JCM Verification Report Form

A. Summary of verification

A.1. General Information

Title of the project	Introduction of Solar PV System at Salt Factory
Reference number	KE002
Monitoring period	14/12/2016 - 31/12/2018
Date of completion of the monitoring report	23/06/2020
Third-party entity (TPE)	Lloyd's Register Quality Assurance Limited (LRQA)
Project participant contracting the TPE	Pacific Consultants Co., Ltd.
Date of completion of this report	01/07/2020

A.2 Conclusion of verification and level of assurance

Overall verification opinion	☒ Positive ☐ Negative
☒ Unqualified opinion	Based on the process and procedure conducted, *Lloyd's Register Quality Assurance Limited (LRQA)* (TPE's name) provides reasonable assurance that the emission reductions for *Introduction of Solar PV System at Salt Factory* (project name) ✓ Are free of material errors and are a fair representation of the GHG data and information, and ✓ Are prepared in line with the related JCM rules, procedure, guidelines, forms and other relevant documents
(If overall verification opinion is negative, please check below and state its reasons.) ☐ Qualified Opinion ☐ Adverse opinion ☐ Disclaimer	<State the reasons> Not applicable

A.3. Overview of the verification results

Item	Verification requirements	No CAR or CL remaining
The project implementation with	The TPE determines the conformity of the actual project and its operation with the eligibility criteria of	☒

Item	Verification requirements	No CAR or CL remaining
the eligibility criteria of the applied methodology	the applied methodology.	
The project implementation against the registered PDD or any approved revised PDD	The TPE assesses the status of the actual project and its operation with the registered/validated PDD or any approved revised PDD.	☒
Calibration frequency and correction of measured values with related requirements	If monitoring Option C is selected, the TPE determines whether the measuring equipments have been properly calibrated in line with the monitoring plan and whether measured values are properly corrected, where necessary, to calculate emission reductions in line with the PDD and Monitoring Guidelines.	☒
Data and calculation of GHG emission reductions	The TPE assesses the data and calculations of GHG emission reductions achieved by/resulting from the project by the application of the selected approved methodology.	☒
Avoidance of double registration	The TPE determines whether the project is not registered under other international climate mitigation mechanisms.	☒
Post registration changes	The TPE determines whether there are post registration changes from the registered PDD and/or methodology which prevent the use of the applied methodology.	☒

Authorised signatory:	Mr. ☒	Ms. ☐
Last name: Chiba	First name: Michiaki	
Title: Climate Change Manager - Asia & Pacific		
Specimen signature: [redacted]		Date: 01/07/2020

B. Verification team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Michiaki Chiba	LRQA Ltd.	Team leader	☒	Technical competence authorised	☒
Mr. ☒ Ms. ☐	Stewart Niu	LRQA China	Intenral reviewer	☒	N/A	☐
Mr. ☐ Ms. ☐				☐		☐
Mr. ☐ Ms. ☐				☐		☐

Please specify the following for each item.

* *Function: Indicate the role of the personnel in the validation activity such as team leader, team member, technical expert, or internal reviewer.*

* *Scheme competence: Check the boxes if the personnel have sufficient knowledge on the JCM.*

* *Technical competence: Indicate if the personnel have sufficient technical competence related to the project under validation.*

C. Means of verification, findings and conclusions based on reporting requirements

C.1. Compliance of the project implementation and operation with the eligibility criteria of the applied methodology

<Means of verification>

LRQA has determined during the verification process that the actual implementation and operation of the project has been conducted in conformance with the eligibility criteria of the applied methodology.

The project applied the approved methodology: JCM_KE_AM002_ver01.0 Installation of Solar PV System, Ver 01.0.

LRQA assessed by means of an on-site visit that the physical features of the project are in place and that the PPs have operated the project as per the eligibility criteria of the applied methodology. The steps taken to verify each eligibility criterion and the conclusions about implementation of the project are summarised as below.

Criterion 1: The project installs solar PV system(s).

Justification in the PDD: A solar PV system is installed. The solar PV module employed is Kyocera polycrystalline solar module KT265-6MCA. The inverter employed is SMA Tripower 25000TL.

Steps taken for assessment: The verification team assessed the project documentation, technical specification of the project solar PV system, the contract, the commissioning report and conducted physical on site assessment.
Conclusion: The verification team confirmed that the project installs solar PV system including the solar PV modules and inverters, and the criterion is met by the project.

Criterion 2: The PV modules have obtained a certification of design qualifications (IEC 61215, IEC 61646 or IEC 62108) and safety qualification (IEC 61730-1 and IEC 61730-2).
Justification in the PDD: The installed PV module Kyocera polycrystalline solar module KT265-6MCA has obtained a certification of design qualifications (IEC 61215) and safety qualification (IEC 61730-1 and IEC 61730-2).
Steps taken for assessment: The verification team reviewed the technical specification of the PV module and the quality certificates.
Conclusion: The verification team confirmed that the PV module employed by the project has been certified with IEC 61215, IEC 61730-1, and IEC 61730-2 as appropriate. The criterion is met by the project.

Criterion 3: The equipment to monitor the output power of the solar PV system(s) and irradiance is installed at the project site.
Justification in the PDD: An electricity meter is installed to measure output power of the solar PV system. A pyranometer is installed at the site to measure irradiance.
Steps taken for assessment: The verification team assessed the project documentation, technical specification of the monitoring system, and conducted physical on site assessment.
Conclusion: The verification team confirmed that the equipment to monitor output power of the solar PV system and irradiance have been installed at the project site. The criterion is met by the project.

The verification team confirmed that the eligibility conditions are satisfied by the project by reviewing the supporting documents and the on site assessment.
The details of the persons interviewed and the documents reviewed are shown in the Section F of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of the section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team confirmed that the project has been implemented in conformity with the

eligibility criteria of the applied methodology.

C.2. Assessment of the project implementation against the registered PDD or any approved revised PDD

<Means of verification> The project introduced a 991.1 kW grid-connected solar photovoltaic (PV) system adjacent to a salt refinery of Krystalline Salt Limited in Gongoni, Malindi, Kilifi County, the Republic of Kenya. The power from the solar PV system replaces the grid electricity and power from the diesel genset. A 1,600 kW diesel generator is operated synchronously with the project solar PV system that the electricity generated by the project solar PV system is given the first priority and the diesel generator mainly back up the grid electricity when a power failure occurs. All of the power generated by the solar PV system is self-consumed and not fed into the grid. A remote monitoring system to monitor the performance of the system is also installed. The project solar PV system applies Kyocera polycrystalline solar module KT265-6MCA. The project has been implemented by Krystalline Salt Limited from the Republic of Kenya, and Pacific Consultants Co., Ltd. (PCKK) from Japan (the PPs). The start date of project operation is on 14/12/2016 and the expected operational lifetime of the project is for 10 years. The project has been selected as one of the JCM model projects by the Ministry of the Environment, Japan (MOE) and receives financial support from the Government of Japan. The project was under the registration process by the JC at the time of verification and the verification was conducted based on the PDD, Monitoring Plan (MP) and the Validation Report having been submitted by the PPs on the request for registration. The project was subsequently registered on 27/01/2020 and this final verification report is issued based on the Monitoring Report (MR) completed using the registered MP and the Monitoring spreadsheet and in consideration of the updated information. The verification team assessed the MR consists of Monitoring Report Sheet (MRS) parts of the Monitoring Spreadsheet and the supporting documents, conducted a physical site visit to assess the status of the actual project and its operation in accordance with the registered PDD. No revision to the PDD was requested from the version submitted for registration of the project. The verification team determined through the verification process that the implementation and operation of the project has been in accordance with the description contained in the validated and registered PDD. The verification team, by means of a desk review and an on-site visit, assessed that: - all physical features of the JCM project described in the validated and registered PDD are in place, and - the PPs have operated the JCM project as per the validated and registered PDD.

The MR follows the MP of the validated and registered PDD that have been established based on the approved methodology. The parameter to be monitored ex-post is EGi,p the total quantity of the electricity generated by the project solar PV system i during the period p (in MWh/p).

The roles and responsibilities of the persons are described in the Monitoring Structure Sheet (MSS) in accordance with the requirements of the applied methodology. There was no change in the organisational structure during the monitoring period.

CAR 1 and CAR 2 were raised through the verification process as resolution details below.

The details of the persons interviewed and the documents reviewed are shown in the Section F of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Grade / Ref: CAR 1

Nature of the issue raised: The MR was not completed using the latest version of the Monitoring Spreadsheet on which the validation report had been issued. The project was under the registration process by the JC as of the time of the verification.

The information used for ex-ante estimation of the Emission Reductions (ERs) and the MSS, for example, were not reflected the changes made through the validation.

Nature of responses provided by the PPs: The PPs provided the revised MR using the Monitoring Spreadsheet validated and submitted for registration process.

Assessment of the responses: The verification team reviewed the revised MR and confirmed that the information of the Monitoring Spreadsheet is corrected.

The CAR was closed.

Grade / Ref: CAR 2

Nature of the issue raised: The MRS was not completed with appropriate information below:

1) Column (a) of Table 1 (Monitoring period is supposed to be indicated) was left blank,

2) Columns (g) and (h) of Table 1 did not show the monitoring option and the source of data chosen for the project, and

3) Column (i) of Table 1 was not completed with the description of the measurement methods and procedures applied to the project with the QA/QC procedures and the measuring equipment including the details on accuracy level and the calibration information.

Nature of responses provided by the PPs: The PPs submitted the revised MR to address the issues for review by the verification team.

Assessment of the responses: The verification team reviewed the revised MR and confirmed the description is corrected as appropriate.

The CAR was closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team confirmed that the project was implemented and operated in accordance with the validated PDD under the registration process and no revision to the same was requested for the monitoring period. Following the formal registration of the project on 27/01/2020, the verification team confirmed the MR was completed in accordance with the registered PDD and the MP.

C.3. Compliance of calibration frequency and correction of measured values with related requirements

<Means of verification>

The parameter No. (1) EGi,p applies the monitoring Option C and the monitoring of the parameter uses electricity meter as the measuring equipment. The electricity meter is certified by a factory test to comply with Measuring Instruments (MID) Class C accuracy standards. The meter is not required to be replaced or calibrated on a regular interval since the type approval and manufacturer's specification were provided in accordance with the applied methodology. No correction was required to the measured values to calculate ERs in line with the PDD and Monitoring Guidelines during the monitoring period.

The details of the persons interviewed and the documents reviewed are shown in the Section F of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team confirmed that the measuring equipment applied for the parameter satisfied the requirements of the MP concerning the calibration and no correction was required to the measured values during the monitoring period.

C.4. Assessment of data and calculation of GHG emission reductions

<Means of verification>

The MR is developed using the MRS applied to the JCM project that is confirmed fulfilment of the requirements of the MRS of the applied methodology.

LRQA has determined that:

1. a complete set of data for the specified monitoring period is available,
2. information provided in the MR has been cross-checked with other sources such as plant log books, purchase records,

3. calculations of reference emissions (REs) and project emissions (PEs), as appropriate, have been carried out in accordance with the formulae and methods described in the MP and the applied methodology,
4. any assumptions used in emission calculations have been justified, and
5. appropriate emission factors, default values and other reference values have been correctly applied.

The project introduces solar PV system at the salt factory and emission source is consumption of grid electricity in the reference scenario. PEs is not applicable for generation of electricity from solar PV system in accordance with the applied methodology.

The REs are determined as a product of total electricity generation and the default reference CO2 emission factor of the applied methodology at 0.533 tCO2/MWh.

The GHG emission reductions during the monitoring period (each for year 2016, 2017 and 2018) are calculated as: ERp = REp - PEp = REs = Σ i EG_i,p x EF_RE

From 14/12/2016 to 31/12/2016

0 x 0.533 tCO2/MWh = 0 tCO2e

From 01/01/2017 to 31/12/2017

682.10 x 0.533 tCO2/MWh = 363.6 tCO2e

From 01/01/2018 to 31/12/2018

1,147.43 x 0.533 tCO2/MWh = 611.6 tCO2e

Achieved electricity generation in first monitoring period of 25 months (748 days) is 1,829.53 MWh in total, that is 892.75 MWh (1,829.53MWh x 365/748) in a year and 60.5 % of ex-ante estimation in PDD of 1,476 MWh. Although the project operation stated from 14/12/2016, normal data was not obtained due to wrong setting of electricity meter that was finally replaced on 07/06/2017. The PPs decided to only apply the monitored data from 07/06/2017 with the new electricity meter replaced the original one having the wrong setting. Therefore, the effective period the project was operated is 573 days from 07/06/2017 to 31/12/2018 where the electricity generated in a year was 1,165.41 MWh (1,829.53MWh x 365/573) that is 79.0 % of ex-ante estimation in the PDD. The level of generation is considered as reasonable with natural fluctuation and generation loss on the holidays.

The verification team assessed the reported data with documented evidence and by means of on site visit.

CL 1 was raised through the verification process that resolution details as below.

The details of the persons interviewed and the documents reviewed are shown in the Section F of this report.

Parameters	Monitored	Method to check values in the monitoring report with

	values	sources
EGi,p (2016)	0 MWh/p	Assessment was conducted based on records of monthly meter readings and on site assessment.
EGi,p (2017)	682.10 MWh/p	Assessment was conducted based on records of monthly meter readings and on site assessment.
EGi,p (2018)	1,147.43 MWh/p	Assessment was conducted based on records of monthly meter readings and on site assessment.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

Grade / Ref: CL 1

Nature of the issue raised: The PPs were requested to clarify if the MRS is completed as relevant with the monitored values in each calendar year covered by the monitoring period.

Nature of responses provided by the PPs: The PPs revised the MR in which the MRS is provided for each calendar year covered by the monitoring period.

Assessment of the responses: The verification team confirmed that the PPs provided MRS completed for each calendar year in the revised MR.

The CL was closed.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team confirmed that appropriate methods and formulae for calculating REs and PEs have been followed. The verification team is of the opinion that all assumptions, emissions factors and default values that were applied in calculations have been justified.

C.5. Assessment of avoidance of double registration

<Means of verification>

The verification team assessed and confirmed relevance of the written confirmation from the PPs that the project is not registered under the other international climate mitigation mechanisms.

The team in addition to the interviews with the PPs checked publicly accessible information of Clean Development Mechanism (CDM), Joint Implementation (JI), Verified Carbon Standard (VCS) and Gold Standard (GS) and found no identical project as the proposed JCM project in terms of the name of entities, applied technology, scale and the location. The result of researches confirmed that the proposed project was not registered under the other international climate mitigation mechanisms than JCM and it will not result in a double counting of GHG emission reductions.

The details of the persons interviewed and the documents reviewed are shown in the Section F

of this report.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team confirmed that the projects not registered under other international climate mitigation programs.

C.6. Post registration changes

<Means of verification>

Under the situation that the project was under the registration process as of the time of verification, the requirements on the post registration changes were assessed based on the changes to the validated PDD and MP in this report assuming the PDD and MP would not be required amendments through the process for registration. This was considered permissible in JCM rules that allows a validation and a verification to be conducted either simultaneously or separately.

The verification team assessed the post registration change that the monitoring parameter was not correctly monitored in accordance with the validated MP from 14/12/2016 to 06/06/2017 due to wrong settings of the electricity meter and the time required to solve the problem that prevented from obtaining of normal data until the electricity meter was finally replaced with a new one on 07/06/2017.

The verification team assessed the project documentation, conducted the on site visit and confirmed that the post registration change from the validated MP does not prevent application of the approved methodology. For the period data was not correctly monitored from 14/12/2016 to 06/06/2017, the PPs assumed the data is zero for calculation of the ERs and the verification team confirmed that the treatment is conservative as the data is used for calculation of REs.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No issue was raised to the requirements of this section.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification through the verification processes determined that there was no post registration change from the validated PDD or approved methodology which prevent from use of the applied methodology. Following the formal registration of the project on 27/01/2020, the verification team confirmed through reviews of the MR and the updated information that

there is no more post registration change from the registered PDD or the approved methodology.

D. Assessment of response to remaining issues

An assessment of response to the remaining issues including FARs from the validation and/or previous verification period, if appropriate

No FAR was issued in the validation and this is the first verification of the project.

E. Verified amount of emission reductions achieved

Year	Verified Reference Emissions (tCO_2e)	Verified Project Emissions (tCO_2e)	Verified Emission Reductions (tCO_2e)
2013			
2014			
2015			
2016	0	0	0
2017	363.6	0	363
2018	611.6	0	611
2019			
2020			
2021			
2022			
2023			
2024			
2025			
2026			
2027			
2028			
2029			
2030			
Total (tCO_2e)			974

F. List of interviewees and documents received

F.1. List of interviewees

Krystalline Salt Limited

Deepak Kanji Patel, Director

Kishor Hirani, Plant Engineer

Jayesh Vekaria, Engineer

Pacific Consultants Co., Ltd.

Noriko Ishibashi, Consultant, Urban Development Department, Global Business Division

F.2. List of documents received

Category A documents (documents prepared by the PP)
- Monitoring report dated 22/02/2019
- Revised Monitoring report dated 13/03/2019 and 23/06/2020
- Electricity meter reading logbook
- Technical specification, Kyocera Polycrystalline Solar Modules KT-Series: KT265-6MCA
- List of main equipment
- Implementation report for JCM model project
- Corporate profile: Krystalline Salt Limited
- Solar PV Proposal Version 8.0, NVI Energy, 29/01/2016
- Construction progress report dated 10/03/2017
- Commissioning checklist 1041-KAY-TEC-CCL-1.0 dated 14/12/2016, NVI Energy Kenya Ltd.
- Monitoring Manual Ver.2.3, Pacific Consultants Co., Ltd.
- Certificate for IEC 61215:2005, TUV Rheinland, 25/05/2015
- Certificate for IEC 61730-1:2004 and IEC 61730-2:2004, TUV Rheinland, 25/05/2015
- Electronic polyphaser meter alpha A1500, Elster Solutions GmbH
- The SMP10 Pyranometer, Kipp & Zonen B.V.
- Summary report of construction work for JCM model project
- Drawing of Power house
- Site plan
- kWh meter recording data October 2017 Kaysalt
- Calibration certificate, Elster Solutions GmbH
- Type-approval certificate under German Law, Physical-technical Federal Institute, 14/02/2008
- Environmental Impact Assessment Project Report 2016
- Environmental Impact Assessment License No. NEMA/EIA/PSL/3818, National Environment Management Authority (NEMA), 20/09/2016
- Electricity generation records by Fuel Save Controller from December 2016 to June 2017
- SMA Fuel Save Controller, SMA Solar Technology
- Energy meter replacement report, 1041-KAY-TEC-Energy Meter-1.0
- Records of on site training on 13 and 14/12/2016
- Outline of the installation
- Explanation on issues of the electricity meter dated 31/10/2017
- Specification of Grid Measurement Module GM260, Bachmann Electronic GmbH
- Type Approval Certificate for Generator Control and Protection Units Grid Modules GM260 dated 15/05/2017

- Declaration letter on no double registration dated 25/02/2019
- JCM Modalities of Communication Statement Form ANNEX 1 dated 22/02/2019 (for change of contact details of the focal point)

Category B documents (other documents referenced)
- PDD Version 02.0 dated 26/10/2017 and the Monitoring spreadsheet (registration on 27/01/2020)
- Validation report for the project dated 20/12/2017
- JCM_KE_AM002_ver01.0 Installation of Solar PV System Version 1.0
- Additional Information to the Proposed Methodology “Installation of Solar PV System”
- JCM Project Cycle Procedure JCM_KE_PCP_ver03.0
- JCM Guidelines for Validation and Verification JCM_KE_GL_VV_ver01.0
- JCM Guidelines for Developing PDD and MR JCM_KE_GL_PDD_MR_ver02.0 and JCM_KE_GL_PDD_MR_ver03.0
- JCM Glossary of Terms JCM_KE_Glossary_ver01.0
- JCM Verification Report Form JCM_KE_F_Vrf_Rep_ver02.0
- Measuring Instruments Directive (MID) 2014/32/EU
- CSN EN 50470-1, Electricity metering equipment (a.c.) – Part 1: General requirements, tests and test conditions
- CSN EN 50470-3, Electricity metering equipment (a.c.) – Part 3: Particular requirements – Static meters for active energy (class indexes A, B and C)
- IEC 62053-22:2003, Electricity metering equipment (ac) - Particular requirements. Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)
- Technical Information: Functional Description, SMA Fuel Save Controller, PV Diesel Hybrid System, SMA Solar Technology AG
- JCM_KE_AM001_ver01.0 Electrification of communities using Micro hydropower generation, version 1.0
- Approved Small Scale CDM Methodology AMS I.D. Version 18.0 Grid connected renewable electricity generation
- Approved CDM Methodological Tool to calculate the Emission Factor for an electricity system
- PDD of the proposed JCM project ref No. KE001 Electrification of communities using Ultra Low Head Micro Hydro Power Generation system
- PDD of the registered CDM project ref No. 9960 5.1MW Grid Connected Wind Electricity Generation at Ngong Hills, Kenya
- Approved Small Scale CDM Methodology AMS I.D. Version 18.0 Grid connected renewable electricity generation

- Approved CDM Methodological Tool to calculate the Emission Factor for an electricity system
- Proposed and registered projects under CDM, VCS, Gold Standard, and the other international schemes

Annex Certificates or curricula vitae of TPE's verification team members, technical experts and internal technical reviewers

Please attach certificates or curricula vitae of TPE's validation team members, technical experts and internal technical reviewers.

Certificate of Appointment is attached to this report.

Joint Crediting Mechanism Certificate of Appointment

Title of Project: Introduction of Solar PV System at Salt Factory (Ref# KE002)
Verification for the first monitoring period: 14/12/2016 – 31/12/2018

We hereby certify that the following personnel have engaged in the verification process that has fully satisfied the competence requirements of the verification of the JCM project.

Name of Person	Assigned Roles
Michiaki Chiba	Team Leader
Stewart Niu	Technical Reviewer

Signed by

Michiaki Chiba
Climate Change Manager – Asia & Pacific
28/02/2019