SOLAR POWER PROJECT BY SAISUDHIR ENERGY LIMITED

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Summary:

Saisudhir Energy Limited has commissioned the TÜV NORD JI / CDM Certification Program to carry out the verification of the Project "Solar Power project by Sai Sudhir Energy Limited" with regard to the requirements of VCS Version 3 Standard.

The project activity comprises installation of a grid connected solar photovoltaic based power project with a total capacity of 5 MWp. The project is located at T. Veerapuram village of Anantapur (also called as "Ananthapur") district, in the State of Andhra Pradesh of India and the power generated from the project activity is supplied to the southern regional grid of India. The power purchase agreement is signed with NTPC Vidyut Vyapar Nigam Limited (NVVN), New Delhi, India and the project has started commercial operation since 05/01/2012.

Reporting period: 05/01/2012 to 30/05/2012 (Including both days)

In the course of the verification 4 Corrective Action Requests (CARs). No Clarification Requests (CLs) or Forward Action Request (FAR) is raised in this verification.

The verification is based on the draft monitoring report[/MR1/], revised monitoring report[/MR2/], the monitoring plan as set out in the registered CDM PDD[/PDD/], Supplementary VCS project design[/SUP-PD/], the validation report[/VAL/], Supplementary VCS validation report/[SUP-VAR/] emission reduction calculation spreadsheet[XLS1/XSL2/] and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

As the result of the verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period (05/01/2012 to 30/05/2012) as follows:

Emission reductions 3,526 t CO2 equivalents

ABBREVIATIONS

BAU	Business as usual
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CP	Certification Program
CL	Clarification Request
DNA	Designated National Authority
EB	CDM Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
QC/QA	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCS - PD	VCS - Project Description
VCU	Verified Carbon Unit
VT	Verification team
PDD	Project Design Document
TR	Technical Reviewer

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1 INTRODUCTION

Saisudhir Energy Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project:

"Solar Power project by Sai Sudhir Energy Limited"

with regard to the relevant requirements of the Voluntary Carbon Standard, version 3[/VCS/]. The verifiers have reviewed the implementation of the monitoring plan (MP) in the validated VCS project for the monitoring period 05/01/2012 to 30/052012 (both days included),

The applied monitoring methodology is AMS-I.D. Grid Connected Renewable Electricity Generation, version 17.

1.1 Objective

The purpose of this verification, by independent checking of objective evidence, is as follows:

- to verify that the project is implemented as described in the project design document;
- to assess the implementation of the monitoring plan (MP) content in the registered CDM PDD;
- to assess the project's compliance with other relevant rules, including the host country (India) legislation;
- 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.
- To assess the compliance of the project with the applied methodology, AMS-I.D. Grid Connected Renewable Electricity Generation, version 17.

1.2 Scope and Criteria

The verification is based on the draft monitoring report[/MR1/], revised monitoring report[/MR2/], the monitoring plan as set out in the registered CDM PDD[/PDD/], Supplementary VCS project design[/SUP-PD/], the validation report[/VAL/], Supplementary VCS validation report/[SUP-VAR/] emission reduction calculation spreadsheet[XLS1/XSL2/] and supporting documents[/cal/spec/TC/TR/] made available to the TÜV NORD JI/CDM CP by the project participant and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The TÜV NORD JI/CDM CP has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

1.3 Level of assurance

The verification has been planned and organized to achieve a

☒ Reasonable level of assurance

☐ Limited level of assurance

1.4 Summary Description of the Project

The project activity comprises installation of a grid connected solar photovoltaic based power project with a total capacity of 5 MWp. The project is located at T. Veerapuram village of Anantapur (also called as "Ananthapur") district, in the State of Andhra Pradesh of India and the power generated from the project activity is supplied to the southern regional grid of India. The power purchase agreement is signed with NTPC Vidyut Vyapar Nigam Limited (NVVN), New Delhi, India and the project has started commercial operation since 05/01/2012. The commissioning certificate and power purchase agreement are reviewed by the verification team and found to be appropriate. The verification team has also conducted onsite observation and physically verified the project equipments and monitoring arrangements. The project activity was found to be implemented as it has been defined in the registered CDM PDD[/PDD/].

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

Method and Criteria:

The validation of the project consisted of the following steps:

- Contract review;
- Appointment of team members and technical reviewers;
- Desk review of the Project Document/PD/ submitted by the client and additional supporting documents.
- Validation planning;
- On-Site assessment;
- Background investigation and follow-up interviews with personnel of the project developer and its contractors;
- Draft validation reporting;
- Resolution of corrective actions; (if any)
- Final validation/verification reporting;
- Technical review;

- Final approval of the validation

Table 2.1.1: Validation sequence

Topic	Time
Assignment of validation	15/01/2013
On-site visit	28/01/2013
Draft reporting finalised	31/01/2013
Final reporting finalised	04/03/2013
Technical review on final reporting finalised	04/03/2013
Final corrections	04/03/2013

On the basis of a competence analysis and individual availabilities a validation team was appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 2.1-2 below.

Table 2.1-2: Involved Personnel

	Name	Company	Function [1]	Qualification Status [2]	Scheme competence [3]	Technical competence [4]	Verification competence [5]	Host country Competence	On-site visit
☒ Mr. ☐ Ms.	Pankaj Patel	TUV-India	TL	LA	☒	1.2	☒	☒	☐
☒ Mr. ☐ Ms.	Saroj Sahoo	TUV-India	TM[A)]	LA	☒	1.2	☐	☒	☐
☒ Mr. ☐ Ms.	Vijay Machcha	TUV-India	TM[A)]	A	☒	1.2	☒	☒	☒
☐ Mr. ☐ Ms.	Kunal Rami		TR[B)]	LA	☒	1.2.4	☒	☒	-
☐ Mr. ☐ Ms.			OR[B)]		☐		☐	☐	-

	Name	Company	Function [1)]	Qualification Status [2)]	Scheme competence [3)]	Technical competence [4)]	Verification competence [5)]	Host country Competence	On-site visit
☐ Mr. ☐ Ms.	Stefan Winter	TN CERT	FA[B)]	SA	☒	1.2.4	☒	☐	-

1) TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval
2) GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert
3) GHG auditor status (at least Assessor)
4) As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, …)
5) In case of verification projects
A) Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE
B) No team member

Document Review:

The supplementary VCS PD/PD/ and supporting background documents related to the project design and baseline were reviewed. Furthermore, the validation team reviewed additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

Interviews:

Before and during the on-site visit, the validator of TÜV NORD performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

The project proponent(s), other project entity(ies), the consultants, were interviewed to confirm selected information and to resolve issues identified in the documents review. The main topics of the interviews are summarized in Table 2-1-3.

Table 2.1-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Project Owner & Operations Personnel, Saisudhir Energy Limited 2. Consultant, Emergent Ventures India	• General aspects of the project • Technical equipment and operation • Changes since implementation • Monitoring and measurement equipment • Calibration procedures • Quality management system • Involved personnel and responsibilities

Interviewed Persons / Entities	Interview topics
	• Training and practice of the operational personnel • Implementation of the monitoring plan • Monitoring data management • Data uncertainty and residual risks • Maintenance • Environmental aspects

Site Inspections:

The on-site visit was carried out on 28-01-2013 in order to verify that the project is implemented in compliance with the VCS standard version 3. A team member from the verification team having the applicable technical scope attended the site visit and investigated about the project.

Resolution of Any Material Discrepancy:

Material discrepancies identified in the course of the validation are addressed either as CARs, CLs or FARs.

A Corrective Action Request (CAR) is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

A Clarification Request (CL) will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A Forward Action Request (FAR) will be issued when certain issues related to project implementation should be reviewed during the first verification.

However, no such issue was identified during the course of supplementary validation of the project.

2.2 Validation Findings

2.2.1 Gap Validation

Assessment on the project description in line with the additional information provided in the supplementary VCS project description is as below.

- *Project scope, type, technologies and measures implemented, and eligibility of the project (Section 1.2 of the supplementary VCS PD)*

  The project has been categorised under scope 01, Energy industries (renewable-/ non-renewable sources) under Clean Development Mechanism (CDM) which is a program approved by VCS board. Being a solar based grid connected renewable energy project, the methodology, AMS I D, "Grid Connected Renewable Electricity Generation" has been used by the project proponent appropriately.

  The power purchase agreement is signed with NTPC Vidyut Vyapar Nigam Limited (NVVN), New Delhi, India and the project has started commercial operation since 05/01/2012. The commissioning certificate and power purchase agreement are reviewed by the verification team and found to be appropriate. The verification team has also conducted onsite observation and physically verified the project equipments and monitoring arrangements. The project activity was found to be implemented as it has been defined in the registered CDM PDD[/PDD/].

- *Project proponent (Section 1.3 of the supplementary VCS PD)*

  Saisudhir Energy Limited is the only project proponent participated in the project activity. The contacts details of the project proponent along with the roles are responsibility are provided in section 1.3 of the supplementary VCS PD appropriately. The registered CDM PDD and host country approval are verified by the validation team to confirm the correctness of the address details provided in the VCS PD.

- *Project start date (Section 1.5 of the supplementary VCS PD)*

  The project was commissioned on 05/01/2012 so this has been considered as the project start date correctly. The commissioning certificate of the project has been verified by the by the validation team to confirm the commissioning date.

- *Project crediting period (Section 1.6 of the supplementary VCS PD)*

  The project has already been registered under CDM (UNFCCC ref no: - 6317). The project proponent has opted to claim the VCS credit for the pre-CDM period i.e. since commissioning date of the project till the start date crediting period of the project under CDM. The project was commissioned on 05/01/2012 while the crediting period of the project (under CDM) is 31/05/2012 to 30/05/2022. So accordingly, the project proponent has applied for monitoring the project under

VCS from 05/01/2012 to 30/05/2012. This has been assessed by the validation team to be appropriate. The commissioning certificate of the project and the UNFCCC website have been verified to confirm the commissioning date and duration of crediting period under CDM.

- *Project scale and estimated GHG emission reductions or removals (Section 1.7 of the supplementary VCS PD)*

  As per the registered CDM PDD, annual average estimated emission reduction from the project is 8,117 tCO_2. Thus, the project falls under the category, "Project" as the emission reduction is below 300,000 tonnes of CO2e per year. The registered PDD has been checked by the validation team to confirm the same.

- *Project location (Section 1.9 of the supplementary VCS PD)*

  The project is located at T. Veerapuram village of Anantapur (also called as "Ananthapur") district, in the State of Andhra Pradesh of India and the power generated from the project activity is supplied to the southern regional grid of India. The geographical co-ordinates of the project is as below

  Latitude: 14˚ 45' 41.97" N
  Longitude: 76˚ 57' 03.86" E

  The locations verified from the registered CDM PDD and confirmed during onsite verification by the validation team.

- *Conditions Prior to Project Initiation (Section 1.10 of the supplementary VCS PD)*

  The project is a green field solar based renewable energy project. The project would displace the fossil fuel based power generation which dominates the regional grid i.e. southern regional grid of India into which the project activity is connected.

- *Ownership and other programs (Section 1.12.1, 1.12.2, 1.12.3 and 1.12.4 of the supplementary VCS PD)*

  The project was registered under CDM on 31/05/2012 (UNFCCC ref no: 6317). The project proponent has opted to claim the VCS credit for the pre-CDM period i.e. since commissioning date of the project till the start date crediting period of the project under CDM. The project has not applied for any other GHG program nor is it rejected under any. An undertaking/GHG-UNDRTKNG/ to confirm the same has been submitted by the project proponent. The project proponent has submitted the commissioning certificate and power purchase agreement to confirm the ownership of the project and right of use. The same are reviewed by the validation team and found to be appropriate.

- *Additional information relevant to the project (Section 1.13 of the supplementary VCS PD.)*

This is not a grouped or AFOLU project and so such commercially sensitive information was discovered.

Table 2.2-1: Overview of CARs, CLs and FARs issued

No.	Topic / Chapter	CAR	CL	FAR
i.	VCS PD Template Section - 1.2	-	-	-
ii.	VCS PD Template Section - 1.3	-	-	-
iii.	VCS PD Template Section - 1.5	-	-	-
iv.	VCS PD Template Section - 1.6	-	-	-
v.	VCS PD Template Section - 1.7	-	-	-
vi.	VCS PD Template Section - 1.9	-	-	-
vii.	VCS PD Template Section - 1.10	-	-	-
viii.	VCS PD Template Section - 1.12.1	-	-	-
ix.	VCS PD Template Section - 1.12.2	-	-	-
x.	VCS PD Template Section - 1.12.3	-	-	-
xi.	VCS PD Template Section - 1.12.4	-	3	-
xii.	VCS PD Template Section - 1.13	-	-	-
4	SUM	-	-	-

4.1.1 Methodology Deviations

No methodology deviation is required for this project activity.

4.1.2 Project Description Deviations

The project has been implemented as it has been defined in the registered CDM PDD. The commissioning certificates are reviewed and the project site was physically verified by the verification team to confirm the same.

4.1.3 New Project Activity Instances

There is no new project activity instances is identified or proposed by the project proponent during the current monitoring period.

4.2 Validation Conclusion

The review of the validated project design documentation and additional documents related to baseline and monitoring methodology and subsequent background investigation have provided the TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- A reasonable level of assurance has been applied.
- All data and information used for ex-post calculation of emission reductions is real in nature.

- The project is in line with all relevant host country legislation incl. its GHG assertions, where applicable.
- The project additionality is sufficiently justified in the CDM PDD/PDD/ and the current verification report.
- The monitoring plan is transparent and adequate.
- No deviation from the applied methodology has been identified during the course of validation.
- The project is in line with applied baseline and monitoring methodology of AMS ID, version 17: "Grid Connected Renewable Electricity Generation".
- Project activity meets the criteria of the clauses 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 of the VCS Project Description and complies with the requirements of the VCS Version 3.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation against the VCS version 3.0 standards without any qualifications or limitations.

5 VERIFICATION PROCESS

5.1 Method and Criteria

The verification of the project consisted of the following steps:

- Contract review,
- Appointment of team members and technical reviewers,
- Desk review of the Monitoring Report/MR/ submitted by the client and additional supporting documents,
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the Project developer and its contractors,
- Draft verification reporting,
- Resolution of corrective actions (if any),
- Final verification reporting,
- Technical review,
- Final approval of the verification

Table 3-1: Verification sequence

Topic	Date
Assignment of verification	15/01/2013
On-site visit	28/01/2013

Draft reporting finalised	31/01/2013
Final reporting finalised	04/03/2013
Technical review on final reporting finalised	04/03/2013
Final corrections	04/03/2013

5.2 Document Review

The CDM registered PDD[/PDD/], VCS PD[/PD/], monitoring report and supporting background documents related to the project design and baseline were reviewed.

Furthermore, the verification team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The references used in the course of this verification are summarized in section 7.

5.3 Interviews

The verification team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS / ISO 14064. During verification the verification team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews were summarized in Table 3-4.

Table 3-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Project Owner & Operations Personnel, Saisudhir Energy Limited 2. Consultant, Emergent Ventures India	• General aspects of the project • Technical equipment and operation • Changes since implementation • Monitoring and measurement equipment • Remaining issues from validation • Calibration procedures • Quality management system • Involved personnel and responsibilities • Training and practice of the operational personnel • Implementation of the monitoring plan • Monitoring data management • Data uncertainty and residual risks • GHG calculation • Procedural aspects of the verification • Maintenance • Environmental aspects • Editorial issues of the Monitoring Report

5.4 Site Inspections

The verification team has carried out an inspection on site on 2013-01-28 in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment was conducted and monitoring data were checked with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include,

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed/IM01/ and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- The duly calibration of all metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked completely.
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.

5.5 Resolution of Any Material Discrepancy

Material discrepancies identified in the course of the verification are addressed either as CARs, CLs or FARs.

A Corrective Action Request (CAR) is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for verification of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

A Clarification Request (CL) will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A Forward Action Request (FAR) will be issued when certain issues related to project implementation should be reviewed during the first verification.

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in the next section 4 of this report.

6 VERIFICATION FINDINGS

In this section the assessments and findings from the desk review of the VCS PD / GHG Report PD, site visit, interviews and supporting documents as well as the final assessments are summarised. Table 4-1 includes an overview of all raised CARs, CLs and FARs.

Table 4-1: Overview of CARs, CLs and FARs issued

No.	Topic / Chapter	CAR	CL	FAR
4.1	Project implementation status	1	-	-
4.2	Accuracy of GHG emission reduction or Removal calculations	3	-	-
4.3	Quality of evidence to determine emission reductions or removals	-	-	-
4.4	Management and operational system	-	-	-
7	SUM	04	0	0

7.1 Project Implementation Status

Description

The project activity comprises installation of a grid connected solar photovoltaic based power project with a total capacity of 5 MWp. The project is located at T. Veerapuram village of Anantapur (also called as “Ananthapur”) district, in the State of Andhra Pradesh of India and the power generated from the project activity is supplied to the southern regional grid of India. The power purchase agreement is signed with NTPC Vidyut Vyapar Nigam Limited (NVVN), New Delhi, India and the project has started commercial operation since 05/01/2012. The commissioning certificate and power purchase agreement are reviewed by the verification team and found to be appropriate. The verification team has also conducted onsite observation and physically verified the project equipments and monitoring arrangements. The project activity was found to be implemented as it has been defined in the registered CDM PDD[/PDD/].

The project has been in the continual and successful operation during the requested monitoring period. None of the major technical equipment has been found to be exchanged during the monitoring period.

Essential data of the project is presented in the following Table 4-1a.

Table 4-1a: Project Characteristics

Item	**Data**
Project title	Solar Power project by Sai Sudhir Energy Limited
Project owner	Saisudhir Energy Limited

Any specific project categories	☒ Project: Less than or equal to 300,000 tonnes of CO_2e per year. ☐ Large projects: Greater than 300,000tonnes of CO_2e per year.			
VCS PD/GHG Report PD dated	Draft:	_	Final:	CDM PDD-27/03/2012 VCS PD- 04/03/2013
Applied Methodology	AMS I D, Grid Connected Renewable Electricity Generation			
Project starting date	05/01/2012 (Commissioning date of the project)			
Crediting period (CDM)	☐ Renewable Crediting Period (7 y) ☒ Fixed Crediting Period (10 y)			
Start of crediting period	05/01/2012(VCS) 31/05/2012 (CDM)			

The details of the project location are given in table 4-1b:

Table 4-1b: Project Location

No.	Project Location
Host Country	India
Region:	State- Andhra Pradesh
Project location address:	Village-T. Veerapuram , Taluk- Raydurg, District- Anantapur
Latitude:	14˚ 45’ 41.97” N
Longitude:	76˚ 57’ 03.86” E

The key parameters of the project are given in table 4-1c:

Table 4-1c: Technical data of the solar modules

Parameter	Unit	Value
Output power-Pmax (Watts)	Wp +/-5%	145
Warranted minimum Pmax	Wp +/- 5%	145
Voltage at Pmax	V	78.0
Current at Pmax	A	1.86
Open circuit voltage	V	110
Short circuit current	A	2.1
Maximum system voltage (Volts)	V	DC 600
Fuse rating	A	15
Solar Inverter	kW	500

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	**CAR 4.1.1**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The details of the technology used in the project activity are missing in the monitoring report.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The details of the technology used in the project activity are mentioned in section 1.1 of the monitoring report.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and VT assessments (#2, #3, etc.) shall be added.*	The details of the technology used in the project activity are found to be in corporate in the revised monitoring report appropriately. CAR is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

Final Assessment

The verification team concludes that the project has been implemented and operated as it has been defined in the registered CDM PDD.

7.2 Accuracy of GHG Emission Reduction or Removal Calculations

Description

The GHG emission reduction has been calculated using the following equation in line with the applied methodology, AMS ID, version 17.

$ER_y = BE_y – PE_y – LE_y$

Where,

ER_y= Emission reduction in the year, y

BE_y= Baseline Emission in the year, y

PE_y= Project Emission in the year, y

LE_y= Leakage in the year, y

Baseline emission, BE_y has been calculated as below;

$BE_y = \mathbf{EG_{BL,y} * EF_{CO2, grid,y}}$

Where,

$\mathbf{EG_{BL,y}}$ Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity during the monitoring period

$EF_{CO2, grid,y}$ Emission factor of Southern grid (0.916 tCO2e/MWh)

As per the CDM registered PDD, the values of the Quantity of electricity supplied to the grid during the year y are sourced from the Monthly Statement provided by APTRANSCO. The net quantity of electricity is calculated by subtracting the import readings from export. All the monthly statements provided by APTRANSCO/STM-APTR/ covering the entire monitoring period are verified by the verification team and the values used for baseline emission calculation are found to be correct. The invoices/INV/ raised by the project proponent against the monthly generations are reviewed by the verification team; the invoiced values of generations are found to be consistent with the values considered for the calculation of emission reduction calculation.

It should be noted that the energy generation statements are prepared by APTRANSCO based on monthly reading cycle, however, the project proponent had to consider the reading till 30/05/2012 (the APTRANSCO generation statement is available for the duration 01/05/2012 to 31/05/2012). Thus, project proponent has used alternate approach to account readings for the duration, 01/05/2012 to 30/05/2012.

Project proponent considered the export reading for the entire month of May 2012 from APTRANSCO generation statement (for the duration 01/05/2012 to 31/05/2012). The export reading for 31/05/2012 is deducted from the same to derive the export reading for the duration, 01/05/2012 to 30/05/2012. The export reading for 31/05/2012 is considered by the project

proponent from the daily generation report which is certified by the APTRANSCO[/MAY-READNG/]. The same has been reviewed by the verification team and found to be appropriate. While calculating the net electricity supplied to grid for the duration 01/05/2012 to 30/05/2012, the total import value for the entire month, May 2012 (01/05/2012 to 31/05/2012) has been deducted from the above derived export for the duration, 01/05/2012 to 30/05/2012. The import value for the month of May 2012 has been considered from the APTRANSCO generation statement for the month, May 2012 (for the duration 01/05/2012 to 31/05/2012). The approach applied by the project proponent has been assessed to be appropriate, conservative and hence acceptable. The calculation procedure of the same has been provided clearly in the emission reduction sheet.

$\mathbf{EG_{BL,y}}$ (for the entire monitoring period) is thus calculated as,

$\mathbf{EG_{BL,y}} = \mathbf{EG_{BL,y,\ export}} - EG_{BL,y,\ import}$
= 3874 MWh – 24 MWh
= 3850 MWh

Emission factor of the southern regional grid has been fixed ex-ante in the registered PDD. The value, 0.916 tCO2e/MWh has been sourced directly from the registered PDD to use in the calculation of baseline emission. The registered PDD[/PDD/] has been checked by the verification team and confirmed that the value is correctly sourced.

The baseline emission is then calculated as,

BE_y = 3850 MWh * 0.916 tCO2e/MWh
= 3526 tCO2e (Roundown)

Being a solar based renewable energy project, in accordance with the applied methodology, AMS ID, version 17, project emission is to be considered as zero.

Thus, PE_y= 0

Similarly, no leakage is associated with the project activity in accordance with the applied methodology, AMS ID, version 17.

Thus, LE_y= 0

Hence, the emission reduction has been calculated as;

$ER_y = BE_y – PE_y – LE_y$

=3526 – 0 – 0

=**3526 tCO2e**

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	**CAR 4.2.1**		
Classification	☐ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The baseline emission is to be calculated based on the Quantity of net electricity supplied to the grid as per the applied methodology (i.e. export-import) , AMS ID, version 17 where as in the monitoring report and emission reduction calculation sheet, it has been calculated using only the export value.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The baseline emissions are now calculated based on the quantity of net electricity supplied to the grid. The monitoring report and emission reduction calculation sheet are now made inline with the applied methodology, AMS ID, version 17.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and VT assessments (#2, #3, etc.) shall be added.*	The revised monitoring report and emission reduction calculation sheet are verified by the verification team. the baseline emission has been found to be revised in line with the applied methodology, AMS I D, version 17. Quantity of electricity supplied to the grid i.e. Export-Import has been considered for baseline calculation as per the methodology. CAR is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

Finding:	**CAR 4.2.2**		
Classification	☐ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	Project emission is not to be considered for the solar based renewable projects as per the applied methodology, AMS ID, version 17.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The monitoring report and emission reduction calculation sheet are now made inline with the applied methodology, AMS ID, version 17. Project emissions are not considered in the project activity now.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and VT assessments (#2, #3, etc.) shall be added.*	Project emission has now been considered as zero in the revised monitoring report and emission reduction calculation sheet. The import power which was calculated for calculation of project emission is now accounted in baseline calculation. This is in line with the applied methodology and hence acceptable. CAR is closed.		

Finding:	**CAR 4.2.2**
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Additional action should be taken (finding remains open) ☒ The finding is closed

Finding:	**CAR 4.2.3**		
Classification	☐ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	Apportionment approach used for estimation of net generation for the month of May 2012 is not clear in both monitoring report and emission reduction calculation sheet. The source used for the net generation of 31/05/2013 is also not mentioned.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The details on the estimation of net generation for the month of May 2012 are provided in section 3.3 of the monitoring report and emission reduction calculation sheet. The source used for the net export of electricity to grid on 31st May 2012 has been sourced from the Certified day wise reading of May 2012 by APTRANSCO. This is now mentioned in the monitoring report and ER calculation sheet.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and VT assessments (#2, #3, etc.) shall be added.*	Project proponent considered the export reading for the entire month of May 2012 from APTRANSCO generation statement (for the duration 01/05/2012 to 31/05/2012). The export reading for 31/05/2012 is deducted from the same to derive the export reading for the duration, 01/05/2012 to 30/05/2012. The export reading for 31/05/2012 is considered by the project proponent from the daily generation report which is certified by the APTRANSCO/MAY-READNG/. The same has been reviewed by the verification team and found to be appropriate. While calculating the net electricity supplied to grid for the duration 01/05/2012 to 30/05/2012, the total import value for the entire month, May 2012 (01/05/2012 to 31/05/2012) has been deducted from the above derived export value for the duration, 01/05/2012 to 30/05/2012. The import value for the month of May 2012 has been considered from the APTRANSCO generation statement for the month, May 2012 (for the duration 01/05/2012 to 31/05/2012). The approach applied by the project proponent has been assessed to be appropriate, conservative and hence acceptable. The description for the same is found to be incorporated in the revised monitoring report and emission reduction calculation sheet appropriately. CAR is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

Finding:	**CAR 4.2.3**

Final Assessment

The verification team concludes that the GHG emission reduction for the project activity has been calculated correctly in line with the applied methodology.

7.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

The emission reduction calculation is basically associated with net quantity of power exported to the grid and grid emission factor. As stated above, the values of the Quantity of electricity supplied to the grid during the year y are sourced from the Monthly Statement provided by APTRANSCO. The net quantity of electricity is calculated by subtracting the import readings from export. All the monthly statements provided by APTRANSCO[/STM-APTR/] covering the entire monitoring period are verified by the verification team and the values used for baseline emission calculation are found to be correct. The invoices[/INV/] raised by the project proponent against the monthly generations are reviewed by the verification team; the invoiced values of generations are found to be consistent with the values considered for the calculation of emission reduction calculation.

Emission factor of the southern regional grid has been fixed ex-ante in the registered PDD. The value has been sourced directly from the registered PDD to use in the calculation of baseline emission. The registered PDD[/PDD/] has been checked by the verification team and confirmed that the value is correctly sourced.

Electricity supplied from the project activity is measured at the substation end by a pair of main and check meter with accuracy class 0.2.S. The energy meters are calibrated at a frequency once in a year as per the registered PDD. The calibration certificates[/CAL/] are reviewed by the verification team and found to be appropriate. The errors identified during calibration are found to be within maximum permissible error of the energy meters.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Finding:	…		
Classification	☐ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*			
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*			

DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and VT assessments (#2, #3, etc.) shall be added.*	
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Additional action should be taken (finding remains open) ☐ The finding is closed

Final Assessment

The verification team concludes that the evidences used for the data to be used for emission reduction calculation are of appropriate quality and reliable.

7.4 Management and Operational System

Description

Project proponent has defined an organisation structure to manage CDM or VCS related activities. The project power plant is headed by the plant manager, holding the full charge of the power plant operations, reporting directly to the project promoters.

The plant manager is in charge for both technical and administrative functions. The organization under plant manager is divided into operation and maintenance group.

The plant operation team work in three shifts per day. Each shift is controlled by a shift supervisor. There is an additional shift supervisor who functions as reliever.

Joint meter reading is taken in presence of representatives of APCPDCL and project proponent at the end of each calendar month based on which APCPDCL issues monthly generation statements. Besides that export and import data are recorded and stored in logs as well as in electronic form on a daily basis. The records were checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor.

Verification team had interviewed the concern persons during onsite verification to confirm the management procedure followed by the project proponent.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Finding:	…

Classification	☐ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*			
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*			
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and VT assessments (#2, #3, etc.) shall be added.*			
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Additional action should be taken (finding remains open) ☐ The finding is closed		

Final Assessment

The verification team concludes that the management and operational system for the project activity has been adequately defined and implemented in accordance with the registered CDM PDD.

8 VERIFICATION CONCLUSION

Saisudhir Energy Limited has commissioned the TÜV NORD JI / CDM Certification Program to carry out the verification of the Project "Solar Power project by Sai Sudhir Energy Limited" in at T. Veerapuram village of Anantapur (also called as "Ananthapur") district, in the State of Andhra Pradesh of India with regard to the requirements of VCS 3 Standard.

The project activity involves installation of a grid connected solar photovoltaic based power project with a total capacity of 5 MWp. The power purchase agreement is signed with NTPC Vidyut Vyapar Nigam Limited (NVVN), New Delhi, India and the project has started commercial operation since 05/01/2012.

Reporting period: From 05/01/2012 to 30/05/2012 (Including both days)

In the course of the verification 4 Corrective Action Requests (CARs). No Clarification Requests (CLs) or Forward Action Request (FAR) is raised in this verification.

The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the registered CDM PDD, supplementary VCS PD, CDM validation report, Supplementary VCS validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

In detail the conclusions can be summarised as follows:

- all operations of the project are implemented and installed as planned and described in the validated project description .
- the monitoring plan is in accordance with the applied approved methodology ,i.e. AMS-I.D. Grid Connected Renewable Electricity Generation
- the installed equipment essential for measuring parameters required for calculating emission reductions is calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

8.1.1

GHG Emission Reductions or Removals	**tCO_2e**
Baseline Emissions	**3,526**
Project Emissions	0
Leakage	0
Net GHG emission reduction or removals	**3,526**

Vadodara, 04/03/2013

Pankaj Patel
TÜV NORD JI/CDM Certification Program
Verification Team Leader

Essen, 04/03/2013

Stefan Winter
TÜV NORD JI/CDM Certification Program
Final Approval

ANNEX 1
REFERENCES

Table Annex 1.1: Documents provided by the project participant

Reference	Document
/VCSPD/	Supplementary project design of the project titled, "Solar Power project by Sai Sudhir Energy Limited", version 1, dated 04/03/2013
/MR1/	Monitoring report of the project titled, "Solar Power project by Sai Sudhir Energy Limited", version 1,dated 19/12/2012
/MR2/	Monitoring report of the project titled, "Solar Power project by Sai Sudhir Energy Limited", version 2,dated 04/03/2013
/XLS1/	Emission reduction calculation spread sheet w.r.t monitoring report, version 1
/XLS2/	Emission reduction calculation spread sheet w.r.t monitoring report, version 2
/CC/	Commissioning certificate of the project dated 05/01/2012.
/PPA/	Power Purchase Agreement signed between Saisudhir Energy Limited and NTPC Vidyut Vyapar Nigam Limited (NVVN) dated 09/01/2012
/STM-APTR/	Monthly energy statement provided by the APTRANSCO covering the entire monitoring period, 05/01/2012 to 30/05/2012.
/INV/	Invoices raised by the project proponent against monthly generations covering the entire monitoring period, 05/01/2012 to 30/05/2012.
/CAL/	• Calibration certificates of the energy meter with serial number, 11080369 (Main Meter) dated 01/12/2011 • Calibration certificates of the energy meter with serial number, 11080360 (Check Meter) dated 01/12/2011

Table Annex 1.2: Background investigation and assessment documents

Reference	Document
/AMS ID/	Approved CDM Small Scale Methodology, AMS-I.D, Version 17, "Grid Connected Renewable Electricity Generation"
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/IPPC/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/ISO 14064/	Greenhouse gases -- Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals Greenhouse gases -- Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements Greenhouse gases -- Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions
/ISO14065/	Greenhouse gases -- Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition
/SUP-VAL/	Supplementary validation report of the project titled, "Solar Power project by Sai Sudhir Energy Limited", version 1,dated 05/02/2013
VCS	Verified Carbon Standard 3
/VDS-PD-T/	VCS PD Template
/PDD/	Registered CDM project of the project titled "Solar Power project by Sai Sudhir Energy Limited", version 02.3 dated 27/03/2012
/VAL/	CDM validation of the project titled, "Solar Power project by Sai Sudhir Energy Limited", version 1.2 dated 07/05/2012

Table Annex 1.3: Websites used

Reference	Link	Organisation
/APTRANSCO/	www.aptransco.gov.in/	Transmission Corporation of Andhra Pradesh Limited
/IPCC/	www.ipcc-nggip.iges.or.jp	IPCC publications
/vcs/	www.v-c-s.org	VCSA
/UNFCCC/	http://cdm.unfccc.int	UNFCCC

Table Annex 1.4: List of interviewed persons

Reference	MoI [1]	9	Name	Organisation / Function
/IM01/	V	☒ Mr. ☐ Ms	S. Sreekanth	Saisudhir Energy Limited
/IM01/	V	☒ Mr. ☐ Ms	A. Mahendra Verma	Saisudhir Energy Limited
/IM01/	V	☒ Mr. ☐ Ms	Venkat Srinivas. P	Saisudhir Energy Limited
/IM02/	T,E	☒ Mr. ☐ Ms	Sunil Sharma	Emergent Ventures India
/IM02/	T,E	☐ Mr. ☒ Ms	Riya Rachel	Emergent Ventures India

[1] Means of Interview: (**T**elephone, **E**-Mail, **V**isit)