

TEMPLATE

KEY PROJECT INFORMATION & PROJECT DESIGN DOCUMENT (PDD)

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VERSION **v. 1.2**

RELATED SUPPORT

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Key Project Information

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KEY PROJECT INFORMATION

GS ID of Project	835
Title of Project	Hunan Guanbaodu-Liangjiangkou Small-scale Hydropower Bundle Project
Time of First Submission Date	NA
Date of Design Certification	GS registration date: 31/12/2010
Version number of the PDD	12
Completion date of version	21/02/2023
Project Developer	Climate Bridge (Shanghai) Ltd.
Project Representative	Climate Bridge (Shanghai) Ltd.
Project Participants and any communities involved	Jingzhou Miao & Dong Autonomous County Guanbaodu Hydropower Co., Ltd (project owner of Guanbaodu project) Tongdao Dong Autonomous County Liangjiangkou Hydropower Station (project owner of Liangjiangkou project)
Host Country (ies)	P.R.China (host)
Activity Requirements applied	☐ Community Services Activities ☒ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Scale of the project activity	☐ Micro scale ☒ Small Scale ☐ Large Scale
Other Requirements applied	NA
Methodology (ies) applied and version number	ACM0002: "Grid-connected electricity generation from renewable sources" (version 21.0).
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A
Project Cycle:	☐ Regular ☒ Retroactive

Table 1 – Estimated Sustainable Development Contributions

Sustainable Development Goals Targeted	SDG Impact (defined in B.6.)	Estimated Annual Average	Units or Products
13 Climate Action (mandatory)	Amount of GHGs emissions avoided or sequestered	12,317	t GSVERs/yr
SDG 5 Gender Equality	Number of women serving in managerial/ leadership /ownership role	3	Number/yr
SDG 7 Affordable and Clean Energy	Total electricity produced: Renewable	21,612	MWh/yr
SDG 8 Decent Work and Economic Growth	Total number of jobs	23	Number/yr

SECTION A. DESCRIPTION OF PROJECT

A.1 Purpose and general description of project

The Hunan Guanbaodu-Liangjiangkou Small-scale Hydropower Bundle Project (hereafter referred to as “the bundled project”) consists of two hydropower projects, the Guanbaodu hydropower project (hereafter referred to as “Guanbaodu project”) located in Jingzhou County and the Liangjiangkou hydropower project (hereafter referred to as “Liangjiangkou project”) located in Tongdao County. Both of these two counties belong to Huaihua City, Hunan Province, People’s Republic of China.

Guanbaodu project

The Guanbaodu project is located on Qu River. The installed capacity is 4 MW (1MW×4), and the annual net electricity generation is estimated to be 15,513 MWh. The surface area of the full reservoir is 328,000 m² in 2022, thus the power density of Guanbaodu is 12.20 W/m². The project commenced in August 2005 and its operation started in January 2008. The operation of Guanbaodu project will displace equivalent power generated from Central China Power Grid (hereafter referred to as “CCPG”) which is mainly dominated by fossil fuel fired power plants. It helps to reduce greenhouse gas (GHG) emissions by an estimated 8,841 tCO₂e per year during the third crediting period from 01/01/2023 to 31/12/2029. The main construction of Guanbaodu project consists

of a dam, a power house and a switch station. The generated electricity will be delivered to the Gantang Substation via a 35kv power transmission line, then delivered to Jingzhou Power Grid, and finally connected to CCPG.

Liangjiangkou project

The Liangjiangkou project is located on Tongdao River. The installed capacity is 1.89 MW ($0.63\text{MW} \times 3$), and the annual net electricity generation is estimated to be 6,099 MWh. The surface area of the full reservoir is 176,800 m² in 2022, thus the power density of Liangjiangkou is 10.69 W/m². The project commenced in August 2006 and its operation started in January 2008. The operation of Liangjiangkou project will displace equivalent power generated from CCPG which is mainly dominated by fossil fuel fired power plants. It helps to reduce greenhouse gas (GHG) emissions by an estimated 3,476 tCO₂e per year during the third crediting period from 01/01/2023 to 31/12/2029. The main construction of Liangjiangkou project consists of a dam, a power house, a booster substation and a tail water channel. The generated electricity will be delivered to the Xianxi Substation via a 35kv power transmission line, and finally connected to Central China Power Grid (CCPG).

The scenario existing prior to the implementation of the bundled project activity is electricity delivered to the grid by the project activity would have been generated by the operation of grid-connected power plants and by the addition of new generation sources of CCPG. The baseline scenario is the same as the scenario existing prior to the implementation of the bundled project.

The total installed capacity of the bundle project is 5.89 MW with annual expected net electricity generation (electricity supplied to power grid) of 21,612MWh. The bundled project was registered as a Gold Standard project on 31/12/2010 and the start date of the first crediting period of the bundled project is defined as 01/01/2009. The bundled project has completed the transition to GS4GG on 29/10/2019 with a renewable crediting period of 3*7 years. The second crediting period is from 01/01/2016 to 31/12/2022. The estimated annual emission reductions in the third crediting period from 01/01/2023 to 31/12/2029 are 12,317 tCO₂e, the total estimated emission reductions in the third crediting period are 86,219 tCO₂e.

The bundled project contributes to sustainable development through the reduction of GHG emissions and other pollutants associated with the standard practice of fossil fuel fired power plants in the region. It also contributes to ensuring the local power supply

by generating reliable hydropower, promoting the local economy development and improvement of livelihoods by creating job opportunities, and construct power transmission lines.

A.1.1. Eligibility of the project under Gold Standard

The bundled project activity meets the eligibility criteria of the section 2 and 3 of GS4GG Renewable Energy Activity Requirements (Version 1.4) as described below:

Section 2 Eligible project types

The bundled project is power generation project by using water resource to supply electricity to the local grid, which is an eligible project type as it is in accordance with 2.1.2 (a) and 2.1.2 (b) of GS4GG Renewable Energy Activity Requirements (Version 1.4). Besides, the bundled project was registered as a Gold Standard project on 31/12/2010 not new project. Thus, the paragraph 2.1.3 ~2.1.8 requirements of GS4GG Renewable Energy Activity Requirements (Version 1.4) is not applicable to the bundled project. The bundled project only seeks to issue of GS VERs. So, the paragraph 2.19 requirement is not applicable.

The bundled project applies ACM0002: "Grid-connected electricity generation from renewable sources" (version 21.0) to calculate emission reduction and only claims GS VERs under GS program. The justification for the section 2 of GS4GG GHG Emissions Reduction & Sequestration Product Requirements (Version 2.1) is listed as below.

Section 3 General Eligibility Criteria

Project Type: As discussed above, the project type is eligible.

Project Location: The project is located in China. Thus, the project is eligible.

Project area, boundary and scale: The location and boundary are clearly defined in A.2 and B.3. The estimated annual emission reduction of the bundled project activity is 12,317 tCO₂e in the third crediting period, which is greater than 10,000 tCO₂eq, above microscale threshold. The bundled project is considered as Non microscale project. The

installed capacity of the bundled project activity is 5.89 MW, which is smaller than 15MW, and thus qualifies under small scale¹ projects.

Suppressed demand scenario: The methodology ACM0002: “Grid-connected electricity generation from renewable sources” (version 21.0) is applied by the bundled project. The bundled project does not involve the suppressed demand scenario.

Stacking: The bundled project only claims GS VERs under GS program.

The bundled project activity meets the eligibility criteria of the section 2 of GS4GG GHG Emissions Reduction & Sequestration Product Requirements (Version 2.1) as described below:

The bundled project was registered as a Gold Standard project on 31/12/2010 which does not involve the ineligible components.

The total installed capacity of the bundled project is 5.89 MW which qualifies under small scale projects. Eligibility criteria with regards to the scale of the Project has applied to the bundle as a whole and not to the individual projects.

The paragraph 2.1.3 is not applicable as the bundled project is not VPA belonged to POA.

The bundled project activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements (Version 1.2) document as described below:

Type of project: The project type is power generation using water resource which is an eligible project type as it is in accordance with 2.1.2 a) and 2.1.2 b) of the Eligible Project Types & Scope under Renewable Energy Activity Requirements. The bundled project was registered as a Gold Standard project on 31/12/2010.

Location of the project: The project is located in China, and it is eligible.

Project Area, Project Boundary and Scale: The location and boundary are clearly defined in A.2 and B.3. As discussed above, the installed capacity of the bundled project

¹ The project was classified as Large-Scale project in the first crediting period, so methodology ACM0002 was applied; although the project is classified as Small-Scale project in the second and third crediting period due to the updated emission factors, the project proponent still chooses to apply ACM0002 in the second crediting period for conservativeness.

activity is 5.89 MW, which is smaller than 15MW, and thus qualifies under small scale projects.

Host Country Requirements: The project is in compliance with applicable China's legal, environmental, ecological and social regulations.

Contact Details: The name and contact details of project participants are listed in Appendix 2. By checking the National Enterprise Credit Information Publicity System², both Jingzhou Miao & Dong Autonomous County Guanbaodu Hydropower Co., Ltd. and Tongdao Dong Autonomous County Liangjiangkou Hydropower Station are in good standing.

Legal Ownership: The full and uncontested legal ownership is demonstrated and listed in A.1.2.

Other Rights: The construction of Guanbaodu and Liangjiangkou project have been approved by local Water Conservancy Bureau (WCB) in China. Thus, the project does not involve the contested legal rights and/or permissions concerning changes in use of water resources.

Official Development Assistance (ODA) Declaration: The project does not involve any ODA financing. The bundled project is not eligible of receiving ODA.

No double counting: The bundled project is located in Huaihua City, Hunan Province of China. China has a national emissions trading scheme only cover the high-emission industries, such as thermal power generation, petrochemical, chemical, building materials, iron and steel, non-ferrous, paper, aviation and other key emission industries that emitted at least 26,000 tons of CO₂e/yr, not including renewable project³. And the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner according to the enforced company list⁴ in public information.

Also, the project has not been registered as a CCER (Chinese Certified Emission Reductions) project in China, thus it is not eligible for emission reductions transaction

² <https://www.gsxt.gov.cn/corp-query-homepage.html>

³ http://www.mee.gov.cn/xxgk2018/xxgk/xxgk05/202103/t20210330_826728.html

⁴ <http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf>

under the China's ETS. Therefore, the project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading. Furthermore, as a voluntary emission reduction project, the GHG emission reductions and removals generated by the project will not be enforced to be used for compliance in China.

In case of any such risk of double counting exists, the project developer committed to retiring eligible units equal to the quantity of Gold Standard VERs. It is promised that the bundled project is not registered with any other voluntary or compliance schemes, including renewable energy certificates, clean development mechanism and so on.

A.1.2. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

Jingzhou Miao & Dong Autonomous County Guanbaodu Hydropower Co., Ltd (project owner of Guanbaodu project) and Tongdao Dong Autonomous County Liangjiangkou Hydropower Station (project owner of Liangjiangkou project) have full and uncontested legal ownership of the emission reductions that are generated under this Gold Standard project and has legal rights concerning changes in use of resources required to service the project. The legal ownership of the bundled project can be demonstrated via the following documents:

The legal ownership of the bundled project can be demonstrated by the approval of Environmental Impact Assessment (EIA), Feasible Study Report (FSR). Besides, the equipment purchasing contract and the purchasing power agreement are the evidence for the ownership of the plant, equipment and power generating.

A.2 Location of project

Guanbaodu is located on the lower reach of Qushui River in Guanbaodu Village, Taiyangping Town, Jingzhou Miao & Dong Autonomous County, Huaihua City, Hunan Province of China, and the project is 16 km from Jingzhou County and the geographical coordinates are east longitude 109°44'09" and north latitude 26°40'38".

Liangjiangkou is located on the Tongdao River in Liangjiangkou Village, Shuangjiang Town, Tongdao Dong Autonomous County, Huaihua City, Hunan Province of China, and the project is 8.5 km away from Tongdao County and the geographical coordinates are east longitude 109°47'45" and north latitude 26°13'11".

The location of the Guanbaodu and Lianjiangkou is shown in Figure A-1 and Figure A-2, respectively.



Figure A-1 Location of the Guanbaodu project



Figure A-2 Location of the Lianjiangkou project

A.3 Technologies and/or measures

The total installed capacity of the bundle project is 5.89 MW, and the electricity will be transferred to CCPG. The construction of Guanbaodu project commenced in August 2005 with an installed capacity of 4 MW, and its operation started in January 2008; and the construction of Lianjiangkou project commenced in August 2006 with an installed capacity of 1.89 MW, and its operation started in January 2008.

The Guanbaodu project is located in a mountainous area which mainly consists of hard rocks. The project owner initially decided to retrofit an old dam to construct the dam for the hydropower station. However, the old dam had been in operation for many years and was considered not solid enough to be considered safe for local residents. Furthermore, as requested by local residents, the dam should be constructed to also act as a bridge for transportation for vehicles. Therefore, the project owner finally built a new dam at the near lower reach of the old dam. The generated electricity will be delivered to the Gantang Substation via a 35kv power transmission line, then delivered to Jingzhou Power Grid, and finally connected to CCPG.

The Liangjiangkou project locates at a mountainous area which mainly consists of hard rocks. The power plant locates at the intersection point of two small rivers. To fully use the water energy, the project owner initially wanted to construct a dam which would be two times high as the current situation. However, a higher dam will cause immigrants. To avoid immigrants, the project owner finally decided to construct a much lower dam and no immigrant is cause due to the construction of the project. The generated electricity will be delivered to the Xianxi Substation via a 35kv power transmission line, and finally connected to Central China Power Grid (CCPG).

Please refer to the Figure C-2 and C-3 of section C for electricity connection diagram of the bundled project.

The bundled project was registered under GS Version 1.0 (GS ID 835) on 31/12/2010 and has completed the transition to GS4GG on 29/10/2019 with a renewable crediting period of 3*7 years.

The key technical parameters of the bundled project are listed in the table below.

Table B-1 Technical parameters of the bundled projects

Item	Unit	Guanbaodu	Liangjiangkou
Turbine			
Quantity	/	4	3
Model	/	GD008-WZ-275	Z003-LH-160
Rated Power	kW	1,097	700
Rated water head	m	3.4	6.8
Rotate speed	r/min	133.3	250
Generator			

Quantity	/	4	3
Model	/	SFW1000-10/1430	SF630-24/1830
Rated Power	kW	1,000	630
Rated voltage	V	6,300	400
Rated current	A	114	113
Rated rotate speed	r/min	600	250
Power factor	/	0.8	0.8

The average net exported electricity of the bundled project is 21,612 MWh/yr and it helps to reduce greenhouse gas (GHG) emissions by an estimated 12,317 tCO₂e per year during the third crediting period from 01/01/2023 to 31/12/2029. Based on these, the project achieved the SDG 7: Affordable and clean energy and SDG 13: Climate action. Additionally, during the construction and operation phases of the project, short-term and long-term job opportunities were provided to local people especially women who has same salary as men, which help them increase incomes and improve life. Thus, the project also contributes positively to the SDG 5: Gender and equality and SDG 8: Decent work and economic growth.

A.4 Scale of the project

The type of the bundled project is renewable energy project, and the total installed capacity is 5.89 MW which does not exceed 15 MW of Type I, so the project is defined as small scale.

A.5 Funding sources of project

There is no public funding and no Official Development Assistance (ODA) involved in the bundled project activity.

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

B.1. Reference of approved methodology (ies)

Title of the approved baseline and monitoring methodology:

ACM0002: "Grid-connected electricity generation from renewable sources" (Version 21.0).

Title of Methodological Tool:

Tool to calculate the emission factor for an electricity system (Version 07.0).

Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (version 03.0.1)

For more information regarding the methodology, please refer to the following website:

<https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

B.2. Applicability of methodology (ies)

Baseline and Project Scenario - Emissions Calculations - (see Section B.6)

The Methodology ACM0002 (Version 21.0) is chosen and applicable to the project due to the following reasons:

No.	Requirements as per ACM0002	Project Scenario	Conclusion
1	This methodology applies to project activities that include retrofitting, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant or construction and operation of a Greenfield power plant. This methodology applies to grid-connected renewable energy generation project activities that include: (a) Construction and operation of a Greenfield power plant; or (b) Retrofitting, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant.	The methodology applies to the bundled project since both Guanbaodu project and Liangjiangkou project are Greenfield grid-connected hydro power plant. The bundled project does not involve Battery	Applicable

	Further, the methodology applies to grid-connected renewable energy generation project activities which integrate Battery Energy Storage System (BESS) to a Greenfield power plant or to an existing solar photovoltaic or wind power plant.	Energy Storage System (BESS).	
2	In case the project activity involves the integration of a Battery Energy Storage System (BESS), the methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Integrate BESS with a Greenfield power plant; (b) Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic or wind power plant(s)/unit(s); (c) Integrate a BESS to (an) existing solar photovoltaic or wind power plant(s)/unit(s) without implementing any other changes to the existing plant(s); (d) Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s).	The bundled project does not involve the integration of a BESS.	Not Applicable
3	The methodology is applicable under the following conditions: (a) Hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline	The Guanbaodu project and Liangjiangkou project are Greenfield grid-connected hydro power plants. Thus, the bundled project activity belongs to condition (a).	Applicable

	emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity; (c) In case of Greenfield project activities applicable under paragraph 5 (a) above, the project participants shall demonstrate that the BESS was an integral part of the design of the renewable energy project activity (e.g. by referring to feasibility studies or investment decision documents); (d) The BESS should be charged with electricity generated from the associated renewable energy power plant(s). Only during exigencies may the BESS be charged with electricity from the grid or a fossil fuel electricity generator. In such cases, the corresponding GHG emissions shall be accounted for as project emissions following the requirements under section 5.4.4 below. The charging using the grid or using fossil fuel electricity generator should not amount to more than 2 per cent of the electricity generated by the project renewable energy plant during a monitoring period. During the time periods (e.g. week(s), months(s)) when the BESS consumes more than 2 per cent of the electricity for charging, the project participant shall not be entitled to issuance of the certified emission reductions for the concerned periods of the monitoring period.		
4	In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or	The Guanbaodu project and Liangjiangkou project are newly built hydro power plant with a new	Applicable

	(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (7), is greater than 4 W/m²; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m²; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m², all of the following conditions shall apply. The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m²; Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity. Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project	reservoir which are belonged to condition (a). The power density of the Guanbaodu and Liangjiangkou project is 12.20 W/m² and 10.69 W/m², respectively, which is greater than 4 W/m². Thus, the bundled project belongs to condition (c).	
5	In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The	The Guanbaodu project and Liangjiangkou project are newly built hydro power plant with a new reservoir. The bundled project does not involve integrated hydro power projects.	Not Applicable

	purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum of five years prior to the implementation of the CDM project activity.		
6	The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units;	The bundled project does not involve switching from fossil-fuels to renewable energy sources at the corresponding site of the project activity and also the bundled project is not a biomass-fired power project.	Not Applicable
7	In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	The Guanbaodu project and Liangjiangkou project are newly built hydro power plant with a new reservoir. No replacement, modification and retrofit measures are implemented here.	Not applicable

In addition, the project meets the applicability conditions of the applied tools applied in the PDD as follows:

Tool	Criteria	Applicability	Conclusion
Tool of Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the Baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism. The tool consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.	The validity of the current baseline is assessed by the project using the following sub-steps: Step 1: Assess the validity of the current baseline for the next crediting period, Step 2: Update the current baseline and the data and parameters.	Applicable
Tool to calculate the emission factor for an electricity system	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions	The bundled project is the installation of a hydropower plant supplying electricity to the Grid.	Applicable

	for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).		
	Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 1: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in	This tool is used for calculating the emission factor of grid power plants only, which is not included off-grid power plants.	Applicable

	MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.		
	In the case of CDM projects, the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The bundled project electricity system is located in a non-Annex I country.	Applicable
	Under this tool, the value applied to the CO₂ emission factor of biofuels is zero	The bundled project does not involve this situation.	Not Applicable

The applicability criteria stated in methodology ACM0002 (Version 21.0) are met on the basis of the reasons above.

B.3. Project boundary

The spatial extent of the project boundary includes the project power plant and all power plants/units connected physically to the CCPG that the project power plant is connected to.

The geographic and system boundaries of CCPG include Henan Province, Hubei Province, Hunan Province, Jiangxi Province, Sichuan Province and Chongqing Province. The project boundary of the project is presented as below:

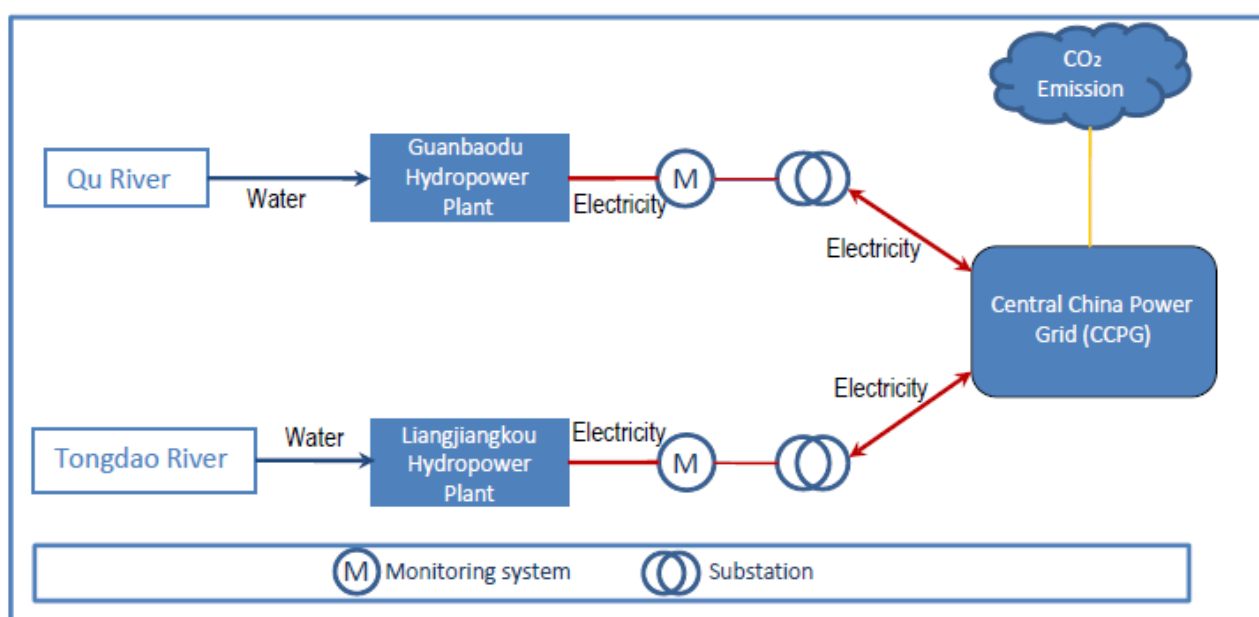


Figure B-1 Boundary of the bundled project

According to ACM0002 (Version 21.0), the Greenhouse Gases (GHG) and emission sources included in or excluded from the project boundary are shown in the following table:

Source	GHGs	Included?	Justification/Explanation
Baseline scenario	CO ₂ emissions from electricity generation in fossil fuel-fired power plants that is displaced due to the project activity	Yes	Main emission sources.
	CH ₄	No	Minor emission source.
	N ₂ O	No	Minor emission source.
Project	CO ₂	No	Minor emission source

	For hydro power plants, emissions of CH ₄ from the reservoir	CH ₄	No	The power density of the Guanbaodu and Liangjiangkou project is 12.20 W/m ² and 10.69 W/m ² , respectively, which is greater than 10 W/m ² , the CH ₄ emissions from the reservoir is not considered
		N ₂ O	No	Minor emission source

B.4. Establishment and description of baseline scenario

In accordance with “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” (version 03.0.1), the validity of the current baseline is assessed using the following sub-steps:

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

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

In China, the Renewable Energy Law has been put into effect since 2006, which encourages the development of renewable energy projects. However, although renewable energy projects have been developed rapidly in recently years, grid connected power generation in China is still dominated by fossil-fuel power plants. There are no new relevant national and/or sectoral policies and/or circumstances in the electricity generation sector applicable to the project activity, in comparison to the time of the submission of the project activity for validation, which would affect the compliance of the current baseline scenario. Hence in the absence of the project activity electricity would still have been generated in the existing fossil fuel power plants or by the addition of new fossil fuel power plants connected to the CCPG.

The current baseline “the electricity produced by the bundle project multiplied by a combined margin (CM) which consists of the combination of operating margin (OM) and build margin (BM) of CCPG” are applicable at the time of requesting renewal of the crediting period, go to step 1.2.

Step 1.2: Assess the impact of circumstances

The current baseline in the registered PDD is “the electricity produced by the bundle project multiplied by a combined margin (CM) which consists of the combination of

operating margin (OM) and build margin (BM) of CCPG”, which means the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment. No changes in market characteristics related to this project are identified at the time of requesting renewal of the crediting period since validation. Hence the current baseline does not need to be updated. Go to step 1.3.

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

The baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, there’s no current baseline equipment, hence the current baseline does not need to be updated. Go to step 1.4.

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

Data and parameters that need to be updated are as follows:

According to the methodological tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of a crediting period”, updates should be undertaken in the following cases:

- Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC.
- Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values, or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.

According to the “Tool to calculate the emission factor for an electricity system (version 07.0)”, for the third crediting period, the build margin emission factor calculated for the second crediting period should be used. For wind and solar power generation project activities, $\omega_{OM} = 0.75$ and $\omega_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods; All other

projects: $w_{OM} = 0.5$ and $w_{BM} = 0.5$ for the first crediting period, and $w_{OM} = 0.25$ and $w_{BM} = 0.75$ for the second and third crediting period.

And the values used for the calculation of $EF_{grid,OM,y}$ and $EF_{grid,CM,y}$ are updated in the third crediting period in this PDD.

Step 2: Update the current baseline and the data and parameters

Step 2.1: Update the current baseline

As per the analysis in step 1 above, the current baseline does not need to be updated.

Step 2.2: Update the data and parameters

The updated baseline emission factors for the project ($EF_{grid,OM,y}$ and $EF_{grid,CM,y}$) are calculated in line with the "Tool to calculate the emission factor for an electricity system (version 07.0)", the data of $EF_{grid,OM,y}$ is calculated as 0.8587 tCO₂e/MWh, and the data of $EF_{grid,CM,y}$ is calculated as 0.56995 tCO₂e/MWh, refer to section B.6 for details.

B.5. Demonstration of additionality

This section has been assessed and validated in registered PDD during the first crediting period.

B.5.1 Prior Consideration

The total installed capacity of the bundle project is 5.89 MW with annual expected net electricity generation (electricity supplied to power grid) of 21,612MWh. The bundled project was registered as a Gold Standard project on 31/12/2010 and the start date of the first crediting period of the bundled project is defined as 01/01/2009. The bundled project has completed the transition to GS4GG on 29/10/2019 with a renewable crediting period of 3*7 years.

Thus, the bundled project is not required to demonstrate prior consideration by submission timelines.

B.5.2 Ongoing Financial Need

As per the Principle 5 (b) Ongoing Financial Need in Principles & Requirements (version 1.2), ongoing financial need was demonstrated as following.

(a) Information highlighting the key categories and amounts or relative proportions (%) of project income and outgoings, including the relative proportion of certification related cost and revenue.

Compared with the revenue realised from Gold Standard certification, the cost of validation, verification and certification are relatively fixed and limited. The project can achieve sustainable management. Up to now, the project has been verified ninth in the first and second crediting period, and a total of 193,998 tons of GS VERs have been issued for the period from 01/01/2009 to 31/12/2020 and 174,318 tons of GS VERs have been retired. The emission reduction during the period from 01/01/2021 to 31/12/2021 is seeking GS VERs issuance under GS program.

Taking the expected price of 20 RMB/tons of GS VERs, the annual revenue of Guanbaodu project from GS certification is about 180,000 RMB. The revenue is mainly used in the following aspects: 28% for employee salary, 40% for power plant equipment maintenance supplement, 13% for employee welfare, 6% for employee training, 3% for employee health examination, and about 10% for the cost of validation, verification and certification for GS development cost. By checking the 2021 financial statement provided by Guanbaodu project owner, the proportion of each expenditure is basically consistent with the above description.

For Liangjiangkou project, the annual revenue from GS certification is about 70,000 RMB. The revenue is mainly used in the following aspects: 22% for employee salary, 39% for power plant equipment maintenance supplement, 11% for employee welfare, 14% for employee training, 2% for employee health examination, and about 12% for the cost of validation, verification and certification for GS development cost. By checking the 2021 financial statement provided by Liangjiangkou project owner, the proportion of each expenditure is basically consistent with the above description.

Thus, the carbon revenues derived from Gold Standard certification have been playing a very important role in helping PO to contribute to SDGs.

(b) Description on how finance derived Gold Standard Certification contributes to or is being used to sustain or enhance the project.

Carbon revenues derived from Gold Standard certification have been playing a very important role in helping project owner to contribute to SDGs. By checking the Monitoring Reports during the period from 01/01/2009 to 31/12/2021, in order to acquire annual carbon revenues, the bundled project has achieved sustainable monitoring management, contributing to SDG 5, SDG 7, SDG 8 and SDG 13. In the 3rd crediting period, the bundled project will preserve 3 permanent job opportunities in managerial role for local women and totally provide 23 jobs position for local residents.

Moreover, stable carbon revenues are conducive to maintain the normal operation of enterprises and further encourage project owner to operate the bundled project in line with monitoring plan, ensuring the continuous supply of renewable electricity generated by the bundled project and increasing the share of renewable electricity in local power grid.

(c) Where no revenue is realised from Gold Standard certification during a given period, this would be considered a FAR for the next Issuance.

GS VERs during the period from 01/01/2009 to 31/12/2020 has been issued and the emission reduction during the period from 01/01/2021 to 31/12/2021 is seeking GS VERs issuance under GS program. Thus, the bundled project does not involve the situation that no revenue is realised from Gold Standard certification during a given period.

B.6. Sustainable Development Goals (SDG) outcomes

Relevant Target/Indicator for each of the three SDGs

Sustainable Development Goals Targeted	Most relevant SDG Target	SDG Impact	
		Indicator (Proposed or SDG Indicator)	
13 Climate Action (mandatory)	N/A	Amount of GHGs emissions avoided or sequestered	
SDG 5 Gender Equality	Target 5.5 Ensure women's full and effective participation and equal opportunities for serving in leadership political, economic and public life	Number of women serving in leadership role	of women managerial/ownership
7 Affordable and Clean Energy	Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix	Total electricity produced: Renewable	
8 Decent Work and Economic Growth	Target 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Total number of jobs	

B.6.1 Explanation of methodological choices/approaches for estimating the SDG Impact

The final Net benefit SDG of the project are calculated as follows:

$$\text{Net benefit of SDG} = \text{Project outcome of SDG} - \text{Baseline outcome of SDG} \quad (1)$$

And the baseline and project outcomes are calculated in the following two parts:

I. Calculate baseline outcomes

SDG 5 Baseline outcome:

In baseline situation, there is no good job opportunities and basic trainings for local women in managerial/ leadership /ownership role to improve living conditions and upgrade their skills in absence of the bundled project. The SDG 5 cannot be achieved in baseline situation. Therefore, SDG 5 baseline outcome benefit is zero.

SDG 7 Baseline outcome:

In baseline situation, generation electricity would be from CCPG used other fossil fuel sources to generate electricity in absence of the bundled project. The SDG 7 cannot be achieved in baseline situation. Therefore, SDG 7 baseline outcome benefit is zero.

SDG 8 Baseline outcome:

In baseline situation, there is no good job opportunities and basic trainings for local people to improve living conditions and upgrade their skills in absence of the bundled project. The SDG 8 cannot be achieved in baseline situation. Therefore, SDG 8 baseline outcome benefit is zero.

SDG 13 Baseline outcome:

In baseline situation, there is no operation of renewable power generation, all the electricity demand would be supplied by CCPG as usual, and no GHG emission reduction would be achieved, therefore SDG 13 baseline outcome benefit is zero.

II. Calculate project outcomes

SDG 5 Baseline outcome:

Guanbaodu project is expected to offer 2 permanent job opportunities in managerial role for local women who enjoy the basic right and holiday for female employees.

Liangjiangkou project is expected to provide 1 permanent position of financial manager for local women who enjoy the basic right and holiday for female employees.

Therefore, the estimated SDG 5 project outcome for number of women serving in managerial/ leadership /ownership role in the bundled project is 3.

SDG 7 Project outcome:

The estimated net generation electricity of the Guanbaodu and Liangjiangkou project delivered to the CCPG is respectively 15,513 MWh/yr and 6,099 MWh/yr in the third crediting period, displacing electricity generation from fossil fuels and reducing GHG emissions.

Therefore, the estimated SDG 7 project outcome of the bundled project is 21,612 MWh/yr.

SDG 8 Project outcome:

Guanbaodu project is expected to offer 16 job opportunities for local women and men, carried out at least once basic training per year for all staff to help them upgrade their skills and knowledge.

Liangjiangkou project is expected to offer 7 job opportunities for local women and men, carried out at least once basic training per year for all staff to help them upgrade their skills and knowledge.

Therefore, the estimated SDG 8 project outcome for total number of jobs in the bundled project is 23.

SDG 13 Project outcome:

According to the ACM0002 (Version 21.0), the annual emission reduction is calculated as below.

Project Emissions

The project activity is a hydro power plant, as per the ACM0002 (Version 21.0), the project emissions of the project activity are calculated as follows:

$$PE_y = PE_{FF,y} + PE_{HP,y} \quad (2)$$

Where:

PE_y = Project emissions in year y (t CO₂e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO₂/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO₂e/yr)

The project is a Greenfield hydro power plant. No fossil fuels are combusted during operation of the project. And as per the ACM0002 (Version 21.0), emissions due to the use of fossil fuel for the backup generators can be neglected. Hence $PE_{FF,y}$ is zero.

As per the ACM0002 (Version 21.0), if the power density of the project is greater than $10W/m^2$, $PE_{HP,y}$ is zero. The power density (PD) of the project activity is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} \quad (3)$$

Where:

- PD = Power density of the project activity (W/m^2)
- Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W)
- Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero
- A_{PJ} = Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2)
- A_{BL} = Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero

Both the Guanbaodu and Liangjiangkou project are greenfield hydro power projects with a new reservoir, hence Cap_{BL} and A_{BL} are zero. The total installed capacity of the Guanbaodu and Liangjiangkou project (Cap_{PJ}) is respectively 4MW and 1.89MW as per the nameplate of the turbine generators and the purchase contract. The reservoir area of the Guanbaodu and Liangjiangkou project after implement of the bundled project (A_{PJ}) is respectively 328,000 m^2 and 176,800 m^2 as per the measuring report of the reservoir for the project activity in 2022 by a qualified third party. Hence the power density of the project activity is calculated as follows:

For Guanbaodu project, Cap_{BL} = 0, A_{BL} = 0, Cap_{PJ} = 4MW, and A_{PJ} = 328,000 m^2

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} = (4,000,000 \text{ W} - 0 \text{ W}) / (328,000 \text{ m}^2 - 0) = 12.20 \text{ W/m}^2$$

For Liangjiangkou project, Cap_{PJ} = 1.89 MW, and A_{PJ} = 176,800 m^2

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} = (1,890,000 \text{ W} - 0 \text{ W}) / (176,800 \text{ m}^2 - 0) = 10.69 \text{ W/m}^2$$

Hence $PE_{HP,y}$ of the bundled project activity is zero. In conclusion, the project emission of the project activity is zero, $PE_y=0$.

Leakage

As per ACM0002 (Version 21.0), no other leakage emissions are considered.

Baseline Emissions

As per ACM0002 (Version 21.0), baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y} = EG_{facility,y} * EF_{grid,CM,y} \quad (4)$$

Where:

BE_y = Baseline emissions in year y (tCO₂/yr)

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

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y (tCO₂/MWh)

According to the "Tool to calculate the emission factor for an electricity system" (Version 07.0), the following six steps applied for calculating the $EF_{grid,CM,y}$:

STEP 1. Identify the relevant electric system

In accordance with delineations of connected electricity systems by China NRDC (China's DNA), Central China Power Grid (CCPG) is the connected electricity system for the project as it is connected by transmission lines to the project electricity system. CCPG covers the power grids of Henan Province, Hubei Province, Hunan Province, Sichuan Province, Jiangxi Province and Chongqing City according to the delineations published by China's DNA.

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

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

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

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

Option I is adopted for calculation for the bundle project.

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

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

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

The bundle project applies method (a) simple OM since low-cost/must-run resources constitute less than 50% of total grid electricity generation of CCPG in the most recent 5 years. According to China Electric Power Yearbook⁵, the average amount of low-cost/must-run resources in the most recent 5 years is less than 50%.

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

- **Ex ante option:** A 3-year generation-weighted average, based on the most recent data available at the time of submission of VER-PDD to the DOE for validation, without requirement to monitor and recalculate the emission factor during the crediting period, or
- **Ex post option:** The year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during monitoring.

The bundled project uses **Ex ante Option** for $EF_{grid,OM,y}$ calculation to be in accordance with the *2019 baseline emissions factor for regional power grids*⁶ published by China DNA.

⁵ China Electric Power Yearbook 206~2018

⁶ https://www.mee.gov.cn/ywgz/ycqhbh/wsqtkz/202012/t20201229_815386.shtml

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

The Simple Operating Margin emission factor $EF_{grid,OM,y}$ is defined as the generation-weighted average emissions per unit net electricity generation (tCO₂/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. Two options can be selected to calculate the simple OM:

Option A: Based on the net electricity generation and a CO₂ emission factor of each power unit; or

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

Option B can only be used if:

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

The criteria for Option B are met, as (a) the necessary data for Option A is not available as indicated in the calculations of the DNA, (b) only nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known, and (c) Option I is chosen in Step 2.

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

$$EF_{grid,OMsimple,y} = \frac{\sum_i (FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y})}{EG_y} \quad (5)$$

Where

$EF_{grid,OMsimple,y}$ = Simple operating margin CO₂ emission factor in year y (t CO₂/MWh)

$FC_{i,y}$	=	Amount of fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fuel type i in year y (GJ/mass or volume unit)
$EF_{CO_2,i,y}$	=	CO ₂ emission factor of fuel type i in year y (t CO ₂ /GJ)
EG_y	=	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year y (MWh)
i	=	All fuel types combusted in power sources in the project electricity system in year y
y	=	The relevant year as per the data vintage chosen in Step 3

If available, $NCV_{i,y}$, and $EF_{CO_2,i,y}$ from the fuel supplier of the power plants in invoices may be used; or, regional or national average default values may be used. In this PDD, $NCV_{i,y}$ of different fuels are obtained from China Energy Statistical Yearbook 2018 and Energy Consumption Statistics System for Public Institutions. Emission factors ($EF_{CO_2,i,y}$) of each type of fossil fuel come from IPCC 2006 default values. Other data are obtained from the China Electric Power Yearbook (2016~2018, published annually) and China Energy Statistical Yearbook (2016~2018). Based on these data, the Simple OM Emission Factor ($EF_{grid,OMsimple,y}$) of CCPG is calculated as 0.8587 tCO₂/MWh. Details of the calculations and the published data from the China DNA⁷ which uses official national statistics.

The $EF_{grid,OM,y}$ calculation of the bundled project is in accordance with the *2019 baseline emissions factor for regional power grids*⁸ published by China DNA. Thus, the $EF_{grid,OM,y}$ is 0.8587 tCO₂e/MWh and fixed in the third crediting period.

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

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

⁷ https://www.mee.gov.cn/ywqz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml

⁸ https://www.mee.gov.cn/ywqz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml

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

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

The project participants have chosen to use the ex-ante option (Option 1 above). For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. Thus, in the third crediting period, the build margin emission factor $EF_{grid,BM,y}$ is 0.4737 tCO₂e/MWh, same as the second crediting period.

Step 6: Calculate the combined margin (CM) emission factor

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

- (a)** Weighted average CM; or
- (b)** Simplified CM.

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

The simplified CM method (Option b) can only be used if:

- a) The project activity is located in: (i) a Least Developed Country (LDC); or in (ii) a country with less than 10 registered CDM projects at the starting date of validation; or (iii) a Small Island Developing States (SIDS); and
- b) The data requirements for the application of step 5 above cannot be met.

The PDD choose **option (a)**.

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (6)$$

Where:

$EF_{grid,OM,y}$ = operating margin CO₂ emission factor in year y (tCO₂e/MWh)

$EF_{grid,BM,y}$ = build margin CO₂ emission factor in year y (tCO₂e/MWh)

w_{OM} = the weight of operating margin emission factor (%)

w_{BM} = the weight of build margin emission factor (%)

As specified in “Tool to calculate the emission factor for an electricity system” (version 07.0), the hydropower project shall use $w_{OM}=0.5$ and $w_{BM}=0.5$ for the first crediting period, and $w_{OM}=0.25$ and $w_{BM}=0.75$ for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.

For the bundled project, $w_{OM}=0.25$ and $w_{BM}=0.75$ are applied for the third crediting period.

$$EF_{grid,CM,y} = 0.8587 \text{ tCO}_2\text{e/MWh} * 0.25 + 0.4737 \text{ tCO}_2\text{e/MWh} * 0.75 = 0.56995 \text{ tCO}_2\text{e/MWh}$$

Emission Reductions

The annual emission reductions of the bundled project during the third crediting period are calculated as follows:

$$ER_y = BE_y - PE_y \quad (7)$$

Where:

BE_y = Baseline emissions in year y (tCO₂/yr)

PE_y = Project emissions in year y (tCO₂/yr)

B.6.2 Data and parameters fixed ex ante

SDG13

Data/parameter	$EF_{grid,CM,y}$
Unit	tCO ₂ e/MWh
Description	Combined margin CO ₂ emission factor for grid connected power generation in year y

Source of data	2019 Baseline Emission Factors for Regional Power Grids in China published by China DNA
Value(s) applied	0.56995
Choice of data or Measurement methods and procedures	Calculated as per the latest version of "Tool to calculate the emission factor for an electricity system" (version 07.0) by China DNA
Purpose of data	Calculation of SDG 13 impacts in project scenario
Additional comment	Calculated ex ante and fixed for the third crediting period

Data/parameter	Cap _{BL}
Unit	W
Description	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero
Source of data	Project site
Value(s) applied	0 (Guanbaodu) 0 (Liangjiangkou)
Choice of data or Measurement methods and procedures	-
Purpose of data	Calculation of SDG 13 impacts in project scenario
Additional comment	-

Data/parameter	A _{BL}
Unit	m ²
Description	Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the

	project activity, when the reservoir is full (m ²). For new reservoirs, this value is zero
Source of data	Project site
Value(s) applied	0 (Guanbaodu) 0 (Liangjiangkou)
Choice of data or Measurement methods and procedures	-
Purpose of data	Calculation of SDG 13 impacts in project scenario
Additional comment	-

B.6.3 Ex ante estimation of SDG Impact

According to the section B.6.1 and B.6.2, the ex-ante estimation of SDG Impact is listed as following table.

SDG Targeted	Ex-ante estimation of SDG Impact
SDG 5 Gender Equality	Baseline outcome: 0 Project outcome: 3 Guanbaodu project will offer 2 permanent job opportunities in managerial role for local women who enjoy the basic right and holiday for female employees. Liangjiangkou project will provide 1 permanent financial manager for local females for financing work. Therefore, the estimated SDG 5 project outcome for number of women serving in managerial/ leadership /ownership role in the bundled project is 3.
SDG 7 Affordable and Clean Energy	Baseline outcome: 0 Project outcome: 21,612 MWh/yr The estimated net generation electricity of the Guanbaodu and Liangjiangkou project delivered to the CCPG is

	respectively 15,513 MWh/yr and 6,099 MWh/yr in the third crediting period, displacing electricity generation from fossil fuels and reducing GHG emissions. Therefore, the estimated SDG 7 project outcome of the bundled project is 21,612 MWh/yr.
SDG 8 Decent Work and Economic Growth	Baseline outcome: 0 Project outcome: 23 Guanbaodu project is expected to offer 16 job opportunities for local women and men, carried out at least once basic training per year for all staff to help them upgrade their skills and knowledge. Liangjiangkou project is expected to offer 7 job opportunities for local women and men, carried out at least once basic training per year for all staff to help them upgrade their skills and knowledge. Therefore, the estimated SDG 8 project outcome for number of jobs in the bundled project is 23.
SDG 13 Climate Action	Baseline outcome: 0 Project outcome: 12,317 tCO₂e/yr The Guanbaodu project and Liangjiangkou project will achieve 8,841 tCO₂e/yr and 3,476 tCO₂e/yr in the third crediting period. Therefore, the estimated SDG 13 project outcome for emission reduction is 12,317 tCO₂e/yr in the third crediting period. The annual emission reduction is calculated as below.

Project Emissions

The project is a Greenfield hydro power plant. No fossil fuels are combusted during operation of the project. And as per the ACM0002 (Version 21.0), emissions due to the use of fossil fuel for the backup generators can be neglected. Hence $PE_{FF,y}$ is zero.

As per the ACM0002 (Version 21.0), if the power density of the project is greater than 10W/m^2 , $PE_{HP,y}$ is zero.

For Guanbaodu project, PD is 12.20 W/m^2 , higher than 10W/m^2 , as per the applied methodology ACM0002 (Version 21.0), the project emission is zero.

For Liangjiangkou project, PD is 10.69 W/m^2 , higher than 10W/m^2 , as per the applied methodology ACM0002 (Version 21.0), the project emission is zero.

Hence $PE_{HP,y}$ of the bundled project activity is zero, $PE_y = PE_{HP,y} = 0$.

Leakage

As per ACM0002 (Version 21.0), no other leakage emissions are considered.

Baseline Emissions

The annual baseline emissions during the third crediting period are to be calculated as follows:

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

For Guanbaodu project,

$$BE_y = EG_{facility,y} * EF_{grid,CM,y} = 15,513\text{ MWh/yr} * 0.56995\text{ tCO}_2\text{e/MWh} = 8,841\text{ tCO}_2\text{e}$$

For Liangjiangkou,

$$BE_y = EG_{facility,y} * EF_{grid,CM,y} = 6,099\text{ MWh/yr} * 0.56995\text{ tCO}_2\text{e/MWh} = 3,476\text{ tCO}_2\text{e}$$

Thus, the annual baseline emission of the bundled project is $12,317\text{ tCO}_2\text{e}$

Emission Reductions

The annual emission reductions of the bundled project during the third crediting period are calculated as follows:

$$ER_y = BE_y - PE_y = 12,317\text{ tCO}_2\text{e}$$

Thus, the estimated SDG 13 project outcome for emission reduction is $12,317\text{ tCO}_2\text{e/yr}$ in the third crediting period.

B.6.4 Summary of ex ante estimates of each SDG Impact

SDG 5 Number of women serving in managerial/ leadership /ownership role

Year	Baseline estimate	Project estimate	Net benefit
01/01/2023 ~31/12/2023	0	3	3
01/01/2024~31/12/2024	0	3	3

01/01/2023 ~31/12/2023	0	3	3
01/01/2023 ~31/12/2023	0	3	3
01/01/2023 ~31/12/2023	0	3	3
01/01/2028 ~31/12/2028	0	3	3
01/01/2029 ~31/12/2029	0	3	3
Total	0	21	21
Total number of crediting years	7		
Annual average over the crediting period	0	3	3

SDG 7 Total electricity produced: Renewable

Year	Baseline estimate	Project estimate	Net benefit
01/01/2023 ~31/12/2023	0	21,612 MWh	21,612 MWh
01/01/2024~31/12/2024	0	21,612 MWh	21,612 MWh
01/01/2023 ~31/12/2023	0	21,612 MWh	21,612 MWh
01/01/2023 ~31/12/2023	0	21,612 MWh	21,612 MWh
01/01/2023 ~31/12/2023	0	21,612 MWh	21,612 MWh
01/01/2028 ~31/12/2028	0	21,612 MWh	21,612 MWh
01/01/2029 ~31/12/2029	0	21,612 MWh	21,612 MWh
Total	0	151,284 MWh	151,284 MWh
Total number of crediting years	7		
Annual average over the crediting period	21,612 MWh		

SDG 8 Total number of jobs

Year	Baseline estimate	Project estimate	Net benefit
01/01/2023 ~31/12/2023	0	23	23
01/01/2024~31/12/2024	0	23	23

01/01/2023 ~31/12/2023	0	23	23
01/01/2023 ~31/12/2023	0	23	23
01/01/2023 ~31/12/2023	0	23	23
01/01/2028 ~31/12/2028	0	23	23
01/01/2029 ~31/12/2029	0	23	23
Total	0	161	161
Total number of crediting years	7		
Annual average over the crediting period	0	23	23

SDG 13 Amount of GHGs emissions avoided or sequestered

Year	Baseline estimate	Project estimate	Net benefit
01/01/2023 ~31/12/2023	0	12,317 tCO ₂ e	12,317 tCO ₂ e
01/01/2024~31/12/2024	0	12,317 tCO ₂ e	12,317 tCO ₂ e
01/01/2023 ~31/12/2023	0	12,317 tCO ₂ e	12,317 tCO ₂ e
01/01/2023 ~31/12/2023	0	12,317 tCO ₂ e	12,317 tCO ₂ e
01/01/2023 ~31/12/2023	0	12,317 tCO ₂ e	12,317 tCO ₂ e
01/01/2028 ~31/12/2028	0	12,317 tCO ₂ e	12,317 tCO ₂ e
01/01/2029 ~31/12/2029	0	12,317 tCO ₂ e	12,317 tCO ₂ e
Total	0	12,317 tCO₂e	12,317 tCO₂e
Total number of crediting years	7		
Annual average over the crediting period	0	12,317 tCO₂e	12,317 tCO₂e

B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

SDG 13

Data / Parameter	ER _y
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Unit	tCO ₂ e/yr
Description	Amount of GHGs emissions avoided or sequestered
Source of data	Calculated
Value(s) applied	8,841 (Guanbaodu) 3,476 (Liangjiangkou)
Measurement methods and procedures	Calculated as per the ACM0002 (Version 21.0)
Monitoring frequency	Annually
QA/QC procedures	This parameter ER _y will be calculated as difference between baseline emission and project emission.
Purpose of data	Calculation of SDG 13 impacts in project scenario
Additional comment	-

Data / Parameter	Cap _{PJ}
Unit	MW
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Measured
Value(s) applied	4 (Guanbaodu) 1.89 (Liangjiangkou)
Measurement methods and procedures	Readings of nameplate
Monitoring frequency	Yearly
QA/QC procedures	The nameplates of all the generators installed in the project will be checked.
Purpose of data	Calculation of SDG 13 impacts in project scenario
Additional comment	-

Data / Parameter	A _{PJ}
------------------	-----------------

Unit	m ²
Description	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data	Measured
Value(s) applied	328,000 (Guanbaodu) 176,800 (Liangjiangkou)
Measurement methods and procedures	The third party's report
Monitoring frequency	Yearly
QA/QC procedures	The area of the reservoir is measured by local River Management Station
Purpose of data	Calculation of SDG 13 impacts in project scenario
Additional comment	-

Data / Parameter	PD
Unit	W/m ²
Description	Power density of project
Source of data	Calculated
Value(s) applied	12.20 (Guanbaodu)
Measurement methods and procedures	10.69 (Liangjiangkou)
Monitoring frequency	This parameter PD is calculated as equation (3) in this PDD.
QA/QC procedures	Yearly
Purpose of data	Calculation of SDG 13 impacts in project scenario
Additional comment	-

SDG 13 & SDG 7

Data / Parameter	EG _{facility,y}
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Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Calculated and measured
Value(s) applied	15,513 (Guanbaodu) 6,099 (Liangjiangkou)
Measurement methods and procedures	The following parameters shall be measured by electricity meter: (i) Electricity delivered to the power grid generated by the project (ii) Electricity imported from the power grid by the project The accuracy of electricity meters is not lower than 0.5s. The $EG_{\text{facility},y}$ is calculated by the difference between (i) and (ii).
Monitoring frequency	Continuous measurement and monthly recording
QA/QC procedures	Meter readings will be cross checked by Electricity Transaction Notes (ETN) or other electricity receipts. Electricity meters will be calibrated annually. The data will be archived and kept at least for two years after the end of the crediting period.
Purpose of data	Calculation of SDG 13 impacts in project scenario
Additional comment	-

SDG 5

Data / Parameter	Number of women serving in managerial/ leadership /ownership role
Unit	Number
Description	Number of women serving in managerial/ leadership /ownership role provided by the bundled project
Source of data	Project activity

Value(s) applied	2 women serving in managerial/ leadership /ownership role (Guanbaodu) 1 woman serving in managerial/ leadership /ownership role (Liangjiangkou)
Measurement methods and procedures	The payroll contains the information about employees' name, gender, position and salary. Number of women serving in managerial/ leadership/ ownership is to be check.
Monitoring frequency	Annually
QA/QC procedures	The gender and position of payroll will be checked.
Purpose of data	Assessment SDG target
Additional comment	-

SDG 8

Data / Parameter	Total number of jobs
Unit	Number
Description	Total number of jobs provided by the bundled project
Source of data	Project activity
Value(s) applied	16 (Guanbaodu) 7 (Liangjiangkou)
Measurement methods and procedures	The payroll contains the information about employees' name, gender, position and salary. Number of permanent jobs is to be check.
Monitoring frequency	Annually
QA/QC procedures	The number of employees in the payroll will be checked. The number of employees in the payroll will be cross checked by the employees in the trainings record.
Purpose of data	Assessment SDG target
Additional comment	-

Safeguarding Principles 9.4

Data / Parameter	Water quality
Unit	Level of management
Description	The impact of wastewater on local water body the operation period
Source of data	Estimated
Value(s) applied	No negative impact
Measurement methods and procedures	The wastewater during the operation period can be monitored by stakeholders' questionnaires
Monitoring frequency	Yearly during the operation period
QA/QC procedures	Stakeholders' questionnaires will be checked.
Purpose of data	Assessment of Safeguarding Principle 9.4
Additional comment	-

Safeguarding Principles 9.4

Data / Parameter	Solid wastes
Unit	Level of management
Description	Management of the domestic rubbish during the operation period
Source of data	Estimated
Value(s) applied	No negative impacts
Measurement methods and procedures	The domestic rubbish treatment during the operation period can be monitored by relevant management.
Monitoring frequency	Yearly
QA/QC procedures	The domestic rubbish treatment manual will be checked.
Purpose of data	Assessment of Safeguarding Principle 9.4
Additional comment	-

Safeguarding Principles 9.4

Data / Parameter	Biodiversity (species and habitat conservation)
Unit	Degree of Biodiversity
Description	The impacts of project activity on fish and organism species and habitats
Source of data	Estimated
Value(s) applied	No negative impacts
Measurement methods and procedures	This parameter can be monitored by stakeholder's questionnaires.
Monitoring frequency	Yearly
QA/QC procedures	According to EIA, there will be no considerable effects on fish and organism species and habitats due to the project activity and no extinction of any animals will happen. The outcome of Report for the Examination and Acceptance of Completed Project has also concluded that the measures of ecological conservation have been well implemented.
Purpose of data	Assessment of Safeguarding Principle 9.4
Additional comment	-

B.7.2 Sampling plan

The bundled project does not involve the sampling approach in the section B.7.1.

B.7.3 Other elements of monitoring plan

1. Operational and management structure

The monitoring of the emissions reductions of the bundled projects are basically the same as each other. The monitoring process will be carried out according to the operation and management structure shown in Figure C-1:

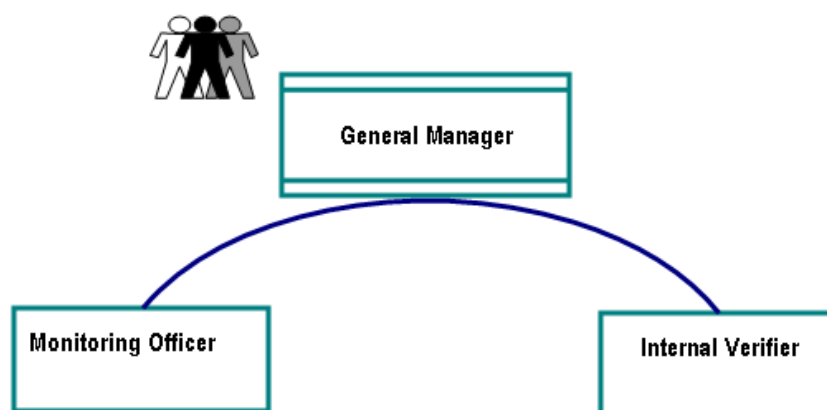


Figure C-1 Operations and Management Structure

- 1) The General Manager conducts the overall responsibility for the monitoring process.
- 2) Station staff serves as the monitoring officer to carry out the measurement of the exports and imports electricity recordings. A staff in monitoring officer carries out the measurement of technical training recordings and stakeholders' questionnaires about water quality, solid wastes and biodiversity.
- 3) An accountant worked as internal verifier is responsible for internal verification of the measurement, collection of electricity receipts or invoices, payroll contains the information about employees' name, gender, position and salary, stakeholders' questionnaires and the calculation of the emission reductions.

2. Monitoring equipment, data and procedures

The baseline and monitoring methodology applied for the project is methodology ACM0002 (Version 21.0): "Grid-connected electricity generation from renewable sources".

Guanbaodu:

For monitoring parameters related to SDG 5, 7, 8, the monitoring officer carries out technical training meetings and the stakeholders' questionnaires annually, and the accountant provides electricity receipts and payroll which contain the information about employees' name, gender, position and salary every year.

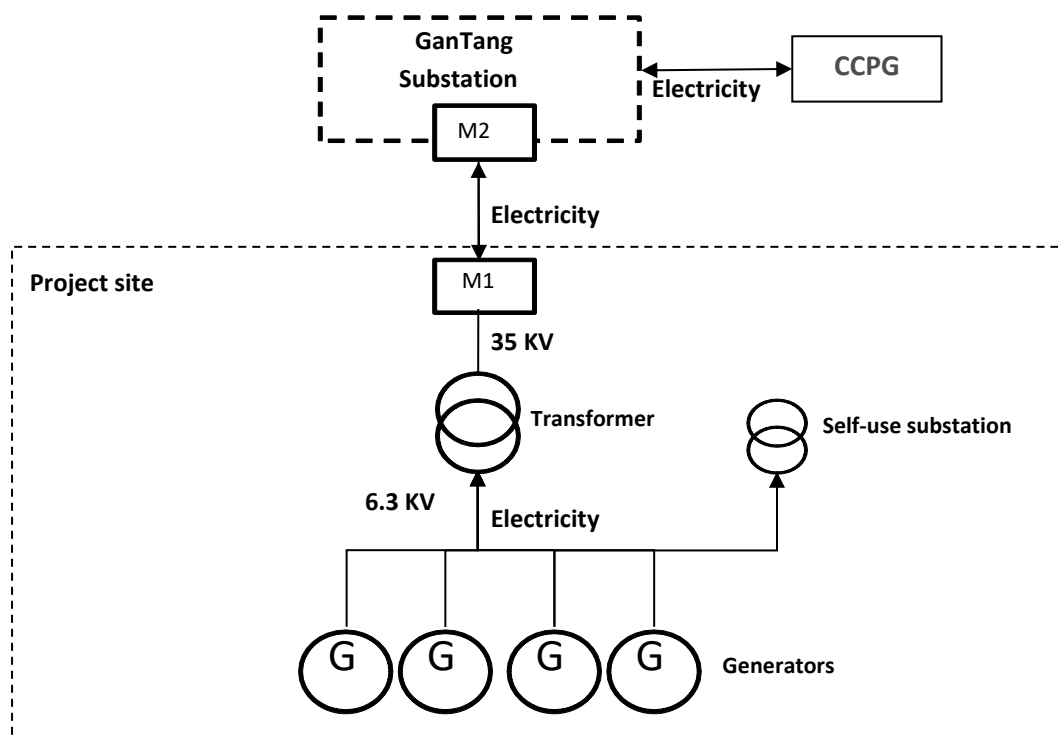


Figure C-2 Electricity connection diagram of Guanbaodu

As Figure C-2 the electricity connection diagram of Guanbaodu shown, for monitoring parameters related to SDG 13, the electricity generated from 4 generators are delivered into the main transformer through a 6.3 kV transmission line, and then transformed into 35 kV which are delivered into GanTang Substation and then connected to CCPG finally. The bidirectional gateway meter M2 (main meter) owned by local power company is installed at GanTang Substation to measure the electricity exported to the grid and imported from the grid, and the meter M1 (backup meter) owned by the Guanbaodu Hydropower Station is installed at the high voltage side of the main transformer in Guanbaodu Hydropower Station for crosscheck. The accuracy of all electricity meters is not lower than 0.5s.

The readings of gateway meter (M2) are recorded on a monthly basis, and the Electricity receipt are served as additional check for quality control. The readings of M1 are recorded in daily log by the technical staff at the power station every day. All data will be archived for at least 2 years after the end of the last crediting period.

M1 and M2 will be verified according to Technical Administrative Code of Electricity Energy Metering (DL/T448-2016) or other national standards and the calibration of the meters will make once a year by the qualified third party to secure the measurement accuracy.

If M2 is detected any failure but M1 operates normally, the emission reduction will be calculated by the readings of M1. The faulty meter will be repaired or replaced by the accredited equipment testing organization as soon as possible. If malfunction occurs for both M1 and M2, no emission reductions will be claimed until the malfunction is fixed.

Liangjiangkou:

For monitoring parameters related to SDG 5, 7, 8, the monitoring officer carries out technical training meetings and the stakeholders' questionnaires annually, and the accountant provides electricity receipts and payroll which contain the information about employees' name, gender, position and salary every year.

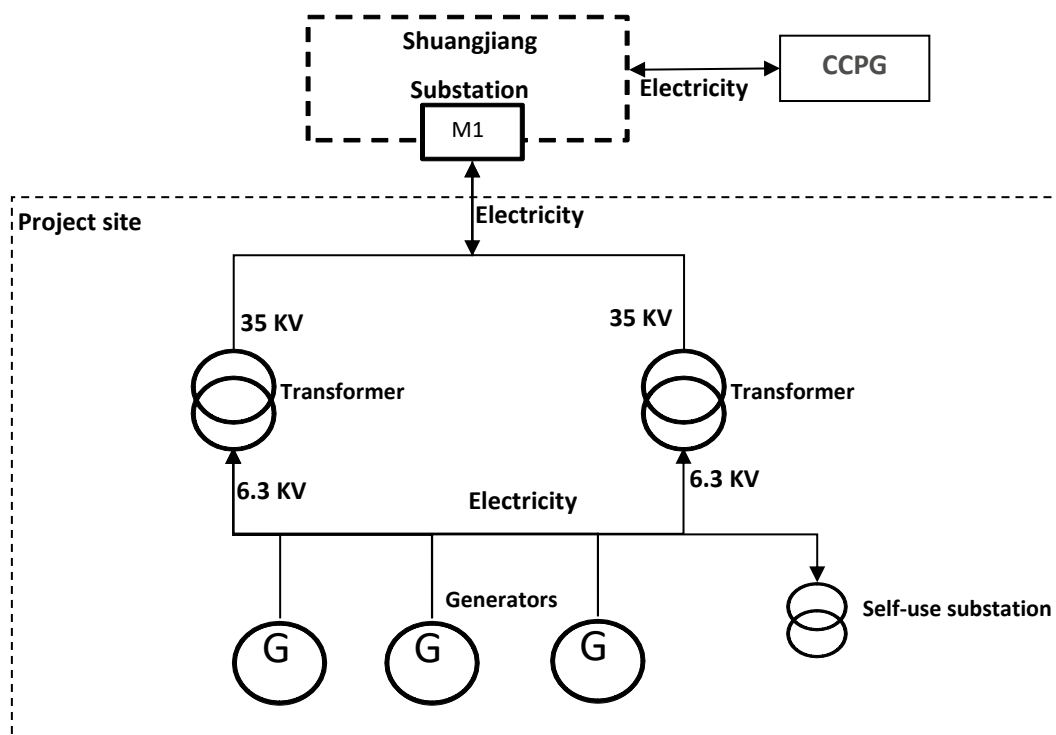


Figure C-3 Electricity connection diagram of Liangjiangkou

As Figure C-3 the electricity connection diagram of Liangjiangkou shown, for monitoring parameters related to SDG 13, the electricity generated from 3 generators are delivered into the two main transformers through 2 separate transmission line of 6.3 kV and then transformed into 35 kV which are delivered into Shuangjiang Substation and connected to CCPG finally. The bidirectional gateway meter M1 owned by local power company is installed at Shuangjiang Substation and to measure and record the electricity exported to the grid and imported from the grid. The accuracy of electricity meter is not lower than 0.5s.

The readings of gateway meter (M1) are recorded on a monthly basis, and the Electricity receipts are served as additional check for quality control. All data will be archived for at least 2 years after the end of the last crediting period.

M1 will be verified according to Technical Administrative Code of Electricity Energy Metering (DL/T448-2016) or other national standard. The operation of M1 will be checked periodically by the qualified third party and calibrated once every year.

If M1 is detected any failure, no emission reductions will be claimed until the malfunction is fixed.

3. Quality control (QC) and quality assurance (QA)

Besides data management procedure described above, the project owner also takes the following procedures to ensure the operation and accuracy:

- 1) All meters are installed in accordance with the national Chinese standard Technical Administrative Code of Electricity Energy Metering (DL/T448-2016).
- 2) All relevant staff receives training periodically to improve their know-how and performance.
- 3) A monitoring and management manual identifying detailed duties and responsibilities of the relevant parties has been developed by Climate Bridge (Shanghai) Ltd., and is served as a basis of the project monitoring.
- 4) All data will be archived for at least 2 years after the end of the last crediting period.

4. Emergency procedure:

For Guanbaodu:

If the readings of gateway meter M2 are not within the acceptable precision level at any month or the meter works abnormally, the readings of the backup meter M1 will be used for ER calculation with deduction of the transmission loss., In the case that the readings of both meters are not within the acceptable precision level, the net electricity supplied to grid will be confirmed based on the conventional process accepted by project owner and Grid Company. If such happens, relevant proof will be achieved by both parties and submitted for verification.

For Liangjiangkou:

If the readings of gateway meter M1 are not within the acceptable precision level at any month or the meter works abnormally, the net electricity supplied to grid will be confirmed based on the conventional process accepted by project owner and Grid Company. If such happens, relevant proof will be achieved by both parties and submitted for verification.

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1 Start date of project

Guanbaodu: 08/08/2005 (Signature of equipment purchase contract)

Liangjiangkou: 02/08/2006 (Signature of construction contract)

C.1.2 Expected operational lifetime of project

20 years 0 month

C.2. Crediting period of project

C.2.1 Start date of crediting period

01/01/2023 (start date of the third renewable crediting period)

C.2.2 Total length of crediting period

21 years⁹

SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

D.1 Safeguarding Principles that will be monitored

A completed Safeguarding Principles Assessment is in [Appendix 1](#), ongoing monitoring is summarized below.

Principles	Mitigation Measures added to the Monitoring Plan
Principle 9.4	Refer to B.7.1 Water quality
Principle 9.4	Refer to B.7.1 Solid wastes
Principle 9.4	Refer to B.7.1 Biodiversity (species and habitat conservation)

⁹ Although the expected operational lifetime is 20 years, the bundled project will be operated until the end of the 2030.

D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy?	The bundled project is a renewable energy project, and it does not discriminate among gender. The bundled project does not adversely impact women or men. During the project implementation, the project provides employment opportunities equally to men and women. During the local stakeholder consultation on 26/03/2008 and 27/03/2008, and during the Stakeholder feedback round starting from 15/04/2022, both men and women are included. For the stakeholder interviews in previous monitoring periods and verifications, both men and women were involved as well. In the project design and implementation, fair chance and gender equality to access the source, information and to reflect their opinions is taken as a main consideration by the project owner.
Question 2 - Explain how the project aligns with existing country policies, strategies and best practices	The project is aligned with the labor policies which does not discriminate on gender. The project also abides the rules of gender equality accordingly and does not involve any form of discrimination. Regarding the gender equality, detailed enforcement rules are regulated in 'Law of the People's Republic of China on the Protection of Women's Rights' and in case

	of lawsuit occurrence, legal aid could be provided as per this law.
Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?	No. The project is a renewable energy project, and it does not discriminate among gender. The bundled project is applying for crediting period renewal. No expert opinion is required.
Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?	No. The project is a renewable energy project, and it does not discriminate among gender. The bundled project is applying for crediting period renewal. No expert opinion is required.

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

The project has conducted the local stakeholder consultation (LSC) by holding the consultation meeting in 2008 before requesting GS registration, and all the comments received have been seriously taken into account. During the following verification, all the necessary data and information required by ER and SDG monitoring plan have been fully monitored and record by project owner, and verified by VVB during each site-visit.

According to the registered monitoring plan, some of the SDG indicators were monitored by stakeholders' questionnaires. Based on the previous verification for the first and second crediting period, the monitoring result of SDG indicators are all positive and the situation is very likely to be continued, and no additional comments were raised by stakeholders.

In the process of crediting period renewal application, the two project owners have carried out questionnaires on 15/04/2022. The local stakeholders' representatives are listed as below:

Representatives of local residents

Representatives of township government

Representatives of relevant local bureaus

Representatives of workers who are working for the project

The stakeholders' questionnaires contained some questions as follows:

1. Do you think that the wastewater produced from the project has unfriendly influence on water quality?
2. Do you think that the solid waste produced from the project has unfriendly influence on local environment?
3. Do you think that the project operation has unfriendly influence on local biodiversity?
4. Do you think that this project offers opportunities for employment?
5. Is there any permanent jobs and temporary jobs provided by the project?
6. Do you think that this project offers job opportunities for women?
7. Do you have electricity access before and now?
8. How much on average do you have to pay for electricity in the past? How is it compared with the actual situation with the project?
9. How do you communicate your questions or comments to the PP?

For Guanbaodu project, 25 questionnaires concerning SDG indicators and safeguarding principles were distributed to local stakeholder representatives and all questionnaires were returned. There is no negative comment raised by stakeholders.

For Liangjiangkou project, 20 questionnaires concerning SDG indicators and safeguarding principles were distributed to local stakeholders and all questionnaires were returned. There is no negative comment raised by stakeholders.

After the questionnaire survey, for further understanding stakeholders' comments, the project owners also randomly distributed the non-technical project summary to other residents around the project site for seeking additional comments. This 2-month-feedback round is from 18/04/2022 to 18/06/2022.

After the 2-month long stakeholder consultation round, no comments were received from the local stakeholder regarding to the documents or other related influence of the project activity.

E.1 Summary of stakeholder mitigation measures

Since no significant issue had been identified during the local stakeholder consultation meeting on 26/03/2008 and 27/03/2008. There are no comments received during the questionnaire assessment and stakeholder feedback round in 2022, no mitigation measures were proposed.

E.2 Final continuous input / grievance mechanism

A stakeholder meeting was held by project owner on 20/02/2020 in the 9th monitoring period in order to discuss the potential options with stakeholders and agree on an appropriate method. Based on the requirements from all stakeholders, the project owner agreed to set up respectively the suggestion box at monitoring office of Guanbaodu and Liangjiangkou. All stakeholders can raise any suggestion about negative impacts of the project operation to monitoring officer at any time. Then the monitoring staff will report the inputs/grievances to general manager who is responsible to solve problem and improve situation. The detailed Continuous Input and Grievance Mechanism is showed as below table.

Method	Include all details of Chosen Method (s) so that they may be understood and, where relevant, used by readers.
Continuous Input / Grievance Expression Process Book (mandatory)	The general manager shall contact and discuss amicably with relevant stakeholders, provide a written response to the grievances within 3 days; secondly, for any grievances that are not resolved by amicable negotiations, the general manager should propose a solution and mediation which is performed by relevant government agency within a week based on all collected information; Thirdly, for any grievances that are not resolved through mediation, it will be addressed by relevant legal method such as arbitration and courts if necessary. Finally, the entire complaints or grievances redress process shall be dealt within 30 days.
GS Contact (mandatory)	help@goldstandard.org
Other	3542346576@qq.com

APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

Complete the Assessment below and copy all Mitigation Measures for each Principle into [SECTION D](#) above. Please refer to the instructions in the [Guide to Completing](#) this Form.

Assessment Questions/ Requirements	Justification of Relevance (Yes/potentially/no)	How Project will achieve Requirements through design, management or risk mitigation.	Mitigation Measures added to the Monitoring Plan (if required)
Principle 1. Human Rights			
1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights 2. The Project shall not discriminate with regards	No	1. The project complies with Chinese Labour Law and relevant regulations while China has ratified two core UN human rights treaties, including the UN International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR) ¹⁰ .	Not applicable

¹⁰ <http://hrlibrary.umn.edu/research/ratification-china.html>

to participation and inclusion		b. There was a stakeholder consultation carried out regarding the project. Local people were actively involved in expressing their opinions and comments.	
Principle 2. Gender Equality			
1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women 2. Projects shall apply the principles of nondiscrimination, equal treatment, and equal pay for equal work 3. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks 4. (where required) Summary of opinions and recommendations of an Expert Stakeholder(s)	No	1. The project is to generate clean electricity from water sources to replace fossil fuel power. The project abides the rules of gender equality accordingly and does not involve any form of discrimination. Specifically, regarding the gender equality, detailed enforcement rules are regulated in 'Women's Rights Protection Law' to provide support and benefits to women. 2. Qualified local residents, both men and women, are recruited to work for the project. During stakeholders' consultation process, comments were collected from the local people,	Not applicable

		including both men and women. The details can be seen in registered passport. During previous monitoring periods, stakeholder interviews were conducted to collect comments about impacts of the project from the local people, including both men and women. The details can be seen in previous verification report. 3. The project abides the rules of equality accordingly. Regarding the gender equality, detailed enforcement rules are regulated in 'Labor Contract Law' and Women's Rights Protection Law. 4. No expert required.	
Principle 3. Community Health, Safety and Working Conditions			
1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	No	The bundled project's purpose is to supply electricity by utilizing water source to replace fossil fuel power. It is beneficial to local people. In the operation period, most of the employees work in	Not applicable

		indoor environment (at the office). In case of on-site monitoring and device maintenance, the project owner provides safety protection equipment. The bundled project also provided some training opportunities for employees periodically, including technical, management and safety knowledge, and the related employees have to pass the examination to ensure the safety working environment. And the project will provide safe and healthy working conditions including a health and safety management system. Since the bundled project does not generate any type of pollutants, employees are not exposed to unsafe or unhealthy environment.	
Principle 4.1 Sites of Cultural and Historical Heritage			
Does the Project Area include sites, structures, or objects	No	According to the geographical coordinates, the bundled	Not applicable

with historical, cultural, artistic, traditional or religious values or intangible forms of culture?		project area does not include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture.	
>>			
Principle 4.2 Forced Eviction and Displacement			
Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?		As described in the EIA reports, the increased water level in the reservoir of the bundled project may lead to a little more flooded area including farmland and 6km-long path.	
>>	No	Before the construction of the bundled project, the project owner and the villagers whose lands might be impacted by the project agreed a compensation agreement. The project owner had compensated for farmland and path, the compensation fee had been paid by the project owner before the construction of the bundled project. In the third crediting period, the bundled project does not	Not applicable

		involve the physical or economic relocation of peoples (temporary or permanent, full or partial).	
Principle 4.3 Land Tenure and Other Rights			
a. Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or access rights, usage rights or land ownership? b. For Projects involving land use tenure, are there any uncertainties with regards to land tenure, access rights, usage rights or land ownership? >>	No	a. The bundled project is not involved any change to land tenure arrangements. b. The project owner and villagers have signed a compensation agreement for their lands might be impacted by the project. In the third crediting period, the bundled project is not required any change or had uncertainties with regards to land tenure, access rights, usage rights or land ownership.	Not applicable
Principle 4.4 - Indigenous people			
Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No	According to the EIA reports, no indigenous peoples present in or within the area of influence of the bundled project.	Not applicable

>>			
Principle 5. Corruption			
1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects	No	The bundled project does not involve and is not complicit in corruption. The bundled project complies with Chinese Labour Law and relevant regulations, does not condone or support corruption.	Not applicable
Principle 6.1 Labour Rights			
1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions	No	1. All employees are engaged in the bundled project implementation on a voluntary basis. Labour rights are protected in the Labour Contract Law ¹¹ . The bundled project fully respects the employee's rights in accordance with all labour related laws. 2. The rights to unionize, bargain collectively is highly	Not applicable

¹¹ <https://www.gov.cn/>

2. Workers shall be able to establish and join labour organisations 3. Working agreements with all individual workers shall be documented and implemented and include: a) Working hours (must not exceed 48 hours per week on a regular basis), AND b) Duties and tasks, AND c) Remuneration (must include provision for payment of overtime), AND d) Modalities on health insurance, AND e) Modalities on termination of the contract with provision		protected by Labor Contract Law ¹². The bundled project activity does not interfere with legal rights regarding employees' freedom of association or their right to collective bargaining. The project fully respects the employee's freedom and rights. 3. The bundled project complies with Chinese Labour Law and relevant regulations. The working agreements between the company and individual workers are documented and implemented. It includes: a) Working hours (must not exceed 48 hours per week on a regular basis), AND b) Duties and tasks, AND	
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¹² <https://www.gov.cn/>

for voluntary resignation by employee, AND f) Provision for annual leave of not less than 10 days per year, not including sick and casual leave. 4. No child labour is allowed (Exceptions for children working on their families' property requires an Expert Stakeholder opinion) 5. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures		c) Remuneration (must include provision for payment of overtime), AND d) Modalities on health insurance, AND e) Modalities on termination of the contract with provision for voluntary resignation by employee, AND f) Provision for annual leave of not less than 10 days per year, not including sick and casual leave. 4. China has published protection laws on the minors. Employment regulations are described in this Law. Therefore, the project does not employ and is not complicit in any form of child labour. According to the Employee employment contract, it could be confirmed that the Project does not employ any child labour. 5. All equipment in the bundled project are operated properly according to the work	
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		procedures and safety regulation rules. The project owner organizes employee training with topics on technical, environmental/safety code, and operational/maintenance procedures. The bundled project has established guard and response procedure, which also regulates the documentation and reporting of accidents and incidents. Thus, the Project owner ensures the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures.	
Principle 6.2 Negative Economic Consequences			
1. Does the project cause negative economic consequences during and after project implementation?	No	The bundled project could supply job opportunities to local people, which is good to local economy. As the Project's purpose is to supply energy by	Not applicable

>>		utilizing water source, there is no potential risks of the project to the local economy.	
Principle 7.1 Emissions			
Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	During the operation period, the electricity generated by the bundled project partially replaces electricity generation from other conventional sources of energy. The bundled project helps to reduce greenhouse gas (GHG) emissions by an estimated 12,317 tCO ₂ e per year during the third crediting period.	Not applicable
>>			
Principle 7.2 Energy Supply			
Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	The bundled project is a hydropower plant who does not use any fuel resource and only involves a little electricity consumption for emergency situation which will be delivered directly from Central China Power Grid (CCPG) and the energy supply for other local users will not be influenced.	Not applicable
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Principle 8.1 Impact on Natural Water Patterns/Flows			
Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	There is no obvious variation of water quantity because the bundled project is a run of river hydropower plant with no capacity of conditioning.	Not applicable
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Principle 8.2 Erosion and/or Water Body Instability			
a. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? b. Is the Project’s area of influence susceptible to excessive erosion and/or water body instability?	No	a. The earthworks are filled in the project site for replanting; rehabilitation of vegetation in the affected places such as construction site and reservoir are conducted right after the completion of the construction work. Walls will be constructed along the shore of the river to keep the soil; an acceptance meeting with governmental agencies has been held to prove that and the project passed the completion check. Thus, the bundled project is not caused additional erosion	Not applicable
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		and/or water body instability or disrupt the natural pattern of erosion in operation period b. According to the result of the acceptance meeting with governmental agencies, the bundled project's area of influence is not susceptible to excessive erosion and/or water body instability.	
Principle 9.1 Landscape Modification and Soil			
Does the Project involve the use of land and soil for production of crops or other products?	No	The bundled project does not involve the use of land and soil for production of crops or other products.	Not applicable
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Principle 9.2 Vulnerability to Natural Disaster			
Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	According to EIA of the bundled project, there is no obvious variation of water quantity because this project is a run of river hydropower plant with no capacity of conditioning. And no significant environmental	Not applicable
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		impact was expected due to the bundled project. In addition, Water and Soil Conservation Plan is strictly enforced during and after the construction period to mitigate the impact on local environment. Therefore, the bundled project will not be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions.	
Principle 9.3 Genetic Resources			
Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development, or take place in facilities or farms that include GMOs in their processes and production)?	No	The bundled project does not involve the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development).	Not applicable
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Principle 9.4 Release of pollutants			
Could the Project potentially result in the release of pollutants to the environment?	Potentially	According to EIA, the air pollution mainly comes from project construction which has been well controlled. In the operation period, the waste mainly consists of oil in the wastewater and domestic wastewater. According to EIA, there will be no considerable effects on fish and organism species and habitats due to the project activity and no extinction of any animals will happen. The outcome of Report for the Examination and Acceptance of Completed Project has also concluded that the measures of ecological conservation have been well implemented.	During the construction period, washing wastewater was treated in a sediment tank before discharged to the river and then the impact of waste water on local water body was not significant. During the operational period, oil in the wastewater is absorbed by oil absorption paper and wood residues. The paper and wood residues with oil is burned afterwards to prevent potential pollutions. Sanitary sewage is treated in the septic tank by digestion process and reused as fertilizers.
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Principle 9.5 Hazardous and Non-hazardous Waste			
Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The bundled project does not involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials.	Not applicable

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Principle 9.6 Pesticides & Fertilisers			
Will the Project involve the application of pesticides and/or fertilisers?	No	The bundled project does not involve the application of pesticides and/or fertilisers.	Not applicable
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Principle 9.7 Harvesting of Forests			
Will the Project involve the harvesting of forests?	No	The bundled project does not involve the harvesting of forests.	Not applicable
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Principle 9.8 Food			
Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The bundled project does not involve the negative influence on access to and availability of food for people affected.	Not applicable
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Principle 9.9 Animal husbandry			
Will the Project involve animal husbandry?	No	The bundled project does not involve animal husbandry.	Not applicable
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Principle 9.10 High Conservation Value Areas and Critical Habitats			

Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	According to the EIA reports, the bundled project does not physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified.	Not applicable
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Principle 9.11 Endangered Species			
a. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)? b. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?	No	According to the EIA report, there are no endangered species identified as potentially being present within the Project boundary (including those that may route through the area), and the bundled project would not potentially impact other areas where endangered species may be present through transboundary affects.	Not applicable
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APPENDIX 2- CONTACT INFORMATION OF PROJECT PARTICIPANTS

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APPENDIX 3- LUF ADDITIONAL INFORMATION

Not applicable as the bundled project is not LUF project.

APPENDIX 4-SUMMARY OF APPROVED DESIGN CHANGES

There is no post registration design change.

Revision History

Version	Date	Remarks
1.2	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Inclusion criteria table added Gender sensitive requirements added Prior consideration (1 yr rule) and Ongoing Financial Need added Safeguard Principles Assessment as annex and a new section to include applicable safeguards for clarity Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on Stakeholder Consultation information required Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1.0	10 July 2017	Initial adoption