



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

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	Gansu Jinchang Magang and Huangmaopo Bundled Wind Power Project
Version number of the PDD	05
Completion date of the PDD	18/06/2014
Project participant(s)	Three Gorges New Energy Jinchang Wind Power Co., Ltd. (Project owner) Carbon Invcap International Trading Co., Ltd. (Buyer)
Host Party(ies)	P.R. of China
Sectoral scope and selected methodology(ies)	01 Energy industries (Renewable sources), ACM0002“ <i>Consolidated baseline methodology for grid-connected electricity generation from renewable sources</i> ”(version 13.0.0)
Estimated amount of annual average GHG emission reductions	175,000tCO ₂ e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>>

Gansu Jinchang Magang and Huangmaopo Bundled Wind Power Project (hereafter referred to as the bundled project) is sited in Jinchang City, Gansu Province, P. R. of China, invested and operated by Three Gorges New Energy Jinchang Wind Power Co., Ltd.. The bundled project consists of two projects as follows:

Jinchuan Magang 49.5MW Wind Power Project (hereafter referred to as Magang project) is sited on north of Jinchuan district, Jinchang City. The purpose of Magang project is to install 33 sets of 1.5MW wind turbine-generators to generate clean and renewable electricity with zero emissions. The total installed capacity of the Magang project is 49.5MW. It is estimated that the quantity of net electricity generation supplied by Magang project is approximately 102.8687GWh per year under full operation. Magang project activity will achieve average greenhouse gas (GHG) emission reductions of 88,137tCO₂e annually.

Yongchang Huangmaopo 49.5MW Wind Power Project (hereafter referred to as Huangmaopo project) is sited in Yongchang County, Jinchang City. The purpose of Huangmaopo project is to install 24 sets of 2MW wind turbine-generators and 1 set of 1.5MW wind turbine-generators to generate clean and renewable electricity with zero emissions. The total installed capacity of Huangmaopo project is 49.5MW. It is estimated that the quantity of net electricity generation supplied by Huangmaopo project is approximately 101.3816GWh per year under full operation. Huangmaopo project activity will achieve average greenhouse gas (GHG) emission reductions of 86,863tCO₂e annually.

The total installed capacity of the bundled project is 99MW, and annual net power generation amounts to 204.2503GWh. Prior to the implementation of the bundled project activity, the electricity is supplied by the operation of grid-connected power plants and by the addition of new generation sources within the Northwest China Power Grid (NWPG), which is the same as baseline scenario. The bundled project activity is a renewable energy project and estimated to achieve average annual greenhouse gas (GHG) emission reductions of 175,000tCO₂e annually, and totally 1,225,000tCO₂e for the first crediting period by displacing power generation from those fossil fuel-fired power plants connected to the NWPG under the baseline scenario.

The bundled project clearly fits into the development priority of China. The bundled project will not only supply renewable electricity to grid, but also contribute to sustainable development of the local community and the host country by means of:

- reducing the emission of other pollutants resulting from the power generation industry in China, compared to a business-as-usual scenario;
- helping to stimulate the growth of the wind power industry and, encouraging and promoting the technology progress and commercial popularization of grid-connected clean renewable energy generation in China;
- creating local employment opportunities during assembly and installation of the electricity generation equipment and during the bundled project construction;
- Providing long-term work positions during the operation of the bundled project.

A.2. Location of project activity

A.2.1. Host Party(ies)

>>

People's Republic of China

**A.2.2. Region/State/Province etc.**

>>

Gansu Province

A.2.3. City/Town/Community etc.

>>

Magang project is sited on north of Jinchuan district, Jinchang City.

Huangmaopo project is sited in Yongchang County, Jinchang City

A.2.4. Physical/Geographical location

>>

The bundled project is sited in Jinchang City, Gansu Province, P. R. of China, and the geographical coordinates of the bundled project are as follows. Figure 1 is a map showing the location of Jinchang City, Figure 2 is a map showing the location of the bundled project.

The geographical coordinates of the bundled project

Project	East longitude	North latitude
Magang project	102 °13'04.74" ~ 102 °15'36.93"	38 °44'48.19" ~ 38 °47'48.67"
Huangmaopo project	101 °33'45" ~ 101 °38'41"	38 °23'04" ~ 38 °25'05"



Figure 1. Map showing the location of Jinchang City, Gansu Province



Figure 2. Map showing the location of Magang project and Huangmaopo project

A.3. Technologies and/or measures

>>

According to the FSR of the bundled project, the total installed capacity of the bundled project is 99MW. The quantity of net electricity generation supplied the bundled project is approximately 204.2503GWh per year after full operation. The estimated annual equivalent operating hours of Magang project are 2,078h and the estimated load factor is 0.2372¹, and the estimated annual equivalent operating hours of Huangmaopo project are 2,048h and the estimated load factor is 0.2338. Prior to the implementation of the bundled project activity, the electricity is supplied by the operation of grid-connected power plants and by the addition of new generation sources within the NWPG, which is the same with the baseline scenario.

The bundled project is expected to achieve average annual greenhouse gas (GHG) emission reductions of 175,000tCO₂e annually by displacing power generation by fossil fuel-fired power plants connected to the NWPG under the baseline scenario, and the accumulated emission reductions for the first crediting period is expected to be 1,225,000tCO₂e.

The electricity produced by Magang project will be sent to the 35kV/ 110kV Substation, and two bi-directional meters (main gateway meter M1 and back-up gateway meter M1') with not lower than 0.5S of accuracy, will be installed at the outlet of Substation to measure the electricity exported to the grid by Magang project and the electricity imported from the grid by Magang project.

The electricity produced by Huangmaopo project will be sent to the 35kV/ 110kV Substation, and two bi-directional meters (main gateway meter M2 and back-up gateway meter M2') with not lower than 0.5S of accuracy, will be installed at the outlet of Substation to measure the electricity exported to the grid by Huangmaopo project and the electricity imported from the grid by Huangmaopo project. And then both projects delivered to the NWPG via 110 kV transmission line.

The wind turbines and the associated generators were provided by domestic manufacturers, thus no technology transfer will be involved. Major technical parameters of the key equipments employed by the bundled project are illustrated in Table 1.

Table 1. Major technical parameters of the key equipment of the bundled project

Wind turbine			Magang project		Huangmaopo project	
	Type		GW93/1500	EN93/1.5	W2000CH	W1500CH
	Rated power	kW	1500	1500	2000	1500
	Lifetime	year	20	20	20	20
	Cut in wind speed	m/s	2.5	3	3.0	3.0
	Cut out wind speed	m/s	19	20	20	20
	Rated wind speed	m/s	9.5	9.5	10.2	10.2

¹ The load factor came from the FSR of the bundled Project. While the FSR of Magang project and the FSR of Huangmaopo project were designed by *Gansu Water Resources and Hydropower Design & Research Institute*, which is one of the Class A state technological survey and design integrated institute, the FSRs prepared by the institute are of high reliability. The PLFs of the Magang project and Huangmaopo project are fully consistent with the relevant requirements in EB48 Annex 11 of “*Guidelines for the reporting and validation of plant load factors*” (Version 01). Therefore, the load factor is reasonable and feasible.



	survival wind speed	m/s	49	52.5	52.5	52.5
Generator	Rated power	kW	1580	1560	2100	1600
	Rated voltage	V	720	690	690	690

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. of China (host)	Three Gorges New Energy Jinchang Wind Power Co., Ltd. (Project owner)	No
United Kingdom of Great Britain and Northern Ireland	Carbon Invcap International Trading Co., Ltd. (Buyer)	No

A.5. Public funding of project activity

>>

There is no public funding from Annex I Parties for the bundled project.

SECTION B. Application of selected approved baseline and monitoring methodology

B.1. Reference of methodology

>>

Approved consolidated baseline and monitoring methodology ACM0002 “*Consolidated baseline methodology for grid-connected electricity generation from renewable sources*” (version 13.0.0) will be employed for the bundled project.

The approved “*Tool for the Demonstration and Assessment of Additionality*” (version 07.0.0) will be employed for additionality demonstration.

The approved “*Tool to calculate the emission factor for an electricity system*” (version 03.0.0) will be employed for the calculation of emission factor.

The bundled project is the installation of two new grid-connected renewable power plants, the baseline scenario was prescribed in the ACM0002 and the “*combined tool to identify the baseline and demonstrate additionality*” (version 04.0.0) does not need to be applied in the case of Greenfield projects as per ACM0002.

No fossil fuel will be consumed by the bundled project activity, so, the “*Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion*” (version 02) was not applied.

The methodology and tools can be found from:

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

B.2. Applicability of methodology

>>

Wind power generation technology is one kind of renewable electricity generation technology which displaces fossil fuel-fired power generation technology to supply electricity to the grid. Therefore the bundled project applies the consolidated methodology ACM0002 version 13.0.0 approved by the CDM EB to determine the project baseline and to calculate GHG emission reductions achieved by wind power generation. The methodology ACM0002 version 13.0.0 is applicable to the bundled project activity as:

No.	Applicability	Explain
1	This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	The bundled project activity belongs to (a) i.e. the installation of two new power plants at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant).
2	The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	The bundled project activity is the installation of two new grid connected wind power plants.
3	In the case of capacity additions, retrofits or	The bundled project is the installation of two new



	replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2: on page 10 to calculate the parameter $EG_{PJ,y}$): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	grid connected wind power plants, not capacity addition, retrofits or replacements. So this applicability condition does not need to be considered.
4	In case of hydro power plants, One of the following conditions must apply: The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m^2; or The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m^2. In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2 all of the following conditions must apply: • The power density calculated for the entire project activity using equation 5 is greater than 4 W/m^2; • Multiple reservoirs and hydro power plants located at the same river and where are designed together to function as an integrated project that collectively constitutes the generation capacity of the combined power plant; • Water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity; • Total installed capacity of the power units, which are driven using water from the reservoirs with a power density lower than 4 W/m^2, is lower than 15MW;	The bundled project is not a hydro power plant, so this applicability condition does not need to be considered.

	Total installed capacity of the power units, which are driven using water from reservoirs with power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.	
5	The methodology is not applicable to the following: .Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; .Biomass fired power plants; .A hydro power plant that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the power plant is less than 4 W/m^2.	The bundled project includes two new grid-connected wind power plants, therefore: (1) The bundled project does not involve switching from fossil fuels to renewable energy sources at the site of the project activity; (2) The bundled project is not a biomass fired power plant; (3) The bundled project is not a hydro power plant.
6	In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is .the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance.	The bundled project activity is the installation of two new grid-connected wind power plants, not retrofits, replacements, or capacity additions. So this applicability condition does not need to be considered.

B.3. Project boundary

According to the methodology ACM0002 version 13.0.0, the spatial extent of the bundled project boundary includes both wind power projects. The bi-directional electricity meters with accuracy not lower than 0.5s measuring the quantity of net electricity generation supplied by Magang project and Huangmaopo project are installed at the outlet of respective 35kV/ 110kV Substation. Electricity generated by the bundled project will be delivered to the NWPG. According to the latest guideline² issued by the China DNA on 17/09/2013, the boundary of the NWPG is composed of Shaanxi Power Grid, Gansu Power Grid, Qinghai Power Grid, Ningxia Power Grid and Xinjiang Power Grid. Therefore, the spatial extent of the bundled project boundary also includes all the power plants physically connected into the NWPG.

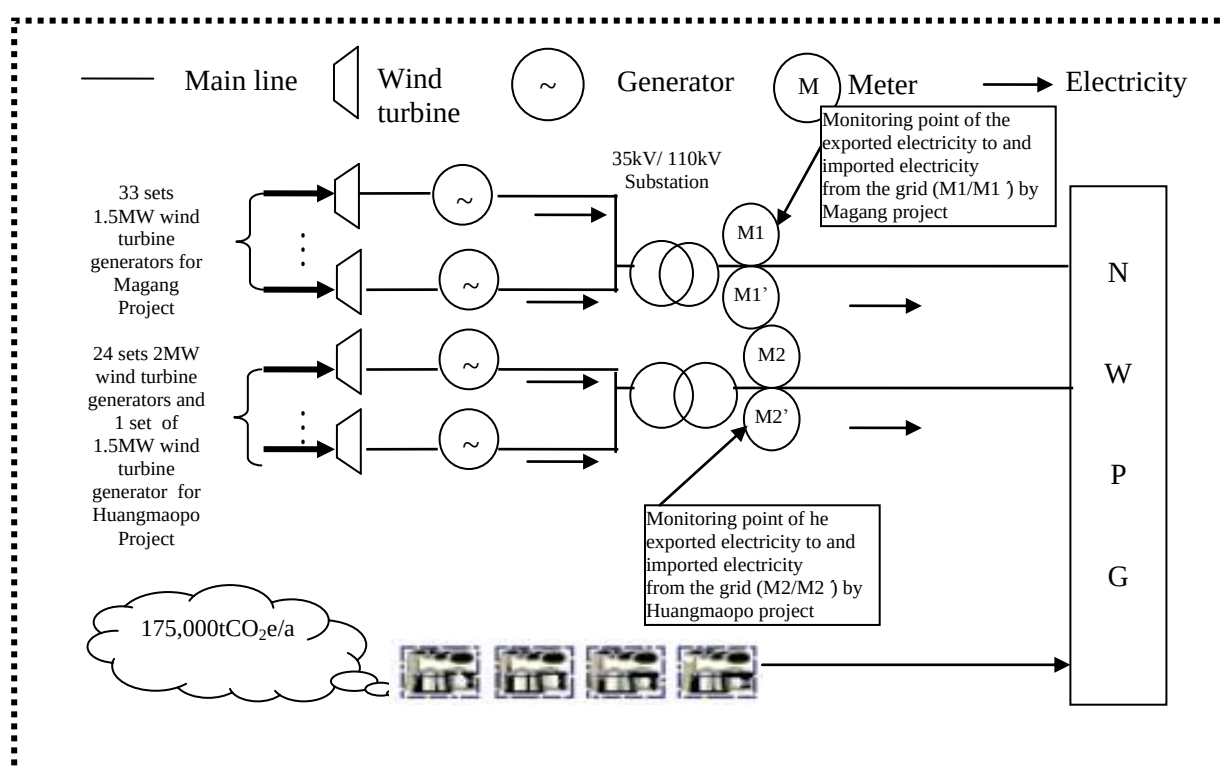
The greenhouse gases and emission sources included in or excluded from the project boundary are shown in Table 2.

² 2013 baseline emission factors for regional power grids in China, issued by China DNA (<http://cdm.ccchina.gov.cn/Detail.aspx?newsId=41387&TId=19>)

Table 2. Emissions sources included in or excluded from the project boundary

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	CO ₂ emissions from electricity generation in fossil fuel fired power plants connected into the NWPG that are displaced due to the Project activity	CO ₂	Yes	Main emission source.
		CH ₄	No	Minor emission source.
		N ₂ O	No	Minor emission source.
Project scenario	Project emission.	CO ₂	No	The bundled project includes two wind power projects, so the project emissions should not be considered as per ACM0002.
		CH ₄	No	Minor emission source.
		N ₂ O	No	Minor emission source.

For details regarding the electricity transmission and meter installation, please refer to Figure 3.



Meter No.	M1	M1'	M2	M2'
Type	Gateway main meter	Gateway backup meter	Gateway main meter	Gateway backup meter
Accuracy	Not lower than 0.5S	Not lower than 0.5S	Not lower than 0.5S	Not lower than 0.5S
Bi-direction	Yes	Yes	Yes	Yes
Location	substation outlet of Magang project	substation outlet of Magang project	substation outlet of Huangmaopo project	substation outlet of Huangmaopo project

Figure 3. The flow diagram of the bundled project boundary

B.4. Establishment and description of baseline scenario

>>

As the bundled project activity is the installation of two new wind power plants, according to the methodology ACM0002 version 13.0.0, the baseline scenario of the bundled project is identified as follows:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the Tool to calculate the emission factor for an electricity system.

The baseline scenario boundary of the bundled project is the NWPG, so the bundled project boundary for calculating EF_{OM} and EF_{BM} will be limited to the NWPG.

In conclusion, the baseline scenario of the bundled project is the provision of equivalent amount of electricity by the NWPG. The GHG emission reduction as a result of the bundled project activity will be calculated based on EF_{OM} and EF_{BM} of the NWPG and the amount of annual feed-in electricity supplied by the bundled project. Please refer to Appendix 4 for the parameters used for calculating the baseline emission.

B.5. Demonstration of additionality

>>

The carbon revenue was a key factor in the investment decision making for the bundled project. The project owner has seriously considered the carbon revenue before the start of the implementation of the bundled project.

For Magang Project

Milestone Date	Event	Document
03/2012	The FSR of Magang project was completed.	The FSR of Magang project
21/12/2012	Magang project obtained the approval from the Gansu Development and Reform Commission.	GFGNY[2012]2072
01/03/2013	The project owner decided to invest Magang project with GS	Investment decision resolution



	VER revenue consideration.	
24/05/2013	Construction Contract of Engineering Road and Wind Turbine Foundation was signed	Construction Contract of Engineering Road and Wind Turbine Foundation
04/06/2013	The construction permit of Magang Project was issued	Construction Permit

For Huangmaopo Project

Milestone Date	Event	Document
03/2012	The FSR of Huangmaopo project was completed.	The FSR of Huangmaopo project
21/12/2012	Huangmaopo project obtained the approval from the Gansu Development and Reform Commission.	GFGNY[2012]2073
01/03/2013	The project owner decided to invest Huangmaopo project with GS VER revenue consideration.	Investment decision resolution
30/04/2013	The wind turbines and the auxiliary equipment purchase contract of Huangmaopo project was signed.	The wind turbines and the auxiliary equipment purchase contract
05/06/2013	The construction permit of The wind turbines and the auxiliary equipment purchase contract was issued	Construction Permit

Demonstration and assessment of additionality

Identify whether the bundled project has additionality by using “*Tool for the Demonstration and Assessment of Additionality*” (version 07.0.0) approved by CDM EB.

Step 0. Demonstration whether the proposed project activity is the first-of-its-kind;

Not applicable. The step can be skipped.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations**Sub-step 1a. Define alternatives to the project activity:**

The bundled project is installation of two new grid-connected renewable power plants, the baseline scenario, according to the methodology of ACM0002 version 13.0.0, is the following:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the Tool to calculate the emission factor for an electricity system.

The selected methodology ACM0002 version 13.0.0 prescribes the baseline scenario, thus alternatives to the bundled project is not needed to be further identified³

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

The baseline scenario of the bundled project is prevailing practice which satisfies China's regulations.

Step 2. Investment Analysis

Sub-step 2a. Determine appropriate analysis method

The “*Tool for the Demonstration and Assessment of Additionality*” (version 07.0.0) suggests three analysis methods which are simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III). Besides the sales revenues, the bundled project will earn the revenues from electricity sales, the simple cost analysis (Option I) is not appropriate. Investment comparison analysis (Option II) is only applicable to projects whose alternatives are similar investment projects. Since the bundled project is two grid-connected wind power projects, and the baseline scenario is the provision of equivalent amount of annual electricity by the NWPG, benchmark analysis is selected for the bundled project in accordance with *Guidelines on the Assessment of Investment Analysis Version 05* (annex 5, EB62).

Sub-step 2b. Benchmark Analysis Method (Option III)

According to the *Measures on Compiling the Feasibility Study Report of Wind Power Plant Project*, which is the annex to *Relevant regulations regarding issuing the Preparatory Work of Wind Power Plant Project* issued by the Office of National Development and Reform Commission (NDRC energy [2005]899), the sectoral benchmark for wind power projects is 8.00% for the project IRR.

Considering the fact that *Relevant regulations regarding issuing the Preparatory Work of Wind Power Plant Project* is currently the official guideline for wind power project design, the 8.00% is adopted by the bundled project as the benchmark for the project IRR. On the basis of the above benchmark, the calculation and comparison of financial indicator(s) are carried out in sub-step 2c.

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

Basic parameters for calculation of financial indicators of the bundled project are shown in Table 3.

Table 3. Basic parameters for calculation of financial indicators

Parameter	Unit	Magang project	Huangmaopo project	Source of data
Installed capacity	MW	49.5	49.5	FSR
Annual feed-in electricity	GWh	102.8687	101.3816	FSR
Project lifetime(including 1 year of construction period)	Year	21	21	FSR
Static total investment	Million CNY	453.4849	454.9302	FSR
Expected bus-bar tariff (VAT included)	CNY/kWh	0.58	0.58	FSR
Annual operation costs	Million CNY	13.5934	13.6259	FSR
VAT rate	%	17	17	FSR
VAT refund rate	%	50	50	FSR

³ *Clean Development Mechanism Validation and Verification Standard* (VVS, version 05.0), paragraph 115.

Income tax rate	%	25	25	FSR
City construction surtax rate	%	5	5	FSR
Education surtax rate	%	5	5	FSR
Years for depreciation	year	15	15	FSR
Annual depreciation rate	%	6.47	6.47	FSR
Rate of residual value	%	3	3	FSR

Based on the data above, without the revenue from ERs sales, the IRR of Magang project is 6.47% (after tax), and the IRR of Huangmaopo project is 6.21% (after tax), which are lower than the benchmark. Magang project and Huangmaopo project are not financially attractive.

Calculated by CNY 80/ tCO₂e, 7 year ×3 crediting period, the ER revenue will enable the IRR of Magang project reach 8.67% (after tax), and the ER revenue will enable the IRR of Huangmaopo project reach 8.39% (after tax), which are higher than 8% (after tax) of the benchmark.

The bundled project IRR with and without the revenue from ERs sales was list in Table 4.

Table 4.Comparison of financial indicators with and without ER revenues

Project	IRR		
	Without ER revenues	Benchmark	With ER revenues
Magang project	6.47%	8%	8.67%
Huangmaopo project	6.21%	8%	8.39%

Sub-step 2d. Sensitivity analysis

To further demonstrate whether the conclusion that bundled project activity is not economic attractive if the key assumptions changes in a reasonable range is still valid, sensitivity analysis will be conducted.

(1) Justification of fluctuation range

As per *Guidelines on the Assessment of Investment Analysis* Version 05, the sensitivity analysis should at least cover a range of -10% and 10%”.

So, the chosen fluctuation range $\pm 10\%$ follows above guidance.

(2) Justification of parameter selection

As per the *Guidelines on the Assessment of Investment Analysis* Version 05, only variables that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation.

Static total investment accounts for more than 20% of the total investment, and moreover the bundled project revenue is decided by the annual operation cost, bus-bar tariff and annual feed-in electricity. Therefore, the following four financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness:

- Static total investment
- Annual operation cost
- Annual feed-in electricity
- Bus-bar tariff

The sensitivity analysis on Magang project IRR is shown in Table 5 and Figure 4.

Table 5. Sensitivity analysis of the financial indicators of Magang project
(Project IRR, without ER revenue)

Range Parameter	-10%	-5%	0	+5%	+10%
Static total investment (%)	8.04%	7.22%	6.47%	5.78%	5.14%
Annual operation cost (%)	6.85%	6.66%	6.47%	6.28%	6.09%
Annual feed-in electricity (%)	4.91%	5.70%	6.47%	7.23%	7.98%
Bus-bar tariff (%)	4.91%	5.70%	6.47%	7.23%	7.98%

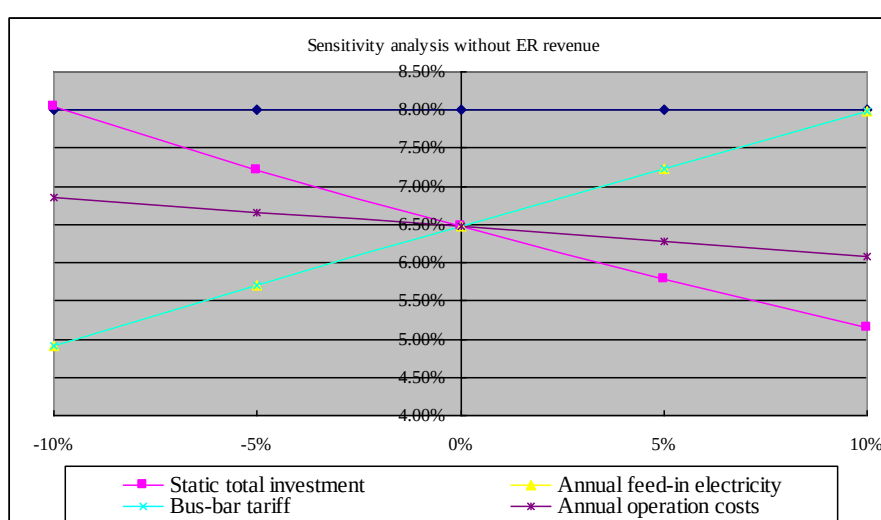


Figure 4. Sensitivity analysis of the financial indicators of Magang project
(Project IRR, without ER sales revenue)

The sensitivity analysis on Huangmaopo project IRR is shown in Table 5 and Figure 6.

Table 5. Sensitivity analysis of the financial indicators of Huangmaopo project
(Project IRR, without ER revenue)

Range Parameter	-10%	-5%	0	+5%	+10%
Static total investment (%)	7.75%	6.95%	6.21%	5.52%	4.90%
Annual operation cost (%)	6.59%	6.40%	6.21%	6.02%	5.83%
Annual feed-in electricity (%)	4.69%	5.44%	6.21%	6.96%	7.70%
Bus-bar tariff (%)	4.69%	5.44%	6.21%	6.96%	7.70%

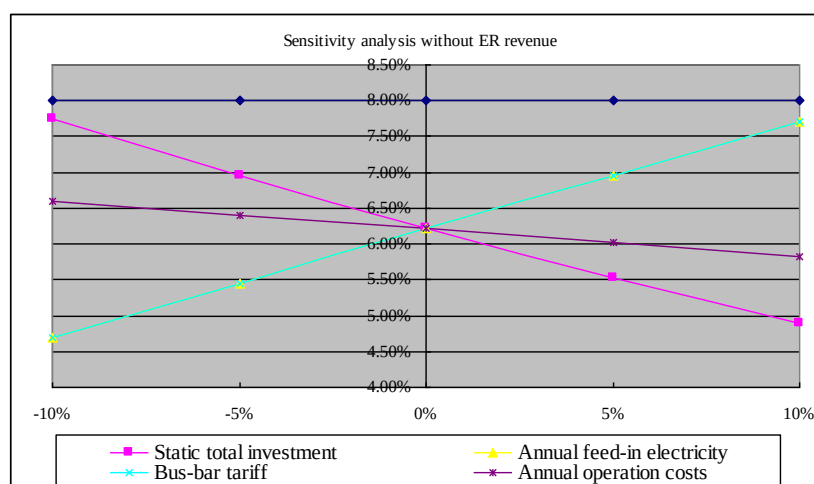


Figure 6. Sensitivity analysis of the financial indicators of Huangmaopo project (Project IRR, without ER sales revenue)

Critical value analysis

Magang Project

If the static total investment decreases by 9.8%, Magang project IRR would reach 8.00%. As *China Statistical Yearbook 2012* issued by the National Bureau of Statistics of China, the average Price Index for Investment in Fixed Assets (PII)⁴ from 2006 to 2011 was 103.62, which means the Investment price index in Fixed Assets keeps growing these years. Furthermore, the actual expenditure occurred of main equipment purchase and construction contracts has accounted for 90.4% of the static total investment. Thus, the assumption that the static total investment decrease by 9.8% is not credible.

If annual operation costs decrease by 40.80%, Magang project IRR could reach 8.00%. The annual operation costs mainly include maintenance cost, insurance cost, salary and welfare, material cost and miscellaneous cost. According to *China Statistical Yearbook 2012*, the average employee salary index from 2006-2011⁵ was 118.03, while the average purchase price index of the material, fuel, power⁶ was 104.30, which means there is a tendency for the employee salary and the material price to increase. Therefore, the possibility for the operation costs to decrease by 40.80% is very slight.

If annual feed-in electricity increases by 10.15%, Magang project IRR can reach 8.00%. However, large variation of annual electricity output is almost impossible. As per the *Methodology of Wind Energy Resource Assessment for Wind Farm* (GB/T18710-2002) and *Methodology of Wind Energy Resource Measurement for Wind Farm* (GB/T18709-2002), Magang project owner has conducted wind resource measurements for 12 months, and the data from above wind resource measurement was correct based on the comparison with historical meteorological data of 30 years provided by local meteorology station. Then the data will be put into the professional software to calculate the annual theoretical electricity output. Considering impacts of some factors like wake flow, climate on the annual theoretical electricity output, comprehensive corrective factor was carried out to adjust. The final result adjusted by comprehensive corrective factor is annual feed-in electricity. The method of calculating electricity output is also approved by the government and is widely used in China for wind energy. Therefore, it is not

⁴ Chapter 9-1 of *China Statistical Yearbook 2012*. The PII for preceding year is considered as 100.

⁵ Section 4-11 of *China Statistical Yearbook 2012*. The employee salary index for preceding year is considered as 100.

⁶ Section 9-1 of *China Statistical Yearbook 2012*. The purchase price index of the material, fuel, power for preceding year is considered as 100.



credible to assume that annual feed-in electricity would increase by 10.15% or more over the lifetime of Magang project in order to reach the benchmark 8%.

As for the bus-bar tariff, when it increases by 10.15%, Magang project IRR could reach 8.00%. However, the tariff of the bundled Project is stipulated as CNY 0.58/KWh (including VAT) by “Notification of Improving Electricity Price for Grid-connected Wind Power” issued by National Development and Reform Commission on Jul 20, 2009 (fagaijiage [2009]1906). Thus, the tariff, CNY 0.58/KWh, is reasonable and the possibility for the tariff to be increased by 10.15% is very slight.

Huangmaopo Project

If the static total investment decreases by 11.45%, Huangmaopo project IRR would reach 8.00%. As per *China Statistical Yearbook 2012* issued by the National Bureau of Statistics of China, the average Price Index for Investment in Fixed Assets (PII)⁷ from 2006 to 2011 was 103.62, which means the Investment price index in Fixed Assets keeps growing these years. Furthermore, the actual expenditure occurred of main equipment purchase and construction contracts has accounted for 90.05% of the static total investment. Thus, the assumption that the static total investment decrease by 11.45% is not credible.

If annual operation costs decrease by 47.80%, Huangmaopo project IRR could reach 8.00%. The annual operation costs mainly include maintenance cost, insurance cost, salary and welfare, material cost and miscellaneous cost. According to *China Statistical Yearbook 2012*, the average employee salary index from 2006-2011⁸ was 118.03, while the average purchase price index of the material, fuel, power⁹ was 104.30, which means there is a tendency for the employee salary and the material price to increase. Therefore, the possibility for the operation costs to decrease by 47.80% is very slight.

If annual feed-in electricity increases by 12.10%, Huangmaopo project IRR can reach 8.00%. However, large variation of annual electricity output is almost impossible. As per the *Methodology of Wind Energy Resource Assessment for Wind Farm* (GB/T18710-2002) and *Methodology of Wind Energy Resource Measurement for Wind Farm* (GB/T18709-2002), the Huangmaopo project owner has conducted wind resource measurements for 12 months, and the data from above wind resource measurement was correct based on the comparison with historical meteorological data of 30 years provided by local meteorology station. Then the data will be put into the professional software to calculate the annual theoretical electricity output. Considering impacts of some factors like wake flow, climate on the annual theoretical electricity output, comprehensive corrective factor was carried out to adjust. The final result adjusted by comprehensive corrective factor is annual feed-in electricity. The method of calculating electricity output is also approved by the government and is widely used in China for wind energy. Therefore, it is not credible to assume that annual feed-in electricity would increase by 12.10% or more over the lifetime of Huangmaopo project in order to reach the benchmark 8%.

As for the bus-bar tariff, when it increases by 12.10%, Huangmaopo project IRR could reach 8.00%. However, the tariff of the bundled Project is stipulated as CNY 0.58/KWh (including VAT) by “Notification of Improving Electricity Price for Grid-connected Wind Power” issued by National Development and Reform Commission on Jul 20, 2009 (fagaijiage [2009]1906). Thus, the tariff, CNY 0.58/KWh, is reasonable and the possibility for the tariff to be increased by 12.10% is very slight.

In conclusion, the bundled project is financially unattractive without the revenue of ERs sales.

⁷ Chapter 9-1 of *China Statistical Yearbook 2012*. The PII for preceding year is considered as 100.

⁸ Section 4-11 of *China Statistical Yearbook 2012*. The employee salary index for preceding year is considered as 100.

⁹ Section 9-1 of *China Statistical Yearbook 2012*. The purchase price index of the material, fuel, power for preceding year is considered as 100.

Outcome of step 2: The additionality of the bundled project is robust and reliable.

Step 3 Barrier analysis

Since Step 2 has fully demonstrated the additionality of the bundled project, Therefore step 3 is not adopted.

Step 4 Common practice analysis

The common practice analysis was conducted as per Guidelines on common practice (Version 02.0).

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

Magang project, or Huangmaopo project activity, has an installed capacity of 49.5MW, and the total installed capacity of the bundled project is 99MW, therefore the range of capacity between 24.75MW and 148.5MW is chosen.

Sub-step 2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

- (a) The projects are located in the applicable geographical area;
- (b) The projects apply the same measure as the proposed project activity;
- (c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
- (d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
- (e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
- (f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

For (a) Gansu province is selected as the applicable geographical area for the common practice and the reasons are detailed as below:

- The investment environment of each province in China is different¹⁰. This is due to a number of factors including the economic development level, the industrial structure, and the fundamental infrastructure of the province, the development strategy and the policy framework. These all can affect the final investment decision;
- The unique geological conditions in Gansu province results in the different natural resources, such as wind power resource¹¹, compared to the other provinces connected to NWPG;
- Finally, a number of other key economic factors influencing power generation projects vary from province to province, including the tariff rates, the cost of labour and services, and the types of loan that can be obtained. These all vary between provinces.

(b) Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies (example: energy efficiency improvements, power generation based on renewable energy);

¹⁰ <http://www.shihang.org/zh/news/2006/11/11/chinese-cities-vary-widely-local-government-effectiveness-investment-climate-quality-life>.

¹¹ <http://www.gscn.com.cn/pub/gscircs/ziranziyuan/sqfengneng/2008/12/03/1228266945406.html>

As per the requirement of (c), only those projects using wind energy as energy source will be considered.

For (d), the project is a wind power project, the goods produced by the Project is electricity, so, only those wind power projects producing electricity will be considered.

For (e), those wind power projects, with the installed capacity between 24.75MW and 148.5MW will be chosen

For (f), the most recent available data/information source up to now for Power generation projects is the Statistics Collections for Power Sector of 2011 issued by China Electricity Council in 07/2012, which provided the operated power generation project information up to the end of 2011. As per “Tool for the demonstration and assessment of additionality” version 07.0.0, the information of commissioned projects after 2011 was not accessible and thus was excluded from the analysis.

So the similar projects (both CDM and non-CDM) which fulfil all of the following conditions are those wind power project, with the installed capacity between 24.75MW and 148.5MW, started commercial operation before the end of 2011.

As Statistics Collections for Power Sector of 2011, 19 similar projects started commercial operation before the start date of proposed project activity.

Ref. No.	Project	Capacity
5047	Gansu Yumen Yuxin Wind Power Project	49.5MW
5405	Gansu Yumen Daba Wind Power Project	49.5MW
6613	Gansu Yumen Sanshilijingzi South 32.5MW Large-scale Wind Turbine Shifan Wind Farm Project	32.5MW
2193	Gansu Yumen Sanshilijingzi Wind Power Project	49.3MW
3167	Gansu Yumen Diwopu Phase II Wind Power Project	49.5MW
Under validation	Gansu Jieyuan 88.4MW Yumen Wind Power Project, Gansu Province, China ¹²	88.4MW
5427	Gansu Anxi Xiangyang Wind Power Project	49.5MW
3253	Gansu Guazhou Xiangyang Phase II Wind Power Project	49.5MW
2916	Gansu Guazhou Daliangxi Wind Power Project	49.5MW
2109	CGN Gansu Anxi Daliang 49.5MW Wind Power Project	49.5MW
3919	Gansu Tianrun Liuyuan 1 st Stage 49.5MW Wind Park Project	49.5MW
4989	Gansu Guazhou East Beudaquai Wind Power Phase II Project	49.5MW
4811	Gansu Guazhou East Beudaquao Wind Power Project	49.5MW
2883	Gansu Bayin Pingchuan Jiangcaitang 45MW Wind Farm Concession Project	49.5MW
1081	Gansu Datang Yumen 49MW Wind Power Project	49MW
2680	Gansu Yumen Diwopu Wind Power Project	49.5MW
6158	Gansu Jingtai Xingquan Localization Wind Power Project	49MW
2766	Gansu Jingtai 45MW Wind Power Project	45MW
GS 554	Gansu Anxi Wind Farm Project, 100.5MW ¹²	100.5MW

Sub-step 3: within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all} .

¹²<http://cdm.unfccc.int/Projects/Validation/DB/JXK999TF34PW8Q4VQXNGDJ8DRQJ0JW/view.html>

18 similar projects started commercial operation before the end of 2011 was identified as registered CDM project activities.

Among the 19 projects, Gansu Anxi Wind Farm Project was registered as GS VER project on 22/01/2008. Considering the bundled project was applied for GS registration, so, GS VER projects also was excluded

so, $N_{all} = 0$

Sub-step 4: within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff} .

Because $N_{all} = 0$, therefore $N_{diff} = 0$.

Sub-step 5: calculate factor $F = 1 - N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

The proposed project activity is a “common practice” within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all} - N_{diff}$ is greater than 3.

$F = 1 - N_{diff}/N_{all} = 0 < 0.2$, and $N_{all} - N_{diff} = 0 < 3$.

Therefore, the bundled project is not common practice as per Guidelines on common practice (Version 02.0).

Conclusion: Through analysis of all steps of the “Tool for the Demonstration and Assessment of Additionality” (version 07.0.0), the bundled project is not a baseline scenario, so the bundled project activity fully meets the requirement of additionality.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

>>

This section includes the following parts:

- Calculate the baseline GHG emissions;
- Calculate the Project GHG emissions;
- Calculate the Project leakage;
- Calculate the emission reductions.

I Calculate project GHG emissions

The bundled project is two wind power projects, no fossil fuel will be consumed according to the methodology ACM0002, the bundled project emission should not be considered, that is $PE_y = 0 \text{ tCO}_2\text{e}$.

II. Calculate baseline GHG emissions

1. Calculate the baseline emission factor

As per the methodology ACM0002 version 13.0.0, Tool to calculate the emission factor for an electricity system version 03.0.0 is applied to calculate the baseline emission factor.

According to the methodological tool, the baseline emission factor is calculated in the following six steps:

STEP 1. Identify the relevant electricity systems

The electricity generated by the bundled project will be supplied to the NWPG. In the absence of the

bundled project activity, both the existing power plants and the power plants to be built in the foreseeable future within the NWPG would supply electricity comparable to that supplied by the bundled project. As per *2013 baseline emission factors for regional power grids in China* published by China DNA on 17/09/2013, Northwest China Power Grid includes the provincial grid spatial extent of Shaanxi Power Grid, Gansu Power Grid, Qinghai Power Grid, Ningxia Power Grid and Xinjiang Power Grid. There is no electricity import to the NWPG from other regional power grid. In accordance with *Tool to Calculate the Emission Factor for an Electricity System* (version 03.0.0), for the purpose of determining the operating margin emission factor and the build margin emission factor, the spatial extent is limited to the bundled project electricity system.

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.

The Option I was selected for the bundled project.

STEP 3. Select a method to determine the Operating Margin (OM)

The *Tool to calculate the emission factor for an electricity system* version 03.0.0 offers four options for the calculation of the Operating Margin emission factor(s) ($EF_{grid,OM,y}$). Low-cost/must run resources¹³ constitute less than 50% of total amount of grid generating output¹⁴ from 2007 to 2011 in NWPG. In line with *2013 baseline emission factors for regional power grids in China* issued by China DNA on Sep. 17, 2013, Method (a) Simple OM was thus selected.

According to the methodological tool, the following option was selected:

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.

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 (tCO₂/MWh) of all generating power plants serving Northwest China Power Grid, not including low-cost/must-run power/plants. The *Tool to calculate the emission factor for an electricity system* version 03.0.0 offers two options for the calculating of the Simple OM.

- Based on data of net electricity generation and CO₂ emission factor of each power plant/unit (Option A), or
- 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).

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

¹³ Low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants.

¹⁴ 14.59%, 15.06%, 17.03%, 17.68% and 21.49% from 2007 to 2011 respectively.

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).

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 is not applicable. Total net electricity generation of all power plants serving Northwest China Power Grid and the fuel types, and total fuel consumption of Northwest China Power Grid are available from *China electric power yearbook* and *China energy statistical yearbook*, and the following conditions can be satisfied:

(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.

So, the Project uses Option B for calculating the simple OM emission factor as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i (FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y})}{EG_y} \quad (1)$$

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 Northwest China Power Grid 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 Northwest China Power Grid, not including low-cost/must-run power plants/units, in year y (MWh);

i All fossil fuel types combusted in power sources in Northwest China Power Grid in year y;

y Because the project is a new built wind power project, the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex-ante option).

$$EG_y = GEN_y \times (1 - AER_y) \quad (2)$$

Where:

GEN_y electricity generated by all power sources serving Northwest China Power Grid, not including low-cost/must-run power plants/units, in year y (MWh);

AER_y the average auxiliary electricity consumption rate(%) of all power sources serving Northwest China Power Grid, not including low-cost/must-run power plants/units, in year y.

The simple operating margin emission factor ($EF_{grid,OM,y}$) of Northwest China Grid is 0.9720 tCO₂/MWh (see Appendix 4 for details).

STEP 5. Identify the Build Margin Emission Factor

In terms of vintage of data, project participants chose Option 1:

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.

Capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.

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});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the build margin. In this case, ignore steps (d), (e) and (f).

However, under the current circumstances in China, the power plants consider the Build Margin data as important business data and will not have them published. Therefore, it is difficult to obtain the data of five power plants that have been put into operation most recently or the newly built power plant capacity additions in the electricity system that comprise 20% of the system generation. In allusion to the situation, the CDM EB accepts the following deviation in the application of the methodology¹⁵.

- 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, being approximately conservative.

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.

The Build Margin emissions factor is the generation-weighted average emission factor (tCO₂e/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

¹⁵ EB guidance for “Request for guidance: Application of AM0005 and AMS-ID in China, 07/10/2005”: Request for clarification on use of approved methodology AM0005 for several projects in China.
<http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM>

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (3)$$

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 power generation data is available.

As per the methodology deviation, China DNA published the BM calculation method as follow:

Because current statistics data can not separate the installed capacity of coal, oil and gas fueled power generation, the method adopted for BM calculation is as follow:

Firstly make use of the latest energy balance data to calculate all sorts of emission scale in total emission from coal, oil and gas fueled power generation; then based on the emission factor under the business best technology, calculated the fueled power emission factor of the grid; last multiply the fuelled power emission factor and fuelled power proportion of the total power, it's the BM of the grid.

Detailed step and formula as follow:

Sub-step 1. Calculation of the share of CO₂ emissions from solid, liquid and gaseous fuels

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (4)$$

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

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

Where

$F_{i,j,y}$ The consumption of fuel i in province j in year y (unit of mass or volume);

$NCV_{i,y}$ Net calorific value (energy content) of fuel i in year y (GJ/mass or volume unit, gas fuel/ GJ/m³);

$EF_{CO_2,i,j,y}$ CO₂ emission factor of fossil fuel type i in year y (tCO₂/GJ).

Coal, Oil and Gas is the foot-index for solid fuels, liquid fuels and gas fuels.

Sub-step 2. Calculation of the emission factor of thermal power

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \quad (7)$$

$EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$ and $EF_{Gas,Adv,y}$ are emission factors of the best efficiency commercial available coal-fired, oil-fired and gas-fired generation technologies.

Sub-step 3. Calculation of the BM in the Grid

$$EF_{grid,BM,y} = \frac{\Delta CAP_{Thermal}}{\Delta CAP_{Total}} \times EF_{Thermal,y} = \frac{CAP_{Thermal,y} - CAP_{Thermal,y-N}}{CAP_{Total,y} - CAP_{Total,y-N}} \times EF_{Thermal,y} \quad (8)$$

$CAP_{Total,y}$ Is the total installed capacity in Northwest China Power Grid in year y, $CAP_{Thermal,y}$ is the total installed capacity of thermal power in Northwest China Power Grid in year y. N is the shortest vintage that the added installed capacity nearest to 20% of total installed capacity in Northwest China Power Grid.

The data on installed capacity for calculating the build margin emission factor ($EF_{grid,BM,y}$) are obtained from *China Electric Power Yearbook 2010-2012*. The data on different fuel consumptions for power generation and the net calorific values of the fuels are obtained from *China Energy Statistical Yearbook 2012*. The emission factors of the fuels employed are obtained from Table 1.3 and Table 1.4 on page 1.21-1.24 of Chapter 1, Volume 2 of *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. The lower values of the 95% confidence intervals in Table 1.4 are used for the emission factors of the fuels employed.

The Build Margin Emission Factor ($EF_{grid,BM,y}$) of Northwest China Power Grid could be obtained to be 0.5115 tCO₂/MWh.

STEP 6. Calculate the Combined Margin emissions factor

The Combined Margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM} \quad (9)$$

Where

$EF_{grid,CM,y}$ Combined Margin CO₂ emission factor in year y (tCO₂/MWh);

W_{OM} Weighting of Operating Margin emissions factor(%);

W_{BM} Weighting of Build Margin emissions factor(%).

2. Calculate baseline GHG emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad (10)$$

Where

BE_y = Baseline emissions in year y (t CO₂)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the bundled project activity in year y (MWh/yr)

Because the bundled project activity is the installation of two new grid-connected renewable power plant/units at site where no renewable power plant was operated prior to the implementation of the bundled project activity, then:

$$EG_{PJ,y} = EG_{facility,y} \quad (11)$$

$EG_{facility,y}$ Quantity of net electricity generation supplied by the bundled project plant/unit to the grid. It shall be determined as a difference between quantity of electricity supplied by the bundled project plant/unit to the grid and quantity of electricity delivered to the bundled project plant/unit from the grid in year y (MWh);

So

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

III. Calculate Leakage GHG emissions

As per the methodology ACM0002 Version 13.0.0, no leakage needs to be considered in the bundled project, $LE_y = 0 \text{ tCO}_2\text{e}$.

IV. Calculate the emission reductions

The emission reduction (ER_y) during a given year y is calculated as follows:

$$ER_y = BE_y - PE_y \quad (13)$$

B.6.2. Data and parameters fixed ex ante

Data / Parameter:	$FC_{i,y}$
Data unit:	mass or volume unit
Description:	Amount of fossil fuel type <i>i</i> consumed in the NWPG in year y.
Source of data used:	<i>China energy statistical yearbooks, 2010-2012</i>
Value applied:	see Appendix 4 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the official publication <i>China energy statistical yearbook</i> , satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system</i> version 03.0.0.
Any comment:	the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/mass or volume unit
Description:	Net calorific value (energy content) of fossil fuel type <i>i</i> in year y.
Source of data used:	<i>China energy statistical yearbook, 2010-2012</i>
Value applied:	see Appendix 4 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the official publication <i>China energy statistical yearbook</i> , satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system</i> version 03.0.0.
Any comment:	-

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



Data unit:	tCO ₂ e/GJ
Description:	CO ₂ emission factor of fossil fuel type <i>i</i> in year <i>y</i> .
Source of data used:	<i>2006 IPCC guidelines on national GHG inventories, Volume 2 Energy, Chapter 1, table 1.3-table 1.4</i>
Value applied:	see Appendix 4 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Regional or national average default values are unavailable, so IPCC default values at the lower limit of the uncertainty at a 95% confidence interval are used, satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system</i> version 03.0.0.
Any comment:	-

Data / Parameter:	GEN_y
Data unit:	MWh
Description:	Electricity generated by all power sources serving Northwest China Power Grid in year <i>y</i> .
Source of data used:	<i>China electric power yearbook, 2010-2012</i>
Value applied:	see Appendix 4 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the official publication <i>China electric power yearbook</i> , satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system</i> version 03.0.0.
Any comment:	the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

Data / Parameter:	AER_y
Data unit:	%
Description:	Auxiliary electricity consumption rate of all power sources serving Northwest China Power Grid.
Source of data used:	<i>China electric power yearbook, 2010-2012</i>
Value applied:	see Appendix 4 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the official publication <i>China electric power yearbook</i> , satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system</i> version 03.0.0.
Any comment:	the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

Data / Parameter:	$F_{i,j,y}$
Data unit:	mass or volume unit
Description:	Consumption of fuel <i>i</i> in province <i>j</i> in year <i>y</i> .
Source of data used:	<i>China energy statistical yearbook, 2010-2012</i>
Value applied:	see Appendix 4 for details
Justification of the choice of data or	The data obtained from the official publication <i>China energy statistical yearbook</i> , satisfying the requirement of latest version of <i>Tool to calculate the</i>



description of measurement methods and procedures actually applied :	<i>emission factor for an electricity system version 03.0.0.</i>
Any comment:	

Data / Parameter:	$Eff_{Coal,Adv,y}$
Data unit:	%
Description:	Electricity supply efficiency of the most efficient, commercially available coal-fired generation technology.
Source of data used:	2013 baseline emission factors for regional power grids in China published by China DNA
Value applied:	39.84
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the China DNA, satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system version 03.0.0.</i>
Any comment:	-

Data / Parameter:	$Eff_{Oil,Adv,y}$
Data unit:	%
Description:	Electricity supply efficiency of the most efficient, commercially available oil-fired generation technology.
Source of data used:	2013 baseline emission factors for regional power grids in China published by China DNA
Value applied:	52.50
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the China DNA, satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system version 03.0.0.</i>
Any comment:	-

Data / Parameter:	$Eff_{Gas,Adv,y}$
Data unit:	%
Description:	Electricity supply efficiency of the most efficient, commercially available gas-fired generation technology.
Source of data used:	2013 baseline emission factors for regional power grids in China published by China DNA
Value applied:	52.50
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the China DNA, satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system version 03.0.0.</i>
Any comment:	-

Data / Parameter:	$CAP_{Total,y}$
Data unit:	MW
Description:	Total installed capacity in Northwest China Power Grid in year y
Source of data used:	<i>China electric power yearbook, 2010-2012</i>
Value applied:	see Appendix 4 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the official publication <i>China electric power yearbook</i> , satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system</i> version 03.0.0.
Any comment:	For calculating the added capacity comprised 20% of Northwest China Power Grid.

Data / Parameter:	$CAP_{Thermal,y}$
Data unit:	MW
Description:	Total installed capacity of thermal power in Northwest China Power Grid in year y
Source of data used:	<i>China electric power yearbook, 2010-2012</i>
Value applied:	see Appendix 4 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from the official publication <i>China electric power yearbook</i> , satisfying the requirement of latest version of <i>Tool to calculate the emission factor for an electricity system</i> version 03.0.0.
Any comment:	-

B.6.3. Ex ante calculation of emission reductions

>>

I. Calculate the baseline GHG emissions

1. Calculate the baseline emission factor

According to the methodological tool, W_{OM} and W_{BM} are by default 0.75 and 0.25 respectively in the first crediting period. Therefore the combined baseline emission factor:

$$EF_{grid,CM,y} = 0.9720 \times 0.75 + 0.5115 \times 0.25 = 0.8568 \text{ tCO}_2/\text{MWh}$$

2. Calculate baseline GHG emissions

The quantity of net electricity generation supplied by Magang project is approximately 102.8687GWh per year, and the quantity of net electricity generation supplied by Huangmaopo project is approximately 101.3816GWh per year. So the quantity of net electricity supply of the bundled project activity to the grid per year is 204.2503GWh.

$$\begin{aligned} BE_{y,MG} &= 102,868.7 \times 0.8568 \text{ tCO}_2/\text{MWh} = 88,137 \text{ tCO}_2 \\ BE_{y,HMP} &= 101,381.6 \times 0.8568 \text{ tCO}_2/\text{MWh} = 86,863 \text{ tCO}_2 \\ BE_y &= 88,137 \text{ tCO}_2 + 86,863 \text{ tCO}_2 = 175,000 \text{ tCO}_2 \end{aligned}$$

II. Estimate project activity emissions:

The bundled project is wind power project, and the bundled project emissions should not be considered as per the methodology ACM0002, $PE_y = 0 \text{ tCO}_2\text{e}$.

III. Estimate project leakage emissions:

As per the methodology ACM0002, no leakage needs to be considered in the bundled project, $LE_y = 0 \text{ tCO}_2\text{e}$.

IV. Estimate emission reductions

As per formula in section B.6.1, the annual emission reduction of the bundled project is:

$$ER_y = 175,000 - 0 = 175,000 \text{ tCO}_2\text{e}$$

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

It is expected that the bundled project activity will generate emission reductions of 1,225,000 tCO₂e over the first 7-year renewable crediting period from 01/01/2014 to 31/12/2020.

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
01/01/2014-31/12/2014	175,000	0	0	175,000
01/01/2015-31/12/2015	175,000	0	0	175,000
01/01/2016-31/12/2016	175,000	0	0	175,000
01/01/2017-31/12/2017	175,000	0	0	175,000
01/01/2018-31/12/2018	175,000	0	0	175,000
01/01/2019-31/12/2019	175,000	0	0	175,000
01/01/2020-31/12/2020	175,000	0	0	175,000
Total	1,225,000	0	0	1,225,000
Total number of crediting years	7			
Annual average over the crediting period	175,000	0	0	175,000

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

The bundled project adopts the ex-ante calculation of emission factor of the grid, so only the quantity of net electricity generation supplied by the bundled project need be monitored during the crediting period.

Data / Parameter	EG _{facility, Magang, y}
------------------	-----------------------------------

Unit	MWh
Description	Quantity of net electricity supply of Magang project to the grid in year y.
Source of data	Measured by electricity meters.
Value(s) applied	102,868.7
Measurement methods and procedures	Directly measured by electricity meters M1/M1' installed at the outlet of the substation with accuracy not lower than 0.5s. M1 meter is the main meter, when main meter in error, the readings of back-up meters M1' would be adopted. The data will be archived and kept electronically at least for two years after the end of the last crediting period or the last issuance of ERs.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	Cross check measurement results with records for sold electricity. The electricity meters are calibrated as stated in B.7.2.
Purpose of data	Calculation of baseline emissions
Additional comment	

Data / Parameter	EG _{facility, Huangmaopo, y}
Unit	MWh
Description	Quantity of net electricity supply of Huangmaopo project to the grid in year y.
Source of data	Measured by electricity meters.
Value(s) applied	101,381.6
Measurement methods and procedures	Directly measured by electricity meters M2/M2' installed at the outlet of the substation with accuracy not lower than 0.5s. M2 meter is the main meter, when main meter in error, the readings of back-up meters M2' would be adopted. The data will be archived and kept at least for two years after the end of the last crediting period or the last issuance of ERs.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	Cross check measurement results with records for sold electricity. The electricity meters are calibrated as stated in B.7.2.
Purpose of data	Calculation of baseline emissions
Additional comment	

B.7.2. Sampling plan

>>

Not applicable, therefore no need for further statement.

B.7.3. Other elements of monitoring plan

>>

Since the baseline emission factor of the bundled project is determined ex ante, the electricity delivered by the bundled project to the NWPG and the electricity imported from NWPG by the bundled project are defined as the key data to be monitored. The monitoring plan is drafted to focus on monitoring the net electricity generation by the bundled project.

Management Structure

For details regarding the management structure of the monitoring plan, please refer to Figure 6.

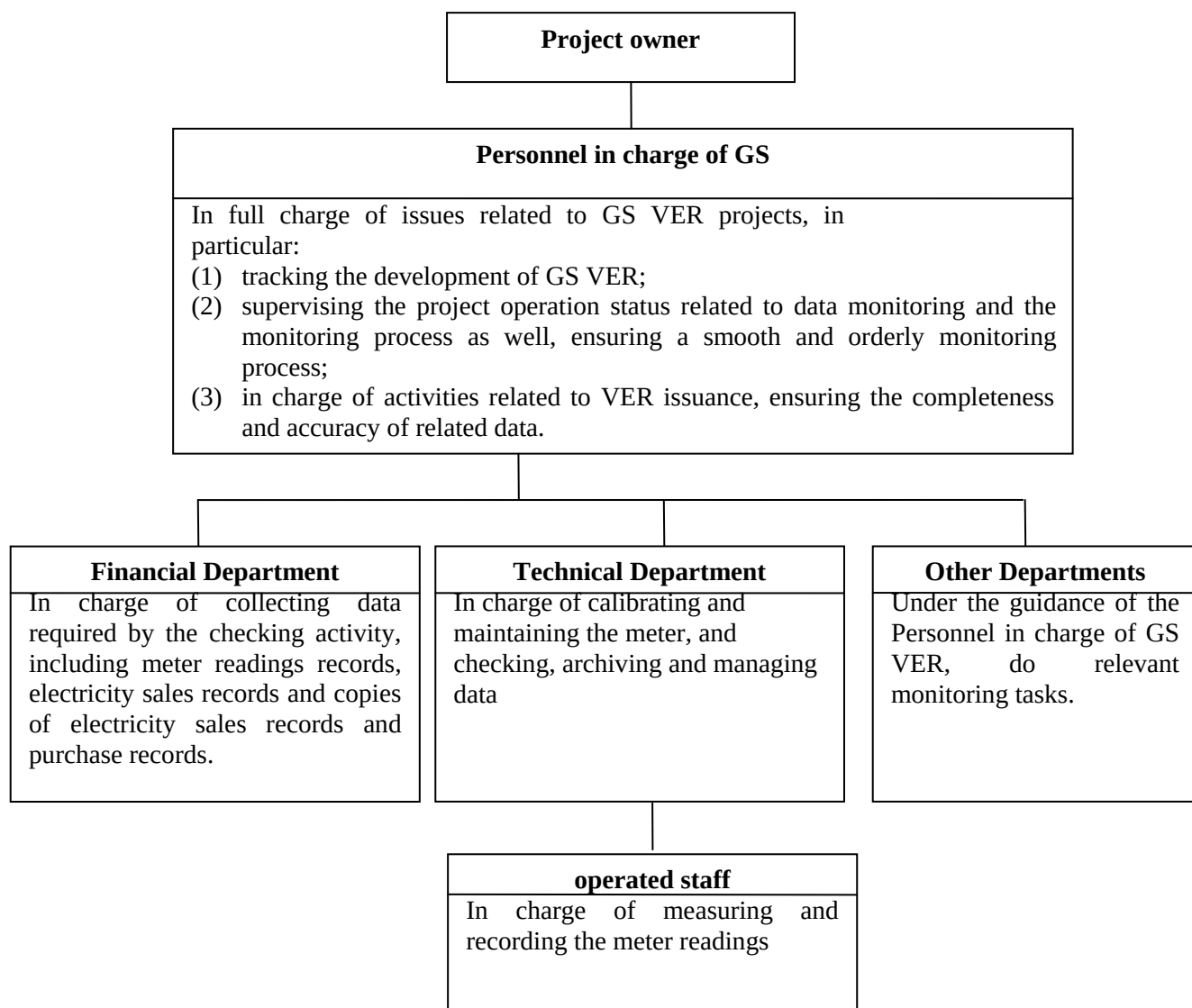


Figure 6. Operational and management structure

Monitoring Measures

The net electricity supply of the bundled project to the grid will be measured by the electricity meters installed at the outlet of the 35kV/110kV substation. The net electricity supply of the bundled project activity to the grid will be double checked by the records of electricity purchase and sale.

For the relevant monitoring requirements, please refer to the Power Purchase Agreement and Parallel Operation Agreement of the bundled project. The project owner ensures that all of the readings of electricity meters are available for DOE's verification.

Installation of monitoring devices

The electricity meters of the bundled project will be installed according to the Technical Administrative

Code of Electric Energy Metering (DL/T 448-2000). Before the operation of the bundled project, the project owner and the local grid company will check and accept those electricity meters as per the Technical Administrative Code of Electric Energy Metering.

Calibration of Meters & Metering

The regular calibration and on-site verification should be implemented as per the Technical Administrative Code of Electric Energy Metering (DL/T 448-2000) to ensure the accuracy of electricity meters. Electricity meters should be calibrated every year. After calibration, the electricity meters must be sealed. When the measurement error of electricity meter is larger than the permitted error or the electricity meter must be repaired because of a malfunction, the electricity will be determined as per the Power Purchase Agreement signed between the project owner and the local grid company.

Quality Assurance and Quality Control

The quality assurance and quality control procedures for recording, maintaining and archiving data shall be enhanced in line with the needs for verification of the emission reductions on an annual basis according to this PDD. All calibration records and all metering records will be stored by the bundled project owner for DOE verification.

Data Management System

Specific staff will be appointed by the bundled project owner to take on the overall responsibility for monitoring greenhouse gas emission reductions and keeping all the data collected as part of monitoring. Data shall be archived electronically and kept at least for two years after the end of the last crediting period, or the last issuance of ERs, whichever occurs later.



SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

>>

24/05/2013 (the signing date for road engineering and foundation for wind turbines contract of Magang project)

30/04/2013 (the signing date for the wind turbines and the auxiliary equipment purchase contract of Huangmaopo project)

C.1.2. Expected operational lifetime of project activity

>>

20yrs, 0 month (not including construction period)

C.2. Crediting period of project activity

C.2.1. Type of crediting period

>>

The bundled project chose the renewable crediting period, this is the first crediting period.

C.2.2. Start date of crediting period

>>

01/01/2014

C.2.3. Length of crediting period

7yrs, 0 month

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>

For Magang Project

According to the *EIA Form and its approval*, the environmental impacts and related environment protection measures arising from Magang project are analyzed separately for the construction phase and the operation phase.

Land erosion

Construction period

The occupied land is the arid desertificational wasteland without any original function. During the construction phase, the construction activities including construction of the wind farm, road built will bring about small certain soil erosion.

Operation period:

After the construction is finished, the land will be smoothed, and the greening measures will be implemented as well, so in the operation, the soil erosion will be resumed.

Noise

Construction period

The construction noise and the traffic noise are the main sources of noise during the construction period. The construction noise mainly results from all kinds of mechanical equipment operating; the traffic noise mainly results from the road traffic noise from the trucks transporting goods for construction. Considering relatively short time is needed for foundation construction of single set of wind turbine, and no construction will be implemented during night time, thus, the impact of construction noise can be ignored.

Operation period:

Magang project site is located in the arid desertificational wasteland, and distance between nearest residential area and the wind turbine is more than 500m, so no noise impact on the surrounding environment will be resulted from the operation of Magang project.

Waste gas

Construction period

The construction impact on ambient air mainly comes from dust pollution produced by filling-in and excavation of earthwork, construction dust and transportation vehicles. Magang project owner will control the gas pollutants through the measures including sand and stone materials location site sheltering and water spray and etc.

Operation period:

No waste gas will be emitted by Magang project in the operation period.

Waste water

Construction period



The industrial wastewater and sanitary wastewater will be generated during the construction period of Magang project. The industrial wastewater includes washing water of the concrete mixing system and other machines. The industrial wastewater will be reused after oil separation and sedimentation without discharge outside.

The sanitary wastewater is from the temporary living area, including excrement and urine, washing water, shower water, etc. The sanitary wastewater after collection and treatment by a wastewater treatment facility and will be used as spraying water for dust control.

Operation period

The wastewater during Magang project operation period is mainly sanitary water. After treatment by septic tank, the waste water will be discharged in the specialized pool as greening water.

Solid waste

Construction period

The solid waste during the construction period consists of discarded earth, building waste, household garbage produced by the construction staff. The residues generated during the construction period will be reused as much as possible, while the remaining will be delivered to the designated disposal site; the household garbage will be cleared and collected to garbage can, then household garbage will be cleared and delivered to be landfilled at regular intervals; therefore, the solid wastes generated during the construction period will not impact the environment in the area.

Operation period

After Magang project is put into operation, no discarded residue will be produced by Magang project itself, only the household garbage produced by the operation staff will be collected and cleared by the sanitation department periodically to avoid any impact on the environment.

Ecological impact

Magang project site is not on the migration route of migratory bird, there is no wild birds given state-level priority protection nearby, therefore migration or flight of birds will not be impacted.

For Huangmaopo Project

According to the *EIA Form and its approval*, the environmental impacts and related environment protection measures arising from Huangmaopo project are analyzed separately for the construction phase and the operation phase.

Soil erosion

Construction period

The occupied land of Huangmaopo project is the arid desertificational wasteland without any original function. During the construction phase, the construction activities including construction of the wind farm, road built will bring about small certain soil erosion.

Operation period

After the construction is finished, the land will be smoothed, the greening measures will be implemented as well, so in the operation, the soil erosion will be resumed.

Noise

**Construction period**

The main noise during the construction phase results from the mechanical equipment running noise and a little amount of blast noise. The construction of Huangmaopo project is implemented during the day. Construction equipments with high efficiency and low noise intensity will be applied as possible. By calculation, the noise intensity will be lower than 55 dB(A) if the distance is 100 m far away from the noise source, satisfying the limit value during the day time stipulated in the *Noise limits for construction site* (GB12533-2011). As a result, the impact of noise on the surrounding environment during the construction phase is slight.

Operation period:

Huangmaopo project site is located in the arid desertificational wasteland, and wind turbines equipment with low noise intensity used by Huangmaopo project will be required. The distance between nearest residential area and the wind turbine is more than 150m; consequently, the wind turbine noise will not impact on the nearby residents basically.

Waste gas**Construction period**

In addition to the small quantity of waste gas from the transportation vehicles and fuel consumption of machine, dust is the main pollutant. The dust prevention as the labour protection measures will be strengthened by the front line workers. The water spraying will be adopted for the traffic road surface to reduce dust, and the slag disposal site should conduct greening after slag cleaning to prevent dust.

Operation period:

Huangmaopo project utilizes the wind energy to generate power energy, so Huangmaopo project itself will not produce dust and waste gas.

Waste water**Construction period**

The industrial wastewater and sanitary wastewater will be produced by Huangmaopo project during the construction period. The industrial wastewater will be reused after oil separation and sedimentation. For the limited generation and discharge of the wastewater, the impact on surrounding environment is slight. The quantity of the sanitary wastewater is very little, it could be used as spraying water of the construction site, which will not form ground surface runoff, and thus will not enter into the ground surface water system to pollute the water environment.

Operation period

The wastewater during Huangmaopo project operation period is mainly sanitary water. After treatment by septic tank, the waste water will be discharged in the specialized pool as greening water.

Solid waste**Construction period**

Construction period: The solid waste produced during the construction period is excavating waste, which should be used as backfilling materials as much as possible to reduce the abandoned slag. The abandoned slag must be cleaned timely, and at the same time land leveling and original plants recovery should be conducted. For the living garbage from the construction period, it will be collected and cleared at regular intervals to designated landfill to be disposed, and this will basically not produce negative impact on the environment.

Operation period



After Huangmaopo project is put into operation, no discarded residue will be produced by Huangmaopo project itself, only the household garbage produced by the operation staff will be collected and cleared by the sanitation department periodically to avoid any impact on the environment.

Ecological impact

Construction period

Construction activities including engineering construction and construction site building, etc. will exert slight impact on local eco-system, but Huangmaopo project site is located in the arid desertificational wasteland, so the impact on local eco-system is so slight. The slight impact is short and reversible, and it will almost disappear upon the completion of the construction.

Operation period

Some proper measures such as grass and trees planting, and the vegetation condition will become better than that of the original natural vegetation system after the construction completion.

In summary, the bundled project will not have significant impacts on the environment.

D.2. Environmental impact assessment

>>

On 13/11/2012, Department of Environmental protection of Gansu Province approved the *EIA Form* of Magang project (GHPBF [2012] 140).

On 13/11/2012, Department of Environmental protection of Gansu Province approved the *EIA Form* of Huangmaopo project (GHPBF [2012] 142).

SECTION E. Local stakeholder consultation**E.1. Solicitation of comments from local stakeholders**

>>

For Magang Project

The project owner invited the Gold standard supporters, the GS experts, the Chinese DNA, the local NGO, the local government and local residential to participate in the Stakeholder consultation feedback meeting by emails, fax, and paste notice. However, the local gold standard expert, relevant gold standard NGO Supporters, the Chinese DNA cannot attend the meeting due to limits of time and distance, or have no response to the invitation. And those stakeholders who can not participate in the meeting gave no comments for project. In addition, they did not have further special comment to the project activity after the Local Stakeholder Consultation.

On 17/10/2013, the Stakeholder consultation feedback meeting was held. Total 24 people have participated in the Stakeholder consultation feedback meeting. Among the participates, 11 people are male, and 13 people are female.

Among the participates who fill in the questionnaire, 1 people is between 31-40, 7 people are between 41-50, and 10 people are above the age of 50. Among the participates who fill in the questionnaire, 10 people finished the education of primary school, 5 people finished the education junior high school, 1 people finished the education of college, and 2 people didn't fill in the blank.

The place is in meeting room of Three Gorges New Energy Jinchang Wind Power Co., Ltd. The participants included the officer of Jinchang Development and Reform Commission, the staff from Three Gorges New Energy Jinchang Wind Power Co., Ltd., the local residential, the staff of Goldchina Consultancy International Co., Ltd. , the validator from TÜV Rheinland Ltd., and anyone who is willing to the meeting. Official language of R.P.C- Mandarin is used in the meeting. The relevant photos and survey will be provided for DOE checking.

The table shows the stakeholder consultation feedback meeting agenda, as follow:

Before 10:00	Participants signed in.
10:00—10:05	Wang Hongye from China Three Gorges New Energy Co., Ltd. started the meeting, introduced participants, the agenda and the objective of the meeting.
10:05—10:20	Dr. Zheng zhaoning, the consultant of the Project introduced the profile the Project and the requirements of Gold Standard.
10:20—10:35	Participants discussed freely the impact of the project on environment, society, economy, technology and sustainable development and sustainability monitoring plan, the Discussion on continuous input / grievance mechanism
10:35—10:50	Participants filled the questionnaires, blind Sustainable development exercise.
10:50—10:55	Participants filled the meeting comments table.
10:55—11:00	The project owner thanked all the participants and made the meeting

	summary.
--	----------

For Huangmaopo Project

The project owner invited the Gold standard supporters, the GS experts, the Chinese DNA, the local NGO, the local government and local residential to participate in the Stakeholder consultation feedback meeting by emails, fax, and paste notice. However, the local gold standard expert, relevant gold standard NGO Supporters, the Chinese DNA cannot attend the meeting due to limits of time and distance, or have no response to the invitation. And those stakeholders who can not participate in the meeting gave no comments for project. In addition, they did not have further special comment to the project activity after the Local Stakeholder Consultation.

On 18/10/2013, the Stakeholder consultation feedback meeting was held. Total 26 people have participated in the Stakeholder consultation feedback meeting. Among the participates, 19 people are male, and 7 people are female.

Among the participates who fill in the questionnaire, 3 people are between 21-30, 4 people is between 31-40, 8 people are between 41-50, and 3 people are above the age of 50. Among the participates who fill in the questionnaire, 3 people finished the education of primary school, 7 people finished the education junior high school, 5 people finished the education of senior high school/technical secondary school, 1 people finished the education of junior college, 2 people finished the education of college.

The place is in meeting room of Three Gorges New Energy Jinchang Wind Power Co., Ltd. The participants included the officer of Jinchang Development and Reform Commission, the staff from Three Gorges New Energy Jinchang Wind Power Co., Ltd., the local residential, the staff of Goldchina Consultancy International Co., Ltd., the validator from TÜV Rheinland Ltd., and anyone who is willing to the meeting. Official language of R.P.C- Mandarin is used in the meeting. The relevant photos and survey will be provided for DOE checking.

The table shows the stakeholder consultation feedback meeting agenda, as follow:

Before 10:00	Participants signed in.
10:00—10:05	Wang Hongye from China Three Gorges New Energy Co., Ltd. started the meeting, introduced participants, the agenda and the objective of the meeting.
10:05—10:20	Dr. Zheng zhaoning, the consultant of the Project introduced the profile the Project and the requirements of Gold Standard.
10:20—10:35	Participants discussed freely the impact of the project on environment, society, economy, technology and sustainable development and sustainability monitoring plan, the Discussion on continuous input / grievance mechanism
10:35—10:50	Participants filled the questionnaires, blind Sustainable development exercise.
10:50—10:55	Participants filled the meeting comments table.
10:55—11:00	The project owner thanked all the participants and made the meeting summary.

**E.2. Summary of comments received**

>>

For Magang Project

On this feedback meeting, local stakeholders gave high positive comments to the project, local stakeholders comments were summarized as follow:

Note: Staffs from Three Gorges New Energy Jinchang Wind Power Co., Ltd., as the meeting president and coordinator, didn't fill in the questionnaire.

1 Do you know the project?			
	☐ know a lot	☐ know a little	☐ know little
Result	18.75%	81.25%	0.00%
2 What's your attitude towards the construction of the project? (single selection, multi-selection invalid)			
	☐ support	☐ against	☐ indifferent
Result	100.00%	0.00%	0.00%
3 What is the impact of the project implementation do you think on local air quality?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	12.50%	0.00%	87.50%
4 What is the impact of the project implementation do you think on local water environment?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	12.50%	0.00%	87.50%
5 What is the impact of the project implementation do you think on local soil conditions?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	0.00%	0.00%	100.00%
6 Whether the noise caused by the project implementation will affect you?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	0.00%	0.00%	100.00%
7 Do you think the project implementation will have impact on the species and numbers of local plants and animals?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	0.00%	0.00%	100.00%
8 What is the impact of the project implementation do you think on local vegetation			
	☐ positive impact	☐ negative impact	☐ no impact
Result	0.00%	0.00%	100.00%
9 What is the impact of the project implementation do you think on the surrounding landscape?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	25.00%	0.00%	75.00%
10 Whether the implementation will have impact on the living environment of local people?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	6.25%	0.00%	93.75%
11 Whether the implementation of the project will have impact on the living conditions of local people, especially the poor?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	37.50%	0.00%	62.50%
12 Whether the implementation of the project will have impact on the clean and green electricity use by local people?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	12.50%	0.00%	87.50%
13 What is the impact of the project implementation do you think on local education?			



	☐ positive impact	☐ negative impact	☐ no impact
Result	37.50%	0.00%	62.50%
14 What is the impact of the project implementation do you think on the local employment and people's income?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	50.00%	0.00%	50.00%
15 What is the impact of the project implementation do you think on the local economy?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	87.50%	0.00%	12.50%
16 Whether the implementation of the project will have impact on China's import and export of coal, oil and other fossil fuels?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	18.75%	0.00%	81.25%
17 Whether the implementation of the project will have impact on China's introduction and digest of wind power technologies?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	37.50%	0.00%	62.50%
18 What method do you think can eliminate the negative effects of project construction?			
More wind farm should be built. And hope the wind farm to generate electricity soon.			
19 What positive impacts do you think the implementation of the project can bring to your life?(possible multiple-choice question)			
	☐ accessing to electricity/ increasing electricity consumption	☐ reducing electricity charge	☐ increasing income
Result	0.00%	37.50%	62.50%
	☐ increasing employment opportunities	☐ improving living standards	☐ improving the environment of the living places
Result	100.00%	81.25%	37.50%
	☐ others		
Result	0.00%		
20 What negative impacts do you think the implementation of the project can bring to your life?(multiple-choice question)			
	☐ noise	☐ land occupation	☐ increasing the waste water
Result	0.00%	0.00%	0.00%
	☐ damaging natural environment	☐ increasing the amount of solid waste	☐ other
Result	0.00%	0.00%	0.00%

When the feedback meeting was nearly closed, the participants gave their comments of the meeting, and the results are as follows:

Name	Mr. Guo Xingwen
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Liu Baiwen
-------------	----------------



What is your impression of the meeting?	Very good.
What do you like about the project?	It is wind farm.
What do you not like about the project?	No

Name	Ms. Zhao Xiufang
What is your impression of the meeting?	Very good.
What do you like about the project?	It is wind farm.
What do you not like about the project?	No

Name	Ms. Zhang Zhaofang
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Pan Cunju
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Li Dexiu
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Wang Yanhua
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Wang Hongmei
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Liu Xiuying
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Ma Weixin
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No



Name	Mr. Wang Zhong
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Zhao Famei
What is your impression of the meeting?	Very good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Wang Yugui
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Qi Jiafang
What is your impression of the meeting?	Very good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Yang Xinghai
What is your impression of the meeting?	Good.
What do you like about the project?	It is wind farm.
What do you not like about the project?	No

Name	Mr. Wang Shuzhen
What is your impression of the meeting?	Satisfied. The meeting is very successful.
What do you like about the project?	
What do you not like about the project?	No

For Huangmaopo Project

On this feedback meeting, local stakeholders gave high positive comments to the project, local stakeholders comments were summarized as follow:

Note: Staffs from Three Gorges New Energy Jinchang Wind Power Co., Ltd., as the meeting president and coordinator, didn't fill in the questionnaire.

1 Do you know the project?			
	☐ know a lot	☐ know a little	☐ know little
Result	33.33%	66.67%	0.00%
2 What's your attitude towards the construction of the project? (single selection, multi-selection invalid)			
	☐ support	☐ against	☐ indifferent
Result	100.00%	0.00%	0.00%
3 What is the impact of the project implementation do you think on local air quality?			
	☐ positive impact	☐ negative impact	☐ no impact



Result	11.11%	0.00%	88.89%
4 What is the impact of the project implementation do you think on local water environment?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	11.11%	0.00%	88.89%
5 What is the impact of the project implementation do you think on local soil conditions?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	22.22%	0.00%	77.78%
6 Whether the noise caused by the project implementation will affect you?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	5.56%	0.00%	94.44%
7 Do you think the project implementation will have impact on the species and numbers of local plants and animals?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	22.22%	0.00%	77.78%
8 What is the impact of the project implementation do you think on local vegetation			
	☐ positive impact	☐ negative impact	☐ no impact
Result	5.56%	0.00%	94.44%
9 What is the impact of the project implementation do you think on the surrounding landscape?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	16.67%	0.00%	83.33%
10 Whether the implementation will have impact on the living environment of local people?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	38.39%	0.00%	61.11%
11 Whether the implementation of the project will have impact on the living conditions of local people, especially the poor?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	66.67%	0.00%	33.33%
12 Whether the implementation of the project will have impact on the clean and green electricity use by local people?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	38.39%	0.00%	61.11%
13 What is the impact of the project implementation do you think on local education?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	66.67%	0.00%	33.33%
14 What is the impact of the project implementation do you think on the local employment and people's income?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	77.78%	0.00%	22.22%
15 What is the impact of the project implementation do you think on the local economy?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	83.33%	0.00%	16.67%
16 Whether the implementation of the project will have impact on China's import and export of coal, oil and other fossil fuels?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	61.11%	0.00%	38.89%
17 Whether the implementation of the project will have impact on China's introduction and digest of wind power technologies?			
	☐ positive impact	☐ negative impact	☐ no impact
Result	50.00%	0.00%	50.00%
18 What method do you think can eliminate the negative effects of project construction?			



The project should conform to the local custom. The construction should be in designed site, and operated by skilled persons.			
19 What positive impacts do you think the implementation of the project can bring to your life?(possible multiple-choice question)			
	☐ accessing to electricity/ increasing electricity consumption	☐ reducing electricity charge	☐ increasing income
Result	16.67%	16.67%	100.00%
	☐ increasing employment opportunities	☐ improving living standards	☐ improving the environment of the living places
Result	94.44%	72.22%	38.89%
	☐ others		
Result	0.00%		
20 What negative impacts do you think the implementation of the project can bring to your life?(multiple-choice question)			
	☐ noise	☐ land occupation	☐ increasing the waste water
Result	0.00%	0.00%	0.00%
	☐ damaging natural environment	☐ increasing the amount of solid waste	☐ other
Result	0.00%	0.00%	0.00%

When the feedback meeting was nearly closed, the participants gave their comments of the meeting, and the results are as follows:

Name	Mr. Lai Zhenkuan
What is your impression of the meeting?	The preparation of the meeting is orderly, and the participants take part in the meeting actively. And the effect of the meeting is nice.
What do you like about the project?	The project converts wind energy into the economy benefit. The wind turbines were installed on the wasteland, making the scene nice.
What do you not like about the project?	No

Name	Mr. Yi Renqing
What is your impression of the meeting?	Very good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Zong Chengshu
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No



Name	Ms. He Yongfen
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Zhang Xuelu
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Zhao Guopeng
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Chen Wei
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Ru Dejie
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Liu Zhansan
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Ru Yongfeng
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Zhao Tianyun
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Zhang Jianguo
What is your impression of the meeting?	Good
What do you like about the project?	
What do you not like about the project?	No



Name	Mr. Zhang Jiancun
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Ru Debin
What is your impression of the meeting?	Satisfied.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Yan Jiwu
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Ms. Mei Zegui
What is your impression of the meeting?	Good.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Ru Deying
What is your impression of the meeting?	Satisfied.
What do you like about the project?	
What do you not like about the project?	No

Name	Mr. Li Xiaohui
What is your impression of the meeting?	My colleague and I understand the importance of environment protection. And I will notice the issue of environment protection.
What do you like about the project?	
What do you not like about the project?	No

E.3. Report on consideration of comments received

>>

As a conclusion, the outcome of feedback round has no negative comments received from the stakeholders, and all comments received show stakeholders have positive attitude and support the project activity. Local residents and government are all very supportive to the implementation of the bundled Project. According to the collected comments received from local stakeholders, it is not necessary to modify the bundled Project.



SECTION F. Approval and authorization

>>

The bundled project is a GS VER project, the Approval and authorization is not necessary.

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

Organization name	Three Gorges New Energy Jinchang Wind Power Co., Ltd.
Street/P.O. Box	No.56 Guilin Road, Economic & Technological Development Area
Building	-
City	Jinchang City
State/Region	Gansu Province
Postcode	737100
Country	P. R. of China
Telephone	+86-(0)10-58689628
Fax	+86-(0)10-58689504
E-mail	hollywang816@126.com
Website	
Contact person	Wang Hongye
Title	
Salutation	Ms.
Last name	Wang
Middle name	
First name	Hongye
Department	
Mobile	
Direct Fax	+86-(0)10-58689504
Direct tel.	+86-(0)10-58689628
Personal e-mail	hollywang816@126.com



Organization name	Carbon Invcap International Trading Co., ltd.
Street/P.O. Box	
Building	Kemp House 152-160 city Road
City	London
State/Region	-
Postcode	EC1V2NX
Country	United Kingdom of Great Britain and Northern Ireland
Telephone	+86-(0)10-62682508
Fax	+86-(0)10-62682682
E-mail	gs@carbonincap.com
Website	-
Contact person	Jessy Tang
Title	project Manager
Salutation	Ms.
Last name	Jessy
Middle name	-
First name	Tang
Department	-
Mobile	-
Direct fax	+86-(0)10-62682682
Direct tel.	+86-(0)10-62682508
Personal e-mail	gs@carbonincap.com



Appendix 2: Affirmation regarding public funding

Not applicable, therefore no need for further statement.



Appendix 3: Applicability of selected methodology

The bundled project is two newly built wind power projects, fall within sectoral scope 1: energy industries (Renewable sources).

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

To determine the simple OM emission factor ($EF_{grid,OMsimple,y}$) and the Build Margin emission factor ($EF_{grid,BM,y}$) of the bundled project, data recommended in the *2013 baseline emission factors for regional power grids in China* for Northwest China Power Grid are adopted.

The following tables summarise the numerical results from the equations listed in the approved methodological tool-*Tool to calculate the emission factor for an electricity system* version 03.0.0. The information provided by the tables includes data, data sources and the underlying calculations. The emission factors of OM and BM are calculated based on the *Tool to calculate the emission factor for an electricity system*. The information provided by the tables includes data, data sources and the underlying calculations.

Table A1. Thermal Electricity generation of Northwest China Power Grid

year	2009			2010			2011		
Province	EG	AER	EDG	EG	AER	EDG	EG	AER	EDG
	(MWh)	(%)	(MWh)	(MWh)	(%)	(MWh)	(MWh)	(%)	(MWh)
Shaanxi	77,400,000	7.24	71,796,240	95,800,000	7.23	88,873,660	108,400,000	7.2	100,595,200
Gansu	44,100,000	6.88	41,065,920	59,100,000	6.73	55,122,570	71,400,000	6.8	66,544,800
Qinghai	10,700,000	7.01	9,949,930	10,900,000	6.58	10,182,780	12,200,000	7.2	11,321,600
Ningxia autonomous region	44,700,000	7.76	41,231,280	57,200,000		57,200,000	96,700,000		96,700,000
Xinjiang autonomous region	45,200,000	5.16	42,867,680	53,900,000	8.7	49,210,700	72,500,000	8.2	66,555,000
Total			200,640,770			206,911,050			341,716,600

Data source: China electric power yearbook, 2010-2012

EG- Electricity generation, AER- Auxiliary electricity consumption Rate, EDG-Electricity delivered to the grid.



Table A2. Calculation of simple OM emission factor of Northwest China Power Grid in 2009

Fuel	Unit	Shaanxi	Gansu	Qinghai	Ningxia autonomous region	Xinjiang autonomous region	Total	Fuel emission factor (kgCO ₂ /TJ)	NCV (MJ/t,km ³)	CO ₂ emissions (tCO ₂)
		A	B	C	D	E	F = sum (A: E)	G	H	I
Raw coal	10 ⁴ t	3949.22	2060	467.05	2350.13	2380	11206.4	87300	20908	204,546,878
Clean coal	10 ⁴ t	-	-	-	-	-	0	87300	26344	0
Other washed coal	10 ⁴ t	8.34	-	-	56.01	6.66	71.01	87300	8363	518,437
briquettes	10 ⁴ t	-	-	-	-	-	0	87300	20908	0
Coke	10 ⁴ t	-	-	-	-	-	0	95700	28435	0
Coke oven gas	10 ⁸ m ³	0.49	0.8	-	-	0.12	1.41	37300	16726	87,967
Other gas	10 ⁸ m ³	18.37	0.44	-	-	-	18.81	37300	5227	366,733
Crude oil	10 ⁴ t	-	-	-	-	-	0	71100	41816	0
Gasoline	10 ⁴ t	0.02	-	-	-	-	0.02	67500	43070	581
Diesel	10 ⁴ t	0.6	0.52	0.2	0.07	0.7	2.09	72600	42652	64,718
Fuel oil	10 ⁴ t	-	0.25	0.08	-	0.06	0.39	75500	41816	12,313
LPG	10 ⁴ t	0.02	-	-	-	-	0.02	61600	50179	618
Refinery gas	10 ⁴ t	-	-	-	-	8.56	8.56	48200	46055	190,019
Natural gas	10 ⁸ m ³	0.91	0.07	3.93	-	7.83	12.74	54300	38931	2,693,177
Other petroleum products	10 ⁴ t	-	-	-	-	-	0	72200	41816	0
Other coking products	10 ⁴ t	-	-	-	-	-	0	95700	28435	0
Other ^E (standard coal)	10 ⁴ t Ce	73.76	18.52	-	18.08	-	110.36	0	0	0
									Subtotal	208,481,441



Total electricity delivered to Northwest China Power Grid MWh	206,911,050
Total emission of Northwest China Power Grid tCO₂	208,481,441
The simple OM emission factor of the Northwest China Power Grid tCO₂/MWh`	1.00759

*I=F*G*H /100000(unit of mass) or I= F*G*H /10000(unit of volume)

Data sources: China energy statistical yearbook 2010, 2006 IPCC guideline on national GHG inventories, Volume 2

Table A3. Calculation of simple OM emission factor of Northwest China Power Grid in 2010

Fuel	Unit	Shaanxi	Gansu	Qinghai	Ningxia autonomous region	Xinjiang autonomous region	Total	Fuel emission factor	NCV	CO ₂ emissions
								(kgCO ₂ /TJ)	(MJ/t,km ³)	(tCO ₂)
		A	B	C	D	E	F = sum (A: E)	G	H	I
Raw coal	10 ⁴ t	4850.49	2771.89	483.72	2916.46	2494.9	13517.46	87,300	20,908	246,729,926
Clean coal	10 ⁴ t	-	-	-	1.05	-	1.05	87,300	26,344	24,148
Other washed coal	10 ⁴ t	11.01	-	-	42.96	6.82	60.79	87,300	8,363	443,822
briquettes	10 ⁴ t	-	-	-	-	-	0	87,300	20,908	0
Coke	10 ⁴ t	-	-	-	-	-	0	95,700	28,435	0
Coal gangue	10 ⁴ t	355.13	37.86	-	163.58	2.85	559.42	87,300	8,363	4,084,269
Coke oven gas	10 ⁸ m ³	1.97	0.89	-	-	0.7	3.56	37,300	16,726	222,101
BFG	10 ⁸ m ³	18.24	4.06	-	-	5.28	27.58	219,000	3,763	2,272,860
LDG	10 ⁸ m ³	-	0.31	-	-	-	0.31	145,000	7,945	35,713
Other gas	10 ⁸ m ³	-	-	-	-	-	0	37,300	5,227	0
Crude oil	10 ⁴ t	-	-	-	-	-	0	71,100	41,816	0
Gasoline	10 ⁴ t	0.01	-	0.03	-	0.01	0.05	67,500	43,070	1,454
Diesel	10 ⁴ t	0.67	0.42	0.21	0.23	0.39	1.92	72,600	42,652	59,453
Fuel oil	10 ⁴ t	-	0.17	0.09	0.1	0.7	1.06	75,500	41,816	33,465
Naphtha	10 ⁴ t	-	-	-	-	-	0	72,600	43,906	0
Lubricating Oil	10 ⁴ t	-	-	-	-	-	0	71,900	41,398	0
Paraffin	10 ⁴ t	-	-	-	-	-	0	72,200	39,934	0
Solvent Oil	10 ⁴ t	-	-	-	-	-	0	72,200	42,945	0



Petroleum asphalt	10 ⁴ t	-	-	-	-	-	0	69,300	38,931	0
Petroleum coke	10 ⁴ t	-	-	-	--	-	0	82,900	31,947	0
LPG	10 ⁴ t	-	-	-	-	-	0	61,600	50,179	0
Refinery gas	10 ⁴ t	-	-	-	-	12.2	12.2	48,200	46,055	270,822
Natural gas	10 ⁸ m ³	0.87	-	2.48	0.3	8.54	12.19	54,300	38,931	2,576,909
Other petroleum products	10 ⁴ t	-	-	-	-	0.01	0.01	72,200	41,816	302
Other coking products	10 ⁴ t	-	-	-	-	-	0	95,700	28,435	0
Other (standard coal)	10 ⁴ t Ce	1.76	2.68	-	-	-	4.44	0	0	0
									Subtotal	256,755,243
Total electricity delivered to Northwest China Power Grid MWh										260,589,710
Total emission of Northwest China Power Grid tCO₂										256,755,243
The simple OM emission factor of the Northwest China Power Grid tCO₂/MWh										0.98529

*I=F*G*H/100000(unit of mass) or I= F*G*H/10000(unit of volume)

Data sources: China energy statistical yearbook 2011, 2006 IPCC guideline on national GHG inventories, Volume 2

Table A4. Calculation of simple OM emission factor of Northwest China Power Grid in 2011

Fuel	Unit	Shaanxi	Gansu	Qinghai	Ningxia autonomous region	Xinjiang autonomous region	Total	Fuel emission factor	NCV	CO ₂ emissions
								(kgCO ₂ /TJ)	(MJ/t,km ³)	(tCO ₂)
		A	B	C	D	E	F = sum (A: E)	G	H	I
Raw coal	10 ⁴ t	4107.56	3427.4	556.68	5051.73	3358.94	16502.3 1	87300	20908	301,211,450
Clean coal	10 ⁴ t						0	87300	26344	0
Other	10 ⁴ t	1473.38			42.36	9.62	1525.36	87300	8363	11,136,499



Fuel	Unit	Shaanxi	Gansu	Qinghai	Ningxia autonomous region	Xinjiang autonomous region	Total	Fuel emission factor	NCV	CO ₂ emissions
washed coal										
briquettes	10 ⁴ t	-	-	-	-	-	0	87300	20908	0
Coke	10 ⁴ t	-	-	-	-	-	0	95700	28435	0
Coal gangue		251.88	41.53		170.51	69.53	533.45	87300	8363	3,894,665
Coke oven gas	10 ⁸ m ³	6.35	0.66		0.05	1.38	8.44	37300	16726	526,555
BFG	10 ⁸ m ³	-	4.68		0.14	4.47	9.29	219,000	3763	765,586
LDG	10 ⁸ m ³	-	1.08	-		1.05	2.13	145,000	7945	245,381
Other gas	10 ⁸ m ³	-	-	-	-	-	-	37300	5227	0
Crude oil	10 ⁴ t	-	-	-	-	-	0	71100	41816	0
Gasoline	10 ⁴ t	-	-	-	-	-	0	67500	43070	0
Diesel	10 ⁴ t	0.66	0.47	0.47	0.29	0.74	2.63	72600	42652	81,439
Fuel oil	10 ⁴ t	-	0.15	0.08	0.47	0.06	0.76	75500	41816	23,994
Naphtha	10 ⁴ t	-	-	-	-	-	0	72600	43906	0
Lubricating oil	10 ⁴ t	-	-	-	-	-	0	71900	41398	0
Paraffin	10 ⁴ t	-	-	-	-	-	0	72200	39934	0
Solvent oil	10 ⁴ t	-	-	-	-	-	0	72200	42945	0
Petroleum asphalt	10 ⁴ t	-	-	-	-	-	0	69300	38931	0
Petroleum coke	10 ⁴ t	-	-	-	-	-	0	82900	31947	0
LPG	10 ⁴ t	-	-	-	-	-	0	61600	50179	0
Refinery gas	10 ⁴ t	-	-	-	-	7.99	7.99	48200	46055	177,366
Natural gas	10 ⁸ m ³	0.83	-	4.62	0.77	9.26	15.48	54300	38931	3,272,400
Other petroleum products	10 ⁴ t	-	-	-	-	-	0.	72200	41816	0
Other coking products	10 ⁴ t	-	-	-	-	-	0	95700	28435	0
Other Energy	10 ⁴ t Ce	0.56	2.78	-	-	6.8	10.14	0	0	0



Fuel	Unit	Shaanxi	Gansu	Qinghai	Ningxia autonomous region	Xinjiang autonomous region	Total	Fuel emission factor	NCV	CO ₂ emissions
(standard coal)										
									Subtotal	321,335,334
Total electricity delivered to Northwest China Power Grid MWh										341,716,600
Total emission of Northwest China Power Grid tCO₂										321,335,334
The simple OM emission factor of the Northwest China Power Grid tCO₂/MWh`										0.9404

* $I = F * G * H / 100000$ (unit of mass) or $I = F * G * H / 10000$ (unit of volume)

Data sources: China energy statistical yearbook 2012, 2006 IPCC guideline on national GHG inventories, Volume 2

According to *Tool to calculate the emission factor for an electricity system* (version 03.0.0), the simple operating margin emission factor in year 2009, 2010 and 2011 are calculated, the three years weighted average simple operating margin emission factor is calculated as 0.9720 tCO₂/MWh, see Table A1~Table A4 for details.

The section B.6.1 detailed the calculation of BM emission factor of Northwest China Power Grid; the following tables summarize the numerical results from the equations listed in *2013 baseline emission factors for regional power grids in China*.

Sub-step 1: Calculation of the share of CO₂ emissions from solid, liquid and gaseous fuels.

Calculated with the data provided in Table and equations (4), (5) and (6), $\lambda_{Coal,y} = 98.42\%$, $\lambda_{Oil,y} = 0.03\%$, $\lambda_{Gas,y} = 1.55\%$

Sub-step 2: Calculated the emission factor of thermal power based on the emission factors of the best efficient and commercial coal-fired, oil-fired and gas-fired generation technologies as follow:

Table A5 CO₂ emission factor for best efficient and commercially available thermal power technologies in China

Thermal Power Technologies	variable	Electricity supply efficiency	Emission factor of fuel(kgCO ₂)	Oxidation	Emission factor(tCO ₂ /MWh)
		A	B	C	D=3.6/A/1,000,000*B*C
Coal fired power plants	$EF_{Coal,Adv,y}$	39.84%	87,300	1	0.7889
Oil fired power plants	$EF_{Oil,Adv,y}$	52.50%	75,500	1	0.5177



Gas fired power plants	$EF_{Gas,Adv,y}$	52.50%	54,300	1	0.3723
------------------------	------------------	--------	--------	---	--------

As per equation (7)

$$\begin{aligned}
 EF_{Thermal,y} &= \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \\
 &= 98.42\% \times 0.7889 + 0.03\% \times 0.5177 + 1.55\% \times 0.3723 \\
 &= 0.78236 \text{ tCO}_2/\text{MWh}
 \end{aligned}$$

Sub-step 3: Calculation BM in the grid by multiply the fuelled power emission factor and fuelled power proportion of the total power.

Table A6. Installed capacity of Northwest China Power Grid in 2011

Installed capacity	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total
Thermal power	MW	22,160	15,240	2,300	16,400	16,230	72,330
Hydro power (MW)	MW	2,320	6,550	10,960	430	3,270	23,530
Nuclear power (MW)	MW	0	0	0	0	0	0
Wind power and Other (MW)	MW	120	5,661	958	1,661	1,880	10,280
Total (MW)	MW	24,600	27,451	14,218	18,491	21,380	106,140

Data source: China electric power yearbook 2012.

Table A7 Installed capacity of Northwest China Power Grid in 2010

Installed capacity	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total
Thermal power	MW	21,370	13,240	1,930	12,710	11,720	60,970
Hydro power (MW)	MW	2,210	6,110	10,680	430	2,990	22,420
Nuclear power (MW)	MW	0	0	0	0	0	0
Wind power and Other (MW)	MW	0	1390	0	600	1360	3,350
Total (MW)	MW	23,580	20,740	12,610	13,740	16,070	86,740

Data source: China electric power yearbook 2011.

**Table A8. Installed capacity of Northwest China Power Grid in 2009**

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

Data source: China electric power yearbook 2010.

Table A9. Calculation of BM emission factor of Northwest China Power Grid

	2009	2010	2011	Capacity added in 2009-2011	Capacity added in 2010-2011	Share in added capacity
	A	B	C	D	E	F
Thermal (MW)	51,160	60,970	72,330	23,547	11,527	65.38%
Hydropower (MW)	19,460	22,420	23,530	4,070	1,110	11.30%
Nuclear (MW)	0	0	0	0	0	0.00%
Windpower(MW)	1,880.3	3,352	10,280	8,400	6,928	23.32%
Total (MW)	72,500	86,742	106,140	36,017	19,565	100.00%
Percentage of 2009 capacity				33.93%	18.43%	

$$EF_{grid,BM,y} = 0.78236 * 65.38\% = 0.5115 \text{ tCO}_2/\text{MWh}$$

Calculation for the combined emission factor is as follows:

**Table A10. Calculation of CM emission factor**

	Value	weight	CM
OM (tCO ₂ /MWh)	0.9720	0.75	0.8568
BM (tCO ₂ /MWh)	0.5115	0.25	



Appendix 5: Further background information on monitoring plan

Not applicable, left blank intentionally.



Appendix 6: Summary of post registration changes

Not applicable, therefore no need for further statement.

History of the document

Version	Date	Nature of revision
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.
04.0	EB 66 13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for CDM project activities” (EB 66, Annex 8).
03	EB 25, Annex 15 26 July 2006	
02	EB 14, Annex 06b 14 June 2004	
01	EB 05, Paragraph 12 03 August 2002	Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration		