



**PROJECT DESIGN DOCUMENT FORM
FOR SMALL-SCALE CDM PROJECT ACTIVITIES (F-CDM-SSC-PDD)
Version 04.1**

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	Everbright Suqian & Huaining Bundled Solar PV Power Generation Project
Version number of the PDD	1.0
Completion date of the PDD	27/05/2013
Project participant(s)	Everbright Photovoltaic Energy (Suqian) Limited Innovative Carbon Investment Corporation
Host Party(ies)	P.R.China
Sectoral scope(s) and selected methodology(ies)	Scope 1: Energy industries (renewable-/non-renewable sources) AMS-I.D. “Grid connected renewable electricity generation”(Version 17.0)
Estimated amount of annual average GHG emission reductions	8,770 tCO ₂ e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Everbright Suqian & Huaining Bundled Solar PV Power Generation Project (hereafter referred to as the proposed bundled project) is a grid connected bundled solar photovoltaic (PV) project. The total installed capacity is 10.28MW (1.85MW+2MW+6.43MW) and the proposed bundled project will provide 11,095MWh electricity to the East China Power Grid (ECPG) every year. The proposed bundled project includes 3 small-scale PV power generation projects as follows:

- Jiangsu Suqian PV Power Plant 1.85MWp Project (hereafter referred to as the Suqian Phase I Project) is built on the roof of Shuanggou and Yanghe Distillery. It will deliver 1,968MWh electricity to East China Power Grid (ECPG) annually with the installed capacity of 1.85MW. The estimated annual average emission reductions of the project are 1,556 tCO₂e.
- Jiangsu Suqian PV Power Plant Phase II 6.43MWp Project (hereafter referred to as the Suqian Phase II Project) is built on the roof of Yanghe Distillery. It will deliver 6,986MWh electricity to East China Power Grid (ECPG) annually with the installed capacity of 6.43MW. The estimated annual average emission reductions of the project are 5,522 tCO₂e.
- Anhui Huaining PV Power Plant 2MWp Project (hereafter referred to as the Huaining Project) is built on the ground. It will deliver 2,141MWh electricity to East China Power Grid (ECPG) annually with the installed capacity of 2MW. The estimated annual average emission reductions of the project are 1,692 tCO₂e.

Prior to the implementation of the proposed bundled project, the equivalent electricity supplied by the proposed bundled project was sourced from ECPG, which is the same as the baseline scenario. The electricity generated by the proposed bundled project can displace part of the power from the fossil fuel-fired power plants of ECPG, and the expected annual GHG emission reductions are 8,770 tCO₂e.

The project contributes to sustainable development in the following ways:

- The proposed bundled project can diversify sources of electric generation.
- The proposed bundled project will supply the local area with the available electric power and contribute to national energy supply.
- Improvement of local air environment quality by reducing GHG and air pollutants (e.g. SO₂, NO_x and particulates) emissions from the combustion of fossil fuels that will be replaced by the solar PV power plant which is clean and renewable energy source.
- The proposed bundled project will create job opportunities directly and indirectly through construction and operation of the plant.

A.2. Location of project activity

A.2.1. Host Party(ies)

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People's Republic of China

A.2.2. Region/State/Province etc.

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Jiangsu Province (Suqian Phase I Project & Suqian Phase II Project)

Anhui Province (Huaining Project)

A.2.3. City/Town/Community etc.

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Suqian City (Suqian Phase I Project & Suqian Phase II Project)

Anqing City (Huaining Project)

A.2.4. Physical/ Geographical location

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Name of Project	Lati-tude	Longi-tude
Suqian Phase I Project ¹	32°09'58" ~32°10'05" N (Sihong County) 33°13'36"~33°13'45"N (Yanghe Town)	119°29'47"~119°30'18" E(Sihong County) 118°11'25"~118°11'53"E (Yanghe Town)
Suqian Phase II Project	33°47'9"~33°47'30"N	118°21'37" ~118°26'2"E
Huaining Project	30°46'14" ~30°46'39" N	116°47'46"~116°48'20"E

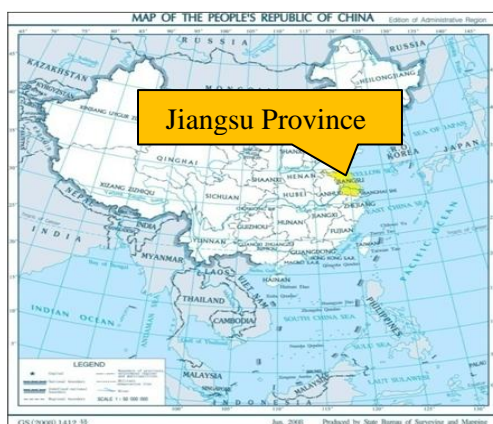


Figure A-1 Location of Jiangsu Province

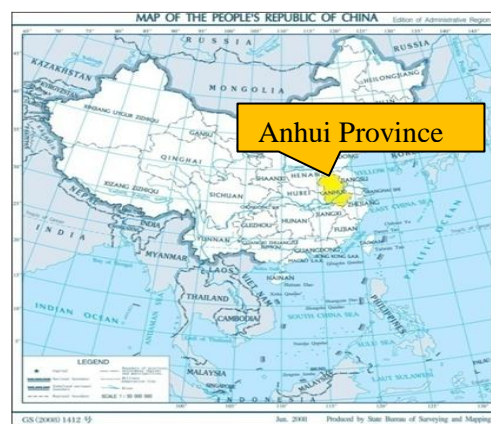


Figure A-2 Location of Anhui Province



Figure A-3 Location of the Suqian Phase I & II Project



Figure A-4 Location of the Huaining Project

A.3. Technologies and/or measures

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¹ Suqian Phase I Project is built in two locations, one is Sihong County and another is Yanghe Town.

Type and category(ies) of the small-scale project activity

The proposed project is a small-scale CDM project activity. According to Appendix B1 to the Simplified Modalities and Procedures for Small-scale CDM Project Activities issued by the UNFCCC:

The proposed project type: Type I. - Renewable Energy Project

The project category: Category I.D. - Grid-connected renewable electricity generation

Technology of the small-scale project activity:

By using photovoltaic effect that can take place at the interface of the semiconductor materials, the Grid connected solar PV electric power system is a renewable electricity technology that converts solar optical energy directly to the electricity energy.

The grid connected Solar PV power plant consists of Solar cell module, dc-to-ac converter (inverter) and transformer. DC electricity energy will be generated by the Solar cell modules in the sunshine, and then the DC electricity generated directly from the solar cell modules will be converted into AC electricity by the dc-to-ac converter (inverter). In the end, the AC electricity will be boosted by transformer and delivered to the East China Power Grid.

The flow diagrams of the Suqian Phase I Project, the Suqian Phase II Project and the Huaining Project are the same, which is shown below:

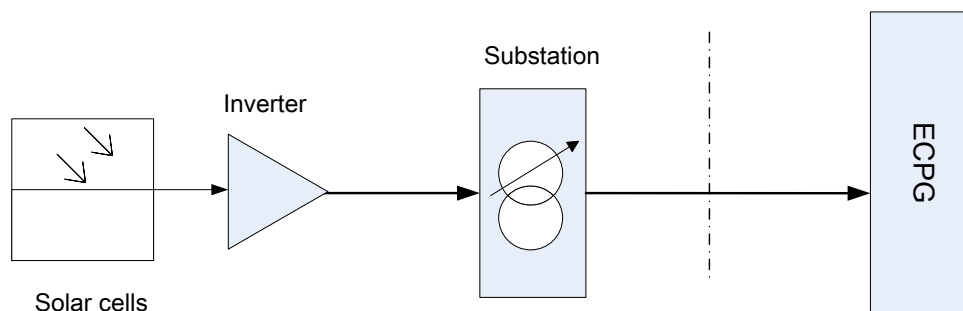


Figure A-5 The flow diagram of the bundled project

Please refer to B.7.3 for details about the monitoring equipments and their location in the system.

The key parameters of the modules and inverters are listed in the Table A-1 below.

Table A-1 Technology description of solar cells and inverters

Plant Name		Suqian Phase I Project	Suqian Phase II Project	Huaining Project
Solar Cells	Type	TW 230 (28) P	TW 240 (28)P	TWSF-aSi- 95W-1
	Manufacturer	Tianwei New Energy (Chengdu) PV Module Co., Lt	Tianwei Solution (Beijing) Co., Ltd	Baoding Tianwei Solarfilms Co., Ltd
	Material	polycrystalline silicon	polycrystalline silicon	amorphous silicon film ²
	Peak power	230 Wp	240Wp	93.01~98.00 Wp
	Rated power	29.7V	30.3V	102~113.08V

² The technical parameters of the amorphous silicon film have a floating range.



	voltage				
	Open circuit voltage	36.7V	37.1V		134.58~142.23V
	Rated power current	7.74A	7.92A		0.93~1.17A
	Short circuit current	8.72A	8.88A		1.11~1.34A
	Number of cells	8080 Pieces	26800 Pieces ³		21030 Pieces
Inverter	Type	Sunway TG 750-800V-TE	Sunway TG750-900V-TE	Solar Ocean 500TL	Sunway TG610-800V-TE
	Manufacturer	Carraro China Drive Systems Co. Ltd.	Carraro China Drive Systems Co. Ltd.	Samil New energy Co., Ltd	Carraro China Drive Systems Co. Ltd.
	Maximum DC Power	684.3kW	770kW	570kW	553.7kW
	MPPT voltage range	495~820V	495~820V	450~820V	415~760V
	Rated capacity	665.1 kW	665.1 kW	500 kW	514.6 kW
	Rated output voltage	320 V	320 V	270 V	270 V
	Rated Input current	1253.4 A	1253.4 A	1200 A	1044.5 A
	Number of units	3 units	8 units	2 units	4 units
	Maximum Efficiency	98.5%	98.5%	98.6%	98.5%

The proposed bundled project involves no technology transferred from abroad.

A.4. Parties and project participants

Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
P.R.China (host)	Everbright Photovoltaic Energy (Suqian) Limited	No
United Kingdom of Great Britain and Northern Ireland	Innovative Carbon Investment Corporation	No

Project entity: Everbright Photovoltaic Energy (Suqian) Limited. is the project owner of Suqian Phase I Project and Suqian Phase II Project. Everbright Photovoltaic Energy (Huaining) is the project owner of Huaining Project. They have reached an agreement that Everbright Photovoltaic Energy (Suqian) Limited. represents as project participant.

³ The number of the solar cells in the registered PDD under UNFCCC is 24,800, which was indicated as the already-purchased part of the equipments. However, as confirmed by the project owner, 2,000 more pieces of the solar cells with the same technical parameters were purchased and installed at the Suqian Phase II Project site, therefore, the total number of solar cells is updated to 26,800 with the total installed capacity of 6.43MW.



For more detailed contact information on participants in the project activities, please refer to Appendix 1.

A.5. Public funding of project activity

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There is no public funding from Annex I Parties for this Project.

A.6. Debundling for project activity

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According to ‘Appendix C of the simplified Modalities and Procedures for Small-Scale CDM project’, a proposed small-scale project activity shall be deemed to be 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/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

In accordance with above the information, the project is not a debundled component of a larger project activity since there is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity with the same project participants, using the same category and technologies/measures and whose project boundary is within 1 km of each proposed project boundary of the proposed small-scale activity at the closest point.

SECTION B. Application of selected approved baseline and monitoring methodology

B.1. Reference of methodology

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The following methodology and tool are applied by the proposed bundled project:

1. The approved baseline and monitoring methodology AMS-I.D.: “Grid connected renewable electricity generation” (Version 17.0)

<http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>.

2. “Tool to calculate the emission factor for an electricity system” (Version 03.0.0).

<http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v3.0.0.pdf>

B.2. Project activity eligibility

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The proposed bundled project meets all the applicability conditions of the AMS-I.D (Version 17.0) as described below:

1. The proposed bundled project is the installation of three renewable power plants, i.e. solar power plants connected to ECPG.
2. The proposed bundled project is the installation of the new solar power plants at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant);
3. The proposed bundled project does not involve an on-site switch from fossil fuels to a renewable source
4. The total capacity of the proposed bundled project is 10.28 MW, which is less than 15MW and there will be no addition of installed capacity during the crediting period. The individual capacity information has been list below.

Participant	Name of Project	Capacity
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Everbright Photovoltaic Energy (Suqian) Limited	Suqian Phase I Project	1.85 MW
	Suqian Phase II Project	6.43 MW
Everbright Photovoltaic Energy (Huaining) Limited	Huaining Project	2 MW
Total installed capacity of three projects		10.28 MW

B.3. Project boundary

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As defined in methodology AMS-I.D. (Version. 17.0), the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to. The power generated by the bundled project will be connected to the ECPG, hence the project boundary includes the proposed bundled project and all grid-connected power plants of ECPG, which covers Jiangsu Province, Anhui Province, Zhejiang Province, Fujian Province and Shanghai Municipality.

Since the project is a grid connected solar power project, only CO₂ emission from fossil fuels fired power plants in baseline scenario need to be considered, and the emissions from project activity not need to be considered. The flow diagram of the project boundary is shown in Figure B-1.

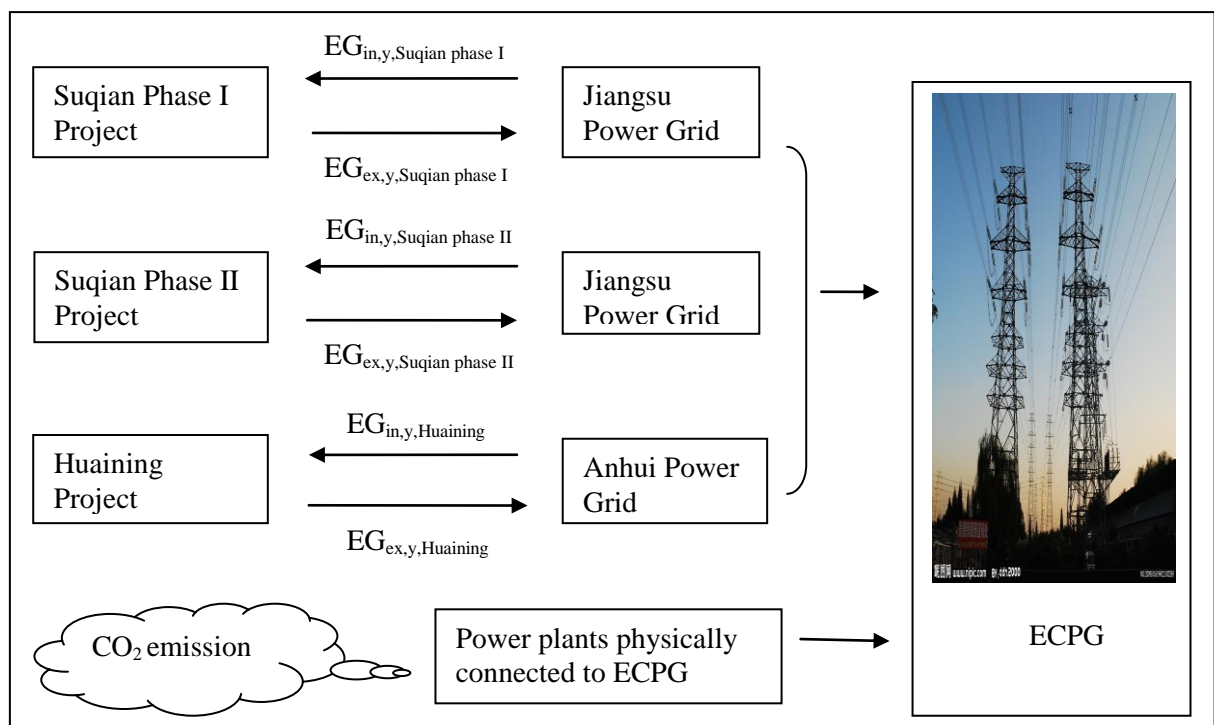


Figure B-1 The Bundled Project Boundary

B.4. Establishment and description of baseline scenario

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According to the methodology AMS I.D (Version 17.0), if the bundled project is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

Electricity delivered to the grid by the bundled project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

The proposed bundled project is the installation of a new grid-connected renewable power plant that connects with and delivers electricity to the ECPG. According to the “Tool to calculate the emission factor for an electricity system” (version 03.0.0), the data published by the Chinese DNA on October 15th, 2012 is selected. Therefore, the ECPG is identified as the electric power system which would provide electricity in baseline scenario. The spatial extent of the ECPG comprises all the power plants connected physically to the East China Power Grid, which consists of 5 sub-grids: Jiangsu, Anhui, Zhejiang, Fujian, Shanghai grid. According to AMS I.D (Version 17.0), the baseline scenario of the proposed bundled project can be identified as follows:

Electricity delivered to the grid by the proposed bundled project would have otherwise been generated by the operation of power plants connected to the ECPG and by the addition of new generation sources.

The methodology offers two methods to calculate the emission factor. Method (a), “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 03.0.0), is chosen for the proposed bundled project and the details are presented in B.6 and Appendix 4.

This PDD refers to the Operating Margin (OM) Emission Factor, the Build Margin (BM) Emission Factor and Combined Margin (CM) Emission Factor of the ECPG in *2012 Baseline Emission Factors for Regional Power Grids in China* published by the Chinese DNA on October 15th, 2012, which was officially published data and considered conservative and transparent.

B.5. Demonstration of additionality

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Suqian Phase I Project

Table B-1 Timeline of the Suqian Phase I Project

Date	Key events	Evidences
09/2010	The Environmental Impact Assessment (EIA) Report was completed	EIA report
14/09/2010	Approval of the EIA	Letter of approval from Environment Protection Bureau of Suqian City
09/2010	The Feasibility Study Report (FSR) was completed	FSR report
08/11/2010	Approval of the FSR	Letter of approval from Development and Reform Commission of Jiangsu Province
12/11/2010	Meeting minute of CDM consideration	Meeting minute from Board of Director of the project owner
25/11/2010	Engineering Project Contract ⁴ was signed (Starting date of the project)	Engineering Project Contract between the project owner and Tianwei Solution (Beijing) Co., Ltd. & Hebei Construction Group Co., Ltd.
22/02/2011	Notification to EB	Prior Consideration of the CDM Form was published on the UNFCCC website
22/03/2011	Notification to Chinese DNA	CDM Project Notification Form
10/08/2011	ERPA was signed between .	ERPA

⁴ It contains the project engineering of equipment procurement, installation and construction.

	Innovative Carbon Investment Corporation and Everbright Photovoltaic Energy (Suqian) Limited	
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Suqian Phase II Project

Table B-2 Timeline of the Suqian Phase II Project

Date	Key events	Evidences
04/2011	The Environmental Impact Assessment (EIA) Report was completed	EIA Report
28/04/2011	Approval of the EIA	Letter of approval from Environment Protection Bureau of Suqian City
04/2011	The Feasibility Study Report (FSR) was completed	FSR Report
30/06/2011	Approval of the FSR	Letter of approval from Development and Reform Commission of Jiangsu Province
10/07/2011	Meeting minute of CDM consideration	Meeting minute from Board of Director of the project owner
25/07/2011	Notification to EB	Prior Consideration of the CDM Form was published on the UNFCCC website
04/08/2011	Photovoltaic stents procurement contract was signed (starting date of the project)	Contract between the project owner and Zhangjiagang Dayang Aluminum Industry Co., Ltd
10/08/2011	Notification to Chinese DNA	CDM Project Notification Form
10/08/2011	ERPA was signed between Innovative Carbon Investment Corporation and Everbright Photovoltaic Energy (Suqian) Limited	ERPA

Huaining Project

Table B-3 Timeline of the Huaining project

Date	Key events	Evidences
26/11/2009	The Environmental Impact Assessment (EIA) Report was completed	EIA Report
12/2009	The Feasibility Study Report (FSR) was completed	FSR Report
09/04/2010	Approval of the FSR	Letter of approval from Energy Bureau of Huaining County
12/04/2010	Approval of EIA	Letter of approval from Environment Protection Bureau of Huaining County.
25/05/2010	Meeting minute of CDM consideration	Meeting minute from Board of Director of the project owner
10/11/2010	Grid inverter Purchase Contract was signed (Starting date of the project)	Grid inverter purchase Contract between the project owner and

		Carraro China Drive Systems Co. Ltd.
22/02/2011	Notification to EB	Prior Consideration of the CDM Form was published on the UNFCCC website
22/03/2011	Notification to Chinese DNA	CDM Project Notification Form
10/08/2011	ERPA was signed between Innovative Carbon Investment Corporation and Everbright Photovoltaic Energy (Suqian) Limited	ERPA

Additionality of the proposed bundled project

According to the Attachment A of Appendix B of the “Simplified Modalities and Procedures for Small-scale CDM Project Activities” (Version 08, EB 63, Annex 24)⁵, the grid-connected renewable electricity generation project of installed capacity up to 15 MW with Solar technologies (photovoltaic and solar thermal electricity generation) are automatically defined as additional without further documentation of barriers. Thus Everbright Suqian & Huaining Bundled Solar PV Power Generation Project can be defined as additional as total capacity of the Bundled Project is about 10.28 MW.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

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1. Baseline Emission Calculation

According to methodology AMS-I.D.: “Grid connected renewable electricity generation” (Version 17.0), the baseline emissions are the product of electricity produced by the renewable generating unit expressed in MWh ($EG_{BL,y}$) multiplied by an emission factor. The formula is as follows:

$$BE_y = EG_{BL,y} \times EF_{CO_2,grid,y} \quad (1)$$

Where:

BE_y : Baseline Emissions in year y (tCO₂);

$EG_{BL,y}$: Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO_2,grid,y}$: CO₂ Emission Factor of the grid in year y (tCO₂/MWh).

The project activity is a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, thus

$$EG_{BL,y} = EG_{facility,y} \quad (2)$$

Where:

$EG_{BL,y}$: Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EG_{facility,y}$: Quantity of net electricity supplied to the grid by the Project in year y (MWh)

⁵http://cdm.unfccc.int/filestorage/L/0/8/L08WMCZ5FO9ATRD7JP1X3BEHQK4NI2/eb63_repan24.pdf?t=bzJ8bHZpd3V4fDDrayvbQgwChY68gTx7DD-p



Paragraph 12 in the methodology offers two methods to calculate the emission factor in a transparent and conservative manner. Method (a), i.e. “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 03.0.0) is chosen for the proposed project.

This PDD refers to the Operating Margin (OM) Emission Factor and the Build Margin (BM) Emission Factor published by the Chinese DNA on October 15th, 2012.

For more information on the published OM and BM emission factors, please refer to:

Calculation result of the baseline emission factor of China Regional Grid:

<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2975.pdf>

Calculation process of the baseline OM emission factor of China Regional Grid:

<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2973.pdf>

Calculation process of the baseline BM emission factor of China Regional Grid:

<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2974.pdf>

According to the *2012 Baseline Emission Factors for Regional Power Grids in China* published by the Chinese DNA on October 15th, 2012, the Combined Baseline Emission Factor of the East China Power Grid corresponds to 0.7905tCO_{2e}/MWh.

Calculation of $EF_{grid,CM,y}$

The “*Tool to calculate the emission factor for an electricity system*” (Version 03.0.0) determines the CO₂ emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the “operating margin” (OM) and “build margin” (BM) as well as the “combined margin”(CM).

Project participants shall apply the following six steps:

STEP 1: Identify the relevant electricity systems;

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

STEP 3: Select a method to determine the operating margin (OM);

STEP 4: Calculate the operating margin emission factor according to the selected method;

STEP 5: Calculate the build margin (BM) emission factor;

STEP 6: Calculate the combined margin (CM) emission factor.

The detailed calculated processes are as follows:

STEP 1: Identify the relevant electricity system

The electricity generated by the Project will be connected to the East China Power Grid (ECPG), in the absence of the project activity, the installed capacity of the ECPG for both the existing power plants and the power plants to be built in a foreseeable future would supply electricity comparable to that supplied by the Project. As per *2012 Baseline Emission Factors for Regional Power Grids in China* published by China DNA on Oct. 15, 2012, the ECPG includes provincial grid spatial extent of Shanghai, Jiangsu Province, Zhejiang Province, Anhui Province and Fujian province.

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

According to the “*Tool to calculate the emission factor for an electricity system*” (Version 03.0.0), 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 I is chosen to calculate the operating margin and build margin emission factor.

STEP 3: 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.

Detailed information to carry out a dispatch data analysis is not publicly available; therefore, method (b) and method (c) is not suitable for the proposed project.

According to “*Tool to calculate the emission factor for an electricity system*” (Version 03.0.0), the Simple OM method is applicable to the project if low-cost resources constitute less than 50% of total grid generation (excluding electricity generated by off-grid power plants) in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

Low-cost/must run resources constitute less than 50%⁶ of total amount of grid generating output from 2006 to 2010 in the ECPG, referred to China Electric Power Yearbook 2007-2011. Therefore, Method (a) Simple OM was selected.

The Simple OM can be calculated using either of the two following data vintages:

(a) *Ex ante option*: If the *ex ante* option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use 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.

(b) *Ex post option*: If the *ex post* option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

Here *ex-ante* vintage is chosen, and the $EF_{grid,OM,y}$ is fixed during the first crediting period.

STEP 4: Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (t CO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated by one of the following two options:

(a) **Option A**: Based on the net electricity generation and a CO₂ emission factor of each power unit⁷; or

⁶ 11.44%, 10.92%, 11.97%, 10.64% and 12.05% from 2006 to 2010 respectively.

⁷ Power units should be considered if some of the power units at the site of the power plant are low-cost/must-run units

- (b) **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 A should be preferred and must be used if fuel consumption data is available for each power plant/unit. As the fuel consumption data for each power plant/unit is not available in China, Option A cannot be selected. While total net electricity generation of all power plants serving the ECPG and the fuel types and total fuel consumption of the ECPG are available from *China Electric Power Yearbook* and *China Energy Statistical Yearbook*. So, the project uses Option B for calculating the simple OM emission factor as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_y} \quad (3)$$

Where

- $EF_{grid,OMsimple,y}$ = Simple operating margin CO₂ emission factor in year y (t CO₂/MWh);
 $FC_{i,y}$ = Amount of 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 fuel type *i* in year y (GJ/mass or volume unit);
 $EF_{CO_2,i,y}$ = CO₂ emission factor of 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 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.

Based on *2012 Baseline Emission Factors for Regional Power Grids in China* published by China DNA, the Operating Margin Emission Factor ($EF_{grid,OM,y}$) of the ECPG could be obtained determined to be: 0.82436 t CO₂/MWh.

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

In terms of vintage of data, project participants can choose between one of the following two options:

- (a) **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.
- (b) **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

and some are not. Power plants can be considered if all power units at the site of the power plant belong to the group of low-cost/must-run units or if all power units at the site of the power plant do not belong to the group of low-cost/must-run units.



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 ($EF_{grid, BM, y}$).

The sample group of power units m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

- (a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5-units}$) and determine their annual electricity generation ($AEG_{SET-5-units}$, in MWh);
- (b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total} , in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEG_{SET-\geq 20\%}$, in MWh);
- (c) From $SET_{5-units}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Otherwise:

- (d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than 10 years ago. Include in that set the power units registered as CDM project activities, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) to the extent is possible. Determine for the resulting set ($SET_{sample-CDM}$) the annual electricity generation ($AEG_{SET-sample-CDM}$, in MWh);

If the annual electricity generation of that set is comprises at least 20% of the annual electricity generation of the project electricity system (i.e. $AEG_{SET-sample-CDM} \geq 0.2 \times AEG_{total}$), then use the sample group $SET_{sample-CDM}$ to calculate the build margin. Ignore steps (e) and (f).

Otherwise:

- (e) Include in the sample group $SET_{sample-CDM}$ the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation);

The sample group of power units m used to calculate the build margin is the resulting set ($SET_{sample-CDM- >10yrs}$).

The Build Margin Emission Factor ($EF_{grid, BM, y}$) is calculated as follows:

$$EF_{grid, BM, y} = \frac{\sum_m EG_{m, y} \times EF_{EL, m, y}}{\sum_m EG_{m, y}} \quad (4)$$

Where:

- $EF_{grid, BM, y}$ = 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 electricity generation data is available.

Due to data's unavailability, the BM calculation follows the guidance provided by CDM EB in the deviation. First, calculate the newly installed capacity and its power generation technology mix, then the weights of different power technologies in the newly installed capacity, finally the BM emission factor based on the emission factors of different types of most advanced commercial generation technologies.⁸

Because the generating capacity of the coal-fired, oil-fired and gas-fired power plants cannot be separated from the existing statistical data, the BM calculation adopts the following method: First, use the available data in the energy balance tables on the most recent year to calculate the proportion of CO₂ emissions from solid, liquid and gaseous fuels corresponding to the total emissions of CO₂ emissions. Second, calculate the emission factor of the fossil fuel fired power generation in each grid using the above proportions as the weights and the emission factors of the most advanced commercial generation technologies as the reference. Finally, the BM emission factor is multiplied by the proportion of fossil fuel fired power generation and the proportion of fossil fuel fired power plants in the newly added 20% capacity. Concrete steps and the formula for BM are as follows:

Sub-step 5a: Calculating the share of CO₂ emissions of different fuel-fired power plants in the total CO₂ emissions

$$\lambda_{Coal, y} = \frac{\sum_{i \in COAL, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}}{\sum_{i, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}} \quad (5)$$

$$\lambda_{Oil, y} = \frac{\sum_{i \in OIL, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}}{\sum_{i, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}} \quad (6)$$

$$\lambda_{Gas, y} = \frac{\sum_{i \in GAS, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}}{\sum_{i, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}} \quad (7)$$

Where:

- $F_{i, j, y}$ = The amount of fuel i (in a mass or volume unit) consumed by project j in year y ;
 $NCV_{i, j}$ = Net calorific value (energy content) of fossil fuel type i consumed by province j (GJ/mass or volume unit)
 $EF_{CO_2, i, j, y}$ = CO₂ emission coefficient of fossil fuel type i (tCO₂/mass or volume unit of the fuel),

⁸<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2975.pdf>

taking into account the carbon content of the fuels used by relevant provincial sub-grids j and the percent oxidation of fuel in year y ;

COAL, *OIL*, and *GAS* refers to all forms of coal, oil and gas.

Sub-step 5b: Calculating the Emission Factor of fuel-fired power technology

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \quad (8)$$

Where:

$EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$ and $EF_{Gas,Adv,y}$ represent the related Emission Factor of the commercially available most advanced coal, oil and gas fired power technology, please refer to Appendix 4 for more details.

Sub-step 5c: Calculating the $EF_{grid, BM, y}$

$$EF_{grid, BM, y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} \quad (9)$$

Where:

$CAP_{Total,y}$ = the newly increment of total installed capacity;

$CAP_{Thermal,y}$ = the newly increment of fuel-fired installed capacity.

Based on *2012 Baseline Emission Factors for Regional Power Grids in China* published by China DNA, the Build Margin Emission Factor ($EF_{grid, BM, y}$) of the ECPG could be obtained determined to be: 0.6889 t CO₂/MWh.

The $EF_{grid, OM, y}$ and $EF_{grid, BM, y}$ of the first crediting period of the proposed project is calculated *ex-ante* and will not change during the first crediting period, but will be updated once the first crediting period is over.

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.

The weighted average CM method (option A) should be used as the preferred option.

The combined margin emissions factor is calculated as follows:

$$EF_{grid, CM, y} = EF_{grid, OM, y} \times w_{OM} + EF_{grid, BM, y} \times w_{BM} \quad (10)$$

Where

$EF_{grid, OM, y}$ = Operating margin CO₂ emission factor in year y (t CO₂/MWh)

$EF_{grid, BM, y}$ = Build margin CO₂ emission factor in year y (t CO₂/MWh)

w_{OM} = Weighting of operating margin emission factor (per cent)

w_{BM} = Weighting of build margin emission factor (per cent)

According to ‘*Tool to calculate the emission factor for an electricity system*’ (Version 03.0.0), the weights of *OM* and *BM* for hydropower projects are as follows:

$$w_{OM} = 0.75, w_{BM} = 0.25$$

Therefore the combined baseline emission factor:

$$EF_{\text{grid,CM},y} = 0.82436 \times 0.75 + 0.6889 \times 0.25 = 0.7905 \text{ t CO}_2/\text{MWh}$$

2. Project Emission Calculation

The project activity generates electricity by utilizing solar power and no greenhouse gas is emitted accordingly. Therefore, the project emission is zero.

3. Leakage Emission Calculation

Energy generating equipment used by the proposed project is purchased from equipment manufacturers other than being transferred from another activity. According to AMS-I.D. (Version 17.0), leakage does not need to be considered for the proposed project, then $LE_y=0$.

4. Emission Reduction Calculation

The emission reduction is calculated as:

$$ER_y = BE_y - PE_y - LE_y \quad (11)$$

B.6.2. Data and parameters fixed ex ante

Data / Parameter	$NCV_{i,y}$
Unit	MJ / mass or volume unit
Description	Net calorific value (energy content) of fuel type i in year y
Source of data	China Energy Statistical Yearbook 2011
Value(s) applied	Refer to Appendix 4 for details
Choice of data or Measurement methods and procedures	Official data accepted by Chinese DNA.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$OXID_i$
Unit	%
Description	Oxidation rate of the fuel i
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied	Refer to Appendix 4 for details
Choice of data or Measurement methods and procedures	IPCC defaults
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EF_{CO_2,i,y}$
-------------------------	-----------------



Unit	t CO ₂ /GJ
Description	CO ₂ emission factor of fuel type <i>i</i> in year <i>y</i>
Source of data	Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied	Refer to Appendix 4 for details
Choice of data or Measurement methods and procedures	International default value, officially accepted by Chinese DNA.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{m,y}$
Unit	MWh
Description	Net electricity generated and delivered to the ECPG by power plant / unit <i>m</i> in year <i>y</i> (MWh)
Source of data	China Electric Power Yearbook (2008- 2010)
Value(s) applied	Refer to Appendix 4 for details
Choice of data or Measurement methods and procedures	Official data accepted by Chinese DNA. This kind of data accords with the “Tool to calculate the emission factor for an electricity system”
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$CAP_{j,y}$
Unit	MW
Description	Installed capacity of source <i>j</i> in year <i>y</i> in the ECPG
Source of data	China Electric Power Yearbook (2008- 2010)
Value(s) applied	Refer to Appendix 4 for details
Choice of data or Measurement methods and procedures	Official data accepted by Chinese DNA.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$GENE_{best.coal/oil/gas}$
Unit	%
Description	Best commercial available efficiency of coal, gas, oil fuel power plant
Source of data	China’s DNA : 2012 Baseline Emission Factors for Regional Power Grids in China, http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2975.pdf
Value(s) applied	Best efficiency for coal plant is 39.65% Best efficiency for oil plant is 51.93% Best efficiency for gas plant is 51.93%

Choice of data or Measurement methods and procedures	Official data accepted by Chinese DNA.
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.6.3. Ex-ante calculation of emission reductions

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1. Baseline emission

According to B6.1, the baseline emission could be calculated by the equation as follows:

$$BE_y = EG_{BL,y} \times EF_{CO_2,grid,y} \quad (12)$$

Where:

BE_y : Baseline Emissions in year y (tCO₂);

$EG_{BL,y}$: Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh);

$EF_{CO_2,grid,y}$: CO₂ Emission Factor of the grid in year y (0.7905tCO₂/MWh, corresponds to $EF_{grid,CM,y}$).

$$\begin{aligned} EG_{BL,y} &= EG_{facility,y,SuqianphaseI} + EG_{facility,y,SuqianphaseII} + EG_{facility,y,Huaining} \\ &= (EG_{ex,y,SuqianphaseI} - EG_{in,y,SuqianphaseI}) + (EG_{ex,y,SuqianphaseII} - EG_{in,y,SuqianphaseII}) \\ &\quad + (EG_{ex,y,Huaining} - EG_{in,y,Huaining}) \end{aligned} \quad (13)$$

Where

$EG_{facility,y,Suqian\ phase\ I}$: Quantity of net electricity supplied to the grid by Suqian phase I project in year y (MWh);

$EG_{facility,y,Suqian\ phase\ II}$: Quantity of net electricity supplied to the grid by Suqian Phase II Project in year y (MWh);

$EG_{facility,y,Huaining}$: Quantity of net electricity supplied to the grid by Huaining Project in year y (MWh);

$EG_{ex,y,Suqian\ phase\ I}$: Electricity supplied to the grid by Suqian Phase I Project in year y (MWh);

$EG_{in,y,Suqian\ phase\ I}$: Electricity consumed by Suqian Phase I Project importing from the grid in year y (MWh);

For ex ante calculation, $EG_{in,y,Suqian\ phase\ I}$ is considered as 0, and it will be continuously measured by meter(s) during the crediting period

$EG_{ex,y,Suqian\ phase\ II}$: Electricity supplied to the grid by Suqian Phase II Project in year y (MWh);

$EG_{in,y,Suqian\ phase\ II}$: Electricity consumed by Suqian Phase II Project importing from the grid in year y (MWh); For ex ante calculation, $EG_{in,y,Suqian\ phase\ II}$ is considered as 0, and it will be continuously measured by meter(s) during the crediting period

$EG_{ex,y,Huaining}$: Electricity supplied to the grid by Huaining Project in year y (MWh);

$EG_{in,y,Huaining}$: Electricity consumed by Huaining Project importing from the grid in year y (MWh). For ex ante calculation, $EG_{in,y,Huaining}$ is considered as 0, and it will be continuously measured by meter(s) during the crediting period.

In accordance with equation, emission reduction calculation for each of the component as follows:

Name of Factory	$EG_{in,y}$	$EG_{ex,y}$	$EG_{facility,y}$	$EF_{CO_2,grid,y}$	BE_y
Unit	MWh	MWh	MWh	tCO ₂ /MWh	tCO ₂

Suqian Phase I Project	0	1,968	1,968 ⁹	0.7905	1,556
Suqian Phase II Project	0	6,986	6,986 ¹⁰		5,522
Huaining Project	0	2,141	2,141 ¹¹		1,692
Total amount	0	11,095	11,095		8,770

For additional background information and data, refer to Appendix 4.

2. Project emission

The project activity generates electricity by utilizing photovoltaic power and it means that no greenhouse gas is emitted by performing this project activity. Therefore, the Project emission is zero.

3. Leakage

Emission due to leakage is zero

4. Ex-ante calculation of Emission reductions

$$ER_y = BE_y - PE_y - LE_y = 8,770 \text{ tCO}_2/\text{yr} - 0 \text{ tCO}_2/\text{yr} - 0 \text{ tCO}_2/\text{yr} = 8,770 \text{ tCO}_2/\text{yr}$$

B.6.4. Summary of ex-ante estimates of emission reductions

Year	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions (tCO ₂ e)
01/04/2012~31/03/2013	8,770	0	0	8,770
01/04/2013~31/03/2014	8,770	0	0	8,770
01/04/2014~31/03/2015	8,770	0	0	8,770
01/04/2015~31/03/2016	8,770	0	0	8,770
01/04/2016~31/03/2017	8,770	0	0	8,770
01/04/2017~31/03/2018	8,770	0	0	8,770
01/04/2018~31/03/2019	8,770	0	0	8,770

⁹ Considering the characteristics that the generating capacity of solar project will be decreased year by year (the decrease rate will be 20% during 25 years), the data of 1,968MWh used for CERs calculation is the average generation value of 25 years from FSR. According to FSR, the generating capacity of Suqian phase I project is 2,432.4MWh in the first year, and it will be decreased to 1,945.9MWh in the 25th year.

¹⁰ Considering the characteristics that the generating capacity of solar project will be decreased year by year (the decrease rate will be 20% during 25 years), the data of 6,986MWh used for CERs calculation is the average generation value of 25 years from FSR. According to FSR, the generating capacity of Suqian phase II project is 8,125.3MWh in the first year, and it will be decreased to 6,500.2MWh in the 25th year.

¹¹ Considering the characteristics that the generating capacity of solar project will be decreased year by year (the decrease rate will be 20% during 25 years), the data of 2,141MWh used for CERs calculation is the average generation value of 25 years from FSR. According to FSR, the generating capacity of Huaining project is 2,513MWh in the first year, and it will be decreased to 2,010MWh in the 25th year.

Total	61,390	0	0	61,390
Total number of crediting years	7			
Annual average over the crediting period	8,770	0	0	8,770

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter	$EG_{\text{facility},y,\text{Suqian phase I}}$
Unit	MWh
Description	Quantity of net electricity supplied to the grid by Suqian phase I project in year y
Source of data	Calculated based on $EG_{\text{ex},y,\text{Suqian phase I}}$ and $EG_{\text{in},y,\text{Suqian phase I}}$, i.e. $EG_{\text{facility},y,\text{Suqian phase I}} = (EG_{\text{ex},y,\text{Suqian phase I}} - EG_{\text{in},y,\text{Suqian phase I}})$
Value(s) applied	1,968
Measurement methods and procedures	Calculated from the following measured parameters of $EG_{\text{ex},y,\text{Suqian phase I}}$ and $EG_{\text{in},y,\text{Suqian phase I}}$ and recorded on a monthly basis.
Monitoring frequency	-
QA/QC procedures	Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts).
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{\text{ex},y,\text{Suqian phase I}}$
Unit	MWh
Description	Electricity supplied to the grid by Suqian phase I project in year y
Source of data	Measured by electricity meter(s)
Value(s) applied	1,968
Measurement methods and procedures	Measured by meters installed at gate way.
Monitoring frequency	Continuously measured and monthly recorded respectively.
QA/QC procedures	Meters will be annually calibrated. Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts).
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{\text{in},y,\text{Suqian phase I}}$
Unit	MWh
Description	Electricity consumed by Suqian phase I project importing from the grid in year y



Source of data	Measured by electricity meter(s)
Value(s) applied	0
Measurement methods and procedures	Measured by by meter(s) installed at the project site and/or gate way.
Monitoring frequency	Continuously measured and monthly recorded respectively.
QA/QC procedures	Meters will be annually calibrated. Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts).
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{\text{facility},y,\text{Suqian phase II}}$
Unit	MWh
Description	Quantity of net electricity supplied to the grid by Suqian phase II project in year y
Source of data	Calculated based on $EG_{\text{ex},y,\text{Suqian phase II}}$ and $EG_{\text{in},y,\text{Suqian phase II}}$, i.e. $EG_{\text{facility},y,\text{Suqian phase II}} = (EG_{\text{ex},y,\text{Suqian phase II}} - EG_{\text{in},y,\text{Suqian phase II}})$
Value(s) applied	6,986
Measurement methods and procedures	Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts)
Monitoring frequency	-
QA/QC procedures	Electricity sales receipt and/or invoice will be used to cross check.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{\text{ex},y,\text{Suqian phase II}}$
Unit	MWh
Description	Electricity supplied to the grid by Suqian phase II project in year y
Source of data	Measured by electricity meter(s)
Value(s) applied	6,986
Measurement methods and procedures	Measured by meter installed at gate way.
Monitoring frequency	Continuously measured and monthly recorded respectively.
QA/QC procedures	Meters will be annually calibrated. Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts)
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{in,y,Suqian\ phase\ II}$
Unit	MWh
Description	Electricity consumed by Suqian phase II project importing from the grid in year y
Source of data	Measured by electricity meter(s)
Value(s) applied	0
Measurement methods and procedures	Measured by electricity meter(s) installed at the project site and/or gate way.
Monitoring frequency	Continuously measured and monthly recorded respectively.
QA/QC procedures	Meters will be annually calibrated. Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts)
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{facility,y,Huaining}$
Unit	MWh
Description	Quantity of net electricity supplied to the grid by Huaining project in year y
Source of data	Calculated based on $EG_{ex,y,Huaining}$ and $EG_{in,y,Huaining}$, i.e. $EG_{facility,y,Huaining} = (EG_{ex,y,Huaining} - EG_{in,y,Huaining})$
Value(s) applied	2,141
Measurement methods and procedures	Calculated from the following measured parameters of $EG_{ex,y,Huaining}$ and $EG_{in,y,Huaining}$ and recorded on a monthly basis.
Monitoring frequency	-
QA/QC procedures	Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts)
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{ex,y,Huaining}$
Unit	MWh
Description	Electricity supplied to the grid by Huaining project in year y
Source of data	Measured by electricity meter(s)
Value(s) applied	2,141
Measurement methods and procedures	Measured by meter installed at gate way.
Monitoring frequency	Continuously measured and monthly recorded respectively.
QA/QC procedures	Meters will be annually calibrated. Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts)
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{in,y,Huaining}$
Unit	MWh
Description	Electricity consumed by Huaining project importing from the grid in year y
Source of data	Measured by electricity meter(s)
Value(s) applied	0
Measurement methods and procedures	Measured by meter(s) installed at the project site and/or gate way.
Monitoring frequency	Continuously measured and monthly recorded respectively.
QA/QC procedures	Meters will be annually calibrated. Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts)
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.7.2. Sampling plan

>>
N/A

B.7.3. Other elements of monitoring plan

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The purpose of the monitoring plan is to ensure the completeness, consistency, and accuracy of the monitoring as well as calculation of the emission reductions. The personnel appointed by the project owner will be in charge of the monitoring plan.

1. Monitoring objects

As the baseline emission factor was calculated ex-ante, the main monitoring parameters are the electricity delivered to the grid and electricity consumed by the proposed project which is imported from the ECPG.

2. Monitoring organization

A dedicated CDM project management group has established by the project owner. The institutional structure and function of the group is shown in the figure below. Within the group a monitoring team is designated with their responsibilities allocated.

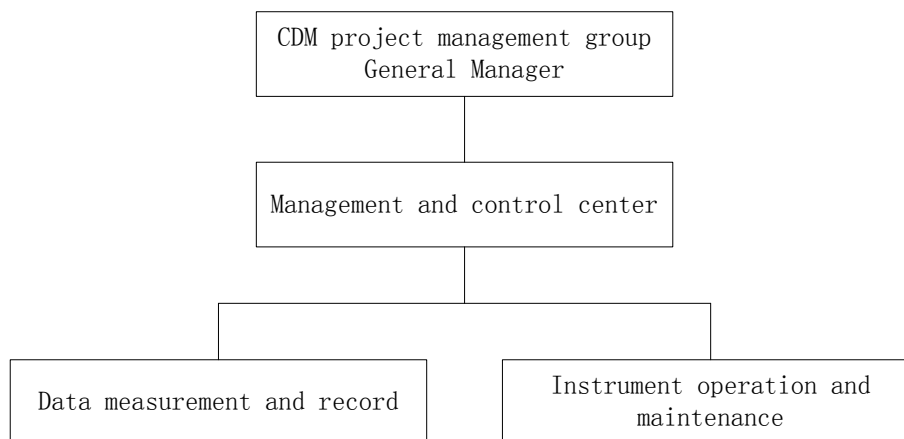


Figure B-2 Structure and function of CDM project management group

Responsibilities allocation

Group General Manager: responsible for the leadership, control for the CDM project management, and external coordination.

Management and control center: responsible for the daily implementation of the CDM project monitoring plan and reporting to the group general manager.

Data measurement and record: responsible for daily data monitoring and recording according to the monitoring plan.

Instrument operation and maintenance: responsible for the installation and testing of the monitoring instruments, their routine operation, regular maintenance and calibrations, troubleshooting and emergency response, to ensure that their performances and accuracies of the installed monitoring instruments meet the standard as required by the registered monitoring plan and reporting to management and control center.

3. Installation of meters

The electricity supplied to East China Power Grid by Suqian phase I project ($EG_{ex,y,Suqian\ phase\ I}$) will be measured through the meter installed at gate way, and the electricity imported from East China Power Grid to the proposed project ($EG_{in,y,Suqian\ phase\ I}$) will be also measured through meter(s) installed at project site and/or gate way. The net electricity used for ex-post CERs calculation of Suqian phase I project could be calculated as the difference between $EG_{ex,Suqian\ phase\ I}$ and $EG_{in,y,Suqian\ phase\ I}$.

The electricity supplied to East China Power Grid by Suqian phase II project ($EG_{ex,y,Suqian\ phase\ II}$) will be measured through the meter installed at gate way, and the electricity imported from East China Power Grid to the proposed project ($EG_{in,y,Suqian\ phase\ II}$) will be also measured through meter(s) installed at project site and/or gate way. The net electricity used for ex-post CERs calculation of Suqian phase II project could be calculated as the difference between $EG_{ex,y,Suqian\ phase\ II}$ and $EG_{in,y,Suqian\ phase\ II}$.

The electricity supplied to East China Power Grid by Huaining project ($EG_{ex,y,Huaining}$) will be measured through the meter installed at gate way, and the electricity imported from East China Power Grid to the proposed project ($EG_{in,y,Huaining}$) will be also measured through meter(s) installed at project site and/or gate way. The net electricity used for ex-post CERs calculation of Huaining project could be calculated as the difference between $EG_{ex,y,Huaining}$ and $EG_{in,y,Huaining}$.

The accuracy of meters measuring supplied electricity is at least 0.5s, and the accuracy of meters measuring imported electricity is at least 1.0, which is satisfied with Technical Code for Designing Electrical Measurement and Energy Metering Device (DL/T448—2000). The measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts).

4. Calibration of meters & Metering

The metering equipment will be properly configured by qualified third party for accuracy according to the Technical Code for Designing Electrical Measurement and Energy Metering Device (DL/T448—2000), and the metering equipment will be checked by both the project owner and the grid company before the project is in operation.



The meters will be calibrated once annually. All the records should be documented and maintained by the project owner for DOE's verification.

5. Quality assurance and quality control (QA/QC)

The electricity supplied and consumed by the Project shall be cross-checked with records for sold/purchase electricity (e.g. invoices/receipts). Since the data required to be monitored is consistent with the data required during project operation by the project owner and the grid company, the Power Purchase Agreement between these two parties can be used as reference.

Problem occurred in monitoring and measurement process will be recorded and reported to the Group General Manager.

Should the reading of the main meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the net generation output shall be determined as follows:

- a) Reading the data monitored by check meter;
- b) If the reading of the check meter is still inaccurate, the project owner and the grid company shall jointly prepare a reasonable and conservative estimate of the correct reading based on the plant consumption rate, and provide sufficient evidence that this estimation is reasonable and conservative when DOE undertakes verification;

6. Data record and management system

Specific staff will be appointed by the project owner to take the overall responsibility for keeping all the data collected as part of monitoring based on paper and computer and kept for two years after the end of the last crediting period.

Electronic data and documents, including readings from electric meters connected to the computer central control system, will be regularly copied and archived via optical discs and storage tapes, and kept at least for two years after the end of the last crediting period.

Written data and documents, including receipts or invoice for cross-checking of data, will be copied and archived with an explanation of the department or company where the original copy is kept, and kept for at least two years after the end of the last crediting period.

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

>>

25/11/2010(Suqian Phase I Project: date of Engineering Project contract signed)

04/08/2011(Suqian Phase II Project: date of photovoltaic stents procurement contract signed)

10/11/2010(Huaining Project: date of grid inverter purchase contract signed)

C.1.2. Expected operational lifetime of project activity

>>

25 years, 0 month

C.2. Crediting period of project activity
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C.2.1. Type of crediting period
--

>>



Renewable crediting period

C.2.2. Start date of crediting period

>>

01/04/2012 (or the date when the submission is complete, whichever is later)

C.2.3. Length of crediting period

>>

7 years, 0 month.

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>

The approval of the EIA (Suqian Phase I Project) was issued by Environmental Protection Bureau of Suqian City on Sep. 14, 2010. The approval of the EIA (Suqian Phase II Project) was issued by Environmental Protection Bureau of Suqian City on Apr. 28, 2011. The approval of EIA (Huaining Project) was issued by Environmental Protection Bureau of Huainign County on Apr. 12, 2010. In the EIA reports, the potential environmental impacts of the proposed bundled project on the water and air quality as well as habitants' life etc are assessed. The main conclusions of the EIA reports are summarized as following.

According to the EIA Report, the main environmental impacts of the proposed project are summarised as follows:

1. Air

The proposed project that generates power utilizing solar energy will not produce waste gas as part of the power generation process. Thus, the proposed project has very little effect on the condition of the air.

2. Solid Waste

The solid waste produced in the operation period will be sent to the garbage treatment plant periodically through a refuse collection point. Therefore, the solid waste has little impact on the environment after it has been treated adequately.

3. Noise

Noise will not be produced in the operation period. The noise at boundary could reach the grade III of Standard of Noise at Boundary of Industrial Enterprises (GB12348-2008), so the proposed project does not have any effect on the acoustic environment.

4. Wastewater

The main wastewater for the proposed project is domestic sewage. The domestic sewage will natural evaporate after having been poured on the ground. The wastewater will have very little effect on the groundwater because of the limited number of employees, the dry climate and the situation of the project in the wilderness.

5. Main Ecological Impacts

The area around the proposed project is home to a rare and unique kind of vegetation. The construction of the proposed project will have some negative effect on the vegetation for some time. However, the vegetation cover will be improved after resuming vegetation and planting. Once the construction is complete and growth of vegetation is resumed gradually, the proposed project will not have any negative effect on the land use. Therefore the construction of the proposed project has little negative effect on the ecological environment after taking actions for ecological conservation.

To summarize, the proposed project will take practical action for the main waste sources, and the discharge standard for waste will be ensured. There is nearly no negative effect on the environment once actions have been undertaken to assure vegetation is restored.

The project will almost cause no negative effects on the local environment by using clean solar energy for power generation. Overall the proposed project will have positive impact on the local region in terms of economic and social development such as increasing employment opportunity and easier access to clean electricity.

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

>>

In order to get feedback the opinions about the proposed bundled project applying for CDM from the stakeholder, the project owner has carried out a survey on the local residents and comments received from the survey are summarized as follows.

E.2. Summary of comments received

>>

Suqian Phase I Project

In Mar. 2011, the project owner of Suqian Phase I Project collected comments from the stakeholders by sending out 30 copies of questionnaire. During the investigation, the 30 copies of the questionnaire distributed all were received. The basic structure of the respondents is illustrated in Table E-1.

Table E-1. Statistics on the basic conditions of people surveyed in Suqian phase I project

	Range	Population	Ratio		Range	Population	Ratio	
Age	Below 30	16	53.33%	Sex	Male	21	70%	
	30-40	11	36.67%		Female	9	30%	
	41-50	2	6.67%					
	Above 50	1	3.33%					
Occupation	Worker	20	66.67%	Education	Primary school	0	0%	
	Farmer	0	0%		Junior School	2	6.67%	
	Manager	3	10%		Senior school	7	23.33%	
	Others	7	23.33%		College	14	46.67%	
					University	7	23.33%	

As shown in Table E-1, people surveyed are representative of the public in terms of occupation and educational levels. Therefore their attitudes towards the Project can be a comprehensive reflection of the attitudes of the local residents possibly affected by the Project. Among the 30 responses to the questionnaire:

30 people surveyed (accounting for 100%) hold a supportive attitude towards the project, which was considered to reduce environmental pollution (83%), improve economy (90%), provide employment opportunity (97%).

As the suggestion towards the project, People surveyed supposed it is necessary to construct the project.

The survey shows that all of the residents at the Project site consider that construction of the Project will benefit the local economic development.

Suqian Phase II Project

In Jul. 2011, the project owner of Suqian Phase II Project collected comments from the stakeholders by sending out 30 copies of questionnaire. During the investigation, the 30 copies of the questionnaire distributed all were received. The basic structure of the respondents is illustrated in Table E-2.

Table E-2. Statistics on the basic conditions of people surveyed in Suqian Phase II project

	Range	Population	Ratio		Range	Population	Ratio
Age	Below 30	8	26.67%	Sex	Male	25	83.33%
	30-40	5	16.67%				
	41-50	5	16.67%		Female	5	16.67%
	Above 50	12	40%				
Occupation	Worker	10	28.57%	Education	Primary school	9	30%
	Farmer	8	32.14%		Junior School	10	33.33%
	Manager	4	3.57%		Senior school	5	16.67%
	Others	8	35.72%		College	2	6.67%
					University	4	13.34%

As shown in Table E-2, people surveyed are representative of the public in terms of occupation and educational levels. Therefore their attitudes towards the Project can be a comprehensive reflection of the attitudes of the local residents possibly affected by the Project. Among the 30 responses to the questionnaire:

30 people surveyed (accounting for 100%) hold a supportive attitude towards the project, which was considered to reduce environmental pollution (83%), improve economy (83%), provide employment opportunity (97%).

As the suggestion towards the project, People surveyed supposed it is necessary to construct the project.

The survey shows that all of the residents at the Project site consider that construction of the Project will benefit the local economic development.

Huaining Project

In Apr. 2011, the project owner of Huaining project collected comments from the stakeholders by sending out 30 copies of questionnaire. During the investigation, the 30 copies of the questionnaire distributed all were received. The basic structure of the respondents is illustrated in Table E-3.

Table E-3. Statistics on the basic conditions of people surveyed in Huaining Project

	Range	Population	Ratio		Range	Population	Ratio
Age	Below 30	3	10.00%	Sex	Male	23	76.67%
	30-40	8	26.67%				
	41-50	6	20.00%		Female	7	23.33%
	Above 50	13	43.33%				
Occupation	Worker	8	26.67%	Educational	Primary school	9	30%



Farmer	13	43.33%	Junior School	8	26.67%
Manager	3	10%	Senior school	12	40.00%
Others	6	20%	Collage	1	3.33%
			University	0	0%

As shown in Table E-3, people surveyed are representative of the public in terms of occupation and educational levels. Therefore their attitudes towards the Project can be a comprehensive reflection of the attitudes of the local residents possibly affected by the Project. Among the 30 responses to the questionnaire:

29 people surveyed (accounting for 97%) hold a supportive attitude towards the project, which was considered to reduce environmental pollution (57%), improve economy (67%), provide employment opportunity (53%).

As the suggestion towards the project, People surveyed supposed it is necessary to construct the project. The survey shows that all of the residents at the Project site consider that construction of the Project will benefit the local economic development.

E.3. Report on consideration of comments received

>>

No negative impacts were identified in the public consultation process. The majority of the respondents expressed strong support for the implementation of the project. Therefore, measures to address adverse impacts are not necessary.

SECTION F. Approval and authorization

>>

The letter of approval from each Party to be involved in the project activity is available at the time of submitting the PDD to the validating DOE.

The letters of approval are available at UNFCCC website, and the URL is:
<http://cdm.unfccc.int/Projects/DB/RWTUV1332161864.95/view>

**Appendix 1: Contact information of project participants**

Organization	Everbright Photovoltaic Energy (Suqian) Limited
Street/P.O. Box	No. 5 Dijin Road, Haidian District
Building	Zhongguancun Environment Protection Park
City	Beijing
State/Region	
Postcode	100095
Country	People's Republic of China
Telephone	086-10-62498838
Fax	
E-mail	cheny@ebchinaintl.com.cn
Website	
Contact person	Chen Yang
Title	Mr.
Salutation	
Last name	Chen
Middle name	
First name	Yang
Department	Operation and Management Department
Mobile	086-15810465805
Direct fax	
Direct tel.	086-10-62498838
Personal e-mail	cheny@ebchinaintl.com.cn



Organization	Innovative Carbon Investment Corporation
Street/P.O. Box	P.O. Box 4389
Building	Quastisky Building
City	Road Town
State/Region	Tortola
Postcode	
Country	United Kingdom of Great Britain and Northern Ireland
Telephone	086-10-65174621(Beijing Office Tel. Number)
Fax	086-10-65175899(Beijing Office Fax Number)
E-mail	Steve.zhao@mailici.com
Website	
Contact person	Zhao Yudong
Title	
Salutation	Mr.
Last name	Zhao
Middle name	
First name	Yudong
Department	
Mobile	
Direct fax	086-10-65175899
Direct tel.	086-10-65174621
Personal e-mail	Steve.zhao@mailici.com



Appendix 2: Affirmation regarding public funding

There is no public funding from Annex I Parties for this Project.



Appendix 3: Applicability of selected methodology

No other information.



Appendix 4: Further background information on ex ante calculation of emission reductions

The baseline information for calculation of OM, BM and CM emission factor of East China Power Grid is shown in *2012 Baseline Emission Factors for Regional Power Grids in China* by the Office of the National Coordination Committee on Climate Change of China at <http://cdm.ccchina.gov.cn>. The concrete process is shown in the following tables.



Table A1 Calculation of simple OM emission factor of the East China Power Grid in 2008

Fuels	Units	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total	Emission factor (tC/TJ)	OXID (%)	Fuel emission factor (kgCO ₂ /TJ)	NCV (MJ/t,km ³)	Emission (tCO ₂ e)
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J	K=F×I×J/100000 (quality unit); K=F×I×J/10000 (volume unit)
Raw coal	10 ⁴ ton	2964.04	10890.2	7316.17	4887.18	3264.88	29322.47	25.8	100	87,300	20,908	535,213,779
Washed coal	10 ⁴ ton						0	25.8	100	87,300	26,344	0
Other washed coal	10 ⁴ ton		513.34		33.49		546.83	25.8	100	87,300	8,363	3,992,351
Module coal	10 ⁴ ton						0	26.6	100	87,300	20,908	0
Coke	10 ⁴ ton			31.12			31.12	29.2	100	95,700	28,435	846,847
Coke oven gas	10 ⁸ m ³	0.5	11.65	0.13	5.62	0.31	18.21	12.1	100	37,300	16,726	1,136,085
Other gas	10 ⁸ m ³	98.42	77.84	3.57		6.36	186.19	12.1	100	37,300	5,227	3,630,092
Crude oil	10 ⁴ ton			8.31			8.31	20	100	71,100	41,816	247,066
Gasoline	10 ⁴ ton						0	18.9	100	67,500	43,070	0
Diesel	10 ⁴ ton	5.85	4.04	2.05		1.04	12.98	20.2	100	72,600	42,652	401,930
Fuel oil	10 ⁴ ton	24.43	0.39	13.48		1.81	40.11	21.1	100	75,500	41,816	1,266,316
LPG	10 ⁴ ton						0	17.2	100	61,600	50,179	0
Refinery gas	10 ⁴ ton	0.05	0.28		1.5	0.57	2.4	15.7	100	48,200	46,055	53,276
Natural gas	10 ⁸ m ³	3.65	25.14	8.99		0.19	37.97	15.3	100	54,300	38,931	8,026,681
Other petroleum products	10 ⁴ ton	21.33	3.09				24.42	20	100	72,200	41,816	737267.9318
Other coking products	10 ⁴ ton						0	25.8	100	95,700	28,435	0
Other energy	10 ⁴ ton	15.88	62.57	34.54		8.99	121.98	0	0	0	0	0
Total												555,551,691

Data source: China Energy Statistical Yearbook 2009

**Table A2 The fuel fired electricity generation and calculation of emission factor of East China Power Grid in 2008**

Province	The fuel fired electricity generation (MWh)	The rate of electricity self-consumption (%)	The fuel fired electricity connected to the grid (MWh)
Shanghai	79,400,000	4.88	75,525,280
Jiangsu	273,500,000	5.51	258,430,150
Zhejiang	174,800,000	5.77	164,714,040
Anhui	107,400,000	5.72	101,256,720
Fujian	74,800,000	5.61	70,603,720
From Shanxi Yangcheng			16,903,640
From CCPG			35,684,610
Emission factor of Yangcheng			1.004945
Simple OM of CCPG			1.04205
The Total			723,118,160
Total Emission (tCO ₂)			609,724,008
<i>EF_{OM,y}</i> for 2008			0.84319

Data source: China Electric Power Yearbook 2009

**Table A3 Calculation of simple OM emission factor of the East China Power Grid in 2009**

Fuels	Units	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total	Emission factor (tC/TJ)	OXID (%)	Fuel emission factor (kgCO ₂ /TJ)	NCV (MJ/t,km ³)	Emission (tCO ₂ e)
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J	K=F×I×J/100000 (quality unit); K=F×I×J/10000 (volume unit)
Raw coal	10 ⁴ ton	2860.29	10875.32	7592.14	5782.21	3539.1	30649.06	25.8	100	87,300	20,908	559,427,607
Washed coal	10 ⁴ ton						0	25.8	100	87,300	26,344	0
Other washed coal	10 ⁴ ton		324.83		50.83		375.66	25.8	100	87,300	8,363	2,742,656
Coke	10 ⁴ ton			50.46			50.46	29.2	100	95,700	28,435	1,373,132
Coke oven gas	10 ⁸ m ³	1.02	8.96	0.29	5.64	0.47	16.38	12.1	100	37,300	16,726	1,021,915
Other gas	10 ⁸ m ³	109.27	101.42	3.67		8.42	222.78	12.1	100	37,300	5,227	4,343,477
Crude oil	10 ⁴ ton			3.36			3.36	20	100	71,100	41,816	99,897
Gasoline	10 ⁴ ton						0	18.9	100	67,500	43,070	0
Diesel	10 ⁴ ton	1.03	1.67	1.49		4.16	8.35	20.2	100	72,600	42,652	258,561
Fuel oil	10 ⁴ ton	13.13		8.87		0.46	22.46	21.1	100	75,500	41,816	709,086
LPG	10 ⁴ ton						0	17.2	100	61,600	50,179	0
Refinery gas	10 ⁴ ton	0.06	0.17		1.97	14.15	16.35	15.7	100	48,200	46,055	362,946
Natural gas	10 ⁸ m ³	5.37	22.78	8.87	0.23	5.74	42.99	15.3	100	54,300	38,931	9,087,885
Other petroleum products	10 ⁴ ton	18.6	5.31				23.91	20	100	72,200	41,816	721870.4443
Other coking products	10 ⁴ ton						0	25.8	100	95,700	28,435	0
Other energy	10 ⁴ ton	14.84	89.4	43.75	33.62	12.59	194.2	0	0	0	0	0
Total												580,149,033

Data source: China Energy Statistical Yearbook 2010

**Table A4 The fuel fired electricity generation and calculation of emission factor of East China Power Grid in 2009**

Province	The fuel fired electricity generation (MWh)	The rate of electricity self-consumption (%)	The fuel fired electricity connected to the grid (MWh)
Shanghai	78,200,000	5.22	74,117,960
Jiangsu	282,500,000	5.38	267,301,500
Zhejiang	185,500,000	5.66	175,000,700
Anhui	129,900,000	5.59	122,638,590
Fujian	88,600,000	5.1	84,081,400
From Shanxi Yangcheng			16,626,120
From CCPG			36,599,120
Emission factor of Yangcheng			0.964179
Simple OM of CCPG			0.95455
The Total			776,365,390
Total Emission (tCO ₂)			631,115,448
<i>EF_{OM,y} for 2009</i>			0.81291
<i>Data source: China Electric Power Yearbook 2010</i>			



Table A5 Calculation of simple OM emission factor of the East China Power Grid in 2010

Fuels	Units	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total	Emission factor (tC/TJ)	OXID (%)	Fuel emission factor (kgCO ₂ /TJ)	NCV (MJ/t,km ³)	Emission (tCO ₂ e)
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J	K=F×I×J/100000 (quality unit); K=F×I×J/10000 (volume unit)
Raw Coal	10 ⁴ ton	3421.2	12612.92	8254.08	5230.09	3371.11	32889.4	25.8	100	87,300	20,908	600,319,825
Cleaned Coal	10 ⁴ ton						0	25.8	100	87,300	26,344	0
Other Washed Coal	10 ⁴ ton		230.14	2.25	1301.82		1534.21	25.8	100	87,300	8,363	11,201,112
Coke	10 ⁴ ton						0	29.2	100	95,700	28,435	0
Coal Gangue	10 ⁴ ton		20.69	1.04	236.33	34.67	292.73	25.8	100	87,300	8,363	2,137,192
Coke Oven Gas	10 ⁸ m ³	0.67	10.8	0.26	5.28	0.19	17.2	12.1	100	37,300	16,726	1,073,073
Blast furnace gas	10 ⁸ m ³	106.03	108.95	14.19	76.22	6.21	311.6	70.8	100	219,000	3,763	25,678,863
Converter gas	10 ⁸ m ³	12.19	4.31	0.95	1.09	0.46	19	46.9	100	145,000	7,945	2,188,848
Other Gas	10 ⁸ m ³						0	12.1	100	37,300	5,227	0
Crude Oil	10 ⁴ ton			3.23			3.23	20	100	71,100	41,816	96,032
Gasoline	10 ⁴ ton						0	18.9	100	67,500	43,070	0
Diesel Oil	10 ⁴ ton	0.9	1.98	1.04		3.19	7.11	20.2	100	72,600	42,652	220,164
Fuel Oil	10 ⁴ ton	17.53	0.06	5.14		0.73	23.46	21.1	100	75,500	41,816	740,658
Naphtha	10 ⁴ ton						0	20.2	100	72,600	43,906	0
Lubricating oil	10 ⁴ ton						0	20	100	71,900	41,398	0
Paraffin wax	10 ⁴ ton						0	20	100	72,200	39,934	0
Solvent oil	10 ⁴ ton						0	20	100	72,200	42,945	0
Petroleum asphalt	10 ⁴ ton						0	21	100	69,300	38,931	0



Petroleum coke	10 ⁴ ton	23.49		37.5			60.99	26.6	100	82,900	31,947	1,615,263
LPG	10 ⁴ ton						0	17.2	100	61,600	50,179	0
Refinery Gas	10 ⁴ ton	0.76	0.16		1.18	42.17	44.27	15.7	100	48,200	46,055	982,728
LNG	10 ⁴ ton			2.76			2.76	15.3	100	54,300	51,434	77,083
Natural Gas	10 ⁸ m ³	7.47	24.39	17.53		19.09	68.48	15.3	100	54,300	38,931	14,476,352
Other Petroleum Products	10 ⁴ ton	0.05	1.22				1.27	20	100	72,200	41,816	38342.76304
Other Coking Products	10 ⁴ ton						0	25.8	100	95,700	28,435	0
Other Energy	10 ⁴ ton	15.59	112.68	49.33	28.77	1.1	207.47	0	0	0	0	0
Total												660,845,535

Data source: China Energy Statistical Yearbook 2011

**Table A6 The fuel fired electricity generation and calculation of emission factor of East China Power Grid in 2010**

Province	The fuel fired electricity generation (MWh)	The rate of electricity self-consumption (%)	The fuel fired electricity connected to the grid (MWh)
Shanghai	94,200,000	4.98	89,508,840
Jiangsu	330,500,000	5.27	313,082,650
Zhejiang	208,200,000	5.34	197,082,120
Anhui	142,600,000	5.37	134,942,380
Fujian	89,100,000	5.17	84,493,530
From NCPG			16,547,520
From CCPG			40,113,670
Simple OM of NCPG			1.00211
Simple OM of CCPG			0.99213
The Total			875,770,710
Total Emission (tCO ₂)			717,225,962
<i>EF_{OM,y} for 2010</i>			0.81897
<i>Data source: China Electric Power Yearbook 2011</i>			

**TableA7 The three years weighted average emission factor of East China Power Grid**

Years	2008	2009	2010	Three years average emission factor (tCO ₂ e/MWh)
Total CO ₂ emission(tCO ₂ e)	609,724,008	631,115,448	717,225,962	0.82436
The total fuel fired electricity connected to the grid(MWh)	723,118,160	776,365,390	875,770,710	
<i>EF_{OM,y}</i>	0.84319	0.81291	0.81897	

Table A8 Calculation the weight of CO₂ emissions from solid fuels, liquid fuels and gas fuels among the total emissions in ECPG

Fuels	Units	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total	NCV	Emission factor	Oxid	Emission
		A	B	C	D	E	F=A+B+C + D+E	G	H	I	J=F×G×H×I/100,000 (quality unit); J=F×G×H×I/100,000 (volume unit)
Raw Coal	10 ⁴ t	3,421.20	12,612.92	8,254.08	5,230.09	3,371.11	32,889.40	20,908	87,300	1	600,319,825
Cleaned Coal	10 ⁴ t	0	0	0	0	0	0.00	26,344	87,300	1	0
Other Washed Coal	10 ⁴ t	0	230.14	2.25	1301.82	0	1,534.21	8,363	87,300	1	11,201,112
Briquettes	10 ⁴ t	0	0	0	0	0	0.00	20,908	87,300	1	
Coal Gangue	10 ⁴ t	0	20.69	1.4	236.33	34.67	293.09	8,363	87,300	1	2,139,820
Coke	10 ⁴ t	0	0	0	0	0	0.00	28,435	95,700	1	0
Other Coking Products	10 ⁴ t	0	0	0	0	0	0	28,435	95,700	1	0
Total of solid fuels											613,660,758
Crude Oil	10 ⁴ t	0	0	3.23	0	0	3.23	41,816	71,100	1	96,032
Gasoline	10 ⁴ t	0	0	0	0	0	0	43,070	67,500	1	0
Diesel Oil	10 ⁴ t	0.9	1.98	1.04	0	3.19	7.11	42,652	72,600	1	220,164
Fuel Oil	10 ⁴ t	17.53	0.06	5.14	0	0.73	23.46	41,816	75,500	1	740,658
Naphtha	10 ⁴ t	23.49	0	37.5	0	0	60.99	31,947	82,900	1	1,615,263
Other petroleum products	10 ⁴ t	0.05	1.22	0	0	0	1.27	41,816	75,500	1	40,095
Total of liquid fuels											2,712,211
LPG	10 ⁴ t	0	0	0	0	0	0	50,179	61,600	1	0
Coke Oven Gas	10 ⁸ m ³	0.67	10.8	0.26	5.28	0.19	17.2	16,726	37,300	1	1,073,073
Blast furnace gas	10 ⁸ m ³	106.03	108.95	14.19	76.22	6.21	311.6	3,763	219,000	1	25,678,863
Converter gas	10 ⁸ m ³	12.19	4.31	0.95	1.09	0.46	19	7,945	145,000	1	2,188,848
Other Gas	10 ⁸ m ³	0	0	0	0	0	0	5,227	37,300	1	0
Refinery Gas	10 ⁴ t	0.76	0.16	0	1.18	42.17	44.27	46,055	48,200	1	982,728



LNG	10 ⁴ t	0.00	0	2.76	0	0	2.76	51,434	54,300	1	77,083
Natural Gas	10 ⁸ m ³	7.47	24.39	17.53	0	19.09	68.48	38,931	54,300	1	14,476,352
Total of gas fuels											44,476,947
Other Energy	10 ⁴ t	15.59	112.68	49.33	28.77	1.1	207.47	0	0	1	0
Total of all fuels											660,849,916
<i>Data source: China Energy Statistical Yearbook 2011</i>											

**Table A9 The emission factor of the most efficient commercial coal-fueled, oil-fueled and gas-fueled power plant**

	Variable	Efficiency of electricity supply	Emission factor of the fuels(kgC/TJ)	OXID	Emission factor (tCO ₂ e/MWh)
		A	B	C	D=3.6/A/1,000,000×B×C
Coal-fueled power plant	$EF_{Coal,Adv,y}$	39.65%	87,300	1	0.7927
Oil-fueled power plant	$EF_{Oil,Adv,y}$	51.93%	75,500	1	0.5234
Gas-fueled power plant	$EF_{Gas,Adv,y}$	51.93%	54,300	1	0.3765

TableA10 the weight of CO₂ emission from solid, liquid and gas fuels among the total emissions and the thermal emission factor of ECPG

$\lambda_{Coal,y}$	$\lambda_{Oil,y}$	$\lambda_{Gas,y}$	$EF_{Thermal,y}$ (tCO ₂ e/MWh)
			$(\lambda_{Coal,y} * EF_{Coal,Adv,y} + \lambda_{Oil,y} * EF_{Oil,Adv,y} + \lambda_{Gas,y} * EF_{Gas,Adv,y})$
0.9286	0.0041	0.0673	0.7636



Table A11 Calculation of BM emission factor of ECPG

	<i>2007 installed capacity</i>	<i>2008 installed capacity</i>	<i>2009 installed capacity</i>	<i>2010 installed capacity</i>	<i>Newly added installed capacity between 2007 and 2010</i>	<i>Weight in newly added installed capacity</i>
	A	B	C	C	D	E
<i>Fossil fueled(MW)</i>	138,650	148,700	157,970	172,710	52,660	90.23%
<i>Hydro power(MW)</i>	19,970	22,240	23,300	23,630	3,660	6.27%
<i>Nuclear power(MW)</i>	5,070	5,070	5,130	5,790	720	1.23%
<i>Wind power(MW)</i>	1,096	1,062	1,689	2,421	1,325	2.27%
<i>Total(MW)</i>	164,786	177,072	188,089	204,551	58,365	100%
<i>Share in 2010 installed capacity</i>					28.53%	
<i>BM tCO₂/MWh</i>	0.6889					
<i>Data source: China Electric Power Yearbook 2009-2011</i>						

$$CM = 0.75 \times OM + 0.25 \times BM = 0.75 \times 0.82436 + 0.25 \times 0.6889 = 0.7905 \text{ tCO}_2\text{e/MWh}$$



Appendix 5: Further background information on monitoring plan

No other information.

**Appendix 6: Summary of post registration changes**

N/A

History of the document

Version	Date	Nature of revision
04.1	11 April 2012	Editorial revision to change history box by adding EB meeting and annex numbers in the Date column.
04.0	EB 66 13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for small-scale CDM project activities” (EB 66, Annex 9).
03	EB 28, Appendix 44 15 December 2006	<ul style="list-style-type: none">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.
02	EB 20, Annex 14 08 July 2005	<ul style="list-style-type: none">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>.
01	EB 07, Annex 05 21 January 2003	Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration		