



CAPACITY UPGRADE OF GUNUNG SALAK GEOTHERMAL POWER PLANT PROJECT, INDONESIA



Document Prepared By: KBS Certification Services Pvt. Ltd.

Project Title	Capacity Upgrade of Gunung Salak Geothermal Power Plant Project, Indonesia
Version	02
Report ID	VCS.19.VER.005

Report Title	Capacity Upgrade of Gunung Salak Geothermal Power Plant Project, Indonesia
Client	South Pole Carbon Asset Management Ltd.
Pages	33
Date of Issue	12/02/2020
Prepared By	KBS Certification Services Pvt. Ltd.
Contact	Registered Office: 414-424, Om Shubham Tower, Neelam-Bata Road, N.I.T.,

	Faridabad-121001, Haryana India. Contact us at: Tel.: +91-129-4034513, 4054513, 403513, Fax: +91-129-4035139. Webpage: www.kbsindia.in .
Approved By	Manager Technical & Certification
Work Carried Out By	Mr. Chetan Swaroop Sharma (Team Leader & Technical Expert 1.2) Ms. Deboshmita Dey (Verifier) Ms. Shikha Sharma (Verifier) Mr. Rohit Badaya (Technical Reviewer & Manager Technical & Certification)

Summary:

“South Pole Carbon Asset Management Ltd.” has commissioned “KBS Certification Services Pvt. Ltd.” to perform the 2nd periodic verification for the monitoring period 01/07/2017 to 31/10/2019 (2nd crediting period) of the project, “Capacity Upgrade of Gunung Salak Geothermal Power Plant Project, Indonesia” with regard to the relevant requirements for Verified Carbon Standard (VCS) Project Activity (PA); to attain real, measurable, additional and permanent emission reductions.

The project activity comprises of a capacity upgrade of Gunung Salak Geothermal Power Plant from 3 x 55 MW to 3 x 60 MW. The additional installed capacity of 15 MW at Gunung Salak Geothermal power plant generates and supplies an average of 213,959 MWh p.a. of electricity to the connected JAMALI Grid. The project is owned and developed by PT. Indonesia Power, a subsidiary company of PT. PLN (Persero), a state-owned electricity company. The proposed project increase the utilization of renewable energy sources, in this case geothermal energy, by modifying turbines and steam gas ejectors.

A risk-based approach has been followed to perform this verification. In the course of the verification 02 Corrective Action Requests (CAR) and 04 Clarification Requests (CL) were raised and successfully closed out.

The verification is based on the VCS MR, proof of title, proof of right, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the verification team by project proponent.

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

- The project fulfils criteria of VCS Standard Version 3.7.
- The project is in line with all relevant VCS requirements.
- Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board and VCS Association;
- All information and references relevant to the project activity resulting in emission reductions;
- The monitoring plan is transparent, adequate and in line with applied baseline and monitoring methodology of ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources”, Version 17.0.

Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 304,016 tCO₂e emission reductions during period 01/07/2017 to 31/10/2019 (including both the days).

1	Introduction	6
1.1	Objective	6
1.2	Scope and Criteria	7
1.3	Level of Assurance	7
1.4	Summary Description of the Project	7
2	Verification Process	8
2.1	Method and Criteria	8
2.2	Document Review	8
2.3	Interviews	8
2.4	Site Inspections	8
2.5	Resolution of Findings	9
2.5.1	Forward Action Requests	10
2.6	Eligibility for Validation Activities	11
3	Validation Findings	11
3.1	Participation under Other GHG Programs	11
3.2	Methodology Deviations	11
3.3	Project Description Deviations	11
	Deviation to parameter $w_{\text{steam},\text{CO}_2,\text{y}}$ and $w_{\text{steam},\text{CH}_4,\text{y}}$	11
3.4	Grouped Project	12
4	Verification Findings	12
4.1	Project Implementation Status	12
4.2	Safeguards	13
4.2.1	No Net Harm	13
4.2.2	Local Stakeholder Consultation	13
4.3	AFOLU-Specific Safeguards	14
4.4	Accuracy of GHG Emission Reduction and Removal Calculations	14
4.5	Quality of Evidence to Determine GHG Emission Reductions and Removals	22
4.6	Non-Permanence Risk Analysis	25
5	Verification conclusion	25
	APPENDIX 1: References	27

APPENDIX 2: Resolution of findings

28

1 INTRODUCTION

1.1 Objective

“South Pole Carbon Asset Management Ltd.” has commissioned “KBS Certification Services Pvt. Ltd.” to perform the 2nd periodic verification for the monitoring period 01/07/2017 to 31/10/2019 (2nd crediting period) of the project, “Capacity Upgrade of Gunung Salak Geothermal Power Plant Project, Indonesia” with regard to the relevant requirements for Verified Carbon Standard (VCS) Project Activity (PA); to attain real, measurable, additional and permanent emission reductions.

The VCS project had undergone the independent third-party verification and certification of emission reductions as the basis for issuance of Verified Carbon Units (VCUs). The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project meets the VCS verification requirements as per the VCS rules;
- The project activity has been implemented and operated as per the validated VCS 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 actual monitoring systems & procedures and monitoring report conforms with the requirements of the approved monitoring plan and the approved monitoring methodology;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan.

1.2 Scope and Criteria

The scope of the verification is an independent and objective review and ex-post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the VCS PD/01/, registered monitoring plan and the monitoring report/02/. The project is assessed against the requirements of VCS Rules/requirements.

KBS has conducted the verification, based on the recommendations in the latest version of VCS Validation and Verification Manual and VCS rules employed a rule-based approach (as criteria) in the verification, focusing on the identification of significant reporting rules and the reliability of project monitoring.

1.3 Level of Assurance

☒ Reasonable level of assurance

1.4 Summary Description of the Project

The project activity comprises of a capacity upgrade of Gunung Salak Geothermal Power Plant from 3 x 55 MW to 3 x 60 MW. The additional installed capacity of 15 MW at Gunung Salak Geothermal power plant generates and supplies an average of 213,959 MWh p.a. of electricity to the connected JAMALI Grid. The project is owned and developed by PT. Indonesia Power, a subsidiary company of PT. PLN (Persero), a state-owned electricity company. The proposed project will increase the utilization of renewable energy sources, in this case geothermal energy, by modifying turbines and steam gas ejectors.

During the on-site visit and from the document review, Verification team has found that the installed technologies are as per the registered PDD /01/. Verification team has checked the total installed capacity till the end of this monitoring period which is in compliance with the registered PDD /01/ and has been verified from the commissioning certificate/14/.

The project activity avoids burning of fossil fuels and thereby mitigates GHG emission during the process. The overall electricity generation from the plant in the current monitoring period is 198,874 MWh.

The location of the project activity, as mentioned in the PD was cross-checked during site visit by the assessment team and found OK.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The project activity applies approved CDM methodologies ACM0002, version 17, categorized under sectoral scope 1 “Energy Industries”. The verification consisted of the following phases:

- Completeness check and desk review of the Project Description, MR
- Onsite inspection, interview with project representatives and issuance of findings.
- Resolution of findings followed by preparation of the final verification report and opinion.

2.2 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 documents reviewed is included in the section ‘References’

2.3 Interviews

Please refer section 2.4, where complete list of interviewed personnel and key points discussed is provided.

2.4 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 proposed VCS project activity as per the approved VCS PD/01/;
- 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 equipment including calibration performance and observations of monitoring practices against the requirements of the PD and the selected methodology;
- 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.

The site visit for this verification assessment was undertaken by the Mr. Chetan Swaroop Sharma (Team Leader & Technical Expert (TA 1.2)) and details are mentioned below:

Location:	Plant site, Sukabumi District, West Java Province, Indonesia	
Dates:	18/12/2019	
Key points discussed:	Name of person interviewed	Designation, Organization
Project implementation, Calibration, Monitoring and VCS Requirements, Baseline and Monitoring plan, Local Stakeholder consultation	Leonardo Sidabalok	Project Manager, South Pole Carbon
	Cece Sutisna	Supervisor, PT. Indonesia power
	Redho Nur R.	Operator, PT. Indonesia power
	Alan Syafrudin	Senior supervisor, PT. Indonesia power
	Anna R	-
	Herry Nugraha	Senior supervisor, PT. Indonesia power
	Vicky A.	Environment supervisor, PT. Indonesia power
	Abdul Karim	Project Manager, South Pole Carbon
	Ladaporn Kat Khunikakorn	Regional Director, South Pole Carbon

2.5 Resolution of Findings

KBS applies the risk-based approach aimed at focusing on high risk issues to the verification results whilst not omitting any part of the mandatory processes. A few discrepancies were found during the verification and the verification report was submitted to the project proponent, indicated under the titles corrective action requests (CARs) and clarification requests (CLs). CARs and CLs require the PP to take relevant actions. Criteria for judging items as CAR or CL are as follows:

Corrective action request (CAR):

- the project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions
- the Verified Carbon Standard's requirements have not been met, or
- there is a risk that emission reductions cannot be monitored or calculated.

Clarification request (CL):

- Information is insufficient or not sufficiently clear to determine whether the applicable VCS requirements have been met.

FARs is to be raised to highlight issues related to project implementation that require review during the first verification of the project activity. FARs does not relate to VCS requirements for registration.

CARs and CLs are to be resolved or closed out if the PP modifies the project description, rectifies the MR or provides adequate additional explanations or evidence that satisfies the concerns. If this is not completed, the project activity cannot be recommended for issuance under VCS registry.

The monitoring report was revised addressing the CARs & CLs issued by KBS. After reviewing the revised and resubmitted MR/02/; resolving the CARs & CLs raised and outstanding concerns, KBS issues this final verification report and opinion.

02 CAR and 04 CL found during verification and closed satisfactorily. The list of CARs/CLs raised and the response provided, the means of verification, reasons for their closure and references to correction in the MR are provided in appendix 2 of this report. The revised MR /02/ with changes incorporated as per the issues raised were rechecked with the documentary evidences and found to be inline.

2.5.1 Forward Action Requests

No FAR was raised during this monitoring period.

2.6 Eligibility for Validation Activities

The validation is separately conducted by another VVB and the separate validation report issued and approved by the VCS association.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is only registered under VCS program. It has been confirmed by the project participant that the VERs will be claimed only from the current VCS programme only. The declaration is submitted from the project participant during the validation that the project will not claim any ERs from any other programme.

Finding: CL 03 was raised and successfully closed. Refer to Appendix 2 of this report.

3.2 Methodology Deviations

The verification team confirms that the VCS PD complies with the requirements in the applied monitoring ACM0002, version 17/10/. Therefore, no methodology deviations are applied during the monitoring period.

3.3 Project Description Deviations

The project developer has requested Deviation of Monitoring Plan for following parameters with details below:

Deviation to parameter $w_{\text{steam.CO2.v}}$ and $w_{\text{steam.CH4.v}}$

As per validated VCS-PD, PP must monitor parameter $w_{\text{steam.CO2.v}}$ and $w_{\text{steam.CH4.v}}$ as described in the methodology ACM0002 version used in the registered VCS-PD of the “Grid-connected electricity generation from renewable sources” (Version 17.0, 13 May 2016, EB 89).

Subject	Original Monitoring Plan as per validated VCS PD	Deviation of the Monitoring Plan
Description of measurement methods and procedures to be applied	Non-condensable gases sampling should be carried out in production wells and at the steam field-power plant interface using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable	Non-condensable gases sampling should be carried out in production wells and/or at the steam field-power plant interface using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable

Subject	Original Monitoring Plan as per validated VCS PD	Deviation of the Monitoring Plan
	to sampling phase steam only). The Non-Condensable Gases (NCG) sampling and analysis will be performed every three months.	to sampling phase steam only). The Non-Condensable Gases (NCG) sampling and analysis will be performed every three months.

The deviation sought by the PP for carrying out the sampling for monitoring parameters “ $w_{\text{steam,CO}_2,y}$ ” and “ $w_{\text{steam,CH}_4,y}$ ” has been found appropriate and in accordance to the applied methodology ACM0002 Version 17.0 and hence acceptable to the verification team. There is no impact of this deviation on the ER calculation.

Finding: CL 02 was raised and successfully closed. Refer to Appendix 2 of this report.

3.4 Grouped Project

Project activity is a not a grouped project activity, hence this section is not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity comprises of a capacity upgrade of Gunung Salak Geothermal Power Plant from 3 x 55 MW to 3 x 60 MW. The additional installed capacity of 15 MW at Gunung Salak Geothermal power plant generates and supplies an average of 213,959 MWh p.a. of electricity to the connected JAMALI Grid. The project is owned and developed by PT. Indonesia Power, a subsidiary company of PT. PLN (Persero), a state-owned electricity company. The proposed project will increase the utilization of renewable energy sources, in this case geothermal energy, by modifying turbines and steam gas ejectors.

During the on-site visit and from the document review, Verification team has found that the installed technologies are as per the approved PDD /01/. Verification team has checked the total installed capacity till the end of this monitoring period which is in compliance with the approved PDD /01/ and has been verified from the commissioning certificate/14/.

The project activity avoids burning of fossil fuels and thereby mitigates GHG emission during the process. The overall electricity generation from the plant in the current monitoring period is 198,874 MWh.

The location of the project activity, as mentioned in the PD was cross-checked during on site visit by the assessment team. During the on-site visit, verification team has verified the Plant name/Latitude-longitude/date of commissioning/unique id/location/capacity etc. and found consistent with monitoring report /02/ and registered PDD /01/. The ownership of plant has been verified from commissioning certificate /14/.

The second crediting period for the project activity is from 01/04/2016 – 31/03/2026. This project activity involves the verification of 2nd monitoring period i.e. 01/07/2017 – 31/10/2019 (including both the days) which is within this crediting period and is accepted to the verification team.

The project activity reduces the use of fossil fuels and result in sustainable development of local area. The technical specification of project activity has been cross checked with the technical specification /20/, Sales contract /15/ and verified during site visit. The start date of the project activity is 29/09/2004 (earliest project start date of three units at Gunung Salak Geothermal Power Plant). Commissioning certificate/14/ has been validated and found that the start date is in compliance with the VCS standard and guidelines.

Finding: CL 01 was raised and successfully closed. Refer to Appendix 2 of this report.

4.2 Safeguards

4.2.1 No Net Harm

No negative environmental and socio-economic impacts identified by the project proponent. Verification team confirms that the project doesn't include any such impacts. There is no net harm.

4.2.2 Local Stakeholder Consultation

Local stakeholder consultation was conducted during validation of project activity. The report reviewed by verification team and concluded that it complies with the requirements of VCS. The stakeholder meeting was conducted on 25/09/2008. The meeting was held at Raudhatul Jannah Mosque, Parung Kuda, near the power plant. The local stakeholder meeting was conducted prior to the start of validation activities with VVB

4.3 AFOLU-Specific Safeguards

This is a non-AFOLU project, this section is not required.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Monitored Parameters:

Assessment of monitoring procedures for all monitoring parameters is discussed below:

1. Data/Parameter: $M_{\text{steam},y}$ (t steam), Quantity of steam produced during the year 'y'

	Discussion and verification assessment																
Purpose of data	Calculation of project emissions																
Monitoring equipment	Monitoring: Main steam line flow meter Monitoring frequency: Continuous monitoring Responsibility: Plant Technician Calibration frequency: As verified from the meter calibration certificate /13/ provided by the equipment supplier, Calibration has been done once in 5 years as per the registered PDD /01/. The calibration has been done more frequently which is accepted to the verification team. Calibration has been checked by the verification team and found that the results within accuracy class and hence accepted to the verification team. Verification team has verified the installed meters during the on-site visit and found OK. <table><tr><th colspan="4">Steam flow meter</th></tr><tr><th></th><th>Type & Accuracy Class</th><th>Serial Number</th><th>Calibration Details</th></tr><tr><td>Unit 1</td><td> - Type: GE PanaFlow MV82 - Accuracy Class: 2% </td><td> 4987429-2 </td><td> Previous: 27/12/2016 Current: 30/05/2017 Next: 30/05/2022 </td></tr><tr><td>Unit 2</td><td> - Type: GE PanaFlow MV82 - Accuracy Class: 2% </td><td> 4987429-1 </td><td> Previous: 29/08/2016 Current: 30/05/2017 Next: 30/05/2022 </td></tr></table>	Steam flow meter					Type & Accuracy Class	Serial Number	Calibration Details	Unit 1	- Type: GE PanaFlow MV82 - Accuracy Class: 2%	4987429-2	Previous: 27/12/2016 Current: 30/05/2017 Next: 30/05/2022	Unit 2	- Type: GE PanaFlow MV82 - Accuracy Class: 2%	4987429-1	Previous: 29/08/2016 Current: 30/05/2017 Next: 30/05/2022
Steam flow meter																	
	Type & Accuracy Class	Serial Number	Calibration Details														
Unit 1	- Type: GE PanaFlow MV82 - Accuracy Class: 2%	4987429-2	Previous: 27/12/2016 Current: 30/05/2017 Next: 30/05/2022														
Unit 2	- Type: GE PanaFlow MV82 - Accuracy Class: 2%	4987429-1	Previous: 29/08/2016 Current: 30/05/2017 Next: 30/05/2022														

		Unit 3	- Type: Endress+Hausser FMD78 - Accuracy Class: 0.25%	D404420109 D	Previous: 13/07/2016 Current: 13/07/2017 Next: 13/07/2022	
Measuring/Reading/Recording frequency	Source of data: Project Owner-main steam line flow meter Continuous monitoring of the quantity of steam produced by the project plants through installed flow meters and monthly values are reported for ER calculation. Steam flow is hourly measured and recorded in paper format. The measuring/reading and recording method was discussed during the on-site visit and found consistent with the registered VCS PD /01/.					
Data collection (from data generation, aggregation, to recording, calculation and reporting)	PP records manually the reading. Verification team has checked the monthly values of generation data /17/ and found consistent with ER sheet /03/.					
Verified value	Units	Steam produced during 1 st July to 31 st December, 2017 (tonnes/year)	Steam produced during 1 st January to 31 st December, 2018 (tonnes/year)	Steam produced during 1 st January to 31 st October, 2019 (tonnes/year)		
	Unit 1	1,754,424.91	3,833,938.30	2,789,486.52		
	Unit 2	1,901,994.30	3,616,722.14	2,772,481.87		
	Unit 3	1,789,189.18	3,584,900.80	3,127,635.40		
	Total	5,445,608.39	11,035,561.24	8,701,638.79		
	Steam produced during the year 'y' (t steam/year)					
	01/07/2017 - 31/12/201701/01/2018 - 31/12/201801/01/2019 - 31/10/2019					
	Unit 1	154,479	362,187	280,869		
	Unit 2	262,625	431,619	342,791		
	Unit 3	189,692	368,048	310,831		
Cross checks	The details have been cross checked with the meter reading details during on-site visit.					
QA/QC procedures	Meters have been calibrated once per 5 years as per the registered					

applied	PDD /01/.
---------	-----------

2. Data/Parameter: $w_{\text{steam}, \text{CO}_2, y}$ (t CO₂/t steam), Average mass fraction of CO₂ in the produced steam in year y

	<i>Discussion and verification assessment</i>				
<i>Purpose of data</i>	Calculation of project emissions				
<i>Monitoring equipment</i>	Gas analysis using Gas Chromotography performed by external laboratory. Non-condensable gases sampling are carried out at the steam field-power plant interface using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable to sampling phase steam only) as prescribed in the Monitoring Methodology ACM0002 version 17.				
<i>Measuring/Reading/Recording frequency</i>	The Non-Condensable Gases (NCG) data has been taken every three months (by Geoservices Ltd) from steam sampling as prescribed in the Monitoring Methodology ACM0002 version 17.0 which is accepted to the verification team. The measuring/reading and recording method was discussed during the on-site visit and found OK. CL-02 was raise in this regard and successfully closed. Verification team verified the values provided in the ER sheets /03/ with the NCG analysis reports /22/ and the same is found to be consistent.				
<i>Data collection (from data generation, aggregation, to recording, calculation and reporting)</i>	Gas analysis using Gas Chromotography performed by external laboratory. Non-condensable gases sampling are carried out at the steam field-power plant interface using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable to sampling phase steam only) as prescribed in the Monitoring Methodology ACM0002 version 17 /10/.				
<i>Verified value</i>	Analysi s #	Period to be used in $PE_{\text{flash steam}, y}$ calculation	CO₂ values to be used in $PE_{\text{flash steam}, y}$ calculation (non dimensional)		
		Month/Yea r	UNIT #1	UNIT #2	UNIT #3
	1	07/2017	0.005744370	0.005719482	0.006582048
		08/2017	0.005744370	0.005719482	0.006582048
		09/2017	0.005744370	0.005719482	0.006582048

2	10/2017	0.004880616	0.005714940	0.005719740
	11/2017	0.004880616	0.005714940	0.005719740
	12/2017	0.004880616	0.005714940	0.005719740
3	01/2018	0.004925128	0.005659398	0.005716680
	02/2018	0.004925128	0.005659398	0.005716680
	-	-	-	-
4	03/2018	0.005335456	0.005332656	0.006576666
	04/2018	0.005335456	0.005332656	0.006576666
	05/2018	0.005335456	0.005332656	0.006576666
5	06/2018	0.006010074	0.006100160	0.006011145
	07/2018	0.006010074	0.006100160	0.006011145
	08/2018	0.006010074	0.006100160	0.006011145
6	09/2018	0.004498320	0.004839390	0.004978502
	10/2018	0.004498320	0.004839390	0.004978502
	11/2018	0.004498320	0.004839390	0.004978502
7	12/2018	0.005267370	0.005899610	0.005880924
	01/2019	0.005267370	0.005899610	0.005880924
	02/2019	0.005267370	0.005899610	0.005880924
8	03/2019	0.006165568	0.006866280	0.007493226
	04/2019	0.006165568	0.006866280	0.007493226
	05/2019	0.006165568	0.006866280	0.007493226
9	06/2019	0.006127810	0.006471356	0.007693056
	07/2019	0.006127810	0.006471356	0.007693056
	08/2019	0.006127810	0.006471356	0.007693056
10	09/2019	0.007198275	0.005695093	0.008895450
	10/2019	0.007198275	0.005695093	0.008895450
	11/2019	0.007198275	0.005695093	0.008895450
Cross checks	NA			
QA/QC procedures	Gunung Salak Geothermal Laboratory QA/QC Procedure has been			

applied	followed as discussed during the site visit.
---------	--

3. Data/Parameter: $W_{\text{steam,CH}_4,y}$ (t CH₄/t steam), Average mass fraction of CH₄ in the produced steam in year y

	Discussion and verification assessment				
Purpose of data	Calculation of project emissions				
Monitoring equipment	Gas analysis using Gas Chromotography performed by external laboratory. Non-condensable gases sampling are carried out at the steam field-power plant interface using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable to sampling phase steam only) as prescribed in the Monitoring Methodology ACM0002 version 17.				
Measuring/Reading/Recording frequency	The Non-Condensable Gases (NCG) data has been taken every three months (by Geoservices Ltd) from steam sampling as prescribed in the Monitoring Methodology ACM0002 version 17.0 which is accepted to the verification team. The measuring/reading and recording method was discussed during the on-site visit and found OK. CL-02 was raise in this regard and successfully closed. Verification team verified the values provided in the ER sheets /03/ with the NCG analysis reports /22/ and the same is found to be consistent.				
Data collection (from data generation, aggregation, to recording, calculation and reporting)	Gas analysis using Gas Chromotography performed by external laboratory. Non-condensable gases sampling are carried out at the steam field-power plant interface using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable to sampling phase steam only) as prescribed in the Monitoring Methodology ACM0002 version 17 /10/.				
Verified value	Analysi s #	Period to be used in PE _{flash steam,y} calculatio n	CH ₄ values to be used in PE _{flash steam,y} calculation (non dimensional)		
		Month/Ye ar	UNIT #1	UNIT #2	UNIT #3
	1	07/2017	0.00001678	0.00000056	0.00002126

		08/2017	0.00001678	0.00000056	0.00002126
		09/2017	0.00001678	0.00000056	0.00002126
	2	10/2017	0.00001215	0.00002118	0.00001850
		11/2017	0.00001215	0.00002118	0.00001850
		12/2017	0.00001215	0.00002118	0.00001850
	3	01/2018	0.00000687	0.00000447	0.00000704
		02/2018	0.00000687	0.00000447	0.00000704
		-	-	-	-
	4	03/2018	0.00003361	0.00003611	0.00003628
		04/2018	0.00003361	0.00003611	0.00003628
		05/2018	0.00003361	0.00003611	0.00003628
	5	06/2018	0.00004518	0.00004910	0.00003474
		07/2018	0.00004518	0.00004910	0.00003474
		08/2018	0.00004518	0.00004910	0.00003474
	6	09/2018	0.00000804	0.00002370	0.00002682
		10/2018	0.00000804	0.00002370	0.00002682
		11/2018	0.00000804	0.00002370	0.00002682
	7	12/2018	0.00005139	0.00003026	0.00003515
		01/2019	0.00005139	0.00003026	0.00003515
		02/2019	0.00005139	0.00003026	0.00003515
	8	03/2019	0.00000069	0.00000000	0.00002955
		04/2019	0.00000069	0.00000000	0.00002955
		05/2019	0.00000069	0.00000000	0.00002955
	9	06/2019	0.00002202	0.00001591	0.00001338
		07/2019	0.00002202	0.00001591	0.00001338
		08/2019	0.00002202	0.00001591	0.00001338
	10	09/2019	0.00000288	0.00000212	0.00003773
		10/2019	0.00000288	0.00000212	0.00003773

		11/2019	0.00000288	0.00000212	0.00003773	
Cross checks	NA					
QA/QC procedures applied	Gunung Salak Geothermal Laboratory QA/QC Procedure has been followed as discussed during the site visit.					

4. Data/Parameter: $EG_{\text{facility},y}$ (MWh), Net electricity delivered to the grid by the project activity

	Discussion and verification assessment								
Purpose of data	Calculation of baseline emissions								
Monitoring equipment	Monitoring: PLN Revenue meters Monitoring frequency: continuous monitoring Responsibility: Plant Technician Calibration frequency: Verification team has verified the installed revenue meters during the on-site visit and found consistent with the monitoring report /02/. Revenue meters are calibrated once per 5 years according to the Standard Operating Procedure (Prosedur Tetap) between PT. Indonesia Power with PT. Pertamina Geothermal Energy / Chevron Geothermal Salak, Ltd., Unit 1,2 and 3, Revision 2, September 2014, which replace to the PPA, and also for PLN owned back up meters calibration, which follows PLN's internal regulations¹. Calibration has been done as per the calibration frequency and no delay identified. Calibration has been done by PT. PLN Persero which is a government body and hence accepted to the verification team. The Calibration results are within the accuracy class and hence accepted to the verification team. <table><tr><th>Revenue meter</th><th>Serial number</th><th>Class of Accuracy</th><th>Calibration date</th></tr><tr><td>Unit #1</td><td>PT 0806A119-01</td><td>0.2</td><td>Previous: 03/06/2014 Current: 26/07/2016 Next:</td></tr></table>	Revenue meter	Serial number	Class of Accuracy	Calibration date	Unit #1	PT 0806A119-01	0.2	Previous: 03/06/2014 Current: 26/07/2016 Next:
Revenue meter	Serial number	Class of Accuracy	Calibration date						
Unit #1	PT 0806A119-01	0.2	Previous: 03/06/2014 Current: 26/07/2016 Next:						

¹ The calibration frequency of PLN-owned back-up meter is every 5 years. This complies with the Minister of Energy and Mineral Resources Regulation No. 3 issued in 2007 (<https://jdih.esdm.go.id/peraturan/permen-esdm-03-2007.pdf>) regarding Java-Madura-Bali (JAMALI) Grid Code that described calibration period of installed meters in power plants connected to JAMALI Grid is once per 5 years.

				26/07/2021	
	Unit #2	PT 0806A118-01	0.2	Previous: 03/06/2014 Current: 26/07/2016 Next: 26/07/2021	
	Unit #3	MT 1006A500-01	0.2	Previous: 03/06/2014 Current: 26/07/2016 Next: 26/07/2021	
Measuring/Reading/ Recording frequency	Continuous monitoring of the electricity generated by the project plants through installed meters and monthly values are reported for ER calculation. The measuring/recording method is in compliance with the registered PDD /01/. The measuring/reading and recording method was discussed during the on-site visit and found OK.				
Data collection (from data generation, aggregation, to recording, calculation and reporting)	PP records manually the reading. Verification team has checked the monthly values of generation data /17/ with the ER sheet /03/ and found consistent.				
Verified value		EG _{facility,y} (MWh)			
		01/07/2017 - 31/12/2017	01/01/2018 - 31/12/2018	01/01/2019 - 31/10/2019	
	Unit 1	213,865	455,693	339,748	
	Unit 2	243,548	449,971	347,860	
	Unit 3	236,713	469,150	406,458	
	Total	694,126	1,374,813	1,094,065	
Cross checks	The QA/QC is conducted through cross checking with sales electricity receipts/18/ as verified by the verification team.				
QA/QC procedures applied	The QA/QC is conducted through cross checking with sales electricity receipts/18/ as verified by the verification team.				

Finding: CL 02, CL 04, CAR 01 & CAR 02 were raised and successfully closed. Refer to Appendix 2 of this report.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

The applied formulae and the method for calculation of baseline emissions are in accordance with the registered VCS PD/01/ and are in line with the requirements of the applied methodology (ACM0002, version 17)/10/. The formulae and the methods referred in the MR and the emission reduction calculation spread sheet for estimation of emission reduction complies with the corresponding formulae and methods in the registered VCS PD/01/. The ex-ante and validated fixed value of grid emission factor i.e. combined margin of the emission factor, (0.946 tCO₂e/MWh, registered VCS PD/01/) is taken into account for the calculation of baseline emissions. The assessment of data and the calculation of GHG emission reduction in the MR/02/ and the emission reduction excel sheet/03/ have been verified based on the monthly net electricity export data.

As per registered VCS PD/01/, the baseline emission (BE_y) is:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

Where:

BE_y = Baseline Emissions in year y (t CO₂)

EG_{PJ,y} = Quantity of net electricity generation as a result of the implementation of project activity in year y (MWh)

EF_{grid,CM,y} = Combined margin CO₂ Emission factor (tCO₂/MWh) 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”, Version 04 (t CO₂/MWh)

EG_{PJ,y} for a retrofit or rehabilitation or replacement of an existing renewable energy power plant is calculated as follows:

$$EG_{PJ,y} = EG_{facility,y} - (EG_{historical} + \sigma_{historical}); \text{until DATE}_{BaselineRetrofit}$$

where:

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

EG_{facility,y} = Quantity of net electricity generation supplied by the project plants/units to the grid in year y (MWh/yr)

EG_{historical} = Annual average historical net electricity generation delivered to the grid by the existing renewable energy power plants/units that was operated at the project site prior to the implementation of the project activity (MWh/yr)

$\sigma_{\text{historical}}$ = Standard deviation of the annual average historical net electricity generation delivered to the grid by the existing renewable energy power plants/units that was operated at the project site prior to the implementation of the project activity (MWh/yr)

$\text{DATE}_{\text{BaselineRetrofit}}$ = Point in time when the existing equipment would need to be replaced in the absence of the project activity (date). This only applies to retrofit or replacement projects

In case $\text{EG}_{\text{facility},y} < (\text{EG}_{\text{historical}} + \sigma_{\text{historical}})$ in a year y then $\text{EGP}_{J,y} = 0$

Verification team has checked the baseline emission calculation and found correct. The formulas used are consistent with the registered PDD /01/. All the ex-ante parameters are correctly used in the ER sheet /03/ for the ER calculation. All the monitoring parameters are monitored as per the requirement of the registered PDD /01/ and correctly used under the ER sheet /03/. The roles and responsibility has been properly defined and employees are aware of their roles and responsibility as verified during the on-site visit interview and the observation.

Baseline emissions calculation has been verified from the submitted ER sheet /3.2/ and found OK.

Period	Baseline emissions (tCO ₂)
01/07/2017-31/12/2017	73,363
01/01/2018 - 31/12/2018	137,311
01/01/2019 - 31/10/2019	111,260
Total	321,934

Calculation of Project Emissions:

The applied formulae and the method for calculation of project emissions are in accordance with the registered VCS PD/01/ and are in line with the requirements of the applied methodology (ACM0002, version 17)/10/. The formulae and the methods referred in the MR and the emission reduction calculation spread sheet for estimation of emission reduction complies with the corresponding formulae and methods in the registered VCS PD/01/. Project emissions are calculated as follows:

Project emissions coming from "Fugitive carbon dioxide and methane emissions due to releases of non-condensable gases from the produced steam ($\text{PE}_{\text{dry or flash steam},y}$)":

$$\text{PE}_y = \text{PE}_{\text{FF},y} + \text{PE}_{\text{GP},y} + \text{PE}_{\text{HP},y}$$

where:

PE_y = Project emissions in year y (t CO₂e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO₂/yr)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (t CO₂e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO₂e/yr)

The project does not involve the fossil fuel consumption (as per ACM0002 version 17.0, for all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected) and hydro power, so $PE_{FF,y} = 0$, $PE_{HP,y} = 0$.

$$PE_y = PE_{GP,y}$$

$$PE_{GP,y} = PE_{\text{dry or flash steam},y} + PE_{\text{binary},y}$$

where:

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (t CO₂e/yr)

$PE_{\text{dry or flash steam},y}$ = Project emissions from the operation of dry steam or flash steam geothermal power plants due to release of non-condensable gases in year y (t CO₂e/yr)

$PE_{\text{binary},y}$ = Project emissions from the operation of binary geothermal power plants due to physical leakage of non-condensable gases and working fluid in year y (t CO₂e/yr)

The project is the operation of flash steam geothermal power plant, so $PE_{\text{binary},y} = 0$.

$$PE_{GP,y} = PE_{\text{dry or flash steam},y}$$

$$PE_{\text{dry or flash steam},y} = (W_{\text{steam},\text{CO}_2,y} + W_{\text{steam},\text{CH}_4,y} \times GWP_{\text{CH}_4}) \times M_{\text{steam},y}$$

where:

$W_{\text{steam},\text{CO}_2,y}$ = Average mass fraction of CO₂ in the produced steam in year y (t CO₂/t steam)

$W_{\text{steam},\text{CH}_4,y}$ = Average mass fraction of CH₄ in the produced steam in year y (t CO₄/t steam)

GWP_{CH_4} = Global warming potential of CH₄ valid for the relevant commitment period (t CO₂e/t CH₄) i.e. 25 tco₂

$M_{\text{steam},y}$ = Quantity of steam produced in year y (t steam/yr)

Project emissions calculation has been verified from the submitted ER sheet /3.2/ and found OK.

Period	Project emissions (tCO ₂)
01/07/2017-31/12/2017	3,708
01/01/2018 - 31/12/2018	7,390
01/01/2019 - 31/10/2019	6,820
Total	17,918

Verification team has checked the project emission calculation and found OK.

Leakage:

The project activity does not involve equipment transfer from another activity thus there are no leakages to be accounted for this project activity.

LE_y = 0 tCO₂e

4.6 Non-Permanence Risk Analysis

Not applicable to the project activity.

5 VERIFICATION CONCLUSION

KBS Certification Services Pvt. Ltd. has been contracted 'South Pole Carbon Asset Management Ltd.' to undertake independent 2nd verification and certification for the greenhouse gas (GHG) emission reductions reported from the "Capacity Upgrade of Gunung Salak Geothermal Power Plant Project, Indonesia" for the monitoring period 01/07/2017 – 31/10/2019 (including both the days). The verification is based on the validated VCS PD and the monitoring report for this project. Our verification approach was based on the requirements as defined under the VCS Standard Version 3.7.

The management of the "South Pole Carbon Asset Management 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, Version 2.1 and dated 03/02/2020. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the 'South Pole Carbon Asset Management Ltd.' The development and maintenance of records and reporting procedures are in accordance with the Final Monitoring Report, Version 2.1 and dated 03/02/2020.

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 01/07/2017 – 31/10/2019 based on the reported emission reductions in the Final Monitoring Report Version 2.1 and dated 03/02/2020 /02/ 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:

Verification period: From 01/07/2017 – 31/10/2019 (including both the days)

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2017	73,363	3,708	0	69,655
2018	137,311	7,390	0	129,921
2019	111,260	6,820	0	104,440
Total	321,934	17,918	0	304,016

Date: 12/02/2020



Signature

Kaushal Goyal;

Managing Director (KBS Certification Services Pvt. Ltd.)

APPENDIX 1: REFERENCES

S. No.	Name of document (Verification Process)
/1/	VCS PD version 02.2 dated 14/12/2017
/2/	/2.1/ VCS MR Version 01 dated 03/12/2019 /2.2/ VCS MR Version 2.1 dated 03/02/2020
/3/	/3.1/ ER spread-sheet dated corresponding to MR Version 01 /3.2/ ER spread-sheet dated corresponding to MR Version 2.1
/4/	VCS Verified Carbon Standard: VCS Program Guide, VCS Version 03, v3.7
/5/	VCS Verified Carbon Standard: VCS Standard, VCS Version 03, v3.7
/6/	VCS Verified Carbon Standard: VCS Guidance, Validation and Verification Manual, Version 3.2
/7/	Audit plan sent to PP for the site inspection.
/8/	VCS-MR Form filling guidelines
/9/	Directorate General of Electricity - Ministry of Energy and Mineral Resources (MEMR), Republic of Indonesia
/10/	ACM0002. Version 17
/11/	Log book details of the steam flow for the monitoring period.
/12/	PT. PLN (Persero) certification services: Operational license for unit -1, 2, 3
/13/	Calibration documents of the monitoring equipments
/14/	Commissioning certificate
/15/	Energy Sales Contract executed among PT PLN (Persero), Perusahaan Pertambangan Minyak dan Gas Bumi Negara, and Unocal Geothermal of Indonesia Ltd. dated 16/11/1994
/16/	Company registration
/17/	Monthly Energy Generation data
/18/	Invoice copy of the sales of electricity to PT. PLN (Persero)
/19/	Approval for supplement environment management plan/environmental monitoring plan for 3*60 MW geothermal power plant dated 23/07/2007
/20/	Technical details for the project activity equipments /meters
/21/	Training records, Organizational chart
/22/	NCG analysis report for the MP
/23/	Gunung Salak_Single line electricity diagram
/24/	IPCC's Second Assessment Report to the IPCC's Fourth Assessment Report
/25/	Plant operation worthiness certificate for unit 1, dated 13/09/2017 and for unit 3, dated 12/10/2017
/26/	Power purchase agreement
/27/	Gunung Salak Breakdown records for 2017, 2018 and 2019
/28/	Gunung Salak Maintenance records 2017-2019

APPENDIX 2: RESOLUTION OF FINDINGS

Summary of findings	CAR	CL	FAR
	02	04	–

Table 1. Remaining FAR from validation and/or previous verifications

No remaining FAR from previous verification (1st periodic verification of 2nd crediting period)

FAR ID	xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
VVB assessment				Date: DD/MM/YYYY

Table 1. CL from this verification

CL ID	01	Section no.	-	Date: 21/12/2019
Description of CL				
PP need to clarify the relation between the companies Star Energy Geothermal Salak Ltd./PT Pertamina Geothermal Energy, PT. PLN (Persero) and PT Indonesia Power in terms of the steam generation, electricity generation and electricity supplying to grid along with supportive document.				
Project participant response				Date: 16/01/2020

The relation between the companies Star Energy Geothermal Salak Ltd./PT Pertamina Geothermal Energy, PT. PLN (Persero) and PT Indonesia Power in terms of the steam generation, electricity generation and electricity supplying to grid is PT. Pertamina Geothermal Energy (subsidiary of Perusahaan Pertambangan Minyak dan Gas Bumi Negara (Pertamina)) is the geothermal steam supplier (steam generation) or Seller, where Star Energy Geothermal Salak Ltd. (previously were Unocal Geothermal of Indonesia (UGI) and Chevron Geothermal Indonesia Ltd. (CGI)) is serving as Contractor to Pertamina or Deliverer of the geothermal steam to Gunung Salak Geothermal power plants.

And, under the Power Purchase Agreement (PPA) has been signed between PT. Indonesia Power and PT. PLN (Persero).

The relation between the companies is also described in the attached chart.

Documentation provided by project participant

- Energy Sales Contract (ESC) 1994
- Power Purchase Agreement (PPA) between PT. PLN (Persero) and PT. Indonesia Power, 2003
- Chart of the relation between the companies

DOE assessment

Date: 29/01/2020

The Verification team has checked the Chart of relation provided by the PP and based on the Energy sales contract between the Seller, Deliverer & buyer confirms that PT. Pertamina Geothermal Energy is the supplier of the steam and Star Energy Geothermal Salak Ltd. Is the deliverer of the steam to the Gunung Salak Geothermal power plant.

Also, the PPA between PT. PLN (Persero) and PT. Indonesia Power has been checked to confirm the supply of electricity by the PT. Indonesia Power to the grid.

Hence, CL-01 is closed.

CL ID	02	Section no.	-	Date:	21/12/2019
Description of CL					
1. As per the registered VCS-PD, the sampling for monitoring parameters “wsteam,CO2,y” and “wsteam,CH4,y” should be carried out in production wells and at the steam field--power plant interface however the sampling is only carried out at the steam field--power plant interface. 2. As per the registered VCS-PD, the sampling should be done quarterly however the monitoring was less frequent during this monitoring period.					
Project participant response					Date:
					16/01/2020

1. As per validated VCS-PD, PP must monitor parameter $w_{\text{steam,CO}_2,y}$ and $w_{\text{steam,CH}_4,y}$ as described in the methodology ACM0002 version used in the registered VCS-PD of the “Grid-connected electricity generation from renewable sources” (Version 17.0, 13 May 2016, EB 89), that the sampling for monitoring parameters “ $w_{\text{steam,CO}_2,y}$ ” and “ $w_{\text{steam,CH}_4,y}$ ” should be carried out in production wells and/or at the steam field-power plant interface. Hence, PP carried out the sampling only at the steam field-power plant interface. The same has been added in the section of 3.2.2 Project Description Deviations of the revised Monitoring Report. 2. Due to internal procurement difficulties there were less frequent monitoring. However, the frequency for sampling will be assured in future by PP.	
Documentation provided by project participant	
Monitoring Report period 01-Jul-2017 to 31-Oct-2019 version 2.0	
DOE assessment	Date: 29/01/2020
1. The justification provided by the PP for carrying out the sampling for monitoring parameters “ $w_{\text{steam,CO}_2,y}$ ” and “ $w_{\text{steam,CH}_4,y}$ ” has been found appropriate and in accordance to the applied methodology ACM0002 Version 17.0. The verification team has also checked the section 3.2.2 of the Monitoring report Version 2.0, which has been revised according to the deviation requested. Hence this part of CL is closed. 2. The reason for less frequent monitoring is found acceptable by the verification team which was also discussed during the site visit. Also for the future monitoring, PP has assured the consistency in frequency of sampling with the registered VCS-PD. There is no direct impact of this delay to the emission reduction calculation, hence this part of CL is closed.	
Hence, CL 02 is closed.	

CL ID	03	Section no.	-	Date: 21/12/2019
Description of CL				
Under section 1.10 of the Monitoring report, PP has mentioned that the specific period of 1-Jun-2018 to 19-Jun 2018 have been issued under International Renewable Energy certificate (I-REC). PP need to clarify how the emission reduction has been corrected for that.				
Project participant response				Date: 16/01/2020
In addition, the period for 2-Feb-2019 has been issued under International Renewable Energy certificate (I-REC). The emission reduction calculation has been corrected by daily electricity generation basis for specific period that have been issued under I-REC. For each day of specific electricity generation has been distinguished from emission reduction calculation which show the electricity generation issued under I-REC. The emission reduction calculation worksheet completed with specific period of 1st issuance of 1-Jun-2018 to 19-Jun 2018, and 2nd issuance of 2-Feb-2019 (one day period) that have been issued under I-REC has been attached as well.				
Documentation provided by project participant				

- Monitoring Report period 01-Jul-2017 to 31-Oct-2019 version 2.0
- Emission Reduction Calculation worksheet version 2.0
- I-REC Issue History for period 2018-06-01 to 2018-06-19
- I-REC Issue History for period 2019-02-02 to 2019-02-02

DOE assessment
Date: 29/01/2020

The I-REC period that have been issued: 01/06/2018 07:00 - 19/06/2018 23:30 and 02/02/2019 00:00 - 02/02/2019 24:00 as mentioned in the submitted ER sheet.

The updated section 1.10 of the monitoring report and the ER sheet Version 02 have been checked with respect to the I-REC issue history and the verification team confirms that I-REC issued period is not considered for the emission reduction calculation which is accepted to the verification team.

Hence, CL 03 is closed.

CL ID

04

Section no.

-

Date: 21/12/2019

Description of CL

PP need to clarify the calibration frequency of the steam flow meter (corresponding to the monitoring parameter $M_{\text{steam},y}$) as the same could not be found from the Monitoring report.

Project participant response
Date: 16/01/2020

The steam flow meters (corresponding to the monitoring parameter $M_{\text{steam},y}$) have been calibrated according to the national standard of Java-Madura-Bali (JAMALI) Grid Code that described calibration period of installed meters in power plants connected to JAMALI Grid is once per 5 years. The same clarification has been added in the Monitoring report.

Documentation provided by project participant

Monitoring Report period 01-Jul-2017 to 31-Oct-2019 version 2.0

DOE assessment
Date: 29/01/2020

Clarification by the PP has been found acceptable as the Calibration frequency of once in 5 years is in compliance with the VCS-PD. The QA/ QC procedure for the parameter " $M_{\text{steam},y}$ " has been updated under section 4.2 "Data and Parameters Monitored" of the monitoring report and found OK.

Hence, CL 04 is closed.

Table 2. CAR from this verification

CAR ID	01	Section no.	-	Date: 21/12/2019
Description of CL				
Verification team has found that the Electricity revenue meters no. for Unit #1 and Unit #2 mentioned in the Monitoring report are not consistent with the no. verified during the on-site visit.				
Project participant response				Date: 16/01/2020
The Electricity revenue meters no. for Unit #1 and Unit #2 mentioned in the Monitoring report have been revised to be consistent with the no. verified during the on-site visit.				
Documentation provided by project participant				
Monitoring Report period 01-Jul-2017 to 31-Oct-2019 version 2.0				
DOE assessment				Date: 29/01/2020
The revised Electricity meter no. for Unit #1 and Unit #2 has been check and the update is now found to be consistent with the no. verified during the on-site visit. Hence, CAR 01 is closed.				

CAR ID	02	Section no.	-	Date: 21/12/2019
Description of CL				
Verification team has found that the calibration date (for the energy meters) mentioned in the monitoring report is not consistent with the submitted Calibration certificates.				
Project participant response				Date: 16/01/2020
The calibration dates (for the steam flow meters and energy meters) mentioned in the monitoring report have been revised to be consistent with the submitted Calibration certificates.				
Documentation provided by project participant				
Monitoring Report period 01-Jul-2017 to 31-Oct-2019 version 2.0				
DOE assessment				Date: 29/01/2020
The revised calibration dates have been checked with the submitted calibration records and found consistent. Hence, CAR 02 is closed.				

Table 4. FAR from this validation

No FAR raised.

FAR ID	xx	Section No.	Date: DD/MM/YYYY
Description of FAR			
Project participant response			Date: DD/MM/YYYY
Documentation provided by project participant			
VVB assessment			Date: DD/MM/YYYY