

CGN HAMI PHASE I 20MWP GRID-CONNECTED PV POWER PLANT PROJECT

Document Prepared By CGN Carbon Asset Management (Beijing) Co., Ltd.

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

CGN Hami Phase I 20MWp Grid-connected PV Power Plant Project (hereafter referred to as “the project”) is a newly built photovoltaic power plant located in Hami City, Xinjiang Uygur Autonomous Region, P.R.China. The project is constructed and operated by CGN Solar Power Development Co., LTD (hereafter referred to as “the project owner”).

The project has a total installed capacity of 20.31MWp, the expected average annual net electricity generation during the whole operation lifetime is 29,846MWh with the plant load factor (PLF) of 16.8%. The electricity generated by the project will be supplied to Northwest China Power Grid (NWCPG). Prior to the implementation of the project, the equivalent electricity supplied by the project was sourced from the NWCPG. The project will substitute part of the fossil fuel-fired power plants connected to NWCPG so as to reduce the CO₂ emission of those plants. The expected electricity generation of the project in first year is 33,294MWh. The attenuation factor of the electricity generation is about 0.99 every year. The expected average annual net electricity generation during the first crediting period is 32,384MWh. The annual average emission reductions of the project during the first crediting period are estimated to be 29,029 tCO₂e.

The Project was put into operation on 28/12/2011. The expected operation period of the Project is 25 years as stated in the registered PDD.

During this monitoring period from 28/12/2011 to 26/12/2012, the total emission reduction achieved is 21,576 tCO₂e.

1.2 Sectoral Scope and Project Type

Category: Renewable electricity in grid connected application

Sectroal Scope 1: Energy Industry

The project is not a grouped project.

1.3 Project Proponent

Organization name	CGN Solar Power Development Co., LTD
Contact person	Shi Lei
Title	CDM office director
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1.4 Other Entities Involved in the Project

There are no other entities involved.

1.5 Project Start Date

28/12/2011(commisioning start date)

1.6 Project Crediting Period

The project crediting period is from 28/12/2011 to 26/12/2012 and the total crediting period is 365 days.

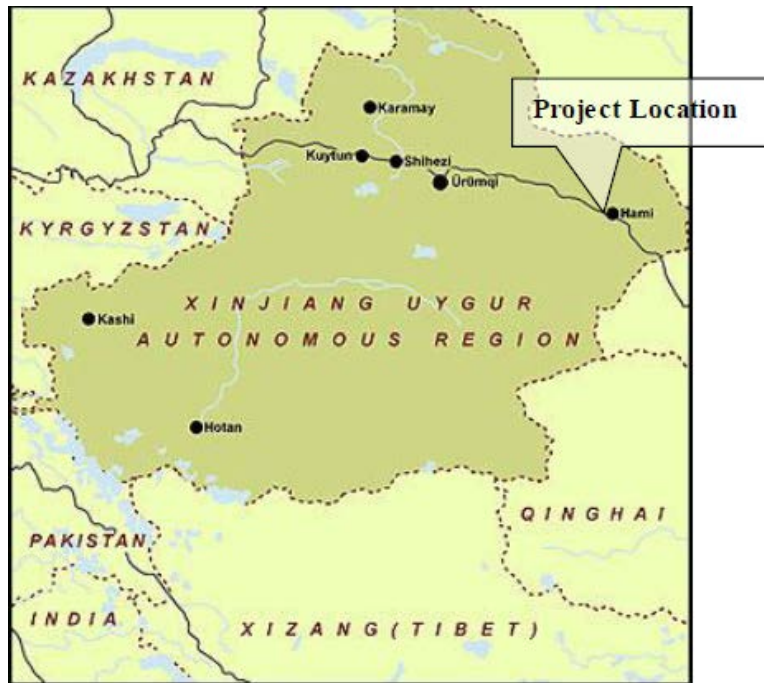
1.7 Project Location

The project is located in Hami City, Xinjiang Uygur Autonomous Region, P. R. China. The central geographical coordinates of the project is E119.1102° and N48.9538° . Figure A1 and A2 shows the geographical location of the project.

Figure A1. The location of the proposed project in the map of P. R. China



Figure A2. The location of the proposed project in the map of Xinjiang Uygur Autonomous Region, P. R. China



1.8 Title and Reference of Methodology

The approved methodology applied in the project activity is ACM0002 (version 13.0.0) – “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.

“Tool for the demonstration and assessment of additionality” (version 06.1.0)

“Tool to calculate the emission factor for an electricity system” (version 02.2.1)

Reference:

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

1.9 Other Programs

The project has been registered as a CDM project on 27/12/2012, for which a renewable crediting period of 3*7 years will be used under the CDM GHG Program. Therefore, CO₂ emission reductions generated by the project during the CDM crediting period will be verified as unique CERs, but not VCUs to avoid double counting. As to the project under VCS Standard (Version. 3.4), only emission reduction achieved from 28/12/2011 to 26/12/2012 will be considered as VCUs.

The project neither has nor intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program for the period from 28/12/2011 to 26/12/2012.

The project has been registered as CDM project and the registration number is 8194, the CDM crediting period is from 27/12/2012 to 26/12/2019.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The Project was put into operation on 28/12/2011. The expected operation period of the Project is 25 years as stated in the registered PDD. There was no significant malfunction or any emergency occurred for the Project during this monitoring period. No events occurred during this monitoring period which may impact the applicability of the methodology.

Each of solar cell array is composed of solar cell module, junction box, inverter and booster. The DC electric power generated by the photo voltaic modules will be converted into AC power by the inverters, stepped up to 35kV through a set of transformers located in a distributed manner all over the plant. Then the electricity generated by the project will be connected to NWCPG.

The key technical specifications of the solar cell modules as the table below:

Item	Unit	Plate (flat)-type polycrystalline silicon
Type		YL235P-29b
Rated capacity	W	235
Open-Circuit Voltage (Voc)	V	37
Short-Circuit Current(Isc):	A	8.54
Peak current	A	7.97
Lifetime	Year	25
Manufacturer		Yingli Energy Co., Ltd

The gateway meters are installed at the connection point of the substation to monitor the electricity supplied to the grid by the project activity. According to methodology, the project is a solar power plant project, so it does not involve project emission.

2.2 Deviations

2.2.1 Methodology Deviations

There is no methodology deviations applied during this monitoring period.

2.2.2 Project Description Deviations

There is no project description deviations applied during this monitoring period.

2.3 Grouped Project

The project is not a grouped project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ / MWh
Description	Combined margin emission factor for grid connected power generation in year y
Source of data	Registered CDM PDD with Ref No.8194
Value applied:	0.8964
Justification of choice of data or description of measurement methods and procedures applied	Refer to the registered CDM PDD with Ref No.8194
Purpose of the data	Calculation of baseline emissions
Comments	The data is calculated ex-ante according to the applied tool.

3.2 Data and Parameters Monitored

Data / Parameter	$EG_{Facility,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project to the Grid in year y.
Source of data	Electricity meter readings from the meters at the project site
Description of measurement methods and procedures to be applied	Continuously measurement and monthly recording
Frequency of monitoring/recording	Calculated based on the measurement results of $EG_{export,y}$, $EG_{import,y}$
Value monitored:	24,070.2MWh
Monitoring equipment	Please refer to the monitoring equipment information in the table of parameters $EG_{export,y}$, $EG_{import,y}$
QA/QC procedures to be applied	The project operator is responsible for recording electricity data. Measurement results are cross checked by records for sold electricity.
Purpose of the data	Baseline Emission calculation

Calculation method	Quantity of net electricity generation supplied to the grid by the Project is measured as electricity supplied to the grid by the Project ($EG_{\text{export},y}$) minus imports ($EG_{\text{import},y}$). $EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y}$ $EG_{\text{export},y}$, $EG_{\text{import},y}$ is measured by electricity meters as the following table shows.
Comments	-

Data / Parameter	EG _{export,y}		
Data unit	MWh		
Description	Quantity of electricity generation supplied by the project to the Grid in year y.		
Source of data	Electricity meter reading (M1 as main meter, M2 as backup meter) at the on-site substation		
Description of measurement methods and procedures to be applied	Bidirectional meter(s) will be installed to measure the electricity exported to the grid. The readings of the electricity meter(s) will be continuously measured and at least monthly recorded. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The accuracy of electricity meter(s) is no lower than 0.5.		
Frequency of monitoring/recording	Continuously measurement and monthly recording		
Value monitored:	24,294.6MWh		
Monitoring equipment	Electricity meter reading (M1 as main meter, M2 as backup meter) at the on-site substation.		
		Main meter	Backup meter
	Meter Type	Bidirectional meter	
	Accuracy	0.2S	
	Calibration frequency	Annually	
	Serial No.	1111091971000004	1111091971000003
	Calibration date	07/11/2011	07/11/2011
		29/10/2012	29/10/2012
Validity of	07/11/2011-	07/11/2011-	

	Calibration	06/11/2012 29/10/2012- 28/10/2013	06/11/2012 29/10/2012- 28/10/2013
QA/QC procedures to be applied	The project operator is responsible for recording electricity data. Measurement results are cross checked by records for sold electricity.		
Purpose of the data	Baseline Emission calculation		
Calculation method	-		
Comments	-		

Data / Parameter	EG _{import,y}		
Data unit	MWh		
Description	Quantity of electricity imported from the Grid to the project in year y.		
Source of data	Electricity meter reading (M1 as main meter, M2 as backup meter) at the on-site substation		
Description of measurement methods and procedures to be applied	Bidirectional meter(s) will be installed to measure the electricity exported to the grid. The readings of the electricity meter(s) will be continuously measured and at least monthly recorded. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The accuracy of electricity meter(s) is no lower than 0.5.		
Frequency of monitoring/recording	Continuously measurement and monthly recording		
Value monitored:	224.4MWh		
Monitoring equipment	Electricity meter reading (M1 as main meter, M2 as backup meter) at the on-site substation.		
		Main meter	Backup meter
	Meter Type	Bidirectional meter	
	Accuracy	0.2S	
	Calibration frequency	Annually	
	Serial No.	1111091971000004	1111091971000003

	Calibration done on	07/11/2011 29/10/2012	07/11/2011 29/10/2012
	Validity of Calibration	07/11/2011-06/11/2012 29/10/2012-28/10/2013	07/11/2011-06/11/2012 29/10/2012-28/10/2013
QA/QC procedures to be applied	The project operator is responsible for recording electricity data. Measurement results are cross checked by records for sold electricity.		
Purpose of the data	Baseline Emission calculation		
Calculation method	-		
Comments	-		

3.3 Monitoring Plan

1. Monitoring Object

The monitoring is to justify the realistic amount of emission reduction from the CDM project. The monitoring plan will provide credible, accurate, transparent and conservative monitoring data and ensure the real, measurable, long-term GHG emission reduction from this project.

2. Management Structure

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

The responsibilities of the project staff are as follow:

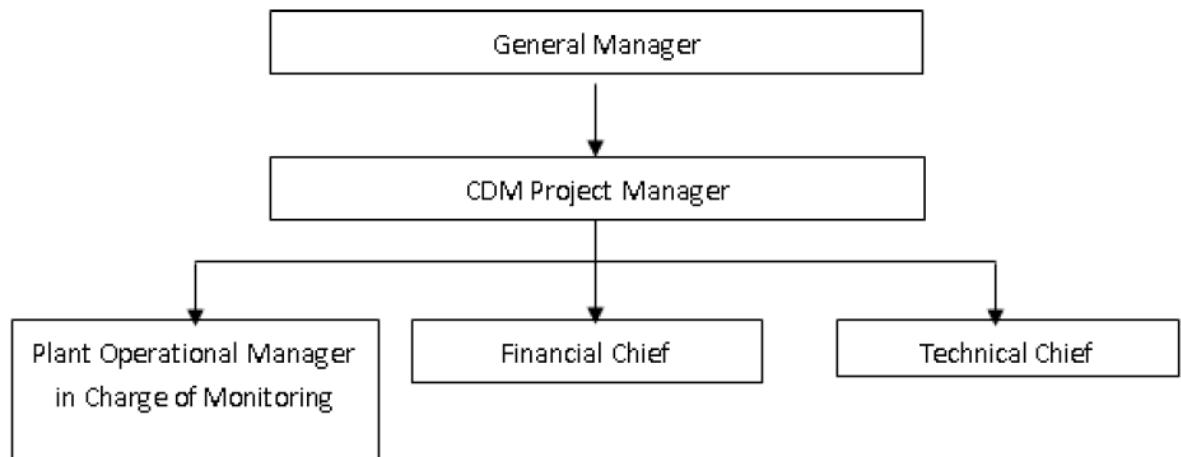
General Manager: To be responsible for supervising the whole monitoring procedure.

CDM Project Manager: To be responsible for data management and compiling monitoring report.

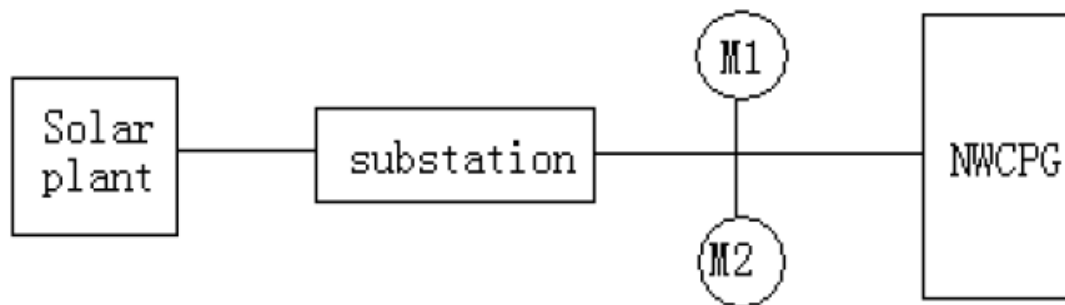
Operational and monitoring manager: To be responsible for collecting data and do internal audit.

Financial chief: To be responsible for collection of sales receipts.

Technical chief: To be responsible for preparing operational reports of the project activity, recording the daily operation of the solar power plant, including operating periods, equipment defects, etc.



3. Monitoring Program and Equipments



The following monitoring equipments are installed to ensure the implement of the monitoring for the project. The gateway meters (M1 and M2) are installed at the connection point of the substation to monitor the electricity supplied to the grid by the project activity. Usually, the main meter (hereafter referred as the meter M1) was used to monitor the grid-connected electricity supplied to the grid by the project, and when the solar power plant is not in operation and electricity purchased from the grid will be used to ensure the minimum requirement of running the solar power plant, the meter can also be used to monitor the electricity purchased from the grid. M2 refers to the back-up meter. At the same time, the data can be monitored and recorded at the on-site control centre using a computer system. The meter readings will be readily accessible for DOE.

Before the project is in operation, both the project owner and the grid company will check the equipments to ensure their work properly. The accuracy of the above meters is no lower than 0.5.

Due to the regulation of the local Grid Company, the monthly cut-off time for the recording of the electricity supplied to the grid and electricity imported from the grid through the main line are at 24:00 on the 27th day in every month. All the relative metered readings and receipts of electricity sales have been achieved for periodic verification. All the relative metered readings and records for sold electricity have been achieved for periodic verification.

4. Data Collection

The verification will use the main meter's data as long as the inaccuracy of the meter is within the permissible tolerance. The main procedures are as follows:

I The project owner will record the power supplied to the grid and purchased from the grid monthly.

II The project owner will calculate the net electricity supplied to the grid based on the records above;

III The project owner keeps and safe keeps the records of the main meter's data readings for verification by the DOE.

If the fault of the main meter exceeds the allowable tolerance or its malfunction occurs, the grid-connected electricity generated by the project will be resolved by following measures:

I Adopting the backup meter's data (after taking the line losses into consideration), unless a test by either party reveals it is inaccuracy;

II If the inaccuracy of the backup meter is not within the acceptable limits or it cannot work properly, the project owner and the grid company shall jointly prepare a new agreement of correct reading;

III If the project owner and the grid company fail to reach an agreement concerning the correct reading, this matter will be submitted for arbitration according to agreed procedures.

5. Calibration of Meters & Metering

The metering equipment will be properly calibrated and checked annually according to DL/T448-2000. The project owner will prepare backup procedures to deal with any errors occurred to the meters. The calibration records carried out by the grid company should be provided to the project owner, and these records will be maintained by the project owner and the third party designated.

Meters should be tested by a qualified metric organization co-authorized by the project owner and the grid company within 10 days after:

I The detection of the reading difference between the main meter and the backup meter that exceeds the allowable tolerance.

II The equipments malfunction caused by improper operation

All the calibration test records should be maintained safely for the verification.

6. Data Management System

To keep safely the record of the data collected during monitoring, this project will set up a complete data management system. The project will perfect the whole monitoring procedure by developing the CDM manual, tracking information from the primary source to the end-data calculations in paper document format. It is the responsibility of the project owner to provide additional necessary data and information for validation and verification requirements of respective DOE. Physical documentation such as paper-based maps, diagrams and environmental assessment will be collated in a central place, together with this monitoring plan. All paper-based information will be stored by the project owner and kept at least one copy.

At the end of each month, the monitoring data will be filed in a spreadsheet, and the paper-based printout should be also archived. Furthermore, the project owner collects the sales receipts for the electricity supplied to the grid as a cross-check, and compiled the monitoring report including the monitoring data and relevant evidence at the end of each crediting year.

All the data will be kept for two years following the end of the last crediting period.

7. Monitoring Report

After the CDM project manager collects and sorts the monitored data, the monitoring report is prepared by the designated project participate. The project developer has to make sure that the format and content of the monitoring report are consistent with the monitoring template in the registered PDD.

8. Quality Assurance and Quality Control

The workers are trained to be competent and the metering equipments are calibrated and sealed as per the industry practices at regular intervals, with the purpose to provide credible, accurate, transparent and conservative monitoring data and ensure the real, measurable, long-term GHG emission reduction from this project.

Monthly net on-grid electricity supplied data will be approved and signed off by the Manager before it is accepted and stored. This audit will check compliance with monitoring procedures in this monitoring plan. This internal audit will also identify potential improvements to procedures to improve monitoring and reporting in future years. The purpose of training is to assure those staffs are competent to conduct the monitoring plan, thus to make the monitored data accurate.

9. Training

The project owner will entrust the professional engineers and experts to train all the relative staffs before operation of generators. The training contains CDM knowledge, operational regulations, quality control (QC) standard flow, data monitoring requirements and data management regulations etc.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline Emissions are calculated by multiplying the ex-ante Baseline Emission factor by annual power generation.

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

Where:

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

$EG_{\text{Facility},y}$ (MWh) = Quantity of net electricity generation supplied by the project to the Grid in year y.

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

$$EG_{\text{Facility},y} = EG_{\text{export},y} - EG_{\text{import},y} = 24,294.6 - 224.4 = 24,070.2 \text{ MWh}$$

$$BE_y = EG_{\text{Facility},y} \times EF_{\text{grid},\text{CM},y} = 24,070.2 \times 0.8964 = 21,576 \text{ tCO}_2\text{e}$$

4.2 Project Emissions

According to ACM0002 (Version 13.0.0), no project emissions were to be counted by the Project.

Hence, $PE_y = 0 \text{ tCO}_2\text{e}$.

4.3 Leakage

According to the baseline methodology ACM0002 (version 13.0.0), the leakage of the Project is not considered.

4.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 1 (28/12/2011-26/12/2012)	21,576	0	-	21,576
Total	21,576	0	-	21,576

The annual average emission reductions estimated in the registered CDM-PDD is 29,029 tCO₂, so the estimated amount of emission reductions for the corresponding 365 days (the duration of

this monitoring period) are $365/365 \times 29,029 = 29,029 \text{tCO}_2$, which is higher than the actual value of $21,576 \text{tCO}_2$.