

VERIFICATION REPORT

SOLAR PV POWER PROJECT BY ROHA DYECHM PVT. LTD.

(EKIESL.CDM.AUG-11-02)



KBS Certification Services Pvt. Ltd.

Project Title	SOLAR PV POWER PROJECT BY ROHA DYECHM PVT. LTD. (EKIESL.CDM.AUG-11-02)
Version	2
Report ID	VCS.13.VER.005

Report Title	SOLAR PV POWER PROJECT BY ROHA DYECHM PVT. LTD. (EKIESL.CDM.AUG-11-02)
Client	Roha Dychem Pvt. Ltd.
Pages	25
Date of Issue	05/06/2013
Prepared By	KBS Certification Services Pvt. Ltd.
Contact	Registered Office: KBS Certification Services Pvt. Ltd. 414-424, Om Shubham Tower, Neelam Bata Road, N.I.T. Faridabad, Haryana-121001, India Tel: +91 129 4034513, 4054513, Website: www.kbsindia.in , Email id: info@kbsindia.in
Approved By	Ashok Kumar Gautam, Manager Technical & Certification
Work Carried	Technical Reviewer: Ashok Kumar Gautam

Out By **Team Leader:** Shreya Garg
Verifier: Neeraj Joshi
Local Expert: Shreya Garg
Technical Expert (TA 1.2): Neeraj Joshi

Summary:

KBS Certification Services Pvt. Ltd. has been contracted by, "Roha Dyechem Pvt. Ltd." to undertake independent gap validation and verification and certification for the greenhouse gas (GHG) emission reductions reported from "Solar PV power project by Roha Dyechem Pvt. Ltd. (EKIESL.CDM.Aug-11-02) ", for the monitoring period 04/03/2012 up to 29/12/2012, in the initial monitoring report version 1 dated 30/04/2013.

The project activity is the installation of photovoltaic solar power plant of 25 MW capacity in the state of Gujarat in India. The project activity feeds electricity to the electricity grid. The project activity utilizes poly-crystalline silicon PV technology and central inverters for its 25 MW solar PV plant. The photovoltaic system mainly consists of PV modules, module mounting structures, inverters, regulators and monitoring devices. The generated electricity is stepped up to 66 kV by 27.5 MVA rating transformer and exported to the regional grid (Northern Eastern Western North Eastern grid, NEWNE) which is dominated by fossil fuel based power plants. The project activity generate s electricity from solar energy and export to the NEWNE grid of India.

In absence of the project activity equivalent amount of electricity would have been generated in the regional electricity grid which comprises of primarily fossil fuel based power plants.. The emission reductions achieved during the monitoring period (04/03/2012 up to 29/12/2012) are **32,158 tCO₂e**.

A risk based approach has been followed to perform the gap validation and verification of the project activity. In the course of the gap validation and verification 02 Corrective Action Requests (CARs) were raised.

The gap validation and verification is based on the registered CDM project design document (PDD), validation report, VCS project description (PD), VCS monitoring report (MR) and other supporting documents made available to the verifiers by project proponent. Our gap validation and verification approach was based on the requirements as defined under the VCS Standards version 3.3.

The management of the 'Roha Dyechem Pvt. Ltd.' responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project final monitoring report Version 02 dated 20/05/2013. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the "Roha Dyechem Pvt. Ltd.". The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 02 dated 20/05/2013.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 04/03/2012 up to 29/12/2012 based on the reported emission reductions in the final monitoring report Version 02 dated 20/05/2013 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place

to mitigate these, KBS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

KBS confirms the following;

Reporting period: 04/03/2012 up to 29/12/2012

	Amount	Unit
Baseline emissions (BE)	32,158	tCO ₂ e
Project emissions (PE)	0	tCO ₂ e
Leakage emissions (LE)	0	tCO ₂ e
GHG Emission reductions	32,158	tCO₂e

Abbreviations

BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CL	Clarification Request
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
ERs	Emission Reductions
FAR	Forward Action Request
GEDA	Gujarat Energy Development Agency
GERC	Gujarat Electricity Regulatory Commission
GETCO	Gujarat Energy Transmission Corporation Limited
GUVNL	Gujarat UrjaVikas Nigam Limited
GHGs	Greenhouse Gas(es)
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilo Watt Hour
LE	Leakage Emissions
MR	Monitoring Report
MP	Monitoring Plan
MWh	Mega Watt Hour
NEWNE	North-East-Western-North Eastern
PE	Project Emissions
PDD	Project Design Document
PLF	Plant Load Factor
QA/QC	Quality Assurance/Quality Control
RDPL	Roha Dyechem Pvt. Ltd.
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VER	Verified Emission Reductions

Table of Contents

Table of Contents	4
1 INTRODUCTION	6
1.1 Objective	6
1.2 Scope and Criteria	6
1.3 Level of assurance	6
1.4 Summary Description of the Project	7
2 VALIDATION PROCESS, FINDINGS AND CONCLUSION.....	7
2.1 Validation Process	7
2.2 Validation Findings	7
2.2.1 Gap Validation	8
2.2.2 Methodology Deviations	10
2.2.3 New Project Activity Instances	10
2.3 Validation Conclusion	10
3 VERIFICATION PROCESS	11
3.1 Method and Criteria	11
3.2 Document Review	11
3.3 Interviews	11
3.4 Site Inspections	12
3.5 Resolution of Any Material Discrepancy	12
4 VERIFICATION FINDINGS	15
4.1 Project Implementation Status	15
4.2 Accuracy of GHG Emission Reduction or Removal Calculations	16
4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals	20
4.4 Management and Operational System	20
5 VERIFICATION CONCLUSION	20
6 REFERENCES	24

1 INTRODUCTION

1.1 Objective

KBS has been commissioned by 'Roha Dyechem Pvt. Ltd.' to perform an independent gap validation and verification of its registered CDM project 'Solar PV power project by Roha Dyechem Pvt. Ltd. (EKIESL.CDM.Aug-11-02)', for the reported GHG emission reductions for the given monitoring period 04/03/2012 – 29/12/2012 (both dates included). The VCS projects must undergo an independent third party verification and certification of emission reductions as the basis for issuance of Voluntary Emission Reductions (VERs).

The objectives of this gap validation and verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the project description (PD) and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report and other supporting documents are complete;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan.
- To confirm that the monitoring system is implemented and fully functional to generate Voluntary Emission Reductions (VERs/VCUs) without any double counting, and
- To establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of monitoring report, VCS project description (VCS PD), including the monitored data, CDM validation report and other relevant documents made available to verifier and information collected through performing interviews during on-site assessment of the project activity.

The project is assessed against the requirements of VCS standard version 3.3 and related rules and guidance. KBS has, based on the recommendations in the latest version of Verified Carbon standard, and employed a rule-based approach (as criteria) in the verification, focusing on the identification of significant reporting rules and the reliability of project monitoring.

The aspects to be covered under the purview of verification are:

- Ensure that the project activity has been implemented and operated as per the registered CDM PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place as per the documents provided by the client and on-site visit;
- Ensure that the monitoring report and other supporting documents provided are complete

- Ensure that the practiced monitoring system and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved CDM methodology;
- Evaluate the data recorded and stored are as per the monitoring methodology.

1.3 Level of assurance

☒ Reasonable level of assurance

1.4 Summary Description of the Project

The VCS project activity has been established to generate electrical energy utilizing solar energy and export the generated electricity to the regional grid and leads to reduction of emission reductions. The proposed project activity has installed a Greenfield 25 MW solar photovoltaic (PV) power plant in the solar park at Patan district in Gujarat. The PV system will mainly consists of PV modules, module mounting structures, inverters, regulators, monitoring devices etc. The project activity uses 172728 nos. of 145 W Nexpower (NT/ AX series)^{/7/} solar thin film modules which are installed in array configuration. The project activity was commissioned on 04/03/2012^{/8/}.

The project is registered as a CDM project (UN Ref. No. 7442) on 26/12/2012^{/6/}, however the crediting period of CDM will start from 30/12/2012, thus the VCS monitoring period is proposed from 04/03/2012 to 29/12/2012.

The geographical coordinates of the project activity as mentioned in the registered CDM PDD^{/5/} were cross checked at the project site through a GPS device during the site visit and were found to be consistent. The project activity was validated for CDM by KBS Certification Services Pvt. Ltd.(validation report: CDM.12.Val.056), issued on 25/12/2012^{/6/} and it was registered on 26 December 2012 under the UNFCCC reference number 7442^{/6/}. The date of start of crediting period for CDM is 30/12/2012. As emission reductions occur prior to the registration of the project as CDM project activity, these emission reductions cannot be claimed as Certified Emission Reductions (CERs). The emission reductions are thus claimed as Voluntary Carbon Units (VCU) for the period 04/03/2012 (start date) to 29/12/2012 under this verification. A gap validation of the registered CDM project activity has been undertaken in accordance with clause 4.1.5 of VCS registration and issuance process version 3. Based on the information seen and evaluated, the verified and certified emission reductions achieved for the current monitoring period from 04/12/2012 to 29/12/2012 are 32,158 tCO₂e.

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

The project activity is already registered under CDM programme; the registered Project Design Document (PDD), validation report and letter of approval issued by Ministry of Environment and Forest, Designated National Authority of India are available on UNFCCC project webpage^{/6/}. The process taken by the validating DOE is described below:

2.2 Validation Findings

2.2.1 Gap Validation

Since, the project is already validated under other approved GHG program only the validation of following additional clauses (supplementary validation), in accordance with clause 3.11.8 of VCS standard version 3.3, was undertaken for section indicated below:

- Sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13

Clause 1.2 of VCS PD (Sectoral Scope and Project Type)

The project activity falls under the following scope as defined by UNFCCC:

- Sectoral Scope: TA1.2 : Energy industries (renewable - / non-renewable sources)
- Project Type: Renewable Energy Projects.

The information has been verified from the registered PDD and project web page was found correct.

Clause 1.3 of VCS PD (Project Proponent)

The information in VCS PD^{/3/} has been verified with the letter of approval^{/9/} issued to the project proponent & registered CDM PDD^{/5/} and found consistent. The roles and responsibilities of the PP are same for the VCS crediting period as defined in registered CDM PDD^{/5/}. The detailed roles and responsibilities are included in the registered PDD^{/5/} and same was found consistent during the onsite audit.

Clause 1.5 of VCS PD (Project Start Date)

The project's start date as per clause 3.7.1 of VCS standard is 04/03/2012 i.e. the date at which the project started generating emission reductions. The start date of the project activity was verified from certificate of first commercial operation of the project activity and found consistent^{/8/}.

Clause 1.6 of VCS PD (Project Crediting Period)

Based on the validated project start date, as mentioned above, the project crediting period for CDM and VCS is identified as under:

CDM Programme: 30th December 2012 – 29th December 2019 (Renewable)

VCS Programme: 04th March 2012 – 03rd March 2022 (Renewable)

As per clause 3.8.3 VCS standard version 3.3, the projects registered under other GHG programs are not eligible for VCU issuance beyond the end of the total crediting period under those programs. Therefore, the PP in VCS PD has confirmed that the last date of the VCS crediting period would end at the end of the 21 years of the CDM crediting period. Since the VCS and CDM crediting period are overlapping, the PP, through a written confirmation, has confirmed that emission reductions will not be claimed simultaneously under both mechanisms. The verification team confirms that the crediting period under CDM is consistent with the information available on UNFCCC project web page.

Clause 1.7 of VCS PD (Project Scale and Estimated GHG ERs or Removals)

The estimated annual average GHG emission reduction indicated in the registered PDD^{/5/} confirms that project is not 'Large Project' but 'project' only as it will generate less than 1,000,000 tCO₂e per year. The estimated annual average GHG emission reductions under the CDM

programme, as specified in the registered PDD are 36,367 tCO₂e per year over the crediting period of 7 years (Renewable).

Clause 1.9 of VCS PD (Project Location)

The project activity is the installation of 25 MW solar photovoltaic (PV) power plant in solar park , located at Village Charanka, Taluka Santalpur, District Patan, State Gujarat and geographically located at 23° 53' 59" N Latitude and 71° 12' 01" E Longitude.

Using GPS coordinates; the project location is verified through <http://itouchmap.com/latlong.html> and confirmed during the site visit.

Clause 1.10 of VCS PD (Conditions prior to Project Initiation)

The project activity is a Greenfield project and prior to project activity the electricity was being generated by the national grid using fossil fuels. The description in the registered PDD^{/5/} confirms that the project is green field that displaces electricity imported from the grid which was mainly supplied to by fossil fuel driven power plants.

Clause 1.12.1 of VCS PD (Proof of Title)

The commissioning certificate^{/8/} confirms that the project activity is owned by the PP. Project title has been validated from Letter of Approval^{/9/}, available on UN project web page.

Clause 1.12.2 of VCS PD (Emissions Trading Programs and Other Bindings Limits)

The Letter of Approval^{/9/} issued towards the project activity by the host Party DNA confirms that the project is voluntary initiative by the PP. India is a non-Annex I country under CDM and has not taken any legally binding target to cut down GHG emissions. Therefore, GHG emission reductions generated from the project activity are not used to meet any compliance.

Clause 1.12.3 of VCS PD (Participation under Other GHG Programs)

The project is already registered under CDM program and key details are mentioned below;

Title of project activity:	Solar PV power project by Roha Dyechem Pvt. Ltd. (EKIESL.CDM.Aug-11-02)
UNFCCC Registration No:	7442
Registration Date:	26/12/2012
Applied Methodology:	ACM0002 Version 13.0.0
UNFCCC Crediting Period	30 Dec 12 - 29 Dec 19 (Renewable)
Location of the project activity:	Village Charanka, Taluka Santalpur, District Patan, State Gujarat
Project web page	http://cdm.unfccc.int/Projects/DB/KBS_Cert1348557135.31/view

Clause 1.12.4 of VCS PD (Other Forms of Environmental Credit)

Since the VCS and CDM crediting period are overlapping, the PP, through a written confirmation, has confirmed that emission reductions will not be claimed simultaneously under both mechanisms. The project activity is a registered CDM project, during the monitoring period PP has not claimed any other form of environmental credit. Same has been confirmed in the monitoring report. The PP has further confirmed in a letter that during 04/03/2012-29/12/2012 the PP is not claiming any emission reductions under any other GHG program. The assessment team confirms that apart from CDM and VCS credits (only one at a time), the project is not eligible for any form of other certificates or credits which was verified from document review and interview with PP. The same is in-line with 3.11.3 VCS standard requirement version 3.3.

Clause 1.13 of VCS PD (Additional Information relevant to the Project)

The project is not a grouped project and therefore no eligibility criteria on this account needs to be evaluated. The applied methodology do not prescribes leakage emissions therefore the same has not been considered in registered PDD^{/5/}. The registered PDD and VCS PD do not contain any commercially sensitive information, which might affect the application of CDM or VCS rules. No further information is required and the content in the VCS PD^{/3/} is accepted by the verification team.

2.2.2 Methodology Deviations

The verification team confirms that the registered PDD complies with the requirements in the applied monitoring methodology ACM0002 version 13.0.0^{/11/}. Therefore, no methodology deviations are applied during the monitoring period.

2.2.3 Project Description Deviations

The verification team confirms that no deviations were observed during the current monitoring period.

2.2.4 New Project Activity Instances

The project activity is not identified as a grouped project as per the description in the registered PDD and VCS PD.

2.3 Validation Conclusion

The project activity complies with the validation criteria defined under CDM Program as confirmed from the validation report of the project activity.

It is confirmed that the validation of the project has completed within 2 years from the project start date (as per VCS definition) as per the requirement 3.7 VCS Standard Version 3.3^{/4/}.

The selected project crediting period (under VCS) is acceptable in accordance with para 3.8 of VCS Standard Version 3.3^{/4/}.

3 VERIFICATION PROCESS

3.1 Method and Criteria

A risk-based approach was followed to carry out verification and assess all the factors and concerns that relate to the issuance of emission reductions from a project activity.

They include:

- The review of the calculation of the carbon emission factor for the electricity grid.
- Identification of all the sources contributing to the project emissions and emission reductions.
- Authenticity of the provided data is checked.
- A risk based analysis is carried out to ensure a clear and transparent assessment. The risks involved in this process are mainly with the informational flows and data recording.

KBS follows a risk based verification approach, wherein a desk review of the project documentation is undertaken, which is followed by an onsite visit by the members of verification team. The verification protocol is filled by the verification team that is based on standard auditing practices and VCS requirements. The verification protocol provides transparent means to record the observations by the verification team members and the non-conformities, if any. The verification protocol is an internal document, and available on request.

Duration of Verification:

Verification Contract	24/04/2013
On site verification	16/05/2013-17/05/2013
Findings raised	17/05/2013
Draft Verification Report	22/05/2013
Final Verification Report, Version 1.1	05/06/2013

3.2 Document Review

A desk review is undertaken, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The list of document reviewed is included in the section 'References'

3.3 Interviews

The site visit for this verification assessment was undertaken by Shreya Garg (Team Leader and Local Expert) and Neeraj Joshi (Verifier and Technical Expert). Summary of on-site activities^{12/} are mentioned below;

Location	Village Charanka, Taluka Santalpur, District Patan, State Gujarat	
Dates	16/05/2013-17/05/2013	
Key points discussed	Name of person interviewed	Designation, Organization
Operational data	Sabyasachi Sam	Senior Consultant, First Climate
Calibration	Sabyasachi Sam	Senior Consultant, First Climate
Data collection	M P Dhruv	President, Roha Dyechem Pvt. Ltd.
QA/QC procedures	M P Dhruv	President, Roha Dyechem Pvt. Ltd.
Calculation of ERs	Sabyasachi Sam	Senior Consultant, First Climate
VCS requirements	Sabyasachi Sam	Senior Consultant, First Climate

3.4 Site Inspections

A site visit is undertaken by members of verification team, involving but not limited to,

- An assessment of the implementation and operation of the project activity as per the registered CDM PDD;
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the approved monitoring plan;
- A cross-check between information provided in the monitoring report and data from other sources such as plant log books, inventories, purchase records or similar data sources;
- A check of the monitoring equipments including calibration performance and observations of monitoring practices against the requirements of the registered CDM PDD and the selected methodology^{17/};
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

3.5 Resolution of Any Material Discrepancy

Date	Type & Number	Raised by	Reference
17/05/2013	CAR#01	Assessment Team	D-30
Non conformities raised			
Following issues were observed in VCS-PD			
a) Crediting period end date is not been indicated correctly. (Refer section 1.6 of VCS PD)			
b) No declaration/undertaking is submitted for double counting of emission reductions by PP			
Project Participant'sresponse		Date: 20-05-2013	
a) The crediting period has now been corrected in the VCS-PD			
b) Declaration /undertaking for double counting of emission reductions is being provided to the DOE			
Documentation Provided as Evidence by Project Participant			

a) VCS-PD, Version-02 b) Undertaking by RDPL on double counting		
Information Verified by Team Leader	Date of review: 22/05/2013	
a) VCS-PD, Version-02 b) Undertaking by RDPL on double counting		
Reasoning for not acceptance or close out		
a) Crediting period is now corrected and made consistent in revised VCS-PD. The point is CLOSED. b) PP has submitted an undertaking which states that that there would not be any double counting of the emission reductions accrued during the crediting period which is accepted by the team. Hence the point is CLOSED.		
Date of acceptance or non- acceptance	Date: 22/05/2013	Status: CLOSED

Date	Type & Number	Raised by	Reference
17/05/2013	CAR#02	Assessment Team	D-30
Non conformities raised			
Following issues were observed in VCS-MR a) Monitoring period is not been indicated correctly at all the places in MR. b) Monitoring equipment description has not been provided under the relevant heading c) Generation (MWh) data for the Monitoring period is not consistent with the supporting documents provided d) PP to provide supportive for the month of December (day wise data) in ER sheet.			
Project Participant'sresponse		Date: 20/05/2013	
a) Monitoring period has now been kept consistent throughout the revised MR (Version 02) b) Monitoring equipment description has now been provided under relevant heading in the revised MR c) Generation data for the month of September 2012 has been corrected in line with the supportive provided d) The daily generation data for the month of December has now been included in the revised MR spreadsheet (Version 02)			
Documentation Provided as Evidence by Project Participant			
a) Revised Monitoring Report (Version 02) b) Revised Emission Reduction Sheet (Version 02)			
Information Verified by Team Leader		Date of review: 22/05/2013	
a) Revised Monitoring Report (Version 02) b) Revised Emission Reduction Sheet (Version 02)			
Reasoning for not acceptance or close out			

- a) Monitoring period has now been made consistent at all places in MR. Hence the point is CLOSED.
- b) The point is CLOSED as the monitoring equipment description has now been described and explained under section 3.2 of VCS-PD.
- c) The point is CLOSED as generation data (MWh) has now been made consistent with ER sheet and supportive provided.
- d) The point is closed as day wise generation data for the month of December is provided in ER sheet which is consistent with the supporting document provided

Date of acceptance or non- acceptance	Date: 22/05/2013	Status: CLOSED
--	-------------------------	-----------------------

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity is a 25 MW photovoltaic solar power plant capacity in the state of Gujarat in India. The project activity supplies electricity to the electricity grid. The project activity utilizes poly-crystalline silicon PV technology and central inverters for its 25 MW solar PV plant. The photovoltaic system mainly consists of PV modules, module mounting structures, inverters, regulators and monitoring devices. The proposed project activity implements array of thin film modules. The generated electricity is stepped up to 66 kV by 27.5 MVA rating transformer and exported to the regional grid (Northern Eastern Western North Eastern grid, NEWNE) which is dominated by fossil fuel based power plants. The project activity generates electricity from solar energy and export to the NEWNE grid. The technical details^{7/} of the major equipment of the solar PV system are summarized below:

	25 MW
PV Module	Nexpower (NT/AX series) of 145W (±5%)
No. of Modules	172728
Modules per string	upto 27
Module Mounting Structure	6400
Inverters	Satcon- PowerGate Plus 500KW
No. of Inverters	50

The technical details as mentioned in the VCS-MR^{1/} and registered PDD^{5/} of the equipment were validated from the Technical brochures of the equipment provided by the technology suppliers^{7/}.

The project activity was commissioned on 04/03/2012 as per commissioning certificate issued by GEDA^{8/}. The onsite visit confirms that the electricity after invertors flows through 11 kV bus and gets stepped up to 66 kV at on site 66/11 kV switch/transformer yard and is evacuated to grid through two parallel lines of 66 kV. The commercial metering system consists of two point metering: one check meter (installed by PP) and one tri-vector ABT energy meter (installed by GETCO) on one 66 kV evacuation line. The electricity generated by the project activity is supplied to the GETCO grid which is interconnected with NEWNE grid of India. The electricity evacuation to grid and metering and billing system are as per PPA with Gujarat Urja Vikas Nigam Ltd. (GUVNL)^{14/}.

Further it was noticed that during the monitoring period the project activity operated under normal conditions and no shutdown was reported. Same has been checked from the operational data during site visit^{12/}.

Opinion:

The implementation and operation of the project activity is in-line with the description in the validated VCS PD^{3/} and it does not affect the conclusions of the validation report^{6/} of the registered PDD^{5/} with regard to:

- Additionality of the project activity;
- Appropriateness of the baseline of the project activity;

- Applicability and application of approved baseline methodology ACM0002 version 13.0.0;
- The level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan.
- The implementation and operation of the project activity is in-line with the description in the validated VCS PD^{/3/} and no material discrepancy was found.
- The total commissioned capacity of the project activity is 25 MW; the same has been checked during physical inspection of site and found consistent.
- The calculation of the Net Electricity supplied to the grid has been checked and was found in line to the procedure mentioned in the validated VCS PD^{/3/}.
- The validation report has been checked and the assessment team confirms, that there are no issues/FARs pending.
- Emission reductions achieved (32,158 tCO₂e) during the monitoring period (04/03/2012-29/12/2012, 301 days) are 4.06% higher than the estimated reductions (30,902 tCO₂e) for the comparable period which can be attributed to higher net electricity generation due to high solar insolation during the monitoring period which is cyclical in nature. The assessment team confirms that there are no issues regarding the operation of the project activity as the observed higher generation in the 10 months is not comparable with the annual PLF

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Discussion:

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0002 (version 13.0.0)^{/11/}, the formulae given in the VCU monitoring report^{/1/} version 02 dated 20/05/2013 and also based on the validation opinion stated in the CDM validation report^{/6/}.

Parameter monitored:

4.2.1 EG_{facility, y} (MWh)

Quantity of net electricity generation supplied by the project plant/unit to the grid in year y

	Discussion and verification assessment						
Purpose of data	Parameter is used in baseline emissions calculation						
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The net electricity supplied by the project activity to the grid has been measured by export-import energy meter. The metering system has a main meter and a check meter. The main meter and check meter details have been provided below: Meter Details for Main Meter^{/15/} <table> <tr> <td>Meter Type</td><td>ABT Meter</td></tr> <tr> <td>Manufacturer</td><td>SEMS</td></tr> <tr> <td>Serial Number</td><td>GJ1211A</td></tr> </table>	Meter Type	ABT Meter	Manufacturer	SEMS	Serial Number	GJ1211A
Meter Type	ABT Meter						
Manufacturer	SEMS						
Serial Number	GJ1211A						

	Accuracy Class	0.2s								
	Meter Details for Check Meter ^{/15/}									
	Meter Type	ABT meter								
	Manufacturer	SEMS								
	Serial Number	GJ1210A								
	Accuracy Class	0.2s								
	The meters have been tested by an external agency. Since the meter is under the purview of GUVNL, hence the testing/calibration of the meter are also done by GUVNL. The meter test records have been maintained in the plant. The calibration details are as follows: Main meter: <table><tr><td>Test Date</td><td>Next Calibration Due Date</td></tr><tr><td>28-12-2011</td><td>27/12/2014</td></tr></table> Check meter: <table><tr><td>Test Date</td><td>Next Calibration Due Date</td></tr><tr><td>31-12-2011</td><td>30/12-/2014</td></tr></table> No gap in the calibration of the energy meters was observed by the assessment team.		Test Date	Next Calibration Due Date	28-12-2011	27/12/2014	Test Date	Next Calibration Due Date	31-12-2011	30/12-/2014
	Test Date	Next Calibration Due Date								
	28-12-2011	27/12/2014								
	Test Date	Next Calibration Due Date								
31-12-2011	30/12-/2014									
Measuring/Reading / Recording frequency	As per registered PDD ^{/5/} , the parameter is being reported on half hourly basis and reported on monthly basis.									
Data collection (from data generation, aggregation, to recording, calculation and reporting)	The net energy exported to the grid is measured every month using calibrated energy meter by the State Electricity Board authorities in the presence of the project implementer. Measuring procedure: The net electricity generation has been measured by an export-import energy meter. The net electricity exported by the project plant would be calculated by deducting the amount of imported electricity from the total amount of exported electricity Entity responsible: Roha Dyechem Private Limited									
Verified value	33,744.312 MWh. The data has been obtained from the monthly generation reports ^{/16/} signed between PP and GETCO. The monthly values are reported in a spreadsheet ^{/2/} and have been checked from the Monthly breakup sheets and plant log books maintained on the site.									
Cross checks	Electricity export, electricity import and net electricity supplied to grid have been cross checked from monthly invoice raised to GUVNL ^{/17/} . Values in monthly generation report and GUVNL Invoice receipts have									

	been found consistent.
QA/QC procedures applied	During the monitoring period, no replacement of meter was observed. Cross check of electricity supplied will be done with records for sold electricity. The energy meters are calibrated as per the signed PPA i.e., once in three year. The same has been confirmed during the site visit and found acceptable by the assessment team.

Finding: Please refer to CAR#01 and CAR#02 in section 3.5 of this report.

Opinion: The verification team confirms;

- The monitoring plan has been implemented as per the registered PDD;
- The monitoring complies with the requirement of the applied methodologies;
- The information inflow (from data generation, aggregation, to recording, calculation and reporting) is included above under each parameters and confirms to the requirement of the PDD;
- The values included in the monitoring report and corresponding emission reduction sheets are verified and included under each monitoring parameter, wherever appropriate;

Parameters not monitored/ex-ante:

4.2.2 EF_{grid,OM,y} (tCO₂/MWh)

Simple Operating Margin for NEWNE Grid in year y

	Discussion and verification assessment
Purpose of data	Calculation of baseline emissions
Verified value	0.984 (based on most recent 3 years data i.e. 2008~2009, 2009-10, 2010-11)
Source of value	As per "Tool to calculate the emission factor for an electricity system", version 02.2.1 ^{/18/} and Central Electricity Authority: Baseline CO ₂ Emission Database Version 07 ^{/19/} http://www.cea.nic.in/reports/planning/cdm_co2/database_7.zip
Justification	Values are checked from registered PDD and CDM validation report

4.2.3 EF_{grid,BM,y} (tCO₂/MWh)

Build margin for NEWNE electricity grid in year y

	Discussion and verification assessment
Purpose of data	Calculation of baseline emissions
Verified value	0.859 (based on data for the most recent year i.e. 2010~2011)
Source of value	As per "Tool to calculate the emission factor for an electricity system", version 02.2.1 ^{/18/} and Central Electricity Authority: Baseline CO ₂

	Emission Database Version 07 ^{/19/} http://www.cea.nic.in/reports/planning/cdm_co2/database_7.zip
Justification	Values are checked from registered PDD and CDM validation report

4.2.4 EF_{grid,CM,y} (tCO₂/MWh)

Combined margin CO₂ emission factor for the project electricity system in year y

	Discussion and verification assessment
Purpose of data	Calculation of baseline emissions
Verified value	0.953
Source of value	As per “Tool to calculate the emission factor for an electricity system”, version 02.2.1 ^{/18/} and Central Electricity Authority: Baseline CO ₂ Emission Database Version 07 ^{/19/} http://www.cea.nic.in/reports/planning/cdm_co2/database_7.zip
Justification	Values are checked from registered PDD and CDM validation report

Opinion:

In the opinion of assessment team, the assumptions, emission factors and default values that were applied in the calculations have been justified.

Assessment of Data and Calculation of GHG emission reductions:

According to the approved methodology ACM0002 (Version 13.0.0) Emission Reductions are calculated as

$$ER_y = BE_y - PE_y$$

Where:

ER_y Emission reductions in year y (t CO₂e)

BE_y Baseline Emissions in year y (t CO₂)

PE_y Project Emissions in year y (t CO₂e)

Baseline Emissions

Baseline emissions are determined using the formula:

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

Where:

BE_y Baseline emissions in year y (tCO₂)

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

EF_{grid,CM,y} Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO₂/MWh)

Project Emissions

As per the registered PDD and methodology used (ACM0002 version 13.0.0) the project activity involves harnessing solar energy and its conversion to electricity, thus there will be no project emissions in the project activity.

Leakage

As per ACM0002 version 13.0.0, no leakage has been considered for the project activity.

Emission reductions

EG_{facility, y} is estimated at 33,744.312 MWh/ year which has been confirmed from the Monthly generation breakup sheet and RDPL Invoice receipts to GUVNL.

Emission reductions are calculated as follows:

$$\begin{aligned} ER_y &= BE_y = EG_{PJ,y} * EF_{grid,CM,y} \\ &= 33,744.312 \text{ MWh} * 0.953 \text{ tCO}_2\text{e/MWh} \\ &= 32,158 \text{ tCO}_2\text{e} \end{aligned}$$

Opinion:

The verification team confirms that

- The complete data set for the identified and required parameters for the operational days in the current monitoring period was available, as indicated in section 3.5 above;
- The reported data has been cross checked with available records, as indicated in the section 4.2 above under each monitored data, wherever appropriate;
- The baseline, project and leakage emissions have been determined in accordance with the requirement of the applied methodologies, as contained in the final monitoring report and corresponding emission reductions spreadsheet;
- The assumptions, emission factors and default values used are justified, as indicated in the section 4.2 above.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

Evidences (Documents/interview/site visit) referred for verification of individual monitoring parameter and fixed parameters are defined section 4.2. We further confirm that, sufficient evidence covering the entire monitoring period and at the required frequency were available. A list of referred documents for verification is also included in section 6 of this report.

4.4 Management and Operational System

Quality Management procedures for measurements, collection and compilation of data, data storage and archiving, calibration, maintenance and training of personnel in the framework of this project activity have been defined. The site visit/11/ confirmed that monitoring and reporting is carried out consistently and records are kept in a secure and consistent manner. The project activity is operated and managed in accordance with the description in the registered PDD/5/. For the accurate execution of the project activity a project team has been constructed. The project team is delegated with the responsibility to monitor and document the electricity generated and also safe keeping of the

recorded data. The CDM monitoring manager is responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner. All the monitoring data is stored/recorded and kept under safe custody.

5 VERIFICATION CONCLUSION

KBS Certification Services Pvt. Ltd. has been contracted by Roha Dyechem Pvt. Ltd. to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the Solar PV power project by Roha Dyechem Pvt. Ltd. (EKIESL.CDM.Aug-11-02), UNFCCC Ref. No. 7442 for the monitoring period 04/03/2012 upto 29/12/2012 (pre-CDM).

The verification is based on the validated and registered PDD^{/5/}, VCS PD^{/3/} and the monitoring report^{/1/} for this project. Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive Board and the VCS Standard Version 3.3^{/4/}.

The management of the Roha Dyechem Pvt. Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report^{/1/} Version 02 and dated 20/05/2013. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the Roha Dyechem Pvt. Ltd. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report^{/1/} Version 02 and dated 20/05/2013.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 04/03/2012 to 29/12/2012 based on the reported emission reductions in the Final Monitoring Report Version 02 dated 20/05/2013 for the same period.

As a result of the verification, the verification team confirms that:

- All operations of the project are implemented and installed as planned and described in the project description.
- The monitoring system is in place and functional.
- The installed equipment essential for generating emission reductions runs reliably.
- The GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, KBS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

Monitoring period: From 04/03/2012 – 29/12/2012

Verified GHG emission reductions or removals in the above reporting period:

GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	32,158
Project Emissions	0
Leakage	0
Net GHG emission reductions or removals	32,158

Location: Faridabad
Date: 05/06/2013



Authorized Signatory: Kaushal Goyal
Designation: Managing Director
KBS Certification Services Pvt. Ltd.

6 REFERENCES

/1/	/1.1/ Monitoring Report, Version 01, dated 30/04/2013 (Initial Version) /1.2/ Monitoring Report, Version 02 dated 20/05/2013 (Final Version)
/2/	/2.1/ Emission Reduction calculation sheet, Version 01 dated 30/04/2013 (corresponding to initial Version of VCS –PD and MR) /2.2/ Emissions Reduction calculation Sheet, Version 02 dated 20/05/2013 (corresponding to final Version of VCS –PD and MR)
/3/	/3.1/ VCS –PD version 0.1 dated 30/04/2013 (Initial Version) /3.2/ VCS-PD version 2.3 dated 20/05/2013 (Final Version)
/4/	VCS Standard Version 3.3 dated 04/10/2012
/5/	Registered PDD version 4 dated 19/12/2012 http://cdm.unfccc.int/Projects/DB/KBS_Cert1348557135.31/view
/6/	Web-Link for the Registered project activity for Validation Report and Grid Emission factor calculation http://cdm.unfccc.int/Projects/DB/KBS_Cert1348557135.31/view
/7/	Technical Specifications of Nexpower 145W solar module Technical Specification of Satcon Power gate 500KW Inverter
/8/	Gujarat Energy Development Agency (GEDA): Readiness for generation of the Solar Power Plant dated 05/03/2012 Gujarat Energy Development Agency (GEDA): Certificate of Commissioning of the Solar Power Plant dated 11/04/2012
/9/	Letter of Approval (Letter No. 4/17/2012-CCC) issued by DNA of India dated 12/12/2012 http://cdm.unfccc.int/Projects/DB/KBS_Cert1348557135.31/view
/10/	Declaration by PP for No double counting of Emission Reductions dated 18/05/2013
/11/	ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources --- Version 13.0.0, valid from 11/05/2012 http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT
/12/	Onsite assessment including physical verification of measuring and monitoring procedure, interviews and data/log review dated 16/05/2013 – 17/05/2013
/13/	Project Allotment Letter from Energy & Petrochemicals department, Government of Gujarat dated 14/10/2010
/14/	PPA signed between RDPL and GUVNL dated 09/12/2010
/15/	Calibration certificates /15.1/ Main Meter Meter serial number: GJ 1211A issued by Gujarat Urja Vidyut Nigam Ltd. dated 28/12/2011 issued to PP /15.2/ Check meters

	Meter serial number: GJ 1210A issued by Gujarat Urja Vidyut Nigam Ltd. dated 31/12/2011 issued to PP
/16/	Monthly generation statements (JMRs) for exported electricity for the entire monitoring period (04/03/2012 -29/12/2012) between PP and GETCO
/17/	Invoices issued by PP for the entire monitoring period (04/03/2012 -29/12/2012) to GETCO
/18/	EB 63, Annex 19: Tool to calculate the emission factor for an electricity system, version 02.2.1
/19/	Central Electricity Authority (CEA) : CO2 Baseline Database for the Indian Power Sector, version 7.0 http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
/20/	Registration and Issuance Process VCS Version 3
/21/	Logbooks for Electricity Generation Data for the monitoring period (04/03/2012- 29/12/2012)