02					**0.02**	18.9	67,500	43,070	581
Diesel	10^4 t	0.6	0.52	0.2	0.07	0.7	**2.09**	20.2	72,600	42,652	64,718
Fuel Oil	10^4 t		0.25	0.08		0.06	**0.39**	21.1	75,500	41,816	12,313
Liquefied petroleum gas	10^4 t	0.02					**0.02**	17.2	61,600	50,179	618

Refinery Gas	10^4 t					8.56	**8.56**	15.7	48,200	46,055	190,019
Natural Gas	10^8 m^3	0.91	0.07	3.93		7.83	**12.74**	15.3	54,300	38,931	2,693,177
Other Petroleum Products	10^4 t						**0**	20	72,200	41,816	0
Other Coking Products	10^4 t						**0**	25.8	95,700	28,435	0
Other Energy	10^4 t	93.67	10.58		21.24		**110.36**	0	0	0	0
Total emissions of the Northwest China Power Grid in 2009(tCO_2e)											**208,481,441**

Data source: China Energy Statistical Yearbook 2010.

Based on the data provided in Table A1~Table A6, the OM emission factor of the Northwest China Power Grid is calculated as 1.0001tCO_2/MWh.

Table 7. Data and Results of Step a.

Fuel	**Unit**	**Shaanxi A**	**Gansu B**	**Qinghai C**	**Ningxia D**	**Xinjiang E**	**Total F=A+B+C+D+E**	**NCV (MJ/t,km^3) H**	**Emission Factor ($kgCO_2$/TJ) I**	**Emission (tCO_2e)** K=G×H×I/100,000
Raw Coal	10^4 t	3949.22	2060	467.05	2350.13	2380	**11206.4**	20,908	87,300	204,546,878
Cleaned Coal	10^4 t	0	0	0	0	0	**0**	26,344	87,300	0
Other Washed Coal	10^4 t	8.34	0	0	56.01	6.66	**71.01**	8,363	87,300	518,437
Briquette	10^4 t	0	0	0	0	0	**0**	20,908	87,300	0
Coke	10^4 t	0	0	0	0	0	**0**	28,435	95,700	0
Other coking products	10^4 t	0	0	0	0	0	**0**	28,435	95,700	0
Sub-total										**205,064,950**
Crude Oil	10^4 t	0	0	0	0	0	**0**	41,816	71,100	0
Gasoline	10^4 t	0.02	0	0	0	0	**0.02**	43,070	67,500	581
Diesel	10^4 t	0.6	0.52	0.2	0.07	0.7	**2.09**	42,652	72,600	64,718
Fuel Oil	10^4 t	0	0.25	0.08		0.06	**0.39**	41,816	75,500	12,313
Other Petroleum Products	10^4 t	0	0	0	0	0	**0**	41,816	72,200	0
Sub-total										**77,612**
Natural Gas	10^8 m^3	0.91	0.07	3.93		7.83	**12.74**	38,931	54,300	2,693,177
Coke oven gas	10^7 m^3	4.9	8	0	0	1.2	**14.1**	16.726	37,300	87,967
Other gas	10^7 m^3	183.7	4.4	0	0	0	**188.1**	5,227	37,300	366,733
Liquefied petroleum gas	10^4 t	0.02					**0.02**	50,179	61,600	618
Refinery Gas	10^4 t					8.56	**8.56**	46,055	48,200	190,019
Sub-total										**3,338,514**
Total										**208,481,076**

Data source: China Energy Statistical Yearbook 2009

Calculated with the data provided in Table A7 and formula (3)~(5), the value of $\lambda_{Coal,y}$ is 98.36%, the value of $\lambda_{Oil,y}$ is 0.04% and the value of $\lambda_{Gas,y}$ is 1.60%. Therefore,

$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y}$ = 0.7899 tCO_2e/MWh.

Table 8. Installed capacity of the Northwest China Power Grid in 2009

	Unit	**Shaanxi**	**Gansu**	**Qinghai**	**Ningxia**	**Xinjiang**	**Total**
Thermal Power (MW)	MW	19,900	10,990	1,930	8,820	9,520	51,160
Hydro (MW)	MW	1,920	5,940	8,740	430	2,430	19,460
Nuclear (MW)	MW	0	0	0	0	0	0
Wind & Others (MW)	MW	0	750	0	270.3	860	1,880
Total	MW	21,820	17,680	10,670	9,520	12,810	72,500

Data source: China Electric Power Yearbook 2010.

Table 9. Installed capacity of the Northwest China Power Grid in 2008

	Unit	**Shaanxi**	**Gansu**	**Qinghai**	**Ningxia**	**Xinjiang**	**Total**
Thermal Power (MW)	MW	17,850	8,980	2,000	7,540	8,200	44570
Hydro (MW)	MW	1,810	5,440	5,910	430	2,190	15780
Nuclear (MW)	MW	0	0	0	0	0	0
Wind & Others (MW)	MW	0	600	0	170	510	1280
Total	MW	19,660	15,020	7,910	8,140	10,900	61,630

Data source: China Electric Power Yearbook 2009.

Table 10. Installed capacity of the Northwest China Power Grid in 2007

	Unit	**Shaanxi**	**Gansu**	**Qinghai**	**Ningxia**	**Xinjiang**	**Total**
Thermal Power (MW)	MW	12,290	7,840	1,900	7,030	6,560	35,620
Hydro (MW)	MW	1,790	4,400	5,830	430	2,140	14,590
Nuclear (MW)	MW	0	0	0	0	0	0
Wind & Others (MW)	MW	73	346	0	50	330	799
Total	MW	14,153	12,586	7,730	7,510	9,030	51,009

Data source: China Electric Power Yearbook 2008.

Table 11. Calculation of the BM emission factor of the Northwest China Power Grid

	Installed Capacity in 2007	**Installed Capacity in 2008**	**Installed Capacity in 2009**	**Capacity Additions from 2007 to 2009**	**Capacity Additions from 2008 to 2009**	**Share in total capacity additions**
	A	B	C	D=C-A	E=C-B	F
Thermal Power (MW)	35,620	44,570	51,160	16,998	7,389	74.07%
Hydro Power (MW)	14,590	15,780	19,460	4,870	3,680	21.22%
Nuclear Power (MW)	0	0	0	0	0	0.00%
Wind Power and Others (MW)	799	1,280	1,880.3	1,081.8	600	4.71%
Total (MW)	**51,008.5**	**61,630**	**72,500.3**	**22,949.8**	**11,669**	**100.00%**
Share in the total installed capacity of 2009				31.65%	16.10%	

Therefore, $EF_{grid,BM,y}$ = 0.7899 × 74.07%=0.5851tCO_2e/MWh.

Annex 4

MONITORING INFORMATION

The monitoring plan will monitor the power generation supplied to the grid, and the electricity use of power plant supplied by the grid and total electricity produced by the project activity. The relative information is provided in section B7.2.