Project design document form

(Version 10.1)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title of the project activity	Zhongshan County Micro Hydro Project Bundle No.3
Scale of the project activity	☐ Large-scale ☒ Small-scale
Version number of the PDD	01
Completion date of the PDD	22/12/2017
Project participants	Zhongshan Dahe Hydropower Project; Liang'an Zhumei Stage II Hydropower Project of Zhongshan County; Honghuali Beicao Hydropower Station of Zhongshan County; Swiss Carbon Value Ltd.
Host Party	People's Republic of China (Host country); Switzerland
Applied methodologies and standardized baselines	AMS I.D. Grid connected renewable electricity generation (v18.0)
Sectoral scopes linked to the applied methodologies	Sectoral scope: 01 Energy industries (renewable-/non-renewable sources)
Estimated amount of annual average GHG emission reductions	3,086tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>>

Zhongshan County Micro Hydro Project Bundle No.3 (hereinafter referred to as the proposed project) is a bundle project consists of three hydro power stations. i.e. Zhongshan Dahe Hydropower Project, Liang'an Zhumei Stage II Hydropower Project and Honghuali Beicao Hydropower Project. All of these hydropower stations are located in Zhongshan Country, Guangxi Province.

The main purpose of the project is to generate electricity from renewable resources and supplies to the China Southern Power Grid (hereafter referred to 'CSPG'), displacing the electricity generation from fossil fuel based power plants connected to CSPG, thereby reducing the greenhouse gas (GHG) emissions. The total install capacity of the project is 2.92MW, and the total electricity supplied to the local grid is estimated to be 6,202 MWh per year. The emission factor for CSPG is 0.4976t/MWh calculated by the Chinese DNA data and *tool to calculate the emission factor for an electricity system（version 06.0）.* Thus the estimated total emission reduction is 3,086 tonnes per year for the project.

The project makes contribution to the local sustainable development as follows:

1. GHG emission reduction

This project activity achieves greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions, as grid-connected power stations in the CSPG are dominated by fossil fuel-fired power plants.

2. Pollutants emission reduction through replacing fossil fuel combustion

This project replaces grid-connected fossil fuel-fired power plants in the CSPG, and thus reduce fossil fuel consumption and avoid pollutants emission, such as sulfur dioxide, carbon dioxide and dust, brought by fossil fuel combustion. Therefore, this project has obvious environmental benefit.

3. Employment opportunities

This project offers job opportunities for local people.

4. Economy development

The region can achieve economic growth and booming of local tourism through the construction and operation of the project. Furthermore, the project contributes to local government with more tax revenues and poverty eradication.

This project has been registered as GS project on 23/07/2013, with ID of 1101. The first crediting period is from 23/07/2011 to 22/07/2018. As the first crediting period will be end, so the project is applying for renewal crediting period. The start date of the second crediting period is from 23/07/2018.

A.2. Location of project activity

>>

The project is located in Zhongshan County, Guangxi Province. The geographic coordinates for each station is

Project name	Geographic coordinates
Zhongshan Dahe Hydropower Project	111°03'49"E; 24°39'09"N
Liang'an Zhumei Stage II Hydropower Project	111°12'26"E; 24°40'26"N
Honghuali Beicao Hydropower Project	111°09'01"E; 24°38'00"N

A.3. Technologies/measures

>>

The scope of the project falls under the UNFCCC Sectoral Scope 1: Energy Industries. (Renewable sources); its type falls under type I: Renewable Energy Project, and its category falls under the Category I.D: Grid Connected Renewable Electricity Generation.

The project consists three sub-components hydropower stations: Zhongshan Dahe Hydropower Project, Liang'an Zhumei Stage II Hydropower Project, and Honghuali Beicao Hydropower Project. All of these stations are using hydropower resource to generate electricity. The type of three hydropower stations are all run-of-river project, the hydropower system consist water retaining dike, water diversion tunnel, pressure tube and hydrologic turbines and generators. Water from the nearby river are diverted to each stations through water diversion tunnel, pressure tube and then flow over the hydrologic turbines of each station at a designed water head to produce an optimal electricity output

Electricity is step-upped using a transformer, and it flows to a substation, which built closed to the power plant house of each station, step-upping and transmitting the electricity via 10kV or 35kV transmission lines. These transmission lines are connected to the local grid, which is delivering electricity to the CSPG.

The main technical parameters for each station are as follows:

Dahe Stage I hydropower station:

Name	Value
Rated Water Head (m)	110
Length of water diversion tunnel (km)	3.3
Hydro-turbines (set)	2
Rated Output (kW)	250+320
Model	XJA-W-40／1×10.5
	XJA-W-40／1×11.5
Generator (set)	2
Model	SFW250-6-740
	SFW320-6／850
Rated Capacity (kW)	250+320

Dahe Stage II hydropower station

Name	Value
Rated Water Head (m)	132
Length of water diversion tunnel (km)	4.98
Hydro-turbines (set)	3
Rated Output (kW)	960
Model	XJA-W-50/1*9
Generator (set)	3
Model	SFW320-6／850
Rated Capacity (kW)	320*3

Liang'an Zhumei Stage II Hydropower Project

Name	Value
Rated Water Head (m)	270
Length of water diversion tunnel (km)	1
Hydro-turbines (set)	2
Rated Output (kW)	
Model	CJ-37-70 / 1×6
	CJ-37-70 / 1×7.5
Generator (set)	2
Model	SFW-320-6/850(400)
	SFW500-6/990(400)
Rated Capacity (kW)	320+500

Honghuali Beicao Hydropower Project

Name	Value
Rated Water Head (m)	105
Length of water diversion tunnel (km)	2.7
Hydro-turbines (set)	2
Rated Output (kW)	570
Model	XJ02-W-40 / 1×11
	XJ02-W-50/1×12.5
Generator (set)	2
Model	SFW250-6-740
	SFW320-8／850
Rated Capacity (kW)	250+320

A.4. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)

People's Republic of China (Host country)	Zhongshan Dahe Hydropower Project	NO
People's Republic of China (Host country)	Liang'an Zhumei Stage II Hydropower Project of Zhongshan Count	NO
People's Republic of China (Host country)	Honghuali Beicao Hydropower Station of Zhongshan County	NO
Switzerland	Swiss Carbon Value Ltd	NO

A.5. Public funding of project activity

>>
The project does not receive public funding from any parties from Annex I countries.

A.6. History of project activity

>>
The PP to confirm that:
(a) This project activity is neither registered as a CDM project activity nor included as a component project activity (CPA) in a registered CDM programme of activities (PoA);
(b) The project activity is not a project activity that has been deregistered.

A.7. Debundling

>>
As defined in 4/CMP.1, Annex II, Appendix C of the Simplified Modalities and Procedures for Small scale CDM project activities [1]:

A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:
a. With the same project participants;
b. In the same project category and technology/measure; and
c. Registered within the previous 2 years; and
d. Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point (4/CMP.1, Annex II, Appendix C, paragraph 2; EB 54, Annex 13, paragraph 2).

The project participants do not own any other hydro project which has applied for CDM project and its geographical location is not within 1 km of the project boundary of the bundle project at the closest point.

SECTION B. Application of selected methodologies and standardized baselines

B.1. Reference to methodologies and standardized baselines

>>
The category for the Project activity according to Appendix B of the UNFCCC's published procedures for small-scale activities is:
Type I: Renewable Energy Project
Category I.D.: Grid Connected Renewable Electricity Generation

Baseline & Monitoring Methdology:
AMS.I-D Grid connected renewable electricity generation (version 18)[2], became valid from 28 Nov 2014 onwards.

References:
Tool to calculate the emission factor for an electricity system (Version 6.0)[3]

[1] http://cdm.unfccc.int/Projects/ppac/howto/SmallScalePA/sscdebund.pdf

[2] http://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 3.0.1)[4]

For more information about the methodology, please refer to the following website:
http://cdm.unfccc.int/methodologies/SSCmethodologies/approved

B.2. Applicability of methodologies and standardized baselines

>>
This project is applicable to AMS.I-D(V18.0), and the applicability analysis is as follows:

No	Applicability	This project	Applicable/Not Applicable
1	Typical project(s) Construction and operation of a new power plant/unit or retrofit, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant that uses renewable energy sources and supplies electricity to the grid	Construct a new power plant	Applicable
	Type of GHG emissions mitigation action Renewable energy. Displacement of electricity that would be provided to the grid by more-GHG-intensive means	Renewable energy Displacement of electricity that would be provided to the grid by more-GHG-intensive means	Applicable
2	This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling	The three plants are hydro plants Supplying electricity to national grid	Applicable
3	Illustration of respective situations under which each of the methodology (i.e. “AMS-I.D.: Grid connected renewable electricity generation”, “AMS-I.F.: Renewable electricity generation for captive use and mini-grid” and “AMS-I.A.: Electricity generation by the user) applies is included in the appendix	This project applied to AMS-I.D as the electricity is connected to national grid	Applicable
4	This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	This project applies (a)	Applicable
5	Hydro power plants with reservoirs that satisfy at least one of the following conditions are	The individual components of the project activity are all run-off-river	Not applicable

[3] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf

[4] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

	eligible to apply this methodology: (a)The project activity is implemented in an existing reservoir with no change in the volume of reservoir; (b)The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m^2; (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m^2.	type small-scale project with no reservoir.	
6	If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	This project does not include non-renewable component	Not applicable
7	Combined heat and power (co-generation) systems are not eligible under this category.	There is no combined heat and power system in this project	applicable
8	In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physicallydistinct1 from the existing units.	This project does not involve capacity addition	NA
9	In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	This project does not involve retrofit, rehabilitation or replacement	NA
10	In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as “AMS-I.C.: Thermal energy production with or without electricity” shall be explored.	This is not landfill gas, waste gas, wastewater treatment and agro-industries project	NA
11	In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.	This project does not include biomass	NA

B.3. Project boundary, sources and greenhouse gases (GHGs)

>>

Source		GHG	Included?	Justification/Explanation
Baseline	CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project	For most renewable energy project activities, *PEy* = 0	CO_2	No	Excluded
		CH_4	No	Excluded
		N_2O	No	Excluded

B.4. Establishment and description of baseline scenario

>>

According to AMS.I-D(V18.0), the baseline scenario is that the 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 into the grid.

The baseline emissions are the quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y ($EG_{PJ,y}$) multiplied by the grid emission factor.

'Tool to calculate the emission factor for an electricity system(version 06.0)' describes that the grid emission factor is determined by a combined margin (CM), which is the sum of built margin (BM) and operation margin (OM).

Under China's circumstance, different OM and BM were established and updated for the country's spatial divided grids. The project belongs to the China Southern Power Grid, according the Chinese NDRC's calculation of the emission factor, the BM and OM of CSPG can be applicable to the project as its baseline emission factor.

According to the '*Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 3.0.1)'*, the stepwise procedure as follows should be adopted to assess the continued validity of the baseline and to update the baseline

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

If the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period, go to Step 1.2.

The current baseline also is that the equivalent electricity of the project is supplied by fossil fuel power plants, complies with all relevant mandatory national and/or sectoral policies which have come into effect at the time of requesting renewal of the crediting period, so go to Step 1.2.

Step 1.2: Assess the impact of circumstances

Assess the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario.

In the situation where the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, an assessment of the changes in market characteristics is required for the renewal of the crediting period.

The baseline scenario for the project is to import equivalent electricity from CSPG, which is dominated by thermal plant in the previous crediting period and now. And there is no impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions.

Evaluate whether the conditions used to determine the baseline emissions in the previous crediting period are still valid. Assess the availability of new fuels or raw materials and the impact of electricity or fuel prices in the identification of the current practice for the baseline emissions;

The baseline emissions have changed based on the methodology AMS.I-D (version 18.0) and tool to calculate the emission factor for an electricity system (Version 05.0). CSPG is dominated by fossil fuel power plants, and the electricity delivered to CSPG from other power plants will not impacted the tariff through the new fuels or raw materials.

If the new circumstances make a continued validity of the current baseline not plausible, then the current baseline needs to be updated for the subsequent crediting period.

There is no new circumstance occurred, so the baseline would not be updated.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

This sub-step should only be applied if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology.

This sub-step is discussing the use of equipment in baseline scenario. In this project activity, the baseline scenario is the equivalent electricity generated by the project activity would be imported from the CSPG, which was not an investment activity. So this is not applicable.

Assess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD or CDM-PDD-REN, exceeds the crediting period for which renewal is requested.

This is not applicable.

Take into consideration the market penetration of different technologies. Evaluate the penetration rate of different technologies that are available in the market and evaluate how they could affect the baseline.

This is not applicable.

If the baseline scenario of the project activity is the continuation of use of the current equipment(s) without any investment and the projects proponents or third party(ies) will undertake an investment later, but before the end of a crediting period, then the current baseline needs to be updated for that crediting period or the crediting of emission reductions should be limited to the period before the baseline equipment would cease its operation.

This is not applicable.

Step 1.4: Assessment of the validity of the data and parameters

Assess whether data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated. Updates should be undertaken in the following cases:

• *Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC;*
For renewal of the crediting period, the updated IPCC 2006 was adopted.

• *Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.*
The emission factors are updated.

If any of the data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, the current baseline needs to be updated for the subsequent crediting period.

The data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period, which are not valid anymore, so the data and parameters need to be updated for the subsequent crediting period.

If the application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline as well as data and parameters are still valid for the subsequent crediting period, then this baseline, data and parameters can be used for the renewed crediting period. Otherwise, proceed to Step 2.

The current baseline still valid, but the data and parameters are need to updated, so it proceeds to Step 2.

Step 2: Update the current baseline and the data and parameters
This step is only applicable if any of the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated.

Step 2.1: Update the current baseline
Update the current baseline emissions for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity. The procedure should be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period.

This is not applicable, as the baseline is not changed.

Step 2.2: Update the data and parameters
If the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters, following the guidance in Step 1.4.

The data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period, which are not valid anymore, so the data and parameters need to be updated for the subsequent crediting period.

So the scenario prior to the project in second crediting period is the same as the baseline scenario. The key parameters used for emission reductions calculation are as follow:

Parameter	Value	Unit
OM	0.8959	tCO_2/MWh
BM	0.3648	tCO_2/MWh
CM	0.4976	tCO_2/MWh

B.5. Demonstration of additionality

>>
This section has been assessed and validated in the first crediting period.

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

>>
The approved consolidated baseline and monitoring methodology *AMS.I-D(version18.0) 'Grid-connected electricity generation from renewable sources*' has been used.
The methodology was applied with the following tools:
Tool to calculate the emission factor for an electricity system（version 06.0）

The Project generates electricity and CO_2 reduction through the displacement of grid electricity generation by fossil fuel fired power. According to the baseline methodology AMS-I.D(v18.0), the emission reduction ER_y by the project activity during a given year y is defined as;

$ER_y=BE_y-PE_y-LE_y$ *Equation 1*

As per AMS.I-D(v18.0), the project emission for most renewable energy project activities is zero (PEy=0). LE=0

BE_y is calculated as;

$BE_y=EG_{PJ,y}*EF_{grid,CM,y}$ *Equation 2*

Where:

Parameter	SI Unit	Description
ER_y	tCO_2e	Emission reductions achieved by the project activity in year y
BE_y	tCO_2e	Baseline Emission in year y
PE_y	tCO_2e	Project Emission in year y
LEy	tCO_2e	Leakage Emissions in year y
$EF_{grid,CM,y}$	tCO_2e/MWh	Combined margin CO_2 emission factor for grid connected power generation in year y
$EG_{PJ,y}$	MWh/year	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of CDM project activity in year y

The combined emission factor $EF_{grid,CM,y}$ for the project activity is calculated as a weighted average of Operating Margin emission factor and Build Margin emission factor as described in the *Tool to calculate the emission factor for an electricity system（version 06.0）*

$$EF_{grid,CM,y}=w_{OM}*EF_{grid,OM,y}+w_{BM}*EF_{grid,BM,y}$$ *Equation 3*

Where:

Parameter	SI Unit	Description
$EF_{grid,CM,y}$	tCO_2e/MWh	Combined margin CO_2 emission factor for grid connected power generation in year y
$EF_{grid,BM,y}$	tCO_2e/MWh	tCO_2/MWh Build margin CO_2 emission factor for grid connected power generation in year y
$EF_{grid,OM,y}$	tCO_2e/MWh	tCO_2/MWh Operating margin CO_2 emission factor for grid connected power generation in year y
w_{OM}	%	Weighting of operation margin emissions factor; Default value 25% for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.
w_{BM}	%	Weighting of built margin emissions factor; Default value 75% for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.

According to the public data by the DNA of China on 06/06/2015[5], the OM of CSPG is 0.8959tCO_2/MWh and BM is 0.3648tCO_2/MWh. According to the *Tool to calculate the emission factor for an electricity system（version 06.0），* default value for w_{OM} is 25% and W_{BM}=75% for the second and third crediting period.

[5] http://cdm.ccchina.gov.cn/Detail.aspx?newsId=61599&TId=19

So **$EF_{grid,CM,y}$=25%*0.8959+75%*0.3648=0.223975+0.2736=0.4976tCO_2/MWh**

The emission factor is calculated as following steps:

Step 1: Identify the relevant electric system
According to the definition of project boundary by AMS-I.D (Version 18), the spatial extent of the project boundary includes the project and all power plants connected to the electricity system that the project is connected to.
Based on "Tool to calculate the emission factor for an electricity system" (Version 06.0), the "project electricity system" is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints. Furthermore, if the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used. The most recent Chinese emission factors that the DNA published is emission factors of 2015, which is the one will be used for calculating the ex-ante emission reduction of this project.

In this specific case, the project finally displaces the power generated by the China Southern Power Grid. According the notification from China DNA, the delineation of CSPG cover Guangdong, Guangxi Autonomous regions, Yunan and Guizhou provincial grids. The electricity generated by the project IS transferred to the CSPG. The baseline emissions factor ($EF_{grid,CM,y}$) is calculated as the average of the operating margin emissions factor and the build margin emissions factor. The data used to calculate the grid emissions factor comes from reliable and publicly accessible statistics e.g. China Energy Statistic Yearbook and China Electric Power Yearbook, as well as the Chinese DNA.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)
Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:
Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation

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

Step3: Select a method to determine the operating margin (OM)
The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:
(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch data analysis OM, or
(d) Average OM

The Simple OM method (a) can only be used if low-cost/must run resources constituted less than 50% of the total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

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. In China, they include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.

According to the data from China Electric Yearbook 2011~2014 the ratio of the low-cost/must run resources in the CSPG are listed in the table below:

Ratio of the low-cost/must run resources installation in the CSPG

Year	2010	2011	2012	2013
Ratio (%)	44.23%	44.97%	44.50%	46.09%

Because the low-cost/must-run resources constitute less than 50% of total grid generation in average of the five most recent years in CSPG, this PDD adopts option "(a) Simple OM".

This PDD uses the “Ex ante option”: 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, without requirement to monitor and recalculate the emission factor during the crediting period.

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

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

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

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

Option B can only be used if:
(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation (i.e., if Option I has been chosen in Step 2).

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

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

$$EF_{grid,OM,simple,y} = \frac{\sum_i (FC_{i,y} \times NCV_{i,y} \times EF_{co2,i,y})}{EG_y} \quad (2)$$

Where:

$EF_{grid,OMsimple,y}$ Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)

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

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

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

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

i All fossil fuel types combusted in power sources in the project electricity system in year y

y The relevant year as per the data vintage chosen in step 3

For the project, the subscript *m* refers to the power plants/units delivering electricity to the grid, not including low-cost/must-run power plants/units, and including electricity imports to the grid (if any)

The simple operating margin CO_2 emission factor ($EF_{grid,OMsimple,y}$) of CSPG is 0.8959 tCO_2/MWh. The detailed data is listed in the Annex 4.

$EF_{grid,OMsimple,y}$ =0.8959 tCO_2/MWh

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

According to "Tool to calculate the emission factor for an electricity system", there are two options regarding vintage of data choices:

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

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

For this project, option 1 is chosen to calculate Build Margin emission factor.
According to "Tool to calculate the emission factor for an electricity system", capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.
The 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 (SET5-units) and determine their annual electricity generation (SET5-units in MWh);

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (SET ≥20%). 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 ≥20%) and determine their annual electricity generation (SET ≥20%, in MWh);

(c) From SET5-units and SET ≥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. Ignore steps (d), (e) and (f).
The build margin emission factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

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

Where:
EFgrid,BM,y Build margin CO_2 emission factor in year y (tCO_2/MWh)
EGm,y: Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
EFEL,m,y CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m Power units included in the build margin
y Most recent historical year for which power generation data is available

The BM emission factor ($EF_{grid,BM,y}$) is calculated ex-ante using the data from 2011 to 2013, available in the China Energy Statistics Yearbook 2012-2014 and the China Electric Power Yearbooks 2012-2014.

According to the above option one: this data vintage remains fixed during the second crediting period and will be updated for the third crediting period.

Following the deviation[6], the build margin consists of the set of power capacity additions in the electricity system that comprises 20% of the system generation capacity (in MW) and that have been built most recently.

Currently, it is very difficulty to get the capacity margin data of power plants in China, since these data as well as net quantity of electricity generated and delivered to the grid and fuel consumption data in power unit m are regarded as commercial secrets or only for internal usage. The 22nd CDM EB meeting agreed the following deviation approaches for $EF_{grid,BM,y}$ calculation:

1) Use the efficiency level of the best technologies commercially available in the provincial/regional or national grid of China, as a conservative proxy, for fuel i consumption estimation to estimate the $EF_{grid,BM,y}$.
2) Use of capacity additions during last several years for estimating the $EF_{grid,BM,y}$, i.e. the capacity addition over last several years, whichever results in a capacity addition that is closest to 20% of total installed capacity.
3) Use installed capacity to replace annual power generation to estimate weights.

Due to the difficulty of separating the coal-fired, gas-fired or oil-fired installed capacity from the total thermal installed capacity, the $EF_{grid,BM,y}$ will be calculated as:

1) Based on the most recent years energy balance of the CSPG, calculating the proportions of CO_2 emissions from the coal-fired, oil-fired and gas-fired power plants in total CO_2 emissions of thermal power plants;

2) Based on the best technologies commercially available that applied by the coal-fired, oil-fired and gas-fired power plants, calculating the emission factor of thermal power plants in CSPG. This approach is more conservative as it assumes all recently built plants have the fuel efficiency as that of the most advanced commercialized technologies;

3) Calculating the $EF_{grid,BM,y}$ through emission factor of thermal power plants times the percentage share of thermal power plants installed capacity addition within all recently built installed capacity. The proper year is selected so that it is the closest time when the last 20% of installed capacity was built.

The BM emission factor in this PDD is calculated as following sub-steps.

Sub-step 5-1: Calculation of weights of CO2 emissions by coal-fired, oil-fired and gas-fired plants in total CO2 emissions of CSPG.

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

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

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

Where:

[6] EB guidance on estimating the build margin for AM0005, consolidated in ACM0002 which refers to the Tool to calculate the emission factor for an electricity system http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM and http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

$F_{i,j,y}$ The total amount of fuel i (in a mass or volume unit) consumed by Province j in CSPG for power generation in year y
$NCV_{i,y}$ The Net Calorific Value of fuel i (GJ/t or GJ/m_3) in year y
$EF_{CO2,i,j,y}$ The emission factor of fuel i (tCO_2/ GJ)
COAL, OIL, and GAS is the aggregation of various kinds of coal, oil, and gas as fossil fuels.

Sub-step 5-2: Calculation of emission factor of thermal power (EF thermal power) of CSPG
The EF thermal power is calculated as a weighted emission factor as the following formula:

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

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

Based on the above calculation principle for BM, basic data and parameter, the calculation process for BM is shown in Annex 3

Sub-step 5-3: Calculation of Build Margin (BM) emission factor of CSPG

$$EF_{grid,BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \cdot EF_{Therma} \quad (8)$$

where

$CAP_{Thermal,y}$ The newly installed capacity of recently built thermal power capacity (MW) in year y

$CAP_{Total,y}$ The installed capacity of all kind of recently built power generation capacity (MW) in year y

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

$EF_{grid,BM,y}$ Build Margin (BM) emission factor with advanced commercialized technologies for year y;

For the project, $EF_{grid,BM,y}$ is calculated according to the statistics information of recent 3 years (from 2011 to 2013), the data are the latest and available at the time of this PDD submission. The result of $EF_{grid,BM,y}$ is 0.3648 tCOe/MWh, the detailed calculations are shown in Annex 3.

Step 6: Calculate the combined margin emission factor
The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:
a. Weighted average CM; or
b. Simplified CM.
The project is located in China, which is not a Least Developed Country (LDC), The number of registered projects in China is more than 10 projects. And the data requirements for the application of step 5 above could be met. Thus the Option (A) is chosen to calculate the combination margin (CM).

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

where

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

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

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

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

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

B.6.2. Data and parameters fixed ex ante

Data/Parameter	$F_{i,y}$
Data unit	t, m^3
Description	Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
Source of data	China Energy Statistics Yearbooks (2012-2014)
Value(s) applied	See annex 3
Choice of data or measurement methods and procedures	Official released statistics; publicly accessible and reliable data source
Purpose of data	Used for OM
Additional comment	/

Data/Parameter	$NCV_{i,y}$
Data unit	KJ/kg
Description	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data	China Energy Statistics Yearbooks 2014
Value(s) applied	See annex 3
Choice of data or measurement methods and procedures	Official released statistics; publicly accessible and reliable data source
Purpose of data	Used for OM and BM
Additional comment	/

Data/Parameter	$OXID_{j,y}$
Data unit	%
Description	Oxidation factor of the fuel *i* in year y
Source of data	Table 1.4 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chap 1, Page 1.21-1.24.
Value(s) applied	See annex 3
Choice of data or measurement methods and procedures	According to the Tool to calculate the emission factor for an electricity system requirement, use IPCC default value
Purpose of data	Used for OM and BM
Additional comment	/

Data/Parameter	$EF_{CO2,i,y}$
Data unit	tCO_2/TJ
Description	CO2 emission factor of fossil fuel type *i* in year *y*
Source of data	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value(s) applied	See Annex 3
Choice of data or measurement methods and procedures	IPCC default value
Purpose of data	Used for OM and BM
Additional comment	/

Data/Parameter	$EG_{grid,y}$
Data unit	MWh
Description	Net electricity generated and delivered to the grid in year y
Source of data	China Electric Power Yearbook (2012-2014)
Value(s) applied	See Annex 3 for details
Choice of data or measurement methods and procedures	China Electric Power Yearbook (2012-2014)
Purpose of data	Used for OM calculation
Additional comment	/

Data/Parameter	Internal use rate of power plant
Data unit	%
Description	The internal power consumption of power plants in year(s) y
Source of data	China Electric Power Yearbook 2012-2014
Value(s) applied	See Annex 3 for details.
Choice of data or measurement methods and procedures	Data used are from Chinese authorities
Purpose of data	Used for OM calculation
Additional comment	/

Data/Parameter	$F_{i,j,y}$
Data unit	t, m^3
Description	The total amount of fuel *i* (in a mass or volume unit) consumed by Province *j* in CSPG for power generation in year *y*
Source of data	China Energy Statistics Yearbooks (2012-2014)
Value(s) applied	See Annex 3
Choice of data or measurement methods and procedures	Official released statistics; publicly accessible and reliable data source
Purpose of data	Used for BM calculation
Additional comment	/

Data/Parameter	$GENE_{best,coal}$
Data unit	/
Description	Best electricity supply efficiency for coal fired plant
Source of data	Notification on Determining Baseline Emission Factor of China's Grid
Value(s) applied	42.0%
Choice of data or measurement methods and procedures	Notification on Determining Baseline Emission Factor of China's Grid
Purpose of data	Used for BM calculation
Additional comment	/

Data/Parameter	$GENE_{best,oil,gas}$
Data unit	/
Description	Efficiency level of the best technology commercially available in China for gas-fired and oil-fired power generators
Source of data	Notification on Determining Baseline Emission Factor of China's Grid
Value(s) applied	52.9%
Choice of data or measurement methods and procedures	Notification on Determining Baseline Emission Factor of China's Grid
Purpose of data	Used for BM calculation
Additional comment	/

Data/Parameter	$CAP_{j,y}$
Data unit	MW
Description	Installed capacity in each province of CSPG
Source of data	China Electric Power Yearbook (2011-2014)
Value(s) applied	See annex 3 for details
Choice of data or measurement methods and procedures	China Electric Power Yearbook (2011-2014)
Purpose of data	Used for OM and BM calculation
Additional comment	/

B.6.3. Ex ante calculation of emission reductions

>>

The baseline emissions are the product of the baseline emission factor ($EF_{grid,CM,y}$ in tCO_2/MWh) and the electricity supplied by the project activity ($EG_{PJ,y}$ in MWh). The annual electricity delivered by the project is estimated and listed in a table above which will be monitored ex-post.

No.	Component	Electricity generation (MWh)
a	Zhongshan Dahe Hydropower Station	3,138.800
b	Liang'an Zhumei Stage II Hydropower Project	1,960.800
c	Honghuali Beicao Hydropower Project	1,102.000

According to the analysis in section B.6.1, no leakage emissions are considered, then

L_y=0 tCO_2

The project is a run-of-river project, thus the project emission is zero

Baseline emissions are:

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

= (a×0.4976tCO_2/MWh+b×0.4976tCO_2/MWh+c×0.4976tCO_2/MWh) =3,086 tCO_2e.

The emission reduction is:

$ER_y=BE_y - PE_y$= 3,086tCO_2e

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

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 1	3,086	0	0	3,086
Year 2	3, 086	0	0	3, 086
Year 3	3, 086	0	0	3, 086
Year 4	3, 086	0	0	3,086
Year 5	3, 086	0	0	3,086
Year 6	3, 086	0	0	3,086
Year 7	3, 086	0	0	3,086
Total	30,860	0	0	30,860
Total number of crediting years	7			
Annual average over the crediting period	3,086	0	0	3,086

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{Exported,\ y}$
Data unit	MWh/yr
Description	Quantity of electricity delivered to the CSPG by this project in year *y*
Source of data	Electric energy meter

Value(s) applied	6,202 (ex-ante estimated)
Measurement methods and procedures	This parameter is continuously measured and at least monthly recorded. All data collected in monitoring will be archived electronically and be kept at least for two years after the end of the crediting period
Monitoring frequency	Monitored continuously, monthly record
QA/QC procedures	The data is monitored through the meter and checked by electricity sales records. The meter is calibrated to ensure the accuracy.
Purpose of data	For BE calculation
Additional comment	/

Data/Parameter	$\boldsymbol{EG}_{imported,\ y}$
Data unit	MWh
Description	Quantity of electricity imported by the project activity from the grid in the year y
Source of data	This parameter will be continuously measured and at least monthly recorded. All data collected in monitoring will be archived electronically and be kept at least for two years after the end of the crediting period.
Value(s) applied	0
Measurement methods and procedures	The data is monitored through the bi-directional meter and checked by electricity sales records.
Monitoring frequency	Monitored continuously, monthly record
QA/QC procedures	The data is monitored through the meter and checked by electricity sales records. The meter is calibrated to ensure the accuracy.
Purpose of data	For BE calculation
Additional comment	/

Data/Parameter	$EG_{PJ,y}$
Data unit	MWh/yr
Description	$EG_{PJ,y} = \boldsymbol{EG}_{exported,\ y} - \boldsymbol{EG}_{imported,\ y}$
Source of data	Calculated
Value(s) applied	MWh/year
Measurement methods and procedures	The data of $EG_{exported,y}$ and $EGi_{mported,y}$ is monitored through the bi-directional meter and checked by electricity sales records.
Monitoring frequency	/
QA/QC procedures	The meter is calibrated to ensure the accuracy. Data measured by meters is crosschecked by electricity sales records.
Purpose of data	For BE calculation
Additional comment	/

B.7.2. Sampling plan

>>
NA

B.7.3. Other elements of monitoring plan

>>

1. Monitoring Object

The monitoring is to justify the realistic amount of emission reduction from the project. The owner of the project will use this document as guideline in monitoring of the project emission reduction performance and will adhere to the guidelines set out in this monitoring plan to ensure that the monitoring is credible, transparent and conservative.

The following data is monitored:
$EG_{Exported, y}$ Annual electricity delivered to the CSPG by the project
$EGi_{mported, y}$ Annual electricity imported from the CSPG to the project

2. Management Structure

General Manager: To be responsible for supervising the whole monitoring procedure.

Project Manager is responsible for data management and compiling monitoring report.

Operational and monitoring manager is responsible for collecting data and perform internal audit.

Financial chief is responsible for collection of sales records.

Technical chief is responsible for preparing operational reports of the project activity, recording the daily operation of the project, including operating periods, equipment defects, etc.

3. Monitoring Equipment

The main meter is used to obtain the amount of electricity supplied to the grid by the Project and the meter is bi-directional

4. Calibration of Meters & Metering

The metering equipment will be properly calibrated and checked annually.

5. Data Management

The project owner will keep all the monitoring data both electric and paper documents till two years after the crediting period.

6. QA&AC

The project owner uses high accurate electricity meters. The meters are calibrated according to industry standard. The project owner has professional monitoring team to keep records and store the data records every month. If the main meters are damaged, the amount of electricity supplied to and imported from the grid should be determined bilaterally with the grid company. Confirmation shall be provided by the grid company. Otherwise, no emission reduction will be claimed until the calibrated meter replacement is installed.

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

>>
The project starting dates of the three components stations are determined based on the signing dates of their construction contract.

Sub-component project	Project start date
Zhongshan Dahe Hydropower Station	09/03/2005
Liang'an Zhumei Stage II Hydropower Project	20/04/2006
Honghuali Beicao Hydropower Project	14/09/2005

C.2. Expected operational lifetime of project activity

>>
The operational lifetime for all the sub-components the project is estimated to be 20 years in the PDR.

C.3. Crediting period of project activity

C.3.1. Type of crediting period

>>
Renewable crediting period

C.3.2. Start date of crediting period

>>
The first crediting period is from 23/07/2011 to 22/07/2018.
The second crediting period will start from 23/07/2018.

C.3.3. Duration of crediting period

>>
7 years

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
The environmental impacts of the three sub components projects are considered insignificant in the EIA form. There is no resettlement or relocation of population, buildings or public services required, therefore social and environmental influences are short-term and reversible.

D.2. Environmental impact assessment

>>
According to the Articles 16 of the Environmental Impact Assessment Law of the P. R. China , the proposed project only cause minor environmental impacts, therefore it should fill and submit the Environmental Impact Assessment Form complied by the Environmental Protection Department of P. R. China. Environmental Impact Assessment forms undertaken by the project owners have been examined by the local Environmental Protection Agency according to the law. And approves have been given to project owners that their project are allowed to implement given the mitigation measures are delivered.

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

>>
The invitation to the stakeholder feedback round was sent to local stakeholders, NGOs, and authorities via poster and email on the 2nd of March 2012. The stakeholder feedback round has been conducted following the GS requirements. The invitation includes a web link to the project page on the Gold Standard website, which makes our project information can be seen to our invited participants. A two months period was open for the invited participants to send us their comment regarding the project.

Until 2nd of May 2012, we received no comment from any invited NGOs or governmental officials. For stakeholders of the local communities, questionnaires were distributed after announcement via the poster. Local stakeholders filled in and returned the questionnaires via the assistance of the local water resource bureau. To date, no objection has been received from the local stakeholders. Therefore, we conclude that no objection by our stakeholder invitation is raised.

At the local level, the stakeholder consultation feedback round was conducted in a format of questionnaire. The questions in the questionnaire are designed based on the Annex H of the Gold Standard Rules and Toolkit. The questions are designed to cover indicators of both the “Do no harm assessment” and the “Sustainable Matrix”. The duration of the consultation at the local level is 2 weeks, i.e. from 9 April to 23 April 2012. As the consultation was open to all members of local public/ stakeholders, the questionnaires were provided to any local stakeholder who would like to participate or share his/her comment. Therefore, there wasn’t a restrain on the number of questionnaires. In terms of respondents, in total, 80 questionnaires were filled-in and returned to the project owner, among which 60 were filled in by respondents in front of Zhongshan Water Resource Bureau office building. The questions are designed in a way to help stakeholder understand potential impacts on environment, social development and technological & economic

development of the project with simple local language. All of these questionnaires have been taken away and filled by villagers from the local community. The questionnaires were distributed from 9th of April, and these questionnaires was asked to be returned by the 23rd of April. The questions that have been designed based on the Gold Standard Annex I “Guidance on Sustainability Assessment” and the Gold Standard Annex H “Do No Harm” Assessment

In the second crediting period, the renewal PDD and non-technical summary will be uploaded on the south pole website for feedback round. The process and result will be added before the final validation report is finished.

E.2. Summary of comments received

>>

In the first crediting period, the result of the questionnaire shows the project does not incur any harmful impacts on the local environment. Respondents show that they believe the project can bring sustainable benefits to them and they are very supportive for the operation of the project. The respondents generally deemed that the project generates reliable electricity, benefit local economy development and employment. They also think the project has no negative impact on ecology.

E.3. Consideration of comments received

>>

No comment is received.

SECTION F. Approval and authorization

>>

This project has been registered as GS project on 23/07/2013, with GS ID of 1101.

Appendix 1. Contact information of project participants

Organization name	Zhongshan Dahe Hydropower Station
Country	China
Address	Dahe Village, Zhongshan county Hezhou City, Guangxi Province
Telephone	+86 13810118463
Fax	
E-mail	bjhuangzhuo@sina.com
Website	
Contact person	Mr. Xinde He

Organization name	Liang'an Zhumei Stage II Hydropower Plant of Zhongshan County
Country	China
Address	Zhongshan County, Hezhou City, Guangxi Province
Telephone	+86 13810118463
Fax	
E-mail	bjhuangzhuo@sina.com
Website	
Contact person	Mr. Licai Chen

Organization name	Honghuali Beicao Hydropower Plant of Zhongshan County
Country	China
Address	Zhongshan County, Hezhou City, Guangxi Province
Telephone	+86 13810118463
Fax	
E-mail	bjhuangzhuo@sina.com
Website	
Contact person	Mr. Jianrong Yang

Organization name	Swiss Carbon Value Ltd.
Country	Switzerland
Address	Technoparkstr. 1, 8005, Zurich.
Telephone	+41 44 633 78 70
Fax	+41 44 633 14 23
E-mail	r.heuberger@southpolecarbon.com
Website	www.southpolecarbon.com
Contact person	Mr. Renat Heuberger

Appendix 2. Affirmation regarding public funding

There is no public funding from Annex I countries used in the project activity.

Appendix 3. Applicability of methodologies and standardized baselines

The applicability of the Methodology has been demonstrated in section B.2

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

The installed capacity, fuel consumption data used for OM and BM calculation are derived from<China Energy Statistical Yearbook>, <China Electric Power Yearbook>.

The low calorific value, CO_2 emission factor and oxidation factor of fuels are listed in Table 4-1

Table 4-1. Low calorific values, CO_2 emission factors and oxidation factors of fuels

Fuel	Net calorific value	Average Low Calorific Value ($kgCO_2/TJ$)	Carbon Oxidation Rate
Raw Coal	20,908 kJ/kg	87,300	1
Cleaned Coal	26,344 kJ/kg	87,300	1
Other washed coal	8,363 kJ/kg	87,300	1
Briquette	20,908 kJ/kg	87,300	1
Gangue	8363 kJ/kg	87,300	1
Coke	28,435 kJ/kg	95,700	1
Petroleum coke	31,947 kJ/kg	82,900	1
Other coking products	28,435 kJ/kg	95,700	1
Crude oil	41,816 kJ/kg	71,100	1
Gasoline	43,070 kJ/kg	67,500	1
Kerosene	43,070 KJ/kg	71,900	1
Diesel	42,652 KJ/kg	72,600	1
Fuel oil	41,816 KJ/kg	75,500	1
Other petroleum products	41,816 KJ/kg	72,200	1
Natural gas	38,931 KJ/m^3	54,300	1
LNG	51,434 kJ/m^3	54,300	1
Coke oven gas	16,726 kJ/m^3	37,300	1
Blast furnace gas	3763 kJ/m^3	219,000	1
Converter gas	7,945 kJ/m^3	145,000	1
Other gas	5,227 kJ/m^3	37,300	1
LPG	50,179 kJ/kg	61,600	1
Refinery gas	46,055 kJ/kg	48,200	1

Data Source: The net calorific values are quoted from *China Energy Statistical Yearbook 2014*, Page 581.
The emission factors are quoted from '*2006IPCC Guidelines for National Greenhouse Gas Inventories*' Volume 2 Energy, as the lower value of 95% confidence interval.
The low calorific values of Gangue, Petroleum coke, LNG, blast furnace gas, converter gas are from *energy statistics rule on public institution*

Table 4-2 Calculation of Operation Margin Emission Factor of China Southern Power Grid 2011

Fuel	Unit	Guangdong	Guangxi	Guizhou	Yunan	Hainan	Total	Carbon Content	Carbon Oxidation Rate	Fuel Emission Factor	Average Low Calorific Value	CO_2 Emission(tCO_2e)
								(tC/TJ)	(%)	($kgCO_2/TJ$)	(MJ/t,km3)	J=E×H×I/100000
		A	B	C	D		E=A+B+C+D	F	G	H	I	J=E×H×I/10000
Raw Coal	10^4 t	11799.44	2807.29	4266	3520.42	607.41	23000.56	25.8	100	87,300	20,908	318,235,546
Cleaned Coal	10^4 t						0	25.8	100	87,300	26,344	79,574
Other	10^4 t			1291.2	22.96		1314.25	25.8	100	87,300	8,363	269,184

Washed Coal				9								
Moulded Coal	10^4 t	182.83					182.83	26.6	100	87,300	20,908	4,951,041
Coke	10^4 t						0	29.2	100	95,700	28,435	105,584
Gangue	10^4 t	320.15		71.26	36.78		428.19					
Coke Oven Gas	10^8 m^3		3.05	1.88	2.66		7.59	12.1	100	37,300	16,726	371,208
Blast-furnace gas	10^8 m^3	1.58	44.78	9.16	50.65		106.17	70.8	100	219,000	3,763	8,749,438
Converter gas	10^8 m^3	0.33	2.71		2.38		5.42	46.9	100	145,000	7,945	624,398
Other Gas	10^8 m^3						0	12.1	100	37,300	5,227	1,021,628
Crude Oil	10^4 t						0	20	100	71,100	41,816	0
Gasoline	10^4 t						0	18.9	100	67,500	43,070	0
Diesel Oil	10^4 t	2.8	0.58	3.58	1.05	0.03	8.04	20.2	100	72,600	42,652	798,596
Fuel Oil	10^4 t	24.44	0.07				24.51	21.1	100	75,500	41,816	14,787,262
Petroleum coke	10^4 t	16.51			1.38		17.89	26.6	100	54,300	51.434	5,448,882
LPG	10^4 t	195.1					195.1	17.2	100	61,600	50,179	0
Refinery Gas	10^4 t	0.91					0.91	15.7	100	48,200	46,055	8,213
Natural Gas	10^8 m^3	38.19		0.76		6.83	45.78	15.3	100	54,300	38,931	6,800,588
Other Petroleum Products	10^4 t	0.53					0.53	20	100	72,200	41,816	255,719
Other Coking Products	10^4 t						0	25.8	100	95,700	28,435	0
Other Energy	10^4 t Standard Coal	34.53	159.22		25.2		218.95	0	0	0	0	0
											Total	462,387,161

Data Source: *China Electric Power Yearbook 2012*

Table 4-3. 2011 China Southern Power Grid Coal Firing Power Generation

Province	Electricity Generation	Electricity Generation	Plant own consumption	Power Supplying to Grid
	(10^8kWh)	(MWh)	(%)	(MWh)
Guangdong	3046	304,600,000	5.6	287,542,400
Guangxi	637	63,700,000	6.6	59,495,800
Guizhou	1022	102,200,000	7.3	94,739,400
Yunnan	536	53,600,000	7.7	49,472,800
Hainan	158	15,800,000	7.8	14,567,600
Sub-total		539,900,000		505,818,000
Net import from Central Grid(MWh)				16,118,680
OM of Central Grid				0.9827
Total emission(tCO_2)				478,226,638

Total electricity supply(MWh)				521,936,680
				0.9163

Data Source: *China Electric Power Yearbook 2012*

Table 4-4. Calculation of Operation Margin Emission Factor of China Southern Power Grid 2012

Fuel	Unit	Guangdong	Guangxi	Guizhou	Yunan	Hainan	Total	Carbon Content	Carbon Oxidation Rate	Fuel Emission Factor	Average Low Calorific Value	CO_2 Emission(tCO_2e)
								(tC/TJ)	(%)	($kgCO_2$/TJ)	(MJ/t,km3)	J=E×H×I/100000
		A	B	C	D		E=A+B+C+D	F	G	H	I	J=E×H×I/10000
Raw Coal	10^4 t	11112.44	2765.45	4033.75	3083.23	691.39	21686.26	25.8	100	87,300	20,908	318,235,546
Cleaned Coal	10^4 t						0	25.8	100	87,300	26,344	79,574
Other Washed Coal	10^4 t			1358	40.06		1398.06	25.8	100	87,300	8,363	269,184
Moulded Coal	10^4 t	167.41					167.41	26.6	100	87,300	20,908	4,951,041
Gangue	10^4 t	33797		84.06	30.47		452.5	25.8	100	87,300	8,363	3,303,657
Coke	10^4 t						0	29.2	100	95,700	28,435	105,584
Coke Oven Gas	10^8 m^3		3.69	2.05	2.29		8.03	12.1	100	37,300	16,726	371,208
Blast-furnace gas	10^8 m^3	18.19	52.4	15.63	56.48		142.7	70.8	100	219,000	3,763	8,749,438
Converter gas	10^8 m^3	1.69	3.46		3.59		8.74	46.9	100	145,000	7,945	624,398
Other Gas	10^8 m^3			0.8			0.8	12.1	100	37,300	5,227	1,021,628
Crude Oil	10^4 t						0	20	100	71,100	41,816	0
Gasoline	10^4 t						0	18.9	100	67,500	43,070	0
Diesel Oil	10^4 t	2.63	0.85	1.89	0.87	0.03	6.27	20.2	100	72,600	42,652	798,596
Fuel Oil	10^4 t	20.63	0.08				20.71	21.1	100	75,500	41,816	14,787,262
Petroleum coke	10^4 t	28.37			1.39		29.76	26.6	100	54,300	51.434	5,448,882
LPG	10^4 t		0.11				0.11	17.2	100	61,600	50,179	0
Refinery Gas	10^4 t	1.27					1.27	15.7	100	48,200	46,055	8,213
Natural Gas	10^8 m^3	32.49				6.84	39.33	15.3	100	54,300	38,931	6,800,588
Other Petroleum Products	10^4 t	0.47					0.47	20	100	72,200	41,816	255,719
Other Coking Products	10^4 t						0	25.8	100	95,700	28,435	0
LNG	10^4 t	178.8	0.11				178.91	15.3	100	54,300	38,391	8,314,178
Other Energy	10^4 t Standard Coal	283.26	160.43		46.52	4.5	494.71	0	0	0	0	0
											Total	440,675,024

Data Source: *China Electric Power Yearbook 2013*

Table 4-5. 2012 China Southern Power Grid Coal Firing Power Generation

Province	Electricity Generation	Electricity Generation	Plant own consumption	Power Supplying to Grid
	(10^8kWh)	(MWh)	(%)	(MWh)
Guangdong	2848	284,800,000	5.8	268,281,600
Guangxi	647	64,700,000	6.7	60,365,100
Guizhou	1046	104,600,000	7.2	97,068,800
Yunnan	480	48,000,000	7.5	44,400,000
Hainan	182	18,200,000	7.6	16,816,800
Sub-total		520,300,000		486,932,300
Net import from Central Grid(MWh)				16,752,770
OM of Central Grid				0.9437
Total emission(tCO_2)				456,483,853
Total electricity supply(MWh)				503,685,070
				0.9063

Data Source: *China Electric Power Yearbook 2013*

Table 4-6. Calculation of Operation Margin Emission Factor of China Southern Power Grid 2013

Fuel	Unit	Guangdong	Guangxi	Guizhou	Yunan	Hainan	Total	Carbon Content	Carbon Oxidation Rate	Fuel Emission Factor	Average Low Calorific Value	CO_2 Emission(tCO_2e)
								(tc/TJ)	(%)	($kgCO_2$/TJ)	(MJ/t,km3)	J=E×H×I/100000
		A	B	C	D		E=A+B+C+D	F	G	H	I	J=E×H×I/10000
Raw Coal	10^4 t	11458.81	310502	4372.74	2706.19	794.95	22437.71	25.8	100	87,300	20,908	318,235,546
Cleaned Coal	10^4 t				1.04		1.04	25.8	100	87,300	26,344	79,574
Other Washed Coal	10^4 t			1341.3	20.13		1361.43	25.8	100	87,300	8,363	269,184
Moulded Coal	10^4 t	171.26					171.26	26.6	100	87,300	20,908	4,951,041
Gangue	10^4 t	433.9		79.03	26.88		539.81	25.8	100	87,300	8,363	3,303,657
Coke	10^4 t						0	29.2	100	95,700	28,435	105,584
Coke Oven Gas	10^8 m^3		4.65	2.18	1.68		8.51	12.1	100	37,300	16,726	371,208
Blast-furnace gas	10^8 m^3	19.74	58.46	18.54	77.26		174	70.8	100	219,000	3,763	8,749,438
Converter gas	10^8 m^3	2.13	3.31		5.63		11.07	46.9	100	145,000	7,945	624,398
Other Gas	10^8 m^3			1.83			1.83	12.1	100	37,300	5,227	1,021,628
Crude Oil	10^4 t	0.02					0.02	20	100	71,100	41,816	0
Gasoline	10^4 t						0	18.9	100	67,500	43,070	0
Diesel Oil	10^4 t	1.99	0.51	2.29	0.79	0.03	5.61	20.2	100	72,600	42,652	798,596
Fuel Oil	10^4 t	19.72	0.07				19.79	21.1	100	75,500	41,816	14,787,262
Petroleum coke	10^4 t	17.27					17.27	26.6	100	54,300	51.434	5,448,882
LPG	10^4 t						0	17.2	100	61,600	50,179	0

Refinery Gas	10^4 t	1.57					1.57	15.7	100	48,200	46,055	8,213
Natural Gas	10^8 m^3	32.09	0.1			4.23	36.42	15.3	100	54,300	38,931	6,800,588
Other Petroleum Products	10^4 t	0.65					0.65	20	100	72,200	41,816	255,719
Other Coking Products	10^4 t						0	25.8	100	95,700	28,435	0
LNG	10^4 t	168.56	0.12			0.03	168.71	15.3	100	54,300	38,391	8,314,178
Other Energy	10^4 t Standard Coal		100.38		44.23	11.54	156.15	0	0	0	0	0
											Total	456,482,065

Data Source: *China Electric Power Yearbook 2014*

Table 4-7. 2013 China Southern Power Grid Coal Firing Power Generation

Province	Electricity Generation	Electricity Generation	Plant own consumption	Power Supplying to Grid
	(10^8kWh)	(MWh)	(%)	(MWh)
Guangdong	2955	295,500,000	5.64	278,833,800
Guangxi	755	75,500,000	6.22	70,803,900
Guizhou	1240	124,600,000	7.26	114,997,600
Yunnan	479	47,900,000	6.98	44,556,580
Hainan	201	20,100,000	7.82	18,528,180
Sub-total		563,000,000		527,720,060
Net import from Central Grid(MWh)				12,007,880
OM of Central Grid				0.9291
Net import from North China Power Grid (MWh)				22,000
OM of North China Power Grid				0.8222
Total emission(tCO_2)				467,656,441
Total electricity supply(MWh)				539,749,940
				0.8664

Data Source: *China Electric Power Yearbook 2014*

Table 4-8. Operating Margin Emission Factor of China Southern Power Grid

	2011	2012	2013
Total CO_2 Emission (tCO_2e)	478,226,638	456,483,853	467,656,441
Total Electricity generation (MWh)	521,936,680	503,685,070	539,749,940
Average OM (tCO2/MWh)	0.8959		

Calculation of Building Margin Emission Factor of China Southern Power Grid

Table 4-9. Calculating of the CO_2 emissions factor of fuel i (tCO_2/MWh)

	Parameter	Efficiency of Power Supply (%)	Emission Factor of Fuel ($kgCO_2$/TJ)	Carbon oxidation rate	Emission Factor (tCO_2/MWh)

		A	B	C	D=3.6/A/10,000×B×C
Coal-fired Power Plant	$EF_{Coal,Adv,y}$	42.0	87,300	1	0.7483
Oil-fired Power Plant	$EF_{Oil,Adv,y}$	52.9	75,500	1	0.5138
Gas-fired Power Plant	$EF_{Gas,Adv,y}$	52.9	54,300	1	0.3695

Table 4-10. Calculating the corresponding percentage of CO_2 emission of solid, liquid and gases fuel i

		Guangdong	Guangxi	Guizhou	Yunnan	Hainan	Total	Average Calorific Value	Fuel Emission Factor	Carbon Oxidation Rate	CO_2 Emission
Fuel	Unit	A	B	C	D	E	G=A+…+F	H	I	J	K=G×H×I×J/100,000
Raw Coal	10^4t	11458.81	3105.02	4,372.74	2706.19	794.95	22,437.71	20,908	87,300	1	409,548,430
Cleaned Coal	10^4t	0	0	0	1.04	0	1	26,344	87,300	1	23,918
Other Washed Coal	10^4t	0	0	1341.30	20.13	0	1361.43	8,363	87,300	1	9,939,663
Mould Coal	10^4t	171.26	0	0	0	0	171.26	20,908	87,300	1	3,125,955
Gangue	10^4t	433.90	0	79.03	26.88	0	539.81	8363	87,300	1	3,941,098
Coke	10^4t	0	0	0	0	0	0	28,435	95,700	1	0
Other Coking Products	10^4t	0	0	0	0	0	0	28,435	95,700	1	0
Subtotal											426,579,064
Crude Oil	10^4t	0.02	0	0	0	0	0.02	41,816	71,100	1	595
Gasoline	10^4t	0	0	0	0	0	0	43,070	67,500	1	0
Diesel Oil	10^4t	1.99	0.51	2.29	0.79	0.03	5.61	42,652	72,600	1	173,716
Fuel Oil	10^4t	19.72	0.07	0	0	0	19.79	41,816	75,500	1	624,792
Petroleum coke	10^4t	17.27	0	0	0	0	17.27	31,947	82,000	1	457,380
Other Petroleum Products	10^4t	0.65	0	0	0	0	0.65	41,816	72,200	1	19,624
Subtotal	10^4t										1,276,106
Natural Gas	$10^7 m^3$	320.90	1.00	0	0	42.30	364.20	38,931	54,300	1	7,699,018
LNG	10^4t	168.56	0.12	0	0	0.00	168.71	51434	54300	1	4,711,845
Coke Oven Gas	$10^7 m^3$	0	46.50	21.80	16.80	0	85.10	16,726	37,300	1	530,922
High furnace gas	$10^7 m^3$	197.40	584.60	185.40	772.60	0	1740.00	3,763	219,000	1	14,339,288
Converter gas	$10^7 m^3$	21.30	33.10	0	56.30	0	110.70	7,945	145,000	1	1,275,292
Other Gas	$10^7 m^3$	0	0	18.30	0	0	18.30	5,227	37,300	1	35,679
LPG	10^4t	0	0	0	0	0	0	50,179	61,600	1	0
Refinery Gas	10^4 t	1.57	0	0	0	0	1.57	46,055	48,200	1	34,852
Subtotal											26,626,894
Total											**456,482,065**

Data source: *China Energy Statistical Yearbook 2014*

Use formulae (4), (5) and (6) in section B.6.1, $\lambda_{Coal,y}$ =93.45%, $\lambda_{Oil,y}$ =0.28%, $\lambda_{Gas,y}$ =6.27%

The final $EF_{Thermal}$ is calculated as follow:

$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y}$ =0.72389 tCO_2/MWh

Table 4-11. Installed Capacities of CSPG in 2013

Installed Capacity	Unit	Guangdong	Guangxi	Yunnan	Guizhou	Hainan	Total
Fuel-fired	MW	64,880	15,420	13,940	24,330	3,750	122,320
Hydro	MW	13,190	15,820	44,090	19,080	830	93,010
Nuclear	MW	6,120	0	0	0	0	6,120
Wind & Others	MW	1784	162	1760	1350	389	5445
Total	MW	85,974	31,402	59,790	44,760	4,969	226,895

Data Source: *China Electric Power Yearbook 2014*

Table 4-12. Installed Capacities of CSPG in 2012

Installed Capacity	Unit	Guangdong	Guangxi	Yunnan	Guizhou	Hainan	Total
Fuel-fired	MW	57,520	14,910	13,850	21,860	3,880	112,020
Hydro	MW	13,060	15,360	33,060	17,280	810	79,570
Nuclear	MW	6,120	0	0	0	0	6,120
Wind & Others	MW	1401	100	1340	960	320	4121
Total	MW	78,101	30,370	48,250	40,100	5,010	201,831

Data Source: *China Electric Power Yearbook 2013*

Table 4-13. Installed Capacities of CSPG in 2011

Installed Capacity	Unit	Guangdong	Guangxi	Yunnan	Guizhou	Hainan	Total
Fuel-fired	MW	56,350	11,770	11,360	20,300	3,150	102,930
Hydro	MW	13,020	15,260	28,420	18,660	810	76,170
Nuclear	MW	6,120	0	0	0	0	6,120
Wind & Others	MW	748	50	690	40	275	1803
Total	MW	76,238	27,080	40,470	39,000	4,235	187,023

Data Source: *China Electric Power Yearbook 2012*

Table 4-14. Installed Capacities of CSPG in 2010

Installed Capacity	Unit	Guangdong	Guangxi	Yunnan	Guizhou	Hainan	Total
Fuel-fired	MW	52,870	10,390	11,330	17,530	2,970	95,090
Hydro	MW	12,600	14,940	24,350	16,550	750	69,190
Nuclear	MW	5,030	0	0	0	0	5,030
Wind & Others	MW	620	0	360	0	210	1190
Total	MW	71,120	25,330	36,040	34,080	3,930	170,500

Data Source: *China Electric Power Yearbook 2011*

Table 4-15. Installed Capacity from Year 2010-2013

	2010	2011	2012	2013	2010-2013 New Capacity Additions	2011-2013 New Capacity Additions	2012-2013 New Capacity Additions	2010-2013Percentage of newly added installed Capacity
Fuel-fired (MW)	95,090	102,930	112,020	122,320	29334	21180	11182	50.40%
Hydro (MW)	69,190	76,170	79,570	93,010	23520	16,840	13440	40.41%
Nuclear(MW)	5,030	6120	6120	6120	1090	0	0	1.87%
Wind &Others (MW)	1190	1803	4121	5445	4255	3642	1324	7.31%
Total	170,500	187023	201,831	226,895	58199	41662	25946	100.00%
Percentage of installed					25.65%	18.36%	11.44%	

capacity in 2013								

$EF_{BM,y}$=0.72389×50.40%=0.3648 tCO_2/MWh

Table 4-16. Baseline Emissions Factor of China Southern Power Grid (tCO_2/MWh)

Operating Margin Emission Factor	0.8959
Build Margin Emission Factor	0.3648
Combined Emission Factor	25%*0.8959+75%*0.3648=0.223975+0.2736=**0.4976**

Appendix 5. Further background information on monitoring plan

The relative information is provided in section B7.2.

Appendix 6. Summary report of comments received from local stakeholders

No comment is received

Appendix 7. Summary of post-registration changes

No change occurs