



Voluntary Carbon Standard Project Description Template

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1 Description of Project:

1.1 Project title

Guizhou Qingshuihe Gelibridge Hydropower Project

1.2 Type/Category of the project

The Clean Development Mechanism (CDM) under the Kyoto Protocol is a greenhouse gas (GHG) program that has been approved by the VCS Board. In accordance with the CDM, the project is categorized as follows:

- Sectoral Category: 1 – Energy industries (renewable- / non-renewable sources)
- Project Activity: Grid-connected renewable power generation from a hydropower plant with a reservoir.

The project is not a Grouped project, which is defined by the VCS 2007.1 as a number of projects and their related methodologies included in a single VCS PD at the time of the validation. The project is a single project at a single location.

1.3 Estimated amount of emission reductions over the crediting period including project size:

- Crediting period start date: 09 February 2010, which is the date on which the project activity became operational and the date on which the first monitoring period commences
- VCS project crediting period: renewable crediting period of 10 years × 3 periods (total 30 years) is selected for the project activity (09 February 2010 to 08 February 2040)
- Annual estimated amount of emission reductions: 387,750 tCO₂e/year
- Total estimated amount of emission reductions over the crediting period: 11,632,500 tCO₂e over 30 years

The project activity is neither categorized as a Micro project (less than 5,000 tCO₂e emissions reductions per year) nor as a Mega project (more than 1,000,000 tCO₂e emissions reductions per year) since the estimated annual emissions reductions are 387,750 tCO₂e/year.

1.4 A brief description of the project:

The Guizhou Qingshuihe Gelibridge Hydropower Project, hereforth referred to as the "Project", is located on the main stream of Qingshui River along the border of Kaiyang and Wengan Counties in Guizhou Province in China. The owner of this project is Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd., (the Developer) a medium-sized hydropower developer with limited experience in developing and running hydropower projects prior to this project (this project is the second hydropower project developed by this company).

The installed capacity of this project is 150MW (2*75MW) which was partially commissioned (1 of 2 turbines) on February 9, 2010 and fully commissioned on March 12, 2010. The project will generate electricity to be supplied to the South China Power Grid via the local Guizhou Power Grid. The project, which includes a reservoir with a power density of 70.42W/m², is expected to produce 508GWh of electricity annually, of which 497.3 GWh will be delivered to the power grid, and the remainder used for the operation of the plant/site.

The project activity will reduce 387,570 tCO₂e annually by replacing carbon-intensive grid electricity, which otherwise would have been produced mainly by coal power stations. The measures undertaken to achieve this are the planning, construction and operation of the hydropower station. In the absence of the completion of the project activity, the baseline case is the provision of the equivalent amount of annual power generated mostly by fossil fuel power plants (coal) supplied to the grid (the South China Power Grid) to which the project is connected.

The hydropower station will provide important power supplies to China's growing industrial, agricultural and domestic sectors without utilizing non-renewable resources. The project helps to fulfil the objectives of the Rural China Plan to improve the standard of living for the rural population. Other ways in which the project activity contributes to sustainable development are set out below:

Economic impacts:

Guizhou is the second poorest province in China after Tibet. During the **construction** phase, there will be employment opportunities for the local people, which will significantly add to their income. The project is located in a very remote area and consequently, the project has brought infrastructure improvements, including road access, which had a massive impact on the quality of life of local residents. Mobile phone

coverage and fixed-line telephones have been installed, providing internet access to the village for the first time.

The development of industry and the creation of employment are goals of China's current five-year plan and provision of power is a key component of this.

Environmental impacts:

By increasing renewable energy capacity, the project will displace **electricity** that may have been generated from fossil fuelled power plants, such as coal, and consequently will deliver improved air quality, both locally and globally, by reducing NO_x, SO_x and CO₂ emissions.

Social impacts:

The **construction**, operation and maintenance will provide employment opportunities for the region. For example, see <http://www.china.org.cn/english/China/164278.htm> which highlights China's 11th 5-year plan to help reduce poverty in Guizhou Province. The project which resulted in new or improved transport links also improved access to potable water and water for localized irrigation. Additionally, the project will provide cheaper electricity for the villages directly adjacent to the power plants.

1.5 Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project:

The Guizhou Qingshuihe Gelibridge Hydropower Project is located at Maoyun Village in Kaiyang County, located in Guizhou Province. The dam is located at 27°0'30"N and 107°12'22"E (Google Earth coordinates 27.008333 and 107.206111) and the powerhouse is located at 27°0'33"N and 107°12'2"E (Google Earth coordinates 27.009167 and 107.200556). The project is located 108km away from Guiyang and 15km away from Maoyun Village in Kaiyang County.

Figure 1 shows the location of this project.



Figure 1. Location of the Guizhou Qingshuhe Gelibridge Hydropower Project

1.6 Duration of the project activity/crediting period:

- Project start date: January 31, 2007, which is the date on which the first major contract for the project was signed
- Crediting period start date: 09 February 2010, which is the date on which the project activity became operational and the date on which the first monitoring period commences
- VCS project crediting period: renewable crediting period of 10 years $\times$ 3 periods (total 30 years) is selected for the project activity (09 February 2010 to 08 February 2040)

1.7 Conditions prior to project initiation:

The scenario existing prior to the implementation of the project activity is the same as the baseline scenario, where delivery of electricity to the grid is by the operation of grid-connected power plants and, in the absence of implementation of the project activity, is by the addition of new generation sources. The equipment and systems in operation prior to the start of the project activity are the power plants (mostly thermal, and mostly coal) supplying electricity to the South China Power Grid and set out in Annex 3 of the registered PDD. These include thermal power generation equipment such as engines, turbines, and related fuel supply (predominantly coal) and electricity distribution infrastructure.

1.8 A description of how the project will achieve GHG emission reductions and/or removal enhancements:

The installed capacity of this project is 150MW (2*75MW) which was partially commissioned (1 of 2 turbines) on February 9, 2010 and fully commissioned on March 12, 2010. The project will generate electricity to be supplied to the South China Power Grid via the local Guizhou Power Grid. The project, which includes a reservoir with a power density of 70.42W/m², is expected to produce 508GWh of electricity annually, of which 497.3 GWh will be delivered to the power grid, and the remainder used for the operation of the plant/site.

The project activity will reduce 387,570 tCO₂e annually by replacing carbon-intensive grid electricity, which otherwise would have been produced mainly by coal power stations. The measures undertaken to achieve this are the planning, construction and operation of the hydropower station. In the absence of the completion of the project activity, the baseline case (same as the current situation) is the provision of the equivalent amount of annual power generated mostly by fossil fuel power plants (coal) supplied to the grid (the South China Power Grid) to which the project is connected.

1.9 Project technologies, products, services and the expected level of activity:

Two sets of 75MW turbine generator sets (total installed capacity of 150MW) will be installed in the Guizhou Qingshuihe Gelibridge Hydropower Project. The main construction works of the project includes dam gates, flood discharge gates, power house and switch station, etc. The main equipment, such as the turbine, generators and transformers, are all made in China. The manufacturer of the turbine and generator sets is Tianjin Tianfa Heavy Hydropower Equipment, a well-known company in the Chinese hydropower equipment manufacture industry. The power generation technology to be used by this project is commonly used in China, and has proven to be reliable and unlikely to be replaced during the project lifetime. The key technical specifications for the Guizhou Qingshuihe Gelibridge Hydropower Project are shown as follows:

Table 1. Key Project Technical Specifications¹

Items	Parameter
Total installed capacity	150 MW
Model for the turbines	HL234-LJ-335
Model for the generators	SF75-28/6740
Estimated amount of electricity uploaded to the grid annually	497.3GWh
Normal water level	719m
Reservoir size under normal water level	2.13km ²
Rated water head	84m
Average flow rate over years	82.3m ³ /s

1.10 Compliance with relevant local laws and regulations related to the project:

A Feasibility Study Report (FSR) was completed for the project activity in November 2006. The FSR was approved by the Guizhou Province Development and Reform Commission on June 4, 2007.

Per Chinese environmental protection laws, an Environmental Impact Assessment (EIA) was completed for the Guizhou Qingshuihe Gelibridge Hydropower Project. The Guizhou Environmental Protection Bureau approved the implementation of the project on September 27, 2006 (Approval No. [2006]390).

According to the Environmental Impact Assessment (EIA) report, the environmental effects caused by the project include:

¹ Refer to FSR of the project activity

1. Noise Impact

The project owner will use equipment that meets national standards. The project owner also will take several measures to mitigate noises levels produced during the project construction period, such as strengthening construction management, limiting the construction time at night, banning blasting activities during the night time, and limiting the speed of and banning honking when transport vehicles pass through the villages. As for the construction workers, the project owner will provide noise-proof equipment in line with national regulations.

2. Sewage

The waste water created from construction will be properly treated via usage of a sand basin and sedimentation basin. The water is recycled after treatment. The sewage produced during the construction and operation periods will be treated by integrated organic sewage treatment equipment. All the sewage discharged will meet the requirement of the first level standard of "Sewage discharge standards" (GB8978-1996).

3. Waste Residue

The project owner established two waste residue fields. In order to avoid water and soil loss caused by residue slipping, the waste residue field will be kept flat. Also, water and soil conservation measures will be undertaken to avoid water and soil loss. Vegetation protection and restoration will be carried out after the construction period.

4. Air Pollution

Sprinklers will be used in the construction area to reduce dust in the excavation and blasting areas. Concrete Mixing System will be equipped with a dust catcher to limit the dust levels on site. Construction workers will be supplied with dustproof respirators.

5. Ecological Impact

In order to reduce ecological impacts during the construction period, measures, such as marking the construction area clearly and banning the activities of smoking, hunting, and fishing in the area, were taken. The construction operations and construction seasons will be strictly controlled to prevent water and soil lost during the construction period from entering into the waters. In the construction area, topsoil should be stored and protected properly so that it can be reused to refill the temporarily occupied land. The project involves a small number of migrants, and they have been properly resettled.

1.11 Identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements:

Natural events or disasters, such as droughts, storms and floods, are potential risks that may impact the project's GHG emission reductions particularly given the nature of the project as a hydropower plant subject to water flow.

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

The project activity will reduce 387,570 tCO₂e annually by replacing carbon-intensive grid electricity, which otherwise would have been produced mainly by coal power stations. In the absence of the

completion of the project activity, the baseline case is the provision of the equivalent amount of annual power generated mostly by fossil fuel power plants (coal) supplied to the grid (the South China Power Grid) to which the project is connected.

Therefore, it is confirmed that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

The project activity is a registered CDM project (UNFCCC Reference No. 3351), which was registered on October 4, 2010. As a registered CDM project, the project is able to claim Certified Emissions Reductions (CERs). Any emission reductions generated from the project starting from the registration date will be verified under the CDM as CERs. Any emission reductions generated outside of the CDM (e.g., emission reductions generated prior to the CDM registration date, which do not qualify as CERs) have been generated voluntarily. Through the application of this project under the VCS, those voluntary emission reductions will be validated and verified as VERs. There will not be any overlap or double counting of the emission reductions from the project since there is a clear delineation between when emissions reductions are generated under the CDM and voluntarily.

1.14 Project rejected under other GHG programs (if applicable):

Not applicable.

1.15 Project proponents roles and responsibilities, including contact information of the project proponent, other project participants:

Table 3. List of project proponents and their roles and responsibilities

Project Proponent	Contact Information	Roles and Responsibilities
Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd.	Mr. Jing FEI Vice Manager No. 9 Xinhua Street Guiyang City, Guizhou Province 550002 P.R. China Tel: +86 (851) 7509141 FAX: +86 (851) 5784535 E-mail: wjqshgs@163.com	Description: a private company which was established under the laws of the People's Republic of China and having its registered office at No. 9 Xinhua Street, Guiyang city, Guizhou province, People's Republic of China. Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. is the project owner and a project proponent in this project activity.
Sindicatum Carbon Capital Ltd. (SCC)	Mr. Gareth PHILLIPS Chief Climate Change Officer 33 Duke Street London W1U1JY	Description: a private company incorporated under the laws of the United Kingdom of

	United Kingdom Tel: +44 (0) 20 7224-7555 FAX: +44 (0) 20 7224-7333 E-mail: gareth.phillips@carbon-capital.com	Great Britain and Northern Ireland and having its registered office at 33 Duke Street, London, W1U 1JY, United Kingdom. Sindicatum Carbon Capital Ltd. is a project developer and project proponent in this project activity.
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1.16 Any information relevant for the eligibility of the project and quantification of emission reductions or removal enhancements, including legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and temporal information.):

Not applicable.

1.17 List of commercially sensitive information (if applicable):

The commercially sensitive documents will be provided to the audit team during the validation process.

2 VCS Methodology:

2.1 Title and reference of the VCS methodology applied to the project activity and explanation of methodology choices:

The project activity is a registered CDM project (UNFCCC Reference No. 3351) that applies the following CDM methodology and tools, which are approved by the VCS Board:

- Approved consolidated baseline methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (version 09)
- "Tool for the Demonstration and Assessment of Additionality" (version 5.2)
- "Tool to calculate the emission factor for an electricity system" (version 01.1)
- "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" (version 02)

For more information regarding the methodologies, please refer to:
<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>.

2.2 Justification of the choice of the methodology and why it is applicable to the project activity:

The Guizhou Qingshuihe Gelibridge Hydropower Project is a grid-connected renewable power generation project activity which fully meets all the applicability requirements stated in the ACM0002 version 09, as shown below:

- The project is the installation of a new 150 MW hydropower plant by using renewable water resources to generate electricity
- The project activity results in new reservoirs and the power density of the plant is 70.42W/m², which is greater than 4 W/m².

- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid (South China Power Grid) is available.
- The project does not involve biomass-fired power plants at the proposed site.
- The project does not involve switching from fossil fuels to renewable energy at the proposed site.

2.3 Identifying GHG sources, sinks and reservoirs for the baseline scenario and for the project:

The boundary of this project includes all of the equipment and instruments installed in the system from the reservoir immediately leading up to the hydropower station to the power output at the power station, as well as the power plants that are connected to the South China Power Grid. Figure 2 shows the boundary of this project.

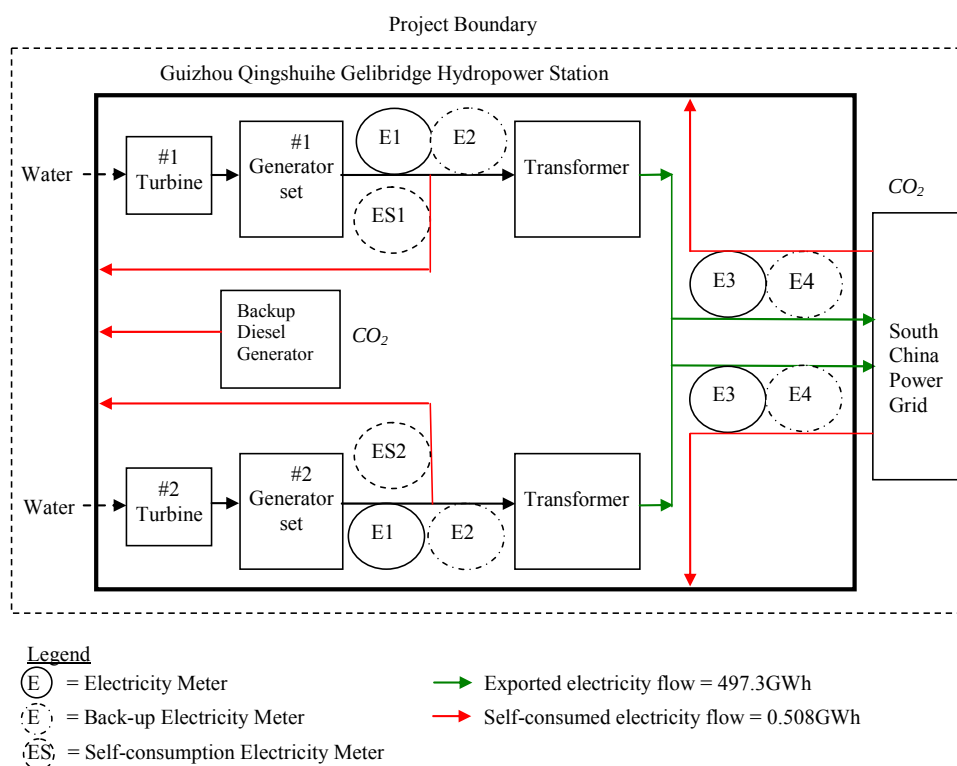


Figure 2. Diagram of project boundary

Table 4 illustrates which emission sources are included and which are excluded from the project boundary for determination of both baseline and project emissions.

Table 4. Overview of emissions sources included in or excluded from the project boundary

Source		Gas	Included?	Justification/Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel fired power plants	CO ₂	Yes	Main emission source (predominantly coal fired power plants).
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source

	that are displaced due to the project activity.			
Project Activity	For hydro power plants, emissions of CH ₄ from the reservoir.	CO ₂	No	Minor emission source
		CH ₄	No	Not required by methodology as the power density is 70.42W/m ² , which is above threshold of 10 W/m ² .
		N ₂ O	No	Minor emission source
	For all renewable energy plants, CO ₂ emissions from backup Power generation.	CO ₂	Yes	Main emission source.
		CH ₄	No	Minor emission source.
		NO ₂	No	Minor emission source.

The main source of baseline emissions is the CO₂ from coal combustion in the existing power generation fleet. Emissions of methane and nitrous oxide from these sources are conservatively excluded. There are project emissions from backup power. Insignificant amounts of power will be used in running the power station, including lighting, and electricity for metering, computers, etc. Methane emissions from the inundated area are excluded due to the high power density, as specified per ACM0002 version 09.

2.4 Description of how the baseline scenario is identified and description of the identified baseline scenario:

According to the applied methodology, ACM0002 version 09, project activities that entail the installation of a new grid-connected renewable power plant/unit, the baseline scenario 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 project activity has the following alternative baseline scenarios:

1. The proposed project activity not undertaken as a CDM project activity
2. Construction of a coal-fired power plant with the same amount of annual electricity generation
3. Construction of a power plant using other sources of renewable energy with the same amount of annual electricity generation
4. Provision of equivalent amount of annual power output supplied by the South China Power Grid (continuation of the existing situation)

Baseline Scenario 1

The financial analysis presented as part of the investment analysis in section B5.1 below shows that this project is not economically attractive when assessed against an IRR benchmark for the power industry of 8%. Therefore, the project activity not undertaken as a CDM project activity is not a realistic and credible alternative to the proposed project activity.

Baseline Scenario 2

The proposed project activity will supply 497.3GWh to the grid. Bearing in mind the difference in utilisation factors of hydropower and fossil fuel plants, this is the same amount of electricity that would be delivered by a 66.8 MW coal fired plant with a utilization capacity of

85%.² According to Chinese regulations, fossil fuel power plants below 135 MW are prohibited from construction in areas where there is access to large grids such as the South China Power Grid.³ For this reason, baseline scenario 2 is not a realistic alternative.

Baseline Scenario 3

Renewable energy resources for electricity production are not available in the region, it is a mountainous region and not suitable for wind, solar, biomass or other forms of renewable energy. Biomass is not a potential source of energy because there is not a sufficient amount of biomass available to supply a biomass-fired power plant. Additionally, there is no biomass-fired power plant with a similar capacity to that of the proposed project. There are also no adequate wind resources in the Guizhou region of similar capacity, nor are there any geothermal resources reported. To use solar energy resources with similar capacity faces not only a resource problem, but also technical and investment barriers due to the first of its kind in the province. Therefore, the development of a renewable electricity power plant using a different type of renewable energy is not feasible as a realistic and credible alternative baseline scenario.

Baseline Scenario 4

Providing electricity via the South China Power Grid is in compliance with national rules and regulations and is economically feasible.

In summary, of the potential baseline scenarios detailed above, Baseline Scenario 4 is the only realistic alternative.

2.5 Description of how the emissions of GHG by source in baseline scenario are reduced below those that would have occurred in the absence of the project activity (assessment and demonstration of additionality):

CDM was considered in early 2006 for the Guizhou Qingshuihe Gelibridge Hydropower Project, followed by a Letter of Intent (LOI) and Emissions Reduction Purchase Agreement (ERPA) signed between Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. (project owner) and Sindicatum Carbon Capital. An Environmental Impact Assessment (EIA) and Feasibility Study Report (FSR) (version 2/final approved by local Development and Reform Commission) for the project were prepared in September 2006 and November 2006, respectively, upon which construction of the plant commenced. The plant commenced power generation in February 2010 with partial operation (1 of 2 turbines) on February 9, 2010 and full operation (2 of 2 turbines) on March 12, 2010. Without CDM, the Guizhou Qingshuihe Gelibridge Hydropower Project would have been financially unattractive.

The following steps are used to demonstrate the additionality of the project according to version 5.2 of the "Tool for the demonstration of additionality".

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

Sub-step 1a. Define alternatives to the project activity.

² "The capacity of 66.8 MW for a coal-fired plant operating at 85% was determined by converting the 497.3GWh equivalent amount of electricity produced by the proposed project using the following formula: $66.8 \text{ MW} = 497.3\text{GWh} / (8,760 \text{ hours per annum of operation} * 85\% \text{ utilisation.})$ "

³ "Notice on Strictly Prohibiting the Installation of Fossil Fuel Generators with the Capacity of 135MW or below" issued by the General Office of the State Council, decree no. 2002-6

The alternatives to the project activity are as follows:

1. The proposed project activity not undertaken as a CDM project activity;
2. Construction of a coal-fired power plant with the same amount of annual electricity generation
3. Construction of a power plant using other sources of renewable energy with the same amount of annual electricity generation; and
4. Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

Renewable energy resources with a similar power supply to the grid are not available in the region, for example, due to the mountainous terrain, lack of reasonably flat, shade-free land suitable for solar panels and lack of vehicular access to ridge tops for positioning of wind turbines. Biomass is not a potential source of energy because there is not a sufficient amount of biomass available to supply a biomass-fired power plant. Additionally, there is no biomass-fired power plant with a similar capacity to that of the proposed project. There are also no adequate wind resources in the Guizhou region of similar capacity, nor are there any geothermal resources reported. To use solar energy resources with similar capacity faces not only a resource problem, but also technical and investment barriers due to the first of its kind in the province. Therefore, the development of a renewable electricity power plant using a different type of renewable energy is not feasible as a realistic and credible alternative baseline scenario. Scenario 3) is therefore removed from this list.

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

As mentioned above, Baseline Scenario 2) conflicts with the regulations on the installation of fossil fuel plants and is therefore removed from the list.

Step 2. Investment analysis

Step 2 will be used to show that the project activity is less attractive in financial terms than the other remaining baseline alternative and that it only becomes attractive with the addition of revenues from the CDM.

Sub-step 2a. Determination of the appropriate analysis method

The "Tool for the demonstration and assessment of additionality" version 05.2 suggests three analysis methods, i.e., simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III). The simple cost analysis is not applicable because the project activity will produce economic benefits (from electricity sale) other than CER income. Investment comparison analysis method (option II) is applicable to projects whose alternatives are also investment projects. Only on such basis, comparison analysis can be adopted. The alternative baseline scenario of the proposed project is the South China Power Grid rather than new investment projects, thus option II is not an appropriate method for the decision-making context. The proposed project will therefore use the benchmark analysis (option III) method since the benchmark IRR is widely available and applied in China.

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

With reference to *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*, the financial benchmark rate of return (after tax) of Chinese power industries requires an IRR of 8% on total investment. This financial benchmark rate of return is applicable to most of the electric power projects. On the basis of above benchmark, calculation and comparison of financial indicators are carried out in sub-step 2c.

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

Basic parameters for the calculation of the financial indicators are listed in Table 5.

Table 5. Basic Parameters for calculating Financial Indicators

Parameter	Value ^a
Installed capacity	150 MW
Annual power generated	508 GWh/year
Annual power supply to the grid	497.3 GWh/year ^b
Percentage of annual power generated for uptake by the grid	98%
Percentage of annual power generated for internal consumption	0.1%
Percentage of annual power generated lost in transmission lines	0%
Annual hours of operation	3,387 hours/year ^c
Plant load factor (PLF)	39%
Static total investment	1.006489 billion RMB ^d
Electricity tariff	0.195 RMB Yuan/kWh (without VAT) ^e
Project lifetime	30 years
Tax	
Value added tax rate	17%
Income tax rate	33%
Added construction and education tax	8%
Annual operation cost	18.54 million RMB
Period of depreciation	28 years
CER price	10 USD/tCO ₂ e
Benchmark	8% (post-tax for the power industry)

^a FSR (November 2006)

^b Power Supply to Grid = Total Power Generated x Percentage of Annual Power Generated for Uptake by the Grid (98%) x [1 - Percentage of Annual Power Generated for Internal Consumption (0.1%)] = 497.3 GWh/year

^c Annual hours of operation of 3,387 is based on annual full load operation hours as determined by the Hydro China Guiyang Engineering Corporation, a third-party engineering company contracted by the project owner to conduct the FSR for the project.

^d The project's engineering investment table dated 31 May 2009, developed by the project owner's Construction Department indicates that around three quarters of the static total investment had been spent to that date on the construction of the plant. At that time construction had not finished. The engineering investment table as of June 2010, prepared by the project owner's Finance Department, indicated that 995.3 Million RMB in static total investment has been spent to date. Although the Station began full operation in March 2010, construction of the station has not yet been fully completed, nor have all of the costs been paid due to unfinished construction. The costs to date for the static total investment per the June 2010 engineering investment table are 98.89% of the FSR estimate.

^e Tariff issued by the Guizhou Price Bureau to the Guizhou Wujiang Hydropower Development Co., Ltd., (the largest (30%) shareholder of the project owner, Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd., in April 2005).

As shown below, four different power tariffs have been applied in various financial analyses at different stages of the Guizhou Qingshuihe Gelibridge Hydropower Project, which include a government-issued tariff available when the investment decision was made to proceed with the project, 2 tariffs per FSR versions that were developed at different stages of the project (e.g., examination and

approval stages), and a government-issued tariff issued to the project following commencement of the project:

Table 6. Power tariffs applied in financial analyses at different stages of the project activity

Tariff	Guizhou Pricing Bureau tariff issued to Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd.'s largest shareholder in April 2005 (project-specific tariff available at the time of the investment decision) (RMB/kWh)	August 2006 FSR (RMB/kWh)	November 2006 FSR (RMB/kWh)	Guizhou Pricing Bureau tariff issued to the Gelibridge Hydropower Plant in March 2010 (project-specific tariff available after project commencement) (RMB/kWh)
Tariff without VAT	0.195	0.251	0.259	0.2115
Tariff with VAT	0.228	0.294	0.303	0.2474

In August 2006, an earlier version of the FSR (draft, version 1) was issued, which contained a 0.294RMB/kWh with VAT or 0.251RMB/kWh without VAT power tariff. Although this tariff is shown in version 1 of the FSR, the FSR version 1 states that the power tariff was determined by applying a backwards calculation with the goal of obtaining a project IRR of 8%, which is the threshold for identifying power industry projects as being financially attractive:

"If calculated in accordance with taking 8% as the Financial Rate of Return of the total investment and the Equity Financial Rate of Return as 10%, the grid power price is RMB 0.294/kWh, higher than 0.2334 RMB/kWh, which is the current average price of the grid power currently implemented in Guizhou."⁴

As shown in the FSR, the tariff is conditional and carries no enforceable weight as it is not a power tariff that has been issued by government, as all power tariffs in China are.

In November 2006, the final version of the FSR was issued (version 2), which the project's FSR approval dated June 4, 2007, is based on. This FSR version contains a higher power tariff (0.303RMB/kWh with VAT equal to 0.259RMB/kWh without VAT) in comparison to that quoted in the August 2006 FSR. Similar to the August 2006 FSR, the November 2006 FSR states:

"Estimated on the basis of the Financial Rate of Return 8% to the total investment, the feed-in power tariff is RMB 0.259/kWh (RMB0.303/kWh if the value-added tax is included). Compared with the average feed-in power tariff (RMB 0.2334/kWh, including value added tax) of the hydropower stations covered in the power grid of Guizhou, the price is slightly higher, but it's still within the acceptable scope of the grid."⁵

Again, as this tariff is not a value issued by government, it is notional and does not indicate what the actual realistic tariff is.

In April 2005, the Guizhou Pricing Bureau issued an electricity tariff of 0.228RMB/kWh (with VAT) or 0.195RMB/kWh (without VAT) to the Guizhou

⁴ Refer to Chinese-to-English translation of Section (3) on page 81 of the August 2006 FSR Book 1: 200608 Geli FSR Consolidated Statement (cn) - Pa, f, 81.pdf

⁵ Refer to Chinese-to-English translation of Section 2.6 on page 5 of the November 2006 FSR Book 14: 200611 Geli Bridge FSR Book 14 Economic Assessment (cn).pdf

Wujiang Hydropower Development Co., Ltd.⁶, which is the largest shareholder (30%) in Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd.⁷ Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd., a company created for the purpose of developing hydropower projects, would not have been able to develop the Guizhou Qingshuihe Gelibridge Hydropower Project without Guizhou Wujiang Hydropower Development Co., Ltd. being a shareholder, and bringing its government-issued tariff and government-issued rights to develop hydropower projects along the particular stretch of the Qingshui River which the Guizhou Qingshuihe Gelibridge Hydropower Project now sits upon. As the 0.195RMB/kWh without VAT (0.228RMB/kWh with VAT) tariff was issued by the Guizhou Pricing Bureau to the project owner's largest shareholder, this was the value the project owner expected to receive. At the time the project was started, the project owner did not receive any other indication from the Guizhou Pricing Bureau that they would receive a tariff different from the already-issued 0.195RMB/kWh without VAT tariff. As such, the tariff of 0.195RMB/kWh without VAT has been applied in the financial analysis for assessing the Guizhou Qingshuihe Gelibridge Hydropower Project.

On 4 May 2009, NDRC issued a statement regarding feed-in tariffs for renewable energy power supplied to the grid identified in FSRs as compared to the actual in the power purchase agreements.⁸ This statement indicates that the FSR contains a "guiding price" only, and that the actual power price is negotiated between the project and the power grid company. As approval for the project depends on an estimation of the financial feasibility of the project (through an IRR, which requires a power tariff value), and as the actual power tariff is only issued after completion of the project, the FSR's tariff can only be estimated. Thus, the NDRC statement shows that the actual feed-in tariff may be different from what is presented in the FSR. NDRC further states that approval of the project's FSR, and the feed-in tariff value contained within, does not mean that the project receives official approval of the feed-in tariff as stated in the FSR. Following commencement of the project, the project received a Power Purchase Agreement (PPA) for the Gelibridge Hydropower Station, issued on March 9, 2010, by the Guizhou Power Grid company, to which the Gelibridge Hydropower Station will upload its electricity. The PPA issues the Station a tariff of 0.2472 RMB/kWh with VAT (or 0.2115 RMB/kWh without a 17% VAT). When applying the current tariff of 0.2115 RMB/kWh without VAT to the financial analysis, the project IRR (5.48%) is still below the 8% power benchmark. Thus, the actual PPA has been issued and is far less than the notional tariffs quoted within the August and November 2006 FSR's, and supports the NDRC statement that government issued tariffs are typically lower than notional tariffs quoted in FSRs.

As the project owner was only aware of the 0.195RMB/kWh without VAT tariff at the time of the project start, it is most appropriate to utilise this information as compared to the notional FSR tariff in conducting the financial analysis as this is the closest indication as to what feed-in tariff the project would actually receive.

The IRR of the project implemented not as a CDM project can be calculated using the assumptions shown in Table 5 above as 4.80%. This is below the 8% benchmark and, therefore, the proposed project activity can be considered to be financially unattractive.

⁶ Refer to 20050428 [2005]80 Implementation of Coal and Elec Coop Mechanism Overcoming Elec Price Conflict (cn).pdf

⁷ Refer to 20070620 [2007]23 Dahuashui Electricity Tariff Application to Guizhou Price Bureau (cn).pdf

⁸ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2236.pdf>

If the project is implemented as a CDM project, with CERs at an estimated price of USD 10 per CER, the IRR increases to 6.88%, helping to make the project more attractive.

Table 7. Financial indicators for the Guizhou Qingshuihe Gelibridge Hydropower Project

Scenario	IRR (total investment, after tax) (%)
Project activity without CDM	4.80%
Development of the project with CDM	6.88%

Sub-step 2d: Sensitivity analysis

The above result is further confirmed by the sensitivity analysis where the "Electricity Exported", "Static Investment", "Annual O&M" and "Power Tariff" are selected as critical parameters and varied $\pm 10\%$. The resulting IRR figures are presented in Table 8 and Figure 3:

Table 8. Sensitivity analysis on project total investment IRR

IRR Sensitivity Analysis Summary (after tax)					
Electricity Exported	90%	95%	100%	105%	110%
	3.91%	4.36%	4.80%	5.21%	5.60%
Static Total Investment	90%	95%	100%	105%	110%
	5.61%	5.20%	4.80%	4.41%	4.05%
Operating Costs	90%	95%	100%	105%	110%
	4.96%	4.88%	4.80%	4.71%	4.63%
Power Tariff	90%	95%	100%	105%	110%
	3.90%	4.36%	4.80%	5.21%	5.60%

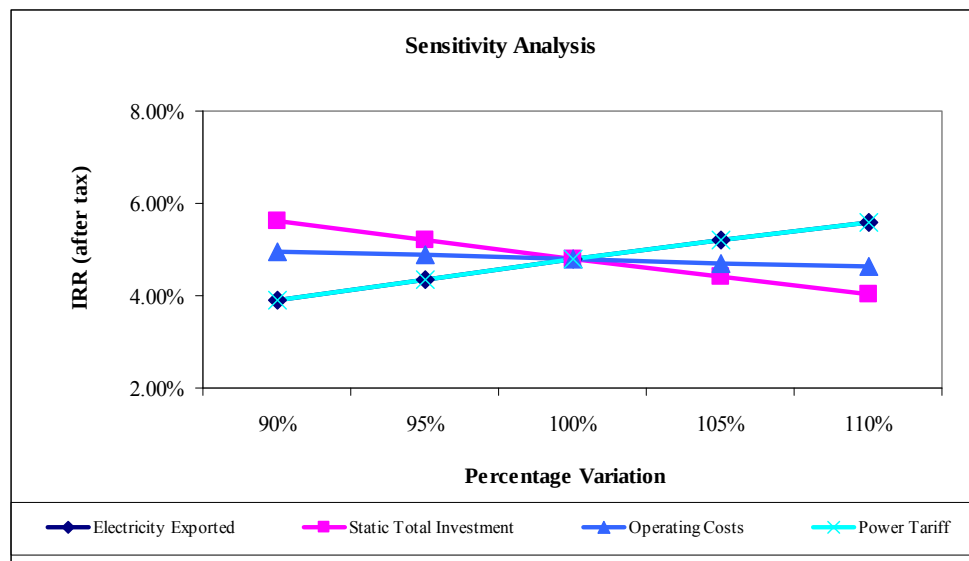


Figure 3. Sensitivity analysis to main costs and revenues

As shown in Table 8 and Figure 3 above, the project remains unattractive (i.e., below the 8% benchmark) in all cases even with a $\pm 10\%$ variation in the electricity exported, static total investment, operating costs, and power tariff.

At the time of the decision to start the project and commence the CDM project activity, the best available information was that the project would receive the 0.195 RMB/kWh without-VAT tariff because this was a condition upon which the original license to develop the hydropower asset had been granted. To reach an 8% IRR, the tariff would need to

increase to approximately 0.2815RMB/kWh without VAT.⁹ The sensitivity analysis shows that the proposed project activity is still not close to the benchmark IRR without the CDM revenues.

Step 3: Barrier analysis

Not selected.

Step 4: Common Practice Analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity.

In accordance with the "Tool for the Demonstration and Assessment of Additionality" (version 5.2), an analysis of other activities that are operational and are similar to the proposed project activity (i.e., projects in the same country/region and/or that rely on broadly similar technology, are of similar scale, and take place in a comparable environment) is discussed in sub-step 4a. Other CDM project activities are not included in this analysis, as per the additionality tool.

Projects of similar location

Policies in China are often varied by province (i.e., electricity tariffs are set by provincial government). Therefore, in taking provinces as a region per the additionality tool, Guizhou Province, the province in which the Guizhou Qingshuihe Gelibridge Hydropower Project is located, is taken to be the similar region for the common practice analysis.

Projects of similar financing

The Government of China publishes a variety of statistical yearbooks, of which the China Water Resources Yearbook is most relevant in terms of containing data on hydropower resources. According to the 2006 China Water Resources Yearbook there were seven hydropower projects in operation in Guizhou Province, the province in which the proposed project activity is located. All seven listed projects have been developed by 100% state-owned companies (as is typical of projects in the hydropower sector due to the large investment required), which in practice have benefited from financing advantages as compared to privately-owned companies. State-owned projects typically do not face investment barriers due to government financial support in the form of equity and debt, and are typically located at optimal sites where construction costs are less and the returns are higher than the 8% power industry benchmark. As the Guizhou Qingshuihe Gelibridge Hydropower Project is privately-funded, the proposed project activity is not similar to and financially disadvantaged in comparison to these government-financed hydropower projects. There are no other privately funded/developed hydropower projects in Guizhou Province. Thus, the Guizhou Qingshuihe Gelibridge Hydropower Project is not common practice in Guizhou Province.

Projects of similar scale

While the proposed project activity has already been identified as not common practice in Guizhou Province due to the ruling out of the seven hydropower projects listed in the 2006 China Water Resources Yearbook on a financing basis, nearly all of the projects can also be ruled out on the basis of scale.

⁹ This value differs from the required power tariffs of 0.251 RMB/kWh and 0.259 RMB/kWh without VAT noted in the August (draft, version 1) and November 2006 (final approved version) FSR version since the financial analysis presented herewithin accounts for the correct treatment of tax losses and a different power generation commencement date (2009 as a current estimation instead of the estimated 2008 per the FSR).

Hydropower plants are categorized according to their size (total installed capacity), as per the Classification & Design Safety Standard of Hydropower Projects (DL5180-2003), issued by the State Economic and Trade Commission of China in 2003:

- Small-scale hydropower projects: total installed capacity less than 50MW
- Medium-scale hydropower projects: total installed capacity between 50MW to 300MW
- Large-scale hydropower projects: total installed capacity greater than 300MW

The abovementioned categorization of hydropower projects by size not only determines which standards apply (e.g., design and safety standards), but also impacts how a project is financially evaluated and approved by the Chinese government. The *Economic Evaluation Code for Small Hydropower Projects (SL16-1995)* applies to small hydropower projects with an installed capacity below 50MW, and provides for a different benchmark (10%) for small hydropower projects as compared to the power industry benchmark (8%), which has typically been applied to medium and large hydropower projects.

As the Guizhou Qingshuihe Gelibridge Hydropower Project has a total capacity of 150MW, it is classified as a medium-scale hydropower project in China.

Therefore, hydropower projects that are operational in Guizhou Province deemed as medium-scale (50MW to 300MW) are considered for comparison in the common practice analysis (i.e., projects that are small- or large-scale are excluded because they are not of similar scale as the proposed project activity).

According to the 2006 China Water Resources Yearbook, there were seven hydropower projects in operation in Guizhou Province. Of these seven, six projects are classified as small-scale (total installed capacity less than 50MW). These six projects are of a different size as compared to the Guizhou Qingshuihe Gelibridge Hydropower Project (medium-scale) and have been excluded from the common practice analysis. The last project of the seven is the Yungui Xiangshui Hydropower Station, which is of medium-scale (100MW total installed capacity). Although this project is of a similar scale to the proposed project activity, it has already been eliminated due to the fact that it is 100% state-owned as compared to the privately-funded project activity.

The 2007 China Water Resources Yearbook also provides information on hydropower projects on a provincial basis; however, the data presented in the 2007 yearbook is aggregated. Only the total number of hydropower projects and the total installed capacity for each province is provided. Thus, the best available project-specific information has been provided in the 2006 China Water Resources Yearbook.

In conclusion, the Guizhou Qingshuihe Gelibridge Hydropower Project is not common practice in Guizhou Province.

Sub-step 4b Discuss any similar options that are occurring

As discussed in sub-step 4a, there are no projects considered to be similar to the proposed CDM project activity because they either:

- a) Have been developed by 100% state-owned companies, which in practice have benefited from financing advantages as compared to the privately-financed proposed project activity. State-owned projects typically do not face investment barriers due to government financial support in the form of equity and debt, and are typically located at optimal sites where construction costs are less and the returns are higher than the 8% power industry benchmark; and
- b) Are not of similar size as compared to the project activity (with the exception of Yungui Xiangshui Hydropower Station, which is of

the same size, but has already been eliminated as being common on a financing basis).

3 Monitoring:

3.1 Title and reference of the VCS methodology (which includes the monitoring requirements) applied to the project activity and explanation of methodology choices:

The project activity is a registered CDM project (UNFCCC Reference No. 3351) that applies the following CDM methodology and tools, which are approved by the VCS Board:

- Approved consolidated baseline methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (version 09)
- "Tool for the Demonstration and Assessment of Additionality" (version 5.2)
- "Tool to calculate the emission factor for an electricity system" (version 01.1)
- "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" (version 02)

For more information regarding the methodologies, please refer to:
<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>.

3.2 Monitoring, including estimation, modelling, measurement or calculation approaches:

- *Purpose of monitoring*
 The monitored data will be used to calculate the emission reduction of the project in verification during crediting period. Based on the monitoring, those data, electricity exported to CSPG, electricity imported from CSPG and quantity of consumed diesel can be used to confirm the baseline emission, leakage and emission reduction.
- *Types of data and information to be reported, including units of measurement*
 The data to be monitored includes the following:
 1. Electricity supplied by the project activity to the grid (parameter $EG_{out,y}$) (MWh)
 2. Electricity consumed by the plant from the grid (parameter $E_{in,y}$) (MWh)
 3. Total electricity produced by the project activity (parameter TEG_y) (MWh)
 4. Installed capacity of the plant after the project activity (parameter Cap_{PJ}) (W)
 5. Area of the reservoir after the project activity (parameter A_{PJ}) (m²)
 6. Quantity of diesel fuel consumed (parameter $FC_{i,j,y}$) (mass or volume unit per year (t/yr or m³/yr))
 7. Weighted average net calorific value of diesel fuel (parameter $NCV_{i,y}$) (GJ/tce)
 8. Weighted average CO₂ emission factor for diesel fuel ($EF_{CO2,i,y}$) (tCO₂/GJ)

- *Origin of the data*
Refer to the "Source of data to be used" in each of the parameters to be monitored listed in section 3.3
- *Monitoring, including estimation, modelling, measurement or calculation approaches*
Refer to the "Description methods and procedures to be applied" in section 3.3, which details the measurement frequency of relevant parameters to be monitoring under the project activity
- *Monitoring times and periods, considering the needs of intended users*
Refer to the "Description methods and procedures to be applied" in section 3.3, which details the measurement frequency of relevant parameters to be monitoring under the project activity
- *Monitoring roles and responsibilities*
Refer to item 2 "Persons responsible for the monitoring work" in section 3.4, which details the monitoring roles and responsibilities
- *Managing data quality*
Refer to the "QA/QC procedures to be applied" in section 3.3, which details the data management procedures for the relevant parameters to be monitoring under the project activity

3.3 Data and parameters monitored / Selecting relevant GHG sources, sinks and reservoirs for monitoring or estimating GHG emissions and removals:

Data / Parameter:	$EG_{out,y}$
Data unit:	MWh
Description:	Electricity supplied by the project activity to the grid
Source of data to be used:	Directly measured by the power generation company
Value of data applied for the purpose of calculating expected emission reductions	497.3 GWh
Description of measurement methods and procedures to be applied:	Electricity meters will measure the amount of power exported to the grid continuously. The measurement data will be recorded monthly by plant staff. The data will be archived electronically and stored for two years after the end of the crediting period.
QA/QC procedures to be applied:	Meters will be calibrated according to national regulations or, in the absence of national regulations, per manufacturer's specifications. Readings of the meters can be corroborated against payments from the local power grid company. Meter readings should be collected by both the project owner and local grid company on-site.
Any comment:	N/A

Data / Parameter:	$E_{in,y}$
Data unit:	MWh
Description:	The amount of electricity received from the South China Power Grid, which is consumed by the project annually.
Source of data to be used:	Meter readings
Value of data applied for the purpose of calculating expected	0

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emission reductions	
Description of measurement methods and procedures to be applied:	Electricity meters will measure the amount of power received from the grid continuously. The measurement data will be recorded monthly by plant staff. The data will be archived electronically and stored for two years after the end of the crediting period.
QA/QC procedures to be applied:	Meters will be calibrated according to national regulations or, in the absence of national regulations, per manufacturer's specifications. Readings of the meters can be corroborated against payments to the local power grid company. Collection of data from readings of the meters should be taken by both project owner and local grid company on-site.
Any comment:	N/A

Data / Parameter:	TEG_y
Data unit:	MWh
Description:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y
Source of data to be used:	Calculated based on the sum of the electricity supplied to the grid (per direct measurement by the power generation company) and electricity consumed by the project (per meter readings)
Value of data applied for the purpose of calculating expected emission reductions	508GWh
Description of measurement methods and procedures to be applied:	Electricity meters will measure the amount of power received from and exported to the grid continuously. Meters will be calibrated according to national regulations or, in the absence of national regulations, per manufacturer's specifications. The measurement data will be recorded monthly by plant staff. The data will be archived electronically and stored for two years after the end of the crediting period. Sales/purchase records can be used for cross-check.
QA/QC procedures to be applied:	N/A (see QAQC for $EG_{out,y}$ and $E_{in,y}$).
Any comment:	N/A

Data / Parameter:	Cap_{PJ}
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data to be used:	Project site.
Value of data applied for the purpose of calculating expected emission reductions	150,000,000
Description of measurement methods and procedures to be applied:	Determined by the project site yearly.
QA/QC procedures to be applied:	-

Any comment:	N/A
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Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data to be used:	Project site
Value of data applied for the purpose of calculating expected emission reductions	2,130,000
Description of measurement methods and procedures to be applied:	Measured from topographical surveys, maps, satellite pictures, or other methods by a reputable organization or institution, for example a design institute. Monitoring frequency: yearly.
QA/QC procedures to be applied:	-
Any comment:	N/A

Data / Parameter:	$FC_{i,j,y}$
Data unit:	Mass or volume unit per year (t/yr or m^3/yr)
Description:	Quantity of fuel type i combusted in process j during the year y
Source of data to be used:	Fuel consumption backup generator
Value of data applied for the purpose of calculating expected emission reductions	0.3757 t (diesel)/yr (estimate based on data (2008) provided by the project owner)
Description of measurement methods and procedures to be applied:	The backup diesel generator is used for backup purposes only. Fuel consumption will be monitored by means of fuel purchase receipts and stock beginning/end reporting period. Sales records for each fuel will be retained for each purchase. Stock variations will be recorded at the beginning and end of each reporting period.
QA/QC procedures to be applied:	-
Any comment:	N/A

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/tce
Description:	Net caloric value for fuel i
Source of data to be used:	China Energy Statistical Yearbook
Value of data applied for the purpose of calculating expected emission reductions	42.652 GJ/tce (per China Energy Statistical Yearbook 2007, page 287)
Description of measurement methods and procedures to be applied:	Use of reliable local or national data.
QA/QC procedures to be applied:	Review appropriateness of the data annually. Check consistency of local/national data with default values by the IPCC. In case values differ significantly from IPCC default values, additional information will be collected.
Any comment:	N/A

Data / Parameter:	$EF_{CO_2,i,y}$
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Data unit:	tCO ₂ /GJ
Description:	CO ₂ emission factor per unit of energy for fuel i
Source of data to be used:	IPCC 2006 default value as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value of data applied for the purpose of calculating expected emission reductions	0.0748 tCO ₂ /GJ (IPCC 2006 default value)
Description of measurement methods and procedures to be applied:	Review appropriateness of the data annually. IPCC 2006 default value as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
QA/QC procedures to be applied:	
Any comment:	N/A

3.4 Description of the monitoring plan

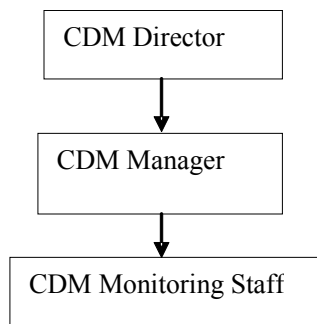
The purpose of the monitoring plan is to ensure that the monitoring and calculating of project activity emission reductions in the crediting period are complete, consistent, clear and accurate. Staff will be assigned by the project owner to perform this task.

1. Data to be monitored

The baseline emission factor is based on ex-ante calculation. Therefore, the main data to be monitored is the amount of power delivered to grid and the amount of power from the South China Power Grid that is consumed by the project activity, as well as the quantity of diesel ($FC_{i,j,y}$) combusted in the backup diesel generator.

2. Persons responsible for the monitoring work

In order to obtain effectively monitored data, the project owner established a monitoring management structure which identifies the relevant staff for data recording, collection and archiving. In addition, the project owner will designate a CDM monitoring director to supervise the process. The monitoring director is responsible for the check of monitoring and recording tasks (such as meter reading, sales receipts), emission reductions calculations and the preparation of monitoring reports, etc. The detailed structure is as follows:

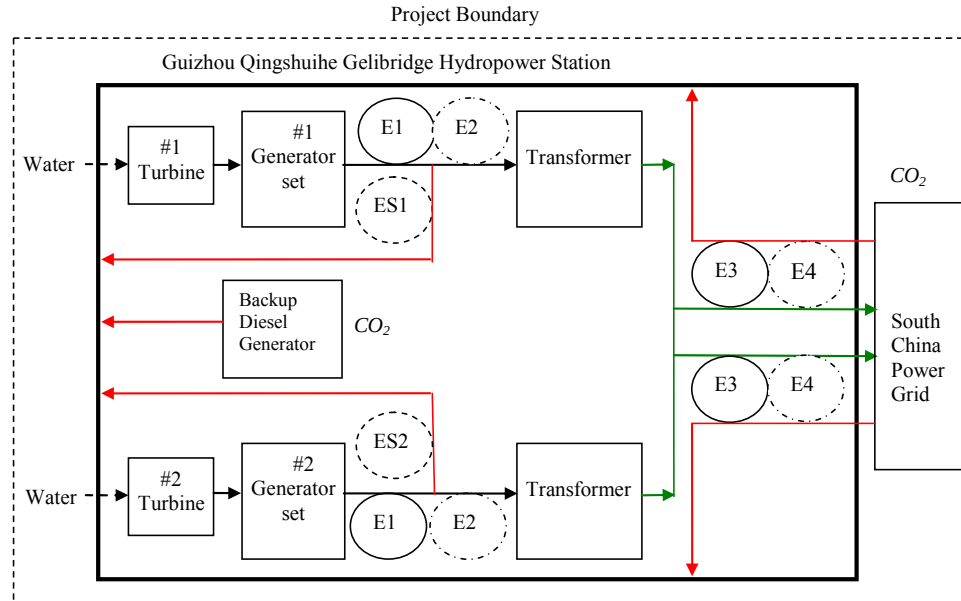


3. Monitoring equipment and its installation

Meters are installed in the system and data from those meters are monitored by the hydropower station staff as part of their routine check in order to monitor the proper operation of the system. The generator output meters (check meters) (refer to the E1 meters in the figure below) monitor the amount of electricity generated by the power

station. One back-up meter (refer to E2 meters in the figure below) has been installed for each of the E1 meters. The E1 and E2 meters are owned by the project owner. Note that meters measuring the amount of electricity consumed by the power station that is self-generated are indicated in the figure below by meters ES1 and ES2, located after the E1 meters and before the transformers. Meters ES1 and ES2 are non-CDM related meters as they do not measure exported electricity (i.e., these meters do not measure a CDM monitoring parameter), but have merely been shown in the figure in order to comprehensively reflect the energy flows of the power station.

The plant has 2 grid connection lines. There are two meters (refer to E3 and E4 meters in the figure below) installed on each of the lines. The amount of electricity exported to the grid ($EG_{out,y}$) and the amount imported from the grid ($E_{in,y}$) are monitored by the two-way meters E3 (refer to figure below). One back-up meter (E4) has been installed for each of the E3 meters and reads measurements simultaneously to E3 in order to ensure continuous data measurement. Meters E3 and E4 are owned by the grid company. The data taken from the E3 and/or E4 meters will be used for CDM purposes. The amount of electricity from this meter can be cross-checked with the amount of electricity exported listed on electricity sale invoices. Before formal operation, the measuring devices will undergo inspection acceptance according to the rules and regulations.



Legend

- | | |
|---|---|
| $\textcircled{E}$ = Electricity Meter | $\rightarrow$ Exported electricity flow = 497.3GWh |
| $\textcircled{E}$ = Back-up Electricity Meter | $\rightarrow$ Self-consumed electricity flow = 0.508GWh |
| $\textcircled{ES}$ = Self-consumption Electricity Meter | |

Remark: E1, E2, ES1 and ES2 metering equipment is used for operational purposes and serve as back-up in case of irregularities/failure in the E3 (back-up E4) export readings.

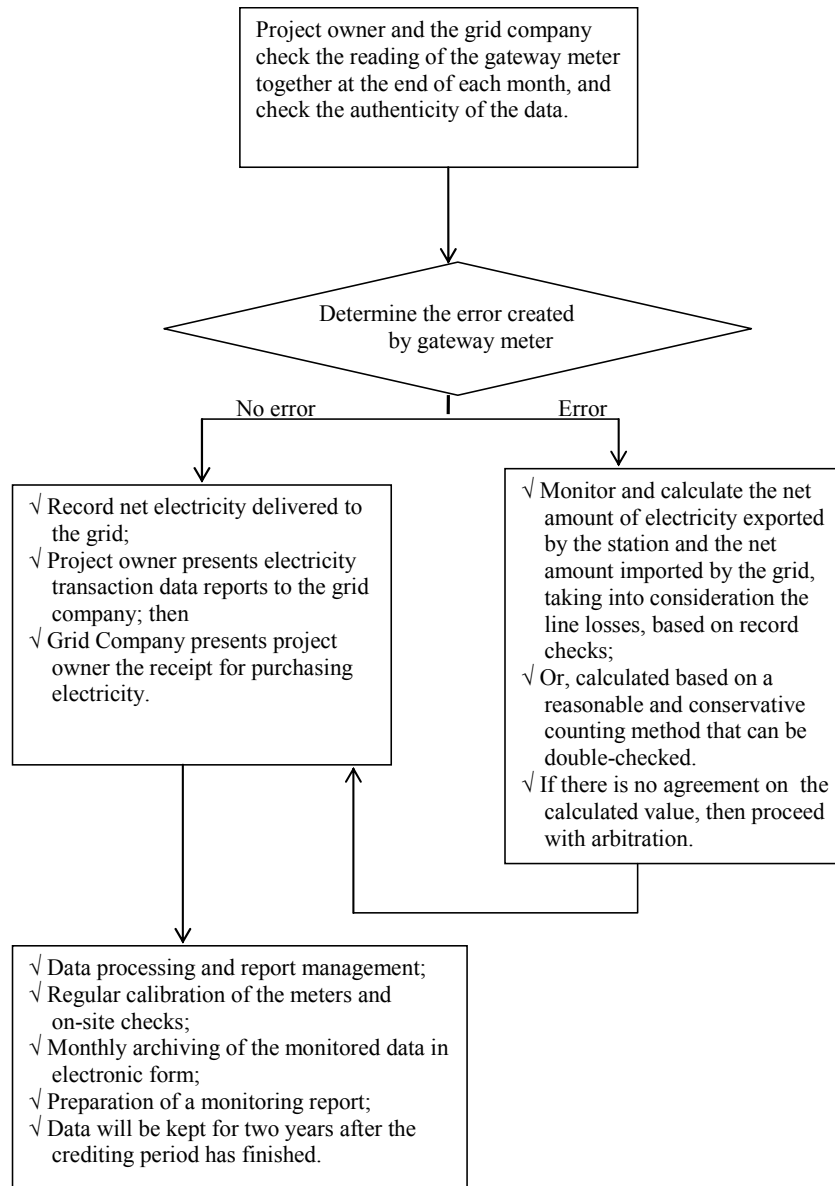
The accuracy of the meters are shown below.

- Generator meters (E1 and E2): $\pm 0.5\%$
- Self-consumed electricity meters (ES): $\pm 0.5\%$
- Meters on the line connecting to the grid (E3 and E4): $\pm 0.2\%$

Depending on the type of meter the positive active power (gross power) and negative active power (power consumed) resulting in net power can be continuously measured by a single power meter.

4. Data collection

The project owner will be responsible for normal operation of the check meters. The Grid Company will be responsible for normal operation of the gateway meters. They must ensure the proper function and maintenance of the meters.



5. Calibration and maintenance of the meters

In order to ensure the accuracy of the meters, regular calibration and maintenance of the meters will be conducted. Maintenance will be conducted in accordance with national regulations or, in the absence of national regulations, manufacturer specifications (e.g., electricity meters in accordance with the power bureau regulations).

The site staff are responsible for data recording. Sales records will be used to cross-check meter readings. In case of metering failure, the meter will be serviced by a qualified institution.

6. Data management system

Data management system describes the procedure for data recording and storing which is collected during monitoring period.

All monitoring data will be stored in a computer system. Regular backup will be foreseen to secure data. Sales records and purchase receipts of electricity purchased and exported will be retained at a central place. All data will be stored for a period of 2 years after the crediting period.

Monitoring and data management will be governed by the monitoring project manager responsible for day-to-day monitoring activities.

7. Monitoring report

By the end of each monitoring period (to be decided), a monitoring report will be prepared by the CDM manager or CDM monitoring staff under supervision of the CDM project manager. The monitoring report will be subject to verification by the DOE.

8. Emergency treatment

Measures taken at emergency situations:

In situations where the reservoir water level exceeds the reservoir's capacity, a motor for the dam controls the waterway gates. To guarantee normal operation of the motor in the case of emergency situations, the following measures are taken:

- 1) Under normal conditions: the motor will be run by electricity generated by the hydropower station;
- 2) Under conditions where the hydropower station is not in operation (e.g., maintenance): the motor will be run by electricity from the grid.
- 3) Under conditions of extreme nature (e.g., both the hydropower station and grid are unable to provide electricity to the motor): a backup diesel generator is installed, which would be used during extreme situations. The purpose for installing this equipment is to supply the motor at the dam and the equipment and instruments at the power station with electricity when an emergency situation occurs.

9. Training program

All staff involved in the monitoring process will be trained. The training contains CDM knowledge, operational regulations, quality control (QC) standard flow, data monitoring requirements and data management regulations, etc.

A site specific monitoring manual comprising monitoring procedures will be developed and implemented to ensure a robust data gathering system at the project location. All relevant monitoring personnel will receive specific training and responsibilities within the monitoring process.

4 GHG Emission Reductions:

4.1 Explanation of methodological choice:

The project activity is a registered CDM project (UNFCCC Reference No. 3351) that applies the following CDM methodology and tools, which are approved by the VCS Board:

- Approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (version 09)
- “Tool for the Demonstration and Assessment of Additionality” (version 5.2)
- “Tool to calculate the emission factor for an electricity system” (version 01.1)
- “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (version 02)

For more information regarding the methodologies, please refer to:
<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>.

Baseline emissions (*BEy*) calculations

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

$$BE_y = (EG_y - EG_{baseline}) \times EF_{grid, CM, y} \quad (1)$$

Where:

BE_y = Baseline emissions in year *y* (tCO₂/yr).
EG_y = Electricity supplied by the project activity to the grid (MWh)
EG_{baseline} = Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For new power plants this value is taken as zero
EF_{grid, CM, y} = Combined margin CO₂ emission factor for grid connected power generation in year *y*
calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".

If the project activity is the installation of a new grid-connected renewable power plant/unit, then $EG_{baseline} = 0$. As this project installs a new grid-connected renewable power plant/unit, $EG_{baseline} = 0$; therefore, $BE\ y = EG\ y \times EF_{grid, CM, y}$.

Project emissions (PE_v) calculations

Reservoir project emissions

Because the power density of the project is 70.42 W/m^2 , which is above the threshold of 10 W/m^2 , as per the methodology, ACM0002 version 9, the emissions from the reservoir are neglected.

Backup power project emissions

One backup diesel generator will be installed at the Guizhou Qingshuihe Gelibridge Hydropower Project for use for emergency purposes only. Backup power project emissions ($PE_{FC,j,y}$) are calculated for the on-site backup diesel generator. Methodology ACM0002 version 9 states that $PE_{FC,j,y}$ should be calculated using the "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion". In accordance with this Tool, CO₂ emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted (i.e., the amount of diesel combusted by the backup generator in the proposed project activity) and the CO₂ emission coefficient of those fuels, as follows:

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y} \quad (11)$$

Where:

$PE_{FC,j,y}$: CO₂ emissions from fossil fuel combustion in process j during the year y (tCO₂/yr)

- $FC_{i,j,y}$: quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr);
- $COEF_{i,y}$: CO₂ emission coefficient of fuel type i in year y (tCO₂/mass or volume unit); i are the fuel types combusted in process j during the year y .

The CO₂ emission coefficient $COEF_{i,y}$ can be calculated using one of two options depending on the availability of data. We have opted to calculate $COEF_{i,y}$ based on Option B as public data is available:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO_2,i,y} \quad (12)$$

Where:

- $COEF_{i,y}$: CO₂ emission coefficient of fuel type i in year y (tCO₂/tonnes);
- $NCV_{i,y}$: weighted average net calorific value of the fuel type i in year y (GJ/tonnes);
- $EF_{CO_2,i,y}$: weighted average CO₂ emission factor of fuel type i in year y (tCO₂/GJ); i are the fuel types combusted in process j during the year y .

Per ACM0002 version 9, project emissions, PE_y , equal the sum of emissions from the reservoir and emissions from backup power.

Leakage emissions (LE_y) calculations

There is no leakage for this project, so, $L_y = 0$.

Grid power emission factor (EF_{ELEC}) calculations

The electricity generated by this project will replace the same quantity of electricity supplied by the South China Power Grid. According to methodology ACM0002 version 09, the emission factor for displaced electricity is calculated as per the "Tool to calculate the emission factor for an electricity system (version 01.1)". The calculation process is described as follows:

Step 1: Identify the relevant electric power system

The Office of National Coordination Committee on Climate Change of China issued a notice on the "Determination of 2008 Baseline Emission Factors for Regional power Grids in China," on July 18, 2008,¹⁰ which identifies the seven Power Grids in China. The Guizhou Qingshuihe Gelibridge project is located in the South China Power Grid.

Step 2: Select an operating margin (OM) method

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

- (a) Simple OM,
- (b) Simple adjusted OM,
- (c) Dispatch data analysis OM, or
- (d) Average OM.

The Simple OM method (a) can only be used if low-cost/must run resources constitute less than 50% of total grid generation. In the five most recent years from 2000 to 2004, the low-cost/must run resources constituted less than 50% of total power generation of the South China Power Grid. The relevant ratios are 32.96% (2000), 32.39% (2001), 31.60% (2002), 30.94% (2003), and 29.72% (2004)¹¹. Each of these percentages is below 50%, which meets the applicability requirements of method (a).

¹⁰ <http://cdm.ccchina.gov.cn/web/index.asp>

¹¹ China Electric Power Yearbook (2001 to 2005)

According to the “Tool to calculate the emission factor for an electricity system” (version 01.1), the simple OM emission factor will be calculated ex-ante as a 3-year generation-weighted average based on the most recent data available (2002-2004) 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.

Step 3: Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO₂ emission per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants. Per the “Tool to calculate the emission factor for an electricity system” (version 01.1), it may be calculated by one of the following options:

- Option A: based on data on fuel consumption and net electricity generation of each power plant;
- Option B: based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit; or
- Option C: based on 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.

In accordance with the “Tool to calculate the emission factor for an electricity system” (version 01.1), since data on fuel consumption and power generation of each power plant is not available for the South China Power Grid, option C is used. The simple OM emission factor is calculated as follows:

$$EF_{grid,OM,simple,y} = \frac{\sum_{i,m} FC_{i,m,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,y}}{\sum_m EG_{m,y}} \quad (2)$$

Where:

$EF_{grid,OM,simple,y}$	: Simple operating margin CO ₂ emission factor for the South China Power Grid in year y (tCO ₂ e/MWh);
$FC_{i,m,y}$	: Amount of fossil fuel type i consumed (ton for solid and liquid fuel, m ³ for gas fuel) per unit m in the South China Power Grid in year y;
$NCV_{i,y}$	: Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit);
$EF_{CO_2,i,y}$	: CO ₂ emission factor for fossil fuel type i in year y (tCO ₂ e/GJ);
$EG_{m,y}$	: Net electricity generated and delivered to the South China Power Grid by power plant/unit m in year y (MWh);
m	: All power plants/units serving the grid in year y except low-cost/must-run power plants/units
i	= All fossil fuel types combusted by all power plants/unit m in the South China Power Grid in year y;
y	= The three most recent years of data available: 2002, 2003, and 2004.

In addition, while net input exists for the South China Power Grid, the specific power plant is not identified. As a result, the average emission rate of the power grid from which the net input of the South China Power Grid is derived can be used.

Step 4: Identify the cohort of power units to be included in the build margin

The sample group of power unit m used to calculate the build margin consists of either:

- The set of five power units that have been built most recently, or
- The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

According to "Tool to calculate the emission factor for an electricity system (version 01.1)", the set of power units that comprises the larger annual generation should be used. Considering the number of newly built power plants in the South China Power Grid, option (b) is selected.

Considering the actual situation of the South China Power Grid, the installed capacity additions between calendar years 2002 and 2004 account for 20.93% of total installed capacity in 2004, which is over the 20% mark. Therefore, the sample group includes the newly built power plants over the period from 2002 to 2004.

Step 5: Calculate the build margin emission factor

According to the "Tool to calculate the emission factor for an electricity system" (version 01.1), the build margin emission factor ($EF_{grid,BM,y}$) 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:

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

Where:

- $EF_{grid,BM,y}$: Build margin CO_2 emission factor of the South China Power Grid in year y (tCO_2e/MWh);
- $EG_{m,y}$: Net quantity of electricity generated and delivered to the South China Power Grid by sample group of power unit m in year y (MWh);
- $EF_{EL,m,y}$: CO_2 emission factor of power unit m in year y (tCO_2e/MWh);
- m : Power units included in the build margin
- y : Most recent historical year for which power generation data is available, namely years 2002, 2003, and 2004.

The CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) should be determined as per the guidance in Step 3(a) for the simple OM, using options B2.

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}} \quad (4)$$

Where:

- $EF_{EL,m,y}$: CO_2 emission factor of power unit m in year y (tCO_2e/MWh);
- $EF_{CO2,m,i,y}$: Average CO_2 emission factor of fuel type i used in power unit m in year y (tCO_2e/GJ);
- $\eta_{m,y}$: Average net energy conversion efficiency of power unit m in year y (%);
- y : The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation, namely calendar years 2002 to 2004

The following method is adopted for the calculation of $EF_{grid,BM,y}$. First, use the available data in the energy balance sheets in the most recent year to calculate the proportion of CO₂ emissions from solid, liquid and gaseous fuels in the total CO₂ emissions. Second, use the percentages as the weights, based on the emission factors at the commercially optimal efficiency level of each power generation technology, calculate the emission factor of the fossil fuel-fired power plants in the grid. Finally, this fossil fuel-fired emission factor is multiplied by the proportion of fossil fuel-fired power in the additional 20% installed capacity. The result is the BM emission factor. Detailed steps and calculations are as follows:

Sub-step 5a. Calculate the percentages of CO₂ emissions of power generation using solid, liquid and gas fuels in total CO₂ emissions.

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, m} F_{i,m,y} \times COEF_{i,m}}{\sum_{i,m} F_{i,m,y} \times COEF_{i,m}} \quad (5)$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, m} F_{i,m,y} \times COEF_{i,m}}{\sum_{i,m} F_{i,m,y} \times COEF_{i,m}} \quad (6)$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, m} F_{i,m,y} \times COEF_{i,m}}{\sum_{i,m} F_{i,m,y} \times COEF_{i,m}} \quad (7)$$

Where:

$F_{i,m,y}$: The amount of fuel i consumed by province m in year y (in mass or volume unit);
 $COEF_{i,m,y}$: The CO₂ emission coefficient of fuel i (tCO₂/mass or volume unit), taking into account the carbon content of the fuels used by province m and the oxidation percent of the fuel;
 Coal, Oil and Gas : Solid fuels, liquid fuels and gas fuels.

Sub-step 5b. Calculate fossil fuel-fired emission factor

$$EF_{fossilfuel-fired} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \quad (8)$$

Where:

$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$: Emission factors corresponding to commercially optimal efficient power generation technology using coal, oil and gas. The specific parameters and calculation process can be seen in Annex 3 of the registered PDD.

Sub-step 5c. Calculate Build Margin emission factor of the South China Power Grid

$$EF_{grid,BM,y} = \frac{CAP_{fossilfuel-fired}}{CAP_{Total}} \times EF_{fossil fuel-fired} \quad (9)$$

Where:

CAP_{Total} : The total additional installed capacity;
 $CAP_{fossil fuel-fired}$: The total additional installed capacity for fossil fuel-fired power.

According to methodology requirements, an ex-ante calculation method was used to calculate $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ for the first crediting period. The result of this calculation will be kept unchanged during the first crediting period. For the next crediting period, the same method for calculating $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ should be applied.

Step 6: Calculate the combined margin emission factor for the South China Power Grid (EF_{ELEC})

The combined margin emission factor (EF_{ELEC}) is calculated as the weighted average of the Operating Margin emission factor ($EF_{grid,OM,y}$) and the Build Margin emission factor ($EF_{grid,BM,y}$):

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

Where:

$EF_{grid,BM,y}$: Build margin CO₂ emission factor in year y (tCO₂/MWh);
 $EF_{grid,OM,y}$: Operating margin CO₂ emission factor in year y (tCO₂/MWh);
 w_{OM} : Weights of operating margin emission factor (%);
 w_{BM} : Weights of build margin emission factor (%).

According to the "Tool to calculate the emission factor for an electricity system" (version 01.1), 0.5 will be used for both w_{OM} and w_{BM} for the first crediting period, and $w_{OM} = 0.25$ and $w_{BM} = 0.75$ for the second and third crediting period.

The OM emission factor ($EF_{grid,OM,y}$) and BM emission factor ($EF_{grid,BM,y}$) as well as the combined margin emission factor of the South China Power Grid as published by the Chinese DNA (December 2006) in the first crediting period are shown below:

$EF_{grid,OM,y}$	0.9873 tCO ₂ e/MWh
$EF_{grid,BM,y}$	0.5714 tCO ₂ e/MWh
$EF_{grid,CM,y} = (EF_{grid,OM,y} + EF_{grid,BM,y})/2$	0.7794 tCO ₂ e/MWh

Emission reductions (ER_y) calculations

For a given year, emission reductions created by the project activity are calculated according to the formula:

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

Where:

ER_y = Emission reductions in year y (t CO₂e/yr).
 BE_y = Baseline emissions in year y (t CO₂e/yr).
 PE_y = Project emissions in year y (t CO₂/yr).
 LE_y = Leakage emissions in year y (t CO₂/yr).

4.2 Quantifying GHG emissions and/or removals for the baseline scenario:

Baseline emissions

According to OM calculation result of the South China Power Grid published by China's DNA, the OM emission factor of South China Power Grid from 2002 to 2004 is 0.9873 (refer to Annex 3 for detailed information on the OM calculation for the South China Power Grid from 2002 to 2004).

According to baseline BM calculation result for the South China Power Grid published by China's DNA¹², the BM emission factor for the South China Power Grid is $EF_{BM}=0.5714$ tCO₂/MWh.

¹² <http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=3239>

$$\begin{aligned}
 \text{Therefore, } EF_y &= 0.5 \times EF_{OM,y} + 0.5 \times EF_{BM,y} \\
 &= 0.5 \times 0.9873 + 0.5 \times 0.5714 \\
 &= 0.7794 \text{ tCO}_2/\text{MWh}
 \end{aligned}$$

According to the feasibility study, the estimated annual net electricity uploaded to the Grid is: $EG_y = 497.3\text{GWh}$.

The annual baseline emissions for this project are: $BE_y = EG_y \times EF_y = 387,571 \text{ tCO}_2/\text{yr}$.

4.3 Quantifying GHG emissions and/or removals for the project:

Project emissions

Reservoir project emissions

Since the power density is 70.42 W/m^2 , which is above the threshold of 10 W/m^2 , GHG emissions of the reservoir are neglected.

Backup power project emissions

The data used to calculate $PE_{FC,j,y}$ are shown as follows:

Item	Value	Source
$FC_{i,y,y}$	0.3757 t (diesel)/yr	Estimate based on data (2008) provided by the project owner ¹³
$NCV_{i,y}$	42.652 GJ/t	China Energy Statistical Yearbook 2007, page 287
$EF_{CO2,i,y}$	0.0748 tCO ₂ /GJ	IPCC 2006 default value

$$COEF_{i,y} = 42.652 \text{ GJ/t} \times 0.0748 \text{ tCO}_2/\text{GJ} = 3.19 \text{ tCO}_2/\text{t}$$

$$PE_{FC,I,y} = 0.3757 \text{ t (diesel) /yr} \times 3.19 \text{ tCO}_2/\text{t (diesel)} = 1.1987 \text{ tCO}_2/\text{yr}$$

Since reservoir project emissions are neglected (i.e., equal zero),
 $PE_y = PE_{FC,i,y} = 1.1987 \text{ tCO}_2/\text{yr}$.

4.4 Quantifying GHG emission reductions and removal enhancements for the GHG project:

Leakage emissions

There is no leakage for this project, so, $L_y = 0$.

Emission reductions

Therefore:

$$\begin{aligned}
 ERY &= BE_y - PE_y - LE_y \\
 &= BE_y - PE_y - 0 \\
 &= BE_y - PE_y
 \end{aligned}$$

Therefore, annual emission reductions created by this project during the crediting period is:

$$ERY = BE_y - PE_y - LE_y = EG_y \times EF_y - PE_y = 387,570 \text{ tCO}_2/\text{yr}$$

5 Environmental Impact:

Per Chinese environmental protection laws, an environmental impact assessment was completed for the Guizhou Qingshuihe Gelibridge Hydropower Project. The Guizhou Environmental Protection Bureau

¹³ Estimate for fuel consumption based on prior experience at a hydropower station of comparable size.

approved the implementation of the project on September 27, 2006 (Approval No. [2006]390). According to the Environmental Impact Assessment (EIA) report, the environmental effects caused by the project include:

1. Noise Impact

The project owner will use equipment that meets national standards. The project owner also will take several measures to mitigate noises levels produced during the project construction period, such as strengthening construction management, limiting the construction time at night, banning blasting activities during the night time, and limiting the speed of and banning honking when transport vehicles pass through the villages. As for the construction workers, the project owner will provide noise-proof equipment in line with national regulations.

2. Sewage

The waste water created from construction will be properly treated via usage of a sand basin and sedimentation basin. The water is recycled after treatment. The sewage produced during the construction and operation periods will be treated by integrated organic sewage treatment equipment. All the sewage discharged will meet the requirement of the first level standard of "Sewage discharge standards" (GB8978-1996).

3. Waste Residue

The project owner established two waste residue fields. In order to avoid water and soil loss caused by residue slipping, the waste residue field will be kept flat. Also, water and soil conservation measures will be undertaken to avoid water and soil loss. Vegetation protection and restoration will be carried out after the construction period.

4. Air Pollution

Sprinklers will be used in the construction area to reduce dust in the excavation and blasting areas. Concrete Mixing System will be equipped with a dust catcher to limit the dust levels on site. Construction workers will be supplied with dustproof respirators.

5. Ecological Impact

In order to reduce ecological impacts during the construction period, measures, such as marking the construction area clearly and banning the activities of smoking, hunting, and fishing in the area, were taken. The construction operations and construction seasons will be strictly controlled to prevent water and soil lost during the construction period from entering into the waters. In the construction area, topsoil should be stored and protected properly so that it can be reused to refill the temporarily occupied land. The project involves a small number of migrants, and they have been properly resettled.

In conclusion, the environmental impacts are not considered significant by the project participants or the host party.

6 Stakeholders comments:

Brief description on how comments by local stakeholders have been invited and compiled:

1. In order to collect stakeholder's comments, the project owner sponsored two stakeholder consultation meetings. The project owner pasted bulletins at markets around the project site to inform local stakeholders before distributing questionnaires. Furthermore, the project owner also entrusted the local government to distribute the questionnaires to local stakeholders, such as the migrant population.

The geographic scope of the survey involved the Maoli, Duimen and Jiangshan villages. On November 22, 2006, the project owner held a meeting in Guiyang. Based on the EIA, the local stakeholders identified include the workers from the surrounding villages (such as Pingzhai Village). In addition, relevant stakeholders were invited by the project owner. Due to their involvement in the project process, the Environmental Protection Bureau (project EIA) and the Development and Reform Committee (local project approval) were included as key stakeholders. As the project involves the generation of electricity, the Power Company was identified as a stakeholder. Participants included investors and officials from the Guizhou DRC, provincial power grid company, Development and Reform Committee of Kaiyang, Municipal Council of Kaiyang, Environmental Protection Bureau of Kaiyang and Power Company, etc. On November 24, 2006, a consultation meeting was held at Maoyun village, which was hosted by the project owner and attended by local farmers.

2. In April 2007, the project owner conducted a survey amongst local farmers to further gather stakeholder's comments on the project. During this activity, 99 questionnaires were delivered to the farmers. The return rate of the questionnaires was 100%. The content of the questionnaire includes:

1. Background information of the participants
2. Background information on the project activity

3. Questions

- How much do you know about hydro-power projects and this project?
- Do you think the implementation of this project will bring any positive influence to your current life?
- Do you think the implementation of this project will bring any negative influence to your current life?
- What extent of impact will this project bring to the local environment?
- Do you think that the implementation of this project will bring any influence on the local economy?
- Generally speaking, what is your attitude to the construction of this project?
- Other suggestions

4. Signature and date

Summary of the comments received:

1. All of the government and regulatory officials were very supportive of the project. They think that the implementation of this project will exert positive influence on the local energy structure, economic development and tourism industry.

The villagers were very proud to host a hydropower project because they felt that it would be beneficial for their environment, in comparison to a coal-fired power plant. They were aware of many benefits, including: road access; piped drinking water; tourism potential; the construction of a central market; installation of mobile phone and fixed line telephones, etc.

All shareholders who participated in both of the meetings agreed with the construction of this project and looked forward to it. No objections were received during the meeting.

2. According to the statistical results from the questionnaires, all stakeholders agreed to and supported the implementation of this project. Meanwhile, we also received some different comments and suggestions, but no objections. The details are shown below.

- 1) 100% of the participants questioned expressed that they had some knowledge about hydropower projects and this project. The

- remaining participants expressed that they have only a little knowledge on hydropower and this project;
- 2) 95.96% of the participants agreed with the project's construction
 - 3) 89.90% of the participants were willing to relocate for the project
 - 4) 77.55% of the participants thought that the project will bring them a positive or no change to their lives. 69.70% of the participants indicated that were willing to partake in the construction of the project. 85.86% of the participants felt that the project would have a positive or no change to the local economy.
 - 5) 45.12% of the participants felt that they had been well or adequately compensated for their relocation.
 - 6) All participants support the implementation of this project.

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

1. Regarding land occupation, the questionnaire was completed at a very early stage of the project when the majority of the farmers involved had not yet been compensated as they were not yet relocated. Relevant farmers have been now been compensated for the loss of land that is occupied by the construction of this project, and they have been compensated by more than what was estimated in the FSR. They have been properly resettled now.
2. As for environmental impacts, relevant measures taken by the project owner have been mentioned in the EIA report and have been approved by the relevant authority. The project owner will strictly follow the environmental protective measures. Vegetation will be restored after the construction is finished.

In conclusion, the local farmers and officials support the construction of this project. According to the comments and suggestions collected from the stakeholders, there is no need to change the design, construction, or operation of this project.

7 Schedule:

The project development timeline is as follows:

Date (dd/mm/yyyy)	Event
05/2006	Project owner became aware fo the CDM
06/2006	LOI signed with Sindicatum Carbon Capital
08/2006	FSR (version 1, draft) issued
27/09/2006	EIA approved by the Guizhou Province Environmental Protection Bureau
02/11/2006	ERPA signed between the Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. (project owner) with Sindicatum Carbon Capital; this marks the serious consideration of CDM
15/11/2006	Proposal from TÜV SÜD for CDM validation
11/2006	FSR (version 2, final) issued
31/01/2007	Signing of first major contracts (dam construction contract and diversion tunnel contract)
04/06/2007	FSR (version 2, final) approved by the Guizhou Province Development and Reform Commission
10/06/2007	Generator supply contract signed
06/2007	Start of plant construction
18/01/2008	Letter of Approval issued by the Chinese DNA (NDRC)
29/05/2008	Transformer supply contract
01/02/2010	Letter of Approval issued by the UK DNA
09/02/2010	Partial commencement (1 of 2 turbines) of power generation
09/02/2010	VCS crediting period start date
12/03/2010	Full commencement (2 of 2 turbines) of power generation
04/10/2010	Project activity is registered as CDM by the UNFCCC

	CDM Executive Board, marking the CDM crediting period start date
03/10/2017	End of first 7-year CDM crediting period
08/02/2020	End of first 10-year VCS crediting period
03/10/2024	End of second 7-year CDM crediting period
08/02/2030	End of second 10-year VCS crediting period
03/10/2031	End of third (and final) 7-year CDM crediting period
08/02/2040	End of third (and final) 10-year VCS crediting period

Although the crediting periods of the project under the CDM and VCS overlap, there will not be any overlap or double counting of the emission reductions from the project since there is a clear delineation between when emissions reductions are generated under the CDM and voluntarily.

8 Ownership:

8.1 Proof of Title:

Under the VCS, the proof of title is required to be proven through one of the following:

- a legislative right;
- a right under local common law;
- Ownership of the plant, equipment and/or process generating the reductions/removals;
- A contractual arrangement with the owner of the plant, equipment or process that grants all reductions/removals to the proponent

The Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. (project owner) owns the Gelibridge Hydropower Station, which is the site of the project activity. The proof of title for the Gelibridge Hydropower Project are detailed below through

Legislative Right

On November 11, 1994, the Guizhou Province General Office issued a Letter of Authorization giving Guizhou Wujiang Hydropower Development Co., Ltd. the Power Development, Operation, and Management Rights to the Qingshuihe Cascade. The Gelibridge Hydropower Project developed by the company sits within the Qingshuihe Cascade.

Other rights and approvals

Per Chinese regulations, both a FSR and an EIA and approvals by government of these reports are required for projects such as the development of the Gelibridge Hydropower Station. The FSR for the project, developed by the Hydro China Guiyang Engineering Cooperation in November 2006, indicates the project owner as the Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. The approval of the FSR was issued by the Guizhou Province Development and Reform Commission on June 4, 2007. The project EIA, developed by the Hydro China Guiyang Engineering Cooperation in September 2006, also references Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. as the project owner. The EIA was approved by the Guizhou Province Environmental Protection Bureau on September 27, 2006. Local approvals of the FSR and EIA are requisite for national letter approval in the form of the Letter of Approval; the LoA for the project was issued by the National Development and Reform Commission on January 18, 2008.

Ownership of the plant, equipment and/or process generating the reductions/removals

Below is a list of contracts signed between the Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. and other entities

regarding the construction of the Gelibridge Hydropower Station and purchase of equipment.

Date (dd/mm/yyyy)	Contract	Contracting Parties
01/2007	Dam construction contract for the "Gelibridge Hydropower Project"; Contract No. GLQ/C3-1	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. and Sino Hydro 8 Engineering Bureau
01/2007	Diversion Tunnel Construction; Contract No. GLQ/C3-2	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. and Jiangnan Hydropower Engineering Co., Ltd.
05/2007	Contract of Dam Anti-seepage Curtain Grouting Engineering for Qingshuihe Geli Bridge Hydropower Station; Contract No.: GLQ/C3-3	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. and Sino Hydro 8 Engineering Bureau
10/06/2007	<i>Turbine and generator purchasing agreement; Contract No.: GLQ-JD-02</i>	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. and Tianjing Tianfa Heavy Machinery and Hydropower Equipment manufacturing Co., Ltd.
24/06/2008	<i>Main transformer purchasing contract; Contract No.: GLQ/C6-D1-1</i>	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. and TBEA Hengyang Transformer Company

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

Not applicable.