

VALIDATION REPORT

GROUPED CONNECT SOLAR PV POWER GENERATION PROJECT IN CHINA



Document Prepared By Bureau Veritas Certification

Project Title	Grouped Connect Solar PV Power Generation Project in China
Version	02
Report ID	BVC/China-VCS/7082/2015

Report Title	Validation of Grouped Connect Solar PV Power Generation Project in China
Client	KOE Environment Consultancy, Inc.
Pages	27
Date of Issue	26/06/2015
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Summary:

Bureau Veritas Certification has conducted the validation of “Grouped Connect Solar PV Power Generation Project in China” (here after referred as the Grouped Project), owned by China Three Gorges New Energy Corp, which is located in P.R.China, on the basis of VCS Standard Version 3.5, VCS Validation and Verification Manual, and the approved Clean Development Mechanism (CDM) methodology ACM0002 (Version 16.0), as well as criteria given to provide for consistent project operations, monitoring and reporting. The validation report and the validation protocol are summarizing the findings of the validation.

The validation scope is defined as an independent and objective review and ex-ante determination of the estimated GHG emission reductions, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) on-line interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion. The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The Grouped Project generate electricity by using renewable solar PV energy to the grid and replacing equivalent electricity generated by fossil fuel fired power plants connected to the State Grid or China Southern Power Grid, the geographical boundary of which is that of the 30 provinces in China, and therefore reducing Greenhouse Gas emissions. The initial seven instances of the Grouped Project displace electricity generated from Northwest China Power Grid (NWPG), which is one of the six Power Grids controlled by State Grid or the Southern Power Grid, resulting in a net reduction of 302,628 tCO₂ emissions annually and 3,026,288 tCO₂ emissions during the first crediting period.

The first output of the validation process is a list of 3 Clarification and 1 Corrective Actions Requests (CL and CAR), presented in APPENDIX A. Taking into account this output, the project proponent revised its project design document.

In summary, it is Bureau Veritas Certification’s opinion that the Project correctly applies the VCS-approved CDM methodologies ACM0002 (Version 16.0) and meets the relevant VCS Standard v3.5 requirements and the relevant host country criteria.

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1 INTRODUCTION

1.1 Objective

KOE Environment Consultancy, Inc. has commissioned Bureau Veritas Certification to conduct the validation of “Grouped Connect Solar PV Power Generation Project in China” (here after referred as the Grouped Project), owned by China Three Gorges New Energy Corp (hereafter referred to as “the PP”), which is located in P.R.China.

Bureau Veritas Certification as the validation/verification body (VVB) of the Project has been accredited as a DOE by UNFCCC and also meets the competence requirements as set out in ISO 14065:2007.

The objective of validation is to verify of the project description, in particular, the Project's baseline, the monitoring plan (MP), and the Project's compliance with relevant Voluntary Carbon Standard version 3.5 /1/ are validated in order to confirm that the project design, as documented, is sound and reasonable, and meets the stated requirements and identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the Project and its intended generation of Voluntary Carbon Units (VCU).

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the VCS project description (VCS-PD), the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against VCS version 3.5 requirements, UNFCCC rules and associated interpretations.

The validation is not meant to provide any consulting towards the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

1.3 Level of Assurance

Bureau Veritas Certification has undertaken a reasonable assurance engagement in accordance with VCS version 3.5. It requires a reasonable level of assurance in validation that GHG assertions are free of material errors, omissions and misrepresentations. The validation conclusion is based on the VCS-PD [2], CPA-DD [4], supporting evidences made available to the verifier and information collected through performing interviews.

1.4 Summary Description of the Project

The Grouped Project is a grouped solar power project in China, aims to generate electricity by using renewable solar PV energy to the grid.

The initial seven instances of the Grouped Project are all located in P.R. China:

INSTANCE 01: Yongchang County Dazhaitan 50MW Grid Connected Solar PV Power Generation Project;

INSTANCE 02: Yongchang County Heqingtian Phase II 50MW Grid Connected Solar PV Power Generation Project;

INSTANCE 03: Wulan 20MW Grid Connected Solar PV Power Generation Project;

INSTANCE 04: Three Gorges New Energy Hetian Pishan Phase II 20MW Grid Connected Solar PV Power Generation Project;

INSTANCE 05: Three Gorges New Energy Hami 20MW Grid Connected PV Power Generation Project;

INSTANCE 06: Suzhou Zhaoyang Dongdongtan Phase I 50MW Grid Connected Solar PV Power Generation Project;

INSTANCE 07: Suzhou Sanyang Dongdongtan Phase II 50MW Grid Connected Solar PV Power Generation Project.

<i>Project title:</i>	<i>Grouped Connect Solar PV Power Generation Project in China</i>
<i>Project Proponents:</i>	<i>China Three Gorges New Energy Corp.</i>
<i>Methodologies used:</i>	<i>ACM0002 (Version 16.0)</i>
<i>Geo coordinates and Location of Instances:</i>	
<i>Instance 01</i>	<i>102°17'49"E, 38°16'29"N Yongchang County, Jinchang City, Gansu Province</i>
<i>Instance 02</i>	<i>102°16'40"E, 38°16'58"N Yongchang County, Jinchang City, Gansu Province</i>
<i>Instance 03</i>	<i>98°23'50"E, 37°00'42"N Wulan County, Qinghai Province</i>
<i>Instance 04</i>	<i>78°14'51"E, 37°32'21"N Pishan County, Hetian City, Xinjiang Uygur Autonomous Region</i>
<i>Instance 05</i>	<i>93°37'07"E, 43°02'44"N Hami City, Xinjiang Uygur Autonomous Region</i>
<i>Instance 06</i>	<i>98°34'30"E, 39°35'06"N Jiuquan City, Gansu Province</i>
<i>Instance 07</i>	<i>98°34'20"E, 39°35'27"N Jiuquan City, Gansu Province</i>

The grouped project start date is 23/01/2013, which is earliest commission date of the initial seven project activity instances.

2 VALIDATION PROCESS

2.1 Method and Criteria

The overall validation, from Contract Review to Validation Report & Opinion, was performed using Bureau Veritas Certification internal procedures.

Bureau Veritas Certification validated the project against the requirements set in VCS standard version 3.5.

2.2 Document Review

The VCS Project Description (VCS-PD) was submitted by KOE Environment Consultancy, Inc. and additional background documents related to the project design and baseline were reviewed.

Furthermore, cross checks were made between information provided in the VCS-PD and information from sources other than those used.

The validation conclusions presented in this report relate to the project as described in the VCS-PD version 01 dated 13/06/2015 [1].

To address Bureau Veritas Certification corrective action and clarification requests, the PD was revised to version 02 [2] and resubmitted on 15/06/2015.

2.3 Interviews

During 04/06/2015, Bureau Veritas Certification participated an online interview via video conference system with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of listed Project Owners and consultants were interviewed. The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed Organization	Interview Topics
China Three Gorges New Energy Corp	➤ Project background information. ➤ Project technology, operation and maintenance. ➤ Project approval and right of use ➤ Project implementation status. ➤ Project management and monitoring plan. ➤ Stakeholder consultation process.
Three Gorges New Energy Jinchang Wind Power Co. Ltd.	
Wulan Jinfeng New Energy PV Power Co., Ltd.	
Three Gorges New Energy Pishan Power Generation Co., Ltd.	
Three Gorges New Energy Hami Wind Power Co., Ltd.	

Jiuquan Zhaoyang New Energy Power Generation Co., Ltd.	
Jiuquan Sanyang New Energy Power Generation Co., Ltd.	
KOE Environment Consultancy, Inc.	➤ Applicability of selected methodology. ➤ Baseline determination. ➤ Emission reductions calculation. ➤ Emission reduction monitoring plan.
Local residence of instances	➤ Project background in details ➤ Stakeholder comments ➤ Social and environmental impact of the Project

2.4 Site Inspections

Bureau Veritas Certification has not concluded a physical site visit, for below reasons.

- Bureau Veritas Certification has already validated all seven instances during CDM CPA inclusion procedure of Grid Connect Solar PV Power Generation Plant Programme (PoA 8868) [5]. All seven CPAs require no site visit and have already been successfully included in the PoA. It is planned that site visit shall be conducted during verification of this project.
- A desk review and online interview have been conducted. Relevant person of each instance was interviewed. The relevant documents, including Feasibility Study Report and its approval, Environmental Impact Assessment [10] and its approval [11], local stakeholder consultation records [27] and other relevant background documents were provided and assessed. The project description in the PD was verified from these documents. In addition, according to Feasibility Study Report, Environmental Impact Assessment, local stakeholder consultation records, no resettlement were involved in these instances.
- Bureau Veritas Certification can confirm the actual project design, construction, operation and monitoring plan by reviewing the related documents, the photos of project physical site and nameplates of the equipment [21], photos of Business Licenses [6], grid connection contracts [15], wiring diagrams [16] and other documents, and the on-line interviews with the instances owners.
- Bureau Veritas Certification checked the signed EPC contracts [14] and other investment contracts [17][18][19], therefore can confirm that the installed main equipments described in

the PD are consistent with the documented evidence. The baseline scenario information also can be confirmed as the methodology ACM0002 Version 16.0 has been applied.

Based on above reasons, Bureau Veritas Certification considers a site visit is not necessary and it does not change the reasonable assurance of this validation.

2.5 Resolution of Findings

The objective of this phase of the validation is to resolve issues that require further elaboration, research or expansion prior to Bureau Veritas Certification's positive conclusion on the project design.

A Corrective Action Request (CAR) is raised, if one of the following situations occurs:

- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable, verifiable and additional emission reductions;
- (b) The applicable VCS requirements have not been met;
- (c) There is a risk that emission reductions cannot be monitored or calculated.

A Clarification Request (CL) is raised, if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

A Forward Action Request (FAR) may also be raised during validation, to identify issues related to project implementation that require review during the first validation of the project activity.

To guarantee the transparency of the validation process, the issues raised, the responses provided by the project participants, the means of validation of such responses and references to any resulting changes in the VCS-PD or supporting annexes are documented in the Appendix A.

2.6 Forward Action Requests

N.A.

3 VALIDATION FINDINGS

3.1 Project Details

The Grouped Project is a grouped solar power project in China, aims to generate electricity by using renewable solar PV energy to the grid. The Grouped Project falls under UNFCCC CDM sectoral scope 01, "Energy Industries (renewable- /non-renewable resources)".

The photovoltaic generating plant consists of PV array, inverter, boost transformer and electricity grid connecting system. The PV array inverts a photovoltaic power to a direct current electricity power. The inverter system inverts a direct current to an alternating current. The boost transformer sends a generated voltage to the grid.

Bureau Veritas Certification reviewed the Feasibility Study Reports [8], technical agreement of the equipment [20], photos of nameplates of the solar cells and inventors [21], and confirms consistency with the technical characteristics of the initial seven instances described in the VCS-PD.

Bureau Veritas Certification confirmed that China Three Gorges New Energy Corp is the grouping entity which is responsible for coordinating and managing the group project. Other entities including the project owners of every instance included in this Group project and the Consultancy Company, initial seven which are listed below.

Table 2 Project owners of the initial seven instances

	Project owner
Instance 01 Instance 02	Three Gorges New Energy Jinchang Wind Power Co. Ltd.
Instance 03	Wulan Jinfeng New Energy PV Power Co., Ltd.
Instance 04	Three Gorges New Energy Pishan Power Generation Co., Ltd.
Instance 05	Three Gorges New Energy Hami Wind Power Co., Ltd.
Instance 06	Jiuquan Zhaoyang New Energy Power Generation Co., Ltd.
Instance 07	Jiuquan Sanyang New Energy Power Generation Co., Ltd.
Consultancy Company	KOE Environment Consultancy, Inc.

Project start date

According to the *VCS Validation and Verification Manual*, the start date refers to the date the project starts generating emission reductions and removals. Bureau Veritas Certification reviewed the commissioning records [24] and therefore confirmed the commission date of the initial seven project activity instances included in the grouped project, on which the project began generating GHG emission. The grouped project started on 23/01/2013, which is earliest commission date of the initial seven project activity instances.

Table 3 Commission date of the initial seven instances

Instance	Commission Date
Instance 01	06-03-2013
Instance 02	26-12-2013
Instance 03	23-01-2013

Instance 04	21-12-2013
Instance 05	26-12-2013
Instance 06	20-07-2013
Instance 07	30-06-2013

Project crediting period

Renewable crediting period has been chosen by the grouped project, Bureau Veritas Certification confirmed that the first 10 year crediting period from 23/01/2013 to 22/01/2023 of the grouped project is correctly chosen.

Project scale and estimated GHG emission reductions or removals

According to VCS standard, Projects are categorized by size according to their estimated average annual GHG emission reductions or removals:

- 1) Projects: Less than or equal to 300,000 tonnes of CO₂e per year.
- 2) Large projects: Greater than 300,000 tonnes of CO₂e per year.

The estimated annual average GHG emission reductions from the initial seven project activity instances are 302,268tCO₂e. Bureau Veritas Certification confirmed that the grouped project is a large project.

Project location

Bureau Veritas Certification reviewed the KML files [13] of the initial seven instances, and confirmed that the initial seven project activity instances are located in Gansu province, Qinghai province and Xinjiang Uygur Autonomous Region separately, which are all included in the Northwest China Power Grid. Their detailed geodetic coordinates are listed as follow:

Instance 01: 102°17'49"E, 38°16'29"N

Instance 02: 102°16'40"E, 38°16'58"N

Instance 03: 98°23'50"E, 37°00'42"N

Instance 04: 78°14'51"E, 37°32'21"N

Instance 05: 93°37'07"E, 43°02'44"N

Instance 06: 98°34'30"E, 39°35'06"N

Instance 07: 98°34'20"E, 39°35'27"N

Conditions prior to project initiation

Prior to the initiation of the Project, *Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the*

addition of new generation sources, as reflected in the combined margin (CM), which is in conformity with the approved ACM0002 (version 16). This is also the baseline scenario.

Project compliance with applicable laws, statutes and other regulatory frameworks

The Project complies with relevant laws and regulations. Bureau Veritas Certification reviewed various local and state approvals [9][11] (including approval letters from governmental authorities: Development and Reform Commission (DRC) and Environment Protection Agency (EPA)) as well as interviewed project personnel during the on-line interview in order to confirm that necessary regulatory requirements were met.

Ownership and other programs

- **Right of use**

By reviewing the Business licences, and on-line National Enterprise Credit Information publicity system [29] published by the State Administration for Industry and Commerce, Bureau Veritas Certification confirmed that, China Three Gorges New Energy Corp. is the major shareholder of the project owner companies of the initial seven project instances, therefore China Three Gorges New Energy Corp. have full ownership of the initial seven instances' polycrystalline silicon solar cells, inventers and other equipments, and process that generates the GHG emission reductions. This constitutes overall control and responsibility for the project activity. A statement of right of use [31] is also provided and checked.

- **Emissions trading programs, other binding limits and Other forms of environmental credit sought or received and eligible to be sought or received**

Bureau Veritas Certification reviewed an attestation [30] signed by China Three Gorges New Energy Corp and project owners of the initial seven project instances, confirmed that the grouped project and any of its project activity instances does not reduce GHG emissions from activities that are included in an emission trading program or any other mechanism that includes GHG allowance trading. Also, the grouped project and any of its project activity have no intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

- **Participation under other GHG programs**

Bureau Veritas Certification has confirmed that the Grouped Project has not been registered, or is seeking registration under any other GHG programs.

Bureau Veritas Certification has checked UNFCCC Website and confirmed that, the initial seven project instances are also the CPAs of the Grid Connect Solar PV Power Generation Plant Programme (PoA 8868) under CDM, which were included in the PoA on 2015/02/04.

Bureau Veritas Certification has checked the project proponent's confirmation letter [30] and confirms that there will be no double counting.

- Rejection by other GHG programs

Bureau Veritas Certification has checked UNFCCC CDM web site, GS website and other information source, confirmed that the grouped project and any of its project instances have not been rejected by any other GHG programs.

Eligibility Criteria

Because this is a grouped project, the VCS PD provides eligibility criteria for the inclusion of additional project activity instances. Bureau Veritas Certification checked the eligibility criteria for new project activity instances in accordance with VCS Standard (version 3.5). All eligibility criteria for the initial seven instances are met:

Bureau Veritas Certification reviewed VCS PD and confirmed that all the initial seven instances are in accordance with ACM0002 (Version 16.0)

Bureau Veritas Certification has reviewed the documents of all the initial seven instances and confirmed they are grid connect solar PV power generation projects.

Bureau Veritas Certification has confirmed that the initial seven instances are located in Gansu province, Qinghai province and Xinjiang Uygur Autonomous Region separately, which are all included in the 30 the provinces in China, and all belongs to Northwest China Power Grid.

Bureau Veritas Certification has confirmed that all the initial seven instances adopt solar photovoltaic technologies and the percentage share of total installed capacity of the specific technology in the total installed grid connected power generation capacity in the host country is about 1.95% [28], less than two percent, therefore are in compliance with the requirements ACM0002 (Version 16.0) for the simplified procedure to demonstrate additionality.

Bureau Veritas Certification has confirmed by documentary evidence (commissioning records [24]) that the earliest start date of all the initial seven instances is 2015/01/23 (start date of instance 03), the start date of other six instances are later.

Bureau Veritas Certification has all the project activity instances under the grouped project are subject to the baseline scenario determined.

Leakage Management

According to applied CDM methodology ACM0002 (Version 16.0), leakage is not considered.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

3.2 Application of Methodology

3.2.1 Title and Reference

The VCS-approved methodology applied to the project activity is the approved consolidated CDM baseline and monitoring methodology ACM0002 (Version 16.0) “Grid-connected electricity generation from renewable sources”.

The methodology also refers to:

“Tool for the demonstration and assessment of additionality” (Version 7.0.0);

“Tool to calculate the emission factor for an electricity system” (Version 04.0).

More information concerning the above methodology and tools can be referred to:

<http://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHLAR6MJ6VEU83>

3.2.2 Applicability

Bureau Veritas Certification has checked the definitions of ACM0002 (Version 16.0) of the applicability of this methodology, and confirmed the Comparison in the following Table, which explains the reason why the methodology applies to the grouped project:

Table 4 the grouped project applicability

ACM0002 (Version 16.0)	the grouped project
This methodology is applicable to grid-connected renewable energy power generation project activities that (a) install a Greenfield power plant; (b) involve a capacity addition to (an) existing plant(s); (c) involve a retrofit of (an) existing plant(s)/unit(s); (d) involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) involve a replacement of (an) existing plant(s)/unit(s).	YES. All of the project activity instances (including the initial project activity instances and new instances will be added to the grouped project) are Greenfield solar PV power plants.
The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: 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 emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been	YES. (a) All of the project activity instances include solar power plant/unit; (b) All of the project activity instances under the grouped project are Greenfield solar PV power plants, and no capacity additions, retrofits, rehabilitations and replacements are involved in the project.

undertaken between the start of this minimum historical reference period and the implementation of the project activity.	
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 (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 (3), 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 (3), 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 (3), is lower than or equal to 4 W/m², all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) 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.	N/A. The grouped project is not hydro power plants.
In the case of integrated hydro power projects, project proponent shall: - 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 - 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 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 five years prior to implementation of CDM project activity.	N/A. The grouped project is not hydro power plants.

The methodology is not applicable to the following: - Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; - Biomass fired power plants/units.	N/A. All of the project activity instances are green field solar PV power plants and do not involve switching from fossil fuels to renewable energy sources at the sites of the projects. Biomass fired power plants/units are also not involved in the project.
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”.	N/A. No capacity additions, retrofits, rehabilitations and replacements are involved in the project.

It can be concluded from the above analysis that the proposed grouped project complies with the applicability requirement of the methodology.

3.2.3 *Project Boundary*

According to ACM0002 version 16.0, the project boundary is defined by the geographical extent of each project activity instance under the grouped project includes the project power plant and all power plants connected physically to the electricity system that the project activity instance power plant is connected to. The boundary of each project activity instance will be within the boundary of the grouped project as a whole.

China Three Gorges New Energy Corp is a new energy entity which plans to invest and build solar projects in all the 30 provinces in China. Therefore the grouped project covers the boundary in all 30 provinces in China. In the future, China Three Gorges New Energy Corp also plans to include other similar project activity instance which can meet the Eligibility Criteria and is located in the project boundary into this grouped project.

For the grouped project, electricity system referred as the grids controlled by State Grid and the Southern Power Grid, which including 30 Province Power Grid. For the initial seven instances, the electricity system referred as the Northwest China Power Grid, Instance 01, 02, 06, 07 located in Gansu Province, Instance 03 located in Qinghai Province, and Instance 04, 05 located in Xinjiang Uygur Autonomous Region. The remaining 27 provinces with no initial project activity instances have the same baseline scenario and rationale for the demonstration of additionality for the following reasons:

- All of the project activity instances (including the initial project activity instances and new instances will be added to the grouped project) has the same baseline scenario: Electricity

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

- Steps for the demonstration of additionality are the same for all of the project activity instances (including the initial project activity instances and new instances will be added to the grouped project). First, if the share of installed capacity of PV plant in China is lower than 2%, the project instance is additional; if not, the benchmark adopted by all of the project activity instances under the grouped project is the same, which is 8% for power sector. According to the conclusion of Section 2.5, the grouped project is additional, that is to say all of the project activity instances (including the initial project activity instances and new instances will be added to the grouped project) are additional. Therefore, the rationale for the demonstration of additionality are the same for all of the project activity instances, including the initial project activity instances and new instances will be added to the grouped project.

In conclusion, the geographical areas of the grouped project including of the 30 provinces are reasonable.

Bureau Veritas Certification reviewed the emissions source and sink determination included in the PD and found the justification accurate and in accordance with the applied methodology.

Overall, the Project Proponent(s) provided an accurate description of the project boundary and a comprehensive justification for the Grouped project and initial seven instances.

3.2.4 *Baseline Scenario*

According to the methodology ACM0002 (Version 16.0), the baseline scenario of each instances included in the Grouped Project is:

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

Bureau Veritas Certification reviewed the project instances description and supporting evidence regarding the technology applied, the modalities of electricity output and connection to the grid and determined that the baseline determination for the initial seven project instances is accurate, justified, and in accordance with the applicable methodologies.

3.2.5 *Additionality*

According to the methodology ACM0002 (Version 16.0), if the percentage share of total installed capacity of the grid-connected solar photovoltaic technology in the total installed grid connected

power generation capacity in the host country is equal to or less than two per cent, the simplified procedure to demonstrate additionality is applicable to the grid-connected projects using the specific technology. According to the latest statistical data [28], the installed capacity of the grid connected solar photovoltaic technology is 26,520MW, about 1.95% of total installed grid connected power generation capacity in China. Therefore it could be demonstrated that the grid-connected projects using solar photovoltaic technology in China is automatically additional according to the simplified procedure stated in the methodology ACM0002 (Version 16.0).

Therefore, the grouped project is additional.

If the installed capacity of the grid connected solar photovoltaic technology is lower than 2%, the project proponent could also demonstrate additionality of the Project through an investment analysis via application of the *Tool for the demonstration and assessment of additionality, version 7.0.0*. The VCS PD follows the stepwise procedure as further described below:

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

Bureau Veritas Certification confirmed that the project activity instances are not the first-of-its-kind.

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

The VCS PD identifies several alternatives to the Project activity, which were assessed to be realistic and consistent with the project technology, societal benefit, and Project Proponents objectives, thus reducing the alternatives to the following:

Baseline alternative I: The project activity instances in the grouped project are not implemented as a VCS project activity;

Baseline alternative II: The continuation of the current situation - Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin(CM) calculations described in the “Tool to calculate the emission factor for an electricity system”

Bureau Veritas Certification confirmed that both I and II alternatives are realistic and feasible and comply with applicable laws and regulations.

Step 2. Investment analysis:

The procedure to carry out investment analysis of the grouped project is in accordance with “*Tool for the demonstration assessment of additionality*”(Version 07.0).

Sub-step 2a. Determine appropriate analysis method

As all the instances in the grouped project is newly installed grid connected solar power generation projects, and the baseline scenario of the grouped project is the provision of electricity by the grid, *Bureau Veritas Certification* confirmed Benchmark analysis (Option III) was the appropriate analysis method selected by the VCS PD.

Sub-step 2b: (Option III) Apply Benchmark Analysis

The VCS PD identifies the financial benchmark project IRR (after tax) on total investment of Chinese power industry is 8% (Government/official approved benchmark).

Bureau Veritas Certification reviewed the Interim Measures on Economic Assessment of Electric Engineering Retrofit Projects issued by former State Power Corporation of China in 2002 [25], which has stated that the financial benchmark of total investment Internal rate of return (IRR) (post tax) in China's power industry is 8%. Therefore *Bureau Veritas Certification* confirmed the benchmark of 8% was appropriate for the grouped project.

Sub-step 2c. Calculation and comparison of IRR

Post-tax Project IRR is required in VCS PD. If the project IRR of a project is lower than that of the benchmark, the project is not considered as financially attractive.

Sub-step 2d: Sensitivity Analysis

A sensitivity analysis is presented in the VCS PD to demonstrate that the financial analysis is robust to reasonable variations in critical assumptions. Specifically, total static investment, tariff (including VAT), O&M cost, and Annual Supplied Electricity were varied by 10 percent. The Project is not financially attractive, if the IRR of the proposed project activity instances is still lower than the benchmark 8%.

Step 3. Barrier analysis:

Not applicable.

Step 4. Common practice analysis:

The VCS PD includes an assessment of common practice applying the “*Guidelines on common practice*” per sub-step 4a of the *Tool for the demonstration and assessment of additionality*.

Step 1: VCS PD calculated applicable output range as +/-50% of the design capacity of each instances activity, Bureau Veritas Certification has confirmed the detailed calculation result listed in table 29 in VCS PD;

Step 2: VCS PD defined the applicable geographical area of a project activity instance is defined as the province where the instance is located in. In the applicable geographical area, VCS PD identified all Grid connected Solar power plants that have the same capacity, within the applicable output range calculated in Step 1, which have started commercial operation before the start date of the instances activity, and note their number N_{all} .

Step 3: Within plants identified in Step 2, VCS PD identified those that apply technologies different from that applied in the proposed project activity and note their number N_{diff} . $N_{all} = N_{diff}$

Step 4: VCS PD calculated that:

$F = 1 - N_{diff}/N_{all}$. The proposed project activity is a “common practice” within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all} - N_{diff}$ is greater than 3.

Bureau Veritas Certification has verified the description in the VCS PD and found that it is consistent with the methodology.

3.2.6 Quantification of GHG Emission Reductions and Removals

As per baseline methodology ACM0002 Version 16, the emission reductions are the difference between baseline emissions and project emissions and leakage. These are:

- 1) Baseline emissions: baseline emissions BE_y (tCO_2) are equal to baseline emission factor $EF_{grid,CM,y}$ (tCO_2/MWh) times the net electricity supplied to the grid $EG_{PJ,y}$ (MWh) (the Project is a Greenfield solar power plant, therefore $EG_{PJ,y}$ equals to $EG_{facility,y}$ that is quantity of net electricity generation supplied by the project plant/unit)
- 2) Project Emissions: the project emissions are regarded as zero as per methodology ACM0002 Version 16.
- 3) Leakage: no leakage need to be considered as per methodology ACM0002 Version 16.
- 4) Emission reductions:

$$ER_y = BE_y - PE_y = EF_{grid,CM,y} \times EG_{PJ,y} - 0 = EF_{grid,CM,y} \times EG_{facility,y}$$

$EG_{PJ,y}$ (equals to $EG_{facility,y}$) is the quantity of net electricity generation supplied by the project plant/unit, which will be monitored during each monitoring period. Bureau Veritas Certification reviewed the VCS PD, and confirmed that this value keep consistent with each instances' FSR Estimate Value, which was calculated from the Installed capacity and operation hours [8].

According to the *baseline methodology ACM0002 Version 16* and *Tool to calculate the emission factor for an electricity system version 04*, the baseline emission factor was calculated as six steps. In addition, the calculation in the VCS PD refers to the "Notification of China-Grid EF"/6/, which is the most recent information available at the time of VCS PD submission to Bureau Veritas Certification for validation.

Bureau Veritas Certification has checked the "Notification of China-Grid EF" and can confirm that the emission factor calculation is in accordance with data in the China Electric Power Yearbook from 2011 to 2013 and China Energy Statistical Yearbook from 2011 to 2013, and also complies with requirement the Tool-Grid EF. According to the "Notification of China-Grid EF", the Simple OM emission factor ($EF_{grid,OM,y}$), build margin emission factor ($EF_{grid,BM,y}$) of each relevant grid are calculated as in following table. According to the *"Tool to calculate the emission factor for an electricity system"*, the default weights for solar power generation projects are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$. Therefore the combined margin emission factors, i.e. the baseline emission factors of each relevant grid are also calculated as in following table:

Table 5 emission factors of power grids in China

Power Grid	$EF_{grid,OM,y}$ (tCO_2/MWh)	$EF_{grid,BM,y}$ (tCO_2/MWh)	$EF_{grid,CM,y}$ (tCO_2/MWh)
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North China Power Grid	1.0580	0.5410	0.92875
Northeast Power Grid	1.1281	0.5537	0.9845
East China Power Grid	0.8095	0.6861	0.77865
Central China Power Grid	0.9724	0.4737	0.847725
Northwest Power Grid	0.9578	0.4512	0.83115
China Southern Power Grid	0.9183	0.4367	0.7979

Table 6 Emission reductions of the grouped project

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
2013/01/23-2013/12/31	135,593	0	0	135,593
2014	319,052	0	0	319,052
2015	319,052	0	0	319,052
2016	319,052	0	0	319,052
2017	319,052	0	0	319,052
2018	319,052	0	0	319,052
2019	319,052	0	0	319,052
2020	319,052	0	0	319,052
2021	319,052	0	0	319,052
2022	319,052	0	0	319,052
2023/01/01-2023/01/22	19,227	0	0	19,227
Total	3,026,288	0	0	3,026,288

Bureau Veritas Certification verified the emission reductions calculation spreadsheet [3] and confirms that the emission reductions of the initial seven instances were reasonably estimated and correctly calculated.

3.2.7 Methodology Deviations

No deviations were identified between the VCS PD and the stated criteria.

3.2.8 Monitoring Plan

The VCS PD applies the approved consolidated monitoring methodology ACM0002 Version 16. Bureau Veritas Certification considers that the selected monitoring methodology is applicable to the initial seven instances.

Data and Parameters Monitored

The quantity of net electricity generation supplied by the initial seven instances in year y

($EG_{\text{facility},y}$), the electricity delivered by the project to the grid in year y ($EG_{\text{output},y}$) and the electricity imported by the initial seven instances from the grid in year y ($EG_{\text{input},y}$) will be measured continuously by the meter installed onsite according to the Technical Administrative Code of Electric Energy Metering (DL/T 448-2000)[32], and recorded monthly. In different instances, the monitoring points and methods may be different according to the real condition of the plant.

Net quantity of electricity delivered to the grid by the proposed initial seven instances in year y ($EG_{\text{facility},y}$) will be calculated monthly, using the following formula:

$$EG_{\text{facility},y} = EG_{\text{output},y} - EG_{\text{input},y}$$

Bureau Veritas Certification reviewed the monitoring points of the initial seven instances and confirmed the initial seven instances' monitoring point are appropriate.

Implementation of the Monitoring Plan

The accuracy of the meter employed by the proposed initial seven instances will be at least 0.5S and the meters will be calibrated once a year. Receipts provided by the grid company are used for crosscheck the measurements of the meter. Bureau Veritas Certification is of the opinion that the monitoring plan complies with the requirements of the methodology.

Operational management for the initial seven instances is comprehensively detailed in the VCS PD. This includes description of the responsibilities, monitoring data, meters precision, meters calibration frequency, data management system, QA/QC procedure, training and emergency procedures.

Electronic data and documents will be regularly copied and archived, and kept at least for two years after the end of the last crediting period or two years after the last issuance of VCUs, whichever is later. Written data and documents will be copied and archived, and kept for at least two years after the end of the last crediting period or two years after the last issuance of VCUs, whichever is later.

The validation team considers that the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions achieved by/resulting from the proposed initial seven instances can be reported ex post and verified.

Bureau Veritas Certification hereby confirms that the monitoring plan complies with the requirements of the methodology including applicable tool(s), the monitoring arrangements described in the monitoring plan are feasible within the initial seven instances design and the project owners are able to implement the described monitoring plan.

3.3 Non-Permanence Risk Analysis

As the project is not an AFOLU project, the project activity does not require a non-permanence risk analysis.

3.4 Environmental Impact

All project activity instances are required to conduct an environmental impact assessments report, and apply for an approval for the environmental impact assessments report [11], in order to obtain construction and operation permits.

For the seven instance projects, their environmental impact assessments (EIA) reports [10] and approvals were checked to be valid.

Therefore, the validation team is able to confirm that the EIA has been conducted in accordance with the relevant Chinese Environmental Regulations and the environmental impact of the Grouped Project is insignificant.

3.5 Comments by Stakeholders

According to the PD, local stakeholders were invited to provide comments during environment impact assessment process before the start date of each instance's construction, which is mandatory according to the Chinese Environment Impact Assessment Law. The processes by which comments from local stakeholders have been invited and compiled, has been described within the PD as well as EIA report. Copies of questionnaires of each instance were distributed and all of them had been complied and returned [27]. The collected questionnaires with responses from stakeholders are maintained by the project operator and were presented to Bureau Veritas Certification for assessment. The stakeholders have recognized the contribution of the CPA to local environment and social economy.

Furthermore, representatives from the local community of all the seven instance projects were interviewed during online assessment. In general, the interviewees show adequate understanding of the nature of the project and agreed that the project would benefit the environment, society and economic development. The response is overall supportive.

4 VALIDATION CONCLUSION

Bureau Veritas Certification has performed the validation of “Grouped Connect Solar PV Power Generation Project in China” (here after referred as the Grouped Project), owned by China Three Gorges New Energy Corp, which applied the methodology ACM0002 Version 16.0. The validation was performed on the basis of VCS Standard version 3.5 and host country criteria and also on the criteria given to provide for consistent Project operations, monitoring and reporting.

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) on-line interview with project stakeholders; iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

Through detailed analysis of the Project, it is concluded that the Project is likely to result in reductions of GHG emissions. The tool for the demonstration assessment of additionality has been applied to demonstrate that the Project is not a plausible baseline scenario. Emission reductions attributable to the Project are hence additional to any that would occur in the absence of the Project. Given that the Project is implemented and maintained as designed, the Project is likely to achieve the estimated average annual emission reductions 302,268tCO₂e over the chosen 10-year crediting period.

The review of the project description (version 01) and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidences to determine the fulfilment of stated criteria. The PD (version 02) was subsequently revised on 15/06/2015 to resolve the issues raised during the interviews and subsequent interactions. In our opinion, the Project correctly applies and meets the relevant VCS 3.5 requirements.

5 REFERENCE

Documents reviewed:

- [1] VCS PD version 01 dated 15-05-2015
- [2] VCS PD version 02 dated 15-06-2015
- [3] Emission reductions calculation spreadsheets of the initial seven instances
- [4] Registered CDM CPA DDs of the initial seven instances
- [5] Registered CDM CPA Validation Report of the initial seven instances
- [6] Business licenses of the project proponent
- [7] Business licenses of the project operators
- [8] Feasibility Study Reports of the initial seven instances
- [9] Feasibility Study Reports approvals of the initial seven instances issued by Local Development and Reform Commission
- [10] Environmental Impact Assessment Reports of the initial seven instances
- [11] Environmental Impact Assessment approvals of the initial seven instances issued by Local Environmental Protection Bureau
- [12] VCS consulting service contract signed between China Three Gorges New Energy Corp and KOE Environment Consultancy, Inc.
- [13] KML files of geodetic coordinate for each instance.
- [14] EPC contracts of the initial seven instances
- [15] Grid connection contracts
- [16] Main wiring diagrams
- [17] Purchase contracts of polycrystalline silicon solar cells of the initial seven instances
- [18] Purchase contracts of inverter of the initial seven instances
- [19] Installation and construction contracts of the initial seven instances
- [20] Technical agreements of the installed equipments of the initial seven instances
- [21] Nameplates of the installed equipments of the initial seven instances
- [22] Project site photos of the initial seven instances
- [23] Construction starting orders of the initial seven instances
- [24] Commissioning records of the initial seven instances
- [25] Economic Evaluation Method and Parameters for Project Construction 3rd edition, issued by NDRC and Ministry of Construction of P.R. China on 03/07/2006
- [26] Website: www.gsdr.gov.cn/; <http://www.qhfgw.gov.cn/>; <http://www.xjdr.gov.cn/>; <http://www.saic.gov.cn/>
- [27] Stakeholder survey questionnaires of the initial seven instances
- [28] http://www.nea.gov.cn/2015-01/16/c_133923477.htm
- [29] <http://qyxy.baic.gov.cn/>
- [30] Confirmation letter of no double counting of the grouped project
- [31] Statement of right of use
- [32] Technical Administrative Code of Electric Energy Metering (DL/T 448-2000)

Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents used for cross-check.

- /1/ VCS Standard, 25 March 2015, v3.5
- /2/ VCS Validation and Verification Manual, 8 October 2013, v3.1
- /3/ Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities version 03.0 published as CDM-EB65 Annex 3

- and Amended as CDM-EB81 Annex 5
- /4/ Approved CDM methodology ACM0002 (Version 16.0), including all methodological tools reference therein
 - /5/ Tool to calculate the emission factor for an electricity system Version 04.0
 - /6/ Notification on Determining Baseline Emission Factor of China's Grid dated 11/02/2015.
 - /7/ <http://cdm.ccchina.gov.cn/>
 - /8/ Tool for the demonstration and assessment of additionality Version 7.0.0

Persons interviewed:

Project Owners

- /1/ Wang Hongye Project Manager of China Three Gorges New Energy Corp
- /2/ Dai Xiangqin Project Manager of Three Gorges New Energy Jinchang Wind Power Co. Ltd.
- /3/ Suo Shenyang Project Manager of Three Gorges New Energy Jinchang Wind Power Co. Ltd.
- /4/ Guan Wenhui Project Manager of Wulan Jinfeng New Energy PV Power Co., Ltd.
- /5/ Guan Wenhui Project Manager of Three Gorges New Energy Pishan Power Generation Co., Ltd.
- /6/ Wang Yaxi Project Manager of Three Gorges New Energy Hami Wind Power Co., Ltd.
- /7/ Wang Yaxi Project Manager of Jiuquan Zhaoyang New Energy Power Generation Co., Ltd.

KOE Environment Consultancy, Inc.

- /8/ Yang Lina Project Manager
- /9/ Qin Wenwen Project Manager
- /10/ Xiang Lihua Project Manager
- /11/ Yang Yaqin Project Manager

Local Stakeholders

- /12/ Liu Xing Local residence of instance 1
- /13/ Wang Zhiqiang Local residence of instance 2
- /14/ Liu Xiaoming Local residence of instance 3
- /15/ Wang Zhixin Local residence of instance 4
- /16/ Wang Hui Local residence of instance 5
- /17/ Wang Yue Local residence of instance 6
- /18/ Ding Shouhua Local residence of instance 7

6 CURRICULUM VITAE OF THE VALIDATION TEAM MEMBER

Mr. Tian Pin	Bureau Veritas Certification, China	Team Leader, Climate Change Lead Verifier, He holds a MEng in Industrial Engineering. Before joining BV in 2009, he gained two years working experience in project management in various industrial sectors. He obtained the certificate of CDM Verifier, Lead Auditor for ISO 14001 and has successfully completed the course assessment for ISO 14064.
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Ms. Peter Huang Qin	Bureau Veritas Certification, China	Technical Reviewer, Climate Change Lead Verifier. He holds a Master Degree in Industrial Ecology. Before joining BV in Jan 2010, he gained almost two years of CDM audit experience and two years of technical experience in power industry. He obtained the certificate of GHG Auditor, Lead Auditor for EMS ISO 14001 and has successfully completed the course assessment for ISO 14064:2006.
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APPENDIX A: RESOLUTION OF CORRECTIVE ACTION /CLARIFICATION / FORWARD ACTION REQUESTS

Draft report clarifications and corrective action requests by validation team	Summary of project participant response	Validation team conclusion
CAR-1 In order to keep the conservativeness of the quantification of GHG emission reductions, annual emission reduction of each instance's should be round down and accurate to integer.	The annual and total GHG emission reductions of each instance have been round down to keep the emission reductions to be conservative. Please refer to the version 02 of the project description and the ER calculation sheet.	Bureau Veritas Certification has checked the revised PD and the ER calculation sheet, and can confirm that the quantification of GHG emission reductions has been revised. The CAR is closed.
CL-1 Geodetic coordinate should be provided for the initial seven instances in a KML file.	The KML file of geodetic coordinate has been provided.	Bureau Veritas Certification has checked KML file of geodetic coordinate, which is consistent with the PD. The CL is closed.
CL-2 Project proponent and each instance company should provide the statement that there's No double counting in the grouped project and in each instance.	The statement that there will not be double counting in the grouped project and each instance has been provided. Please refer to the document.	Bureau Veritas Certification has checked statement that there will not be double counting in the grouped project and each instance written by the project proponent and each instance company. The CL is closed.
CL-3 Each instance company is required to admit the Right of Use of the project proponent.	Three Gorges New Energy Corp. is the grouping entity of the grouped project, and is also the project proponent. Each instance company is the subsidiary of Three Gorges New Energy Corp., which admit the Right of Use of the project proponent. The statements of right of use have been provided.	Bureau Veritas Certification has confirmed the relationship of Three Gorges New Energy Corp. and its subsidiary, and checked statements of right of use. The CL is closed.