VERIFICATION REPORT FOR 50 MW SIPANSIHAPORAS HYDRO POWER PLANT, NORTH SUMATRA

Document Prepared By TÜV NORD CERT GmbH

Project Title	50 MW SIPANSIHAPORAS HYDRO POWER PLANT, NORTH SUMATRA – VCS ID486
Version	1.1
Report ID	MY-VCSPVer 21/11 – 21/072

Report Title	CPII 2nd periodic VCS Verification report for 50 MW Sipansihaporas Hydro Power Plant, North Sumatra
Client	South Pole Carbon Asset Management Ltd
Pages	38
Date of Issue	29-June-2022
Prepared By	TÜV NORD CERT GmbH
Contact	TÜV NORD CERT GmbH JI/CDM Certification Program

	Am TÜV 1 45307 Essen, Germany Phone: +49-201-825-3335 Fax: +49-201-825-3290 www.tuev-nord.de
Approved By	Kunal Rami
Work Carried Out By	Cheong, Chun Yuen (Robert) (Team Leader) David Lubanga (Technical Reviewer)

Summary:

- A brief description of the verification and the project

  The 50 MW Sipansihaporas Hydro Power Plant, North Sumatra is located in Sipan village, Tapanuli Tengah district, North Sumatra province, Indonesia.

  The project activity is a run-off river hydropower generating renewable energy and supply electricity to the Sumatra grid of 150kV. This project activity will reduce CO_2 emission by replacing fossil fuel to generate electricity.

  The total installed capacity of the project is 50 MW comprised of one unit of 33 MW and 17 MW generators with an expected electricity supply to the grid of 214,800 MWh per annum. The project is owned and developed by PT. PLN (Persero), a state-owned electricity company in Indonesia.

  The project started operations on 21/10/2002 based on the date when emission reductions began and was registered as a VCS project activity on 25/08/2010 with registration ID 486. The first 10-year renewable crediting period was from 01/04/2006 to 31/03/2016 (both dates inclusive).

  The project activity is in the 2nd crediting period from 01/04/2016 to 31/03/2026 (both dates inclusive).

  The registration date of the project is crosscheck against the final validation report at the VERRA website. https://registry.verra.org/app/projectDetail/VCS/486

- The purpose and scope of verification

  The objective of the verification is to have an independent review of the ex post determination by a VVB (Validation and Verification Body) of the monitored GHG emission reductions that have occurred as a result of the implementation of the project activity during a defined monitoring period.

- The monitoring period

  This is the 2nd monitoring period for CPII from 01/05/2017 – 31/12/2020 (both dates inclusive).

- The method and criteria used for verification

  Verification is conducted using TÜV NORD CERT GmbH procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying standard auditing techniques. The verification team assessed the project activity's compliance with the VCS Standard Version 4.1, the selected CDM methodology and the project description monitoring plan. The verification criteria followed the guidance documents provided by VCS included the following: VCS Standard Version 4.1, VCS Program Guide Version 4.0 and the applied CDM methodology ACM0002: "Grid-connected electricity generation from renewable sources", version 17.0.

The number of findings raised during this verification

In the course of the verification, 8 Corrective Action request (CARs) and 1 Clarification (CL) were raised and successfully closed. Details of the summary of findings are listed in Appendix 4 below.

- Any uncertainties associated with the verification

  There are no restrictions of uncertainty.

- Summary of the verification conclusion

  South Pole Carbon Asset Management Ltd. has commissioned TÜV NORD JI/CDM Certification Program to carry out the CPII 2nd periodical verification of the project, "50 MW Sipansihaporas Hydro Power Plant, North Sumatra" with regard to the relevant requirements of VCS standard Version 4.1.

  TÜV NORD confirms all verification activities including objectives, scope and criteria, level of assurance, monitoring and monitoring report adhere to VCS Standard Version 4.1 and all associated updated as documented in this report, are complete.

  TÜV NORD concludes that the project activity "*50 MW Sipansihaporas Hydro Power Plant, North Sumatra"* as described in Monitoring Report version 03 dated 15/10/2021, meets all relevant requirements for VCS verification activity and correctly applied the methodology ACM0002: "Grid-connected electricity generation from renewable sources", version 17.0.

  Hence TÜV NORD is able to certify that the GHG emission reduction from the project during the monitoring period from 01/05/2017 to 31/12/2020 (both dates included) amounting to **585,739 tCO_2e**.

1.0 INTRODUCTION

1.1 Objective

South Pole Carbon Asset Management Ltd has commissioned TÜV NORD JI/CDM Certification Program to carry out the CPII 2nd periodical verification of the project for the monitoring period from 01/05/2017 to 31/12/2020 (both dates inclusive). The objective of verification is to have an independent review of the ex-post determination by a VVB of the monitored GHG emission reductions that have occurred as a result of the project activity implemented during a defined monitoring period.

The assessment is conducted against the requirements of the VCS version 4.1 based on the monitoring report. In order to confirm that the GHG emission reductions are reasonable and meet the identified criteria, the verification involves the assessment of project implementation and operation status, monitoring plan conformance to the PD and VCS rules, and the applied CDM baseline and monitoring methodology.

Verification is a requirement and is deemed necessary to provide a reasonable level of assurance on the generation of VCUs.

1.2 Scope and Criteria

The scope of the verification is to verify:

a) the actual monitoring system and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;

b) the GHG emission reductions data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reductions data are free from material misstatements;

c) the reported GHG emissions data is sufficiently supported by evidence.

Verification shall ensure that the reported GHG emission reductions are complete and accurate in accordance with the applicable VCS criteria in order to be certified.

Verification is conducted using TÜV NORD procedures in line with the requirements specified in the VCS Program and ISO14064-3 requirements and applying auditing techniques and a risk-based approach.

The verification team assessed and determined that the implementation and operation of the project activity, and steps to report GHG emission reductions comply with the VCS rules.

The verification involved review of relevant documentation and interview with the project participants.

Verification is not meant to provide any consultancy towards the project participants; however, stated request for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

1.3 Level of Assurance

The project generates an average of 185,392 VCUs per year and therefore can be considered as a normal project as per VCS v 4.1 §3.9.1 (1) requirements since the project annual VUCs is less than or equal to 300,000 tonnes of CO_2e per year. The threshold for materiality with respect to the aggregate of errors, omissions and misrepresentations relative to the total reported GHG emission reductions and/or removals shall be five percent for projects according to VCS v 4.1 §4.1.8 (4).

The assessment conducted is to provide a reasonable level of assurance of compliance against the defined audit criteria and materiality threshold within the audit scope. Based on the audit findings the verification statement reasonably assures that the GHG assertion is materially correct and is a fair representation of the GHG data and information.

1.4 Summary Description of the Project

The project is implemented by PT. PLN (Persero), a state-owned electricity company and it aims to utilize hydropower to generate renewable energy to supply to the Sumatra grid replacing electricity generating by fossil fuel power plants.

The project activity involves the installation of one unit of 33 MW and 17 MW generators with a total capacity of 50MW is located at Sipan village, Tapanuli Tengah district, North Sumatra province, Indonesia

The project was registered with Verra on 25/08/2010 with a project ID 486 and adopted the renewal crediting period of 10 years with maximum 2 times renewal. This is the 2nd crediting period of 10 years from 01/04/2016 to 31/03/2026 (both dates inclusive).

The project registration dated 25/08/2010 as described in the validation report is in the project record on the Verra Registry. As such, it is eligible for the 10-year renewable crediting period that is listed in the project description. Therefore, in accordance to Appendix 2 of the VCS Standard, v4.1, "registered projects and projects that complete validation on or before 19 March 2020 remain eligible to apply the crediting period requirements under VCS Version 3.

The project registration at Verra is verified through the weblink https://registry.verra.org/app/projectDetail/VCS/486.

The project registered as VCS project activity with the emission reductions will be certified as verified carbon units (VCUs).

The total verified carbon units (VCUs) achieved in the monitoring period are **585,739 tCO_2e**, have been verified by means of remote inspection, reviewing and verifying the related documentation, interviews with the project implementer and project consultant.

The project activity generates GHG emission reductions by displacing part of the electricity generated by the grid which is dominated by fossil fuel-fired power plants thus generating green house gas emission reductions and produce financial, social and environmental benefits.

The project has resulted in the local sustainable development as described in Section 1.11 of the Monitoring Report.

Refer Appendix 4 for details of findings.

2.0 VERIFICATION PROCESS

2.1 Method and Criteria

A project specific verification and monitoring plan was developed to guide the verification auditing process to ensure efficiency and effectiveness. The purpose of the verification is to present a risk assessment for determining the nature and extent of verification procedures necessary to ensure the risk of auditing error is reduced to a reasonable level. According to the ISO14064-3, the criteria are the policy, procedure or requirement used as reference against which evidence is compared. Therefore, verification of the monitoring plan and the reported project results were measured for compliance against the following criteria:

- VCS Standard, v4.1
- VCS Program Guide, v4.0
- VCS Program Definitions, v4.1

The verification process derived from all items in the verification criteria stated above. There is no sampling approach applied by PP and VVB during this verification. All monitored data have been 100% verified against documents submitted by project participants.

Thus, based on the project parameters, scope and best professional judgement of the verification team it could be concluded that a reasonable level of assurance is met. The verification consists of the following three phases:

- Remote document review
- Remote virtual site inspection;
- Remote interview of project implementer and project consultant;
- The resolution of outstanding issues and the issuance of the final verification report and certification.

2.2 Document Review

The VCS MR and supporting background documents related to the project implementation were reviewed. Documents review was conducted to ensure consistency with and to identifying any deviation from VCS program requirements. Desk review included a review of the project details, data and parameters and quantification of GHG emission reductions.

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

The references used in the course of this verification are summarized in Appendix 3.

The verification was performed basing on the documents check and review of measurements method. Refer Appendix 5 of this report for the verification process for the monitored parameter detail and corresponding documents verified.

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the verification process. Virtual site inspection and interviews are conducted remotely and information discussions were conducted with project owner, project engineers, plant operators, local commune and project consultant.

The team leader conducted the site inspection virtually and interviews with the project owner, project engineers, project consultant, local communities and plant operators via google meet conference communication tool for opening meeting, inspection of project equipment, project site and closing

meeting. Document review and discussion with the project consultant using skype and google meet as the communication tool.

The team leader is based in Malaysia was unable to travel to conduct site inspection due to the COVID-19 pandemic with travel restrictions and quarantine requirements for both countries Indonesia and Malaysia.

The team leader has interviewed the project owner, technology provider, local commune, operation personnel and project consultant on topics listed in below table:

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Sidabalok	Leonardo	South Pole – Project Manager / IM01/	13/09/2021	Remote opening meeting & closing meeting. Operations, Equipment, Employment, Environment, Metering, Maintenance	Cheong, Chun Yuen (Robert)
2	Valerie	Nethania	South Pole – Project Dev. /IM01/			
3	Simanjuntak	Parlindungan	PLN UPDK Pandan Office - , Manager /IM02/			
4	Dwi	Lejar	PLN UPDK Pandan Office – HSE Staff /IM02/			
5	Rahmaini	Fika	PLN UPDK Pandan Office = General Admin /IM02			
6	Munzir	Muhamad	PLN UPDK Pandan Office – Supervisor Operations and control / IM02			
7	Wardiono	Febru	PLN Sipansihapo ras – Operation Superviros / IM03/			
8	Handayan	Kamia				

9	Meily	Priliani	PLN HQ – HSE Division / IM04/			
10	-	Annisa U.				
11	-	Normali	Local commune /IM05/		Interview of communes – environment, social, employment and training	
13	Sidabalok	Leonardo	South Pole – Project Manager / IM01/	13/09/2021	Review of MR, ER, electricity invoices, calibration, site photos, findings and reporting	
14	Valerie	Nethania	South Pole – Project Dev. /IM01/			

2.4 Site Inspections

In lieu of the COVID-19 pandemic, taking into account of local national authority for international travel restrictions at verification team host country in Malaysia and project site in Indonesia where quarantine is imposed at both countries are required and World Health Organisation (WHO) recommendations, the onsite inspection is not able to carry out as per the VCS- COVID travel guidance (https://verra.org/covid-19-travel-guidance/). In this aspect, the VVB applied alternative auditing approach and techniques as described in VCS rules and requirements.

The verification team applied the following alternative techniques for the assessment and justify that there are sufficient for the purpose of the verification. Along with desk review the audit team had conduct remote interviews and virtual site inspection.

1. A complete and detail desk review of the monitoring report, ER calculations, host country legal requirements, supporting documents on the project technology, equipment installed and site verified.
2. A virtual site inspection and interview of project owner, project engineers and project consultant using google meet to inspect the project site, current equipment and implemented, project boundary, monitoring and metering instruments, monitoring records and calibration.
3. Photos of the project location, site layout drawing, turbine, generators, transformers, switchyard, reservoir, operation room, SCADA system and metering panel provided by the project owner are reviewed and confirmed during the virtual site inspection and interview using google meet.
4. Selected local communities are interviewed using google meet on the project implementation and any negative and positive feedbacks.

The project location was crosschecked using google earth on the geo coordinates provided by the project owner

Duration of remote inspection: 13/09/2021				
No.	**Activity performed remotely**	**Site location**	**Date**	**Team member**
1.	Document review	Puchong, Malaysia	13/09//2021	Cheong, Chun Yuen (Robert)
2	Remote opening meeting &	Jakarta / Puchong /	13/09/2021	

	closing meeting. Interview project owner representatives and plant operators	Sipan village (Project location)		
3	Remote interview of local commune			
4	Review of MR, ER, electricity invoices, equipment, site photos, findings and reporting	Jakarta / Puchong	13/09/2021	

2.5 Resolution of Findings

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:

The project participant made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

The VCS Version 4.1 requirements have not been met;

There is a risk that the emission reductions cannot be monitored or calculated.

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 next verification.

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

2.5.1 Forward Action Requests

This is the CPII 2nd verification and there is no FAR raised during the last verification.

There are no FARs raised for this verification to be addressed in the next verification.

2.6 Eligibility for Validation Activities

The VVB TÜV NORD CERT GmbH holds accreditation for both validation and verification for the relevant sectoral scopes 1.

3.0 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is registered as a VCS project with registration number ID 486.

The project does not participate in other GHG programs that include emissions trading program or any other forms of environmental credit such as environmental credits including renewable energy certificates that includes GHG allowance trading.

The verification team has crosschecked at UNFCCC, Gold Standard and IREC. It could be confirmed the project is not listed in any of these registries and therefore there is no other environmental credit (for example renewable energy certificate) which has or will be produced by or obtained for the project.

In addition, the verification team has further confirmed that the project activity is not participating in Indonesia domestic scheme.

3.2 Methodology Deviations

This section is not applicable as the project activity does not need any deviations of the methodology.

3.3 Project Description Deviations

This section is not applicable as the project activity does not need any deviations of the Project Description

3.4 Grouped Project

This section is not applicable as the project is not a grouped project.

4.0 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project is a run-off-river hydropower plant generating renewable electricity to supply to the national grid of Indonesia replacing fossil fuel generated electricity.

Via remote document review and interview of project owner and project consultant, it is confirmed the project activity is a hydropower plant with a total capacity of 50MW.

The project assists to reduce greenhouse gas (GHG) emissions by an estimated 185,392 tCO_2e on average per year during the 2nd crediting period. /PD1/VAL/

The project start date was defined as 21/10/2002 based on the earliest date when emission reductions began. As per VCS standard, the start date of the first crediting period is defined as 01/04/2006.

The 1st crediting period was from 01/04/2006 to 01/03/2016 (both dates inclusive). This is the 2nd crediting period of ten years starts from 01/04/2016 to 31/03/2026 (both dates inclusive).

The expected operational life time of project activity is 30 years as described in the initially approved PD. This is verified by means of review of the technical specifications provided by the project owner and interview conducted

By means of documents review, verified photos provided and interview with project owner, the Verification Team was able to confirm that the project implementation is in accordance with the project description contained in the registered and approved revised project description. There are no any material discrepancies between project implementation and the project description.

On the basis on the reviewed project documentation, interview conducted it can be confirmed that w.r.t. the realized technology, the project equipment, as well as the monitoring and metering equipment, the project has been implemented and operated as applied monitoring methodology and monitoring plan described in the registered and approved revised PD.

This verification covers the period from 01/05/2017 to 31/12/2020 (including both days). The net emission reductions achieved during this monitoring period is **585,739 tCO_2e**.

Via remote interview with the project owner and local communes, it is verified that the project contributes the sustainable development through the following aspects as describe in the MR:

- Contributes to the development of the region by increasing community development
- Generates direct and indirect employment for skilled and unskilled manpower during the construction phase as well as the operational stage
- Utilizes hydropower to generate electricity, otherwise would have been generated using fossil fuel to reduce GHG emissions

Details of the project location as per table below:

No.	Project Location	
Host Country	Indonesia	
Region:	North Sumatra province	
Project location	Sipan village, Tapanuli Tengah district,	
Power Plant	Sipansihaporas HEPP Unit 1	Sipansihaporas HEPP Unit 2
Latitude:	1.74058 N	1.72882 N
Longitude:	98.86711 E	98.84018 E

The location and geo-coordinates of the project site is verified through google earth. /ge/

Basic technical details of the project are summarized in below which has been verified during documents and photos reviewed.

Technical data of the project activity

Description	Unit of measure
Turbine Unit 1	
Brand	Toshiba
Model	Francis vertical shaft
Rated Output	34,000 kW
Serial No:	M211071 CR1101
Turbine Unit 2	
Brand	Toshiba
Model	Francis vertical shaft
Rated Output	17,600 kW
Serial No:	M211071 CR2101

Description	Unit of measure
Generator Unit 1	
Brand	Meiden
Model	Synchronous generator
Rated Output	39,000 kVA
Rated Voltage	11 kV
Serial No:	8N5554R1
Generator Unit 2	
Brand	Meiden
Model	Synchronous generator
Rated Power	20,000 kVA
Rated Voltage	11kV
Serial No:	8N5555R1
Transformer Unit 1	
Brand	Pauwels
Model	Generator transformer
Rated Power	39 MVA
Rated voltage	11 kV/150kV
Serial No:	99P0041
Transformer Unit 2	
Brand	Pauwels
Model	Generator transformer
Rated Power	20 MVA
Rated voltage	11 kV/150 kV
Serial No:	99P0040

In conclusion, after corrections and findings are closed, the verification team could conclude the project implementation is in accordance with the project description contained in the registered and approved revised VCS PD.

4.2 Safeguards

4.2.1 No Net Harm

In accordance to the Decree of the Ministry of Environment No. 17/2001, all hydroelectric power plants with a dam height of ≥ 15 meters (m), or a flooded area of ≥ 200 hectares (ha), or an installed capacity of ≥ 50 MW need to undertake an Environmental Impact Assessment (EIA).

The project activity has a total installed capacity of 50 MW electricity thus and EIA is required.

An EIA was conducted and approved by the Ministry of Energy and Mining on 03/07/1996 as describe in Section 2.1 of MR and Section 5.1 of the approved revised PD.

During the virtual site inspection and interview with local commune, there are no impacts to the environment cause by the project.

The project activity is required to submit quarterly environmental monitoring report to the local environmental authority.

In conclusion, there were no negative environmental and socio-economic impacts caused by the project activity.

4.2.2 Local Stakeholder Consultation

A local stakeholders' consultation was conducted by the project owner on 17/09/2004 at the time of initial validation and registration of the project activity.

The project owner has sent invitation letter on 07/07/2008 to representative of local authority and local communes to provide comments, feedback and invited to participate in the meeting.

The summary of the stakeholders meeting is described in Section 5.3 of the approved revised PD.

In addition, the project owner has conducted stakeholder engagement socialization meeting annually. The most recent meeting with local commune was on 11/08/2021.

No further assessment required since the project activity is in CPII.

4.3 AFOLU-Specific Safeguards

Not applicable.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

4.4.1 Assessment of Data and Parameters Available at Validation

Means of verification

By means of comparison of the MR and the ER calculation with the registered PD, the verification team has checked whether all parameters fixed ex-ante have been applied correctly.

The parameters that are fixed ex ante are following:

Parameters	Source of data	Values applied	Data Unit	Verification team assessment
$EF_{grid,CM,y}$	Calculated	tCO_2/MWh	0.869	Registered and approved revised PD

The following sources of information have been used in this context:

- /MR/

	• /ER/ • /PD1/ • /AM2/	
Findings	☒	The MR and ER calculation have considered the parameters fixed ex-ante correctly, no deviations have been observed.
	☐	The following deviations from the parameters fixed ex-ante have been identified in the course of this verification: -
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The parameters fixed ex ante indicated in the MR have been crosschecked with the approved revised PD, applied tool and methodologies for consistency.	

4.4.2 Assessment of Data and parameters Monitored

Means of verification	During the verification all relevant monitoring parameters (as listed in chapter 4.2 of the registered PD) have been verified with regards to the (i) appropriateness of the applied measurement / determination method, (ii) the correctness of the values applied for ER calculation, (iii) the accuracy, and applied QA/QC measures. The results as well as the verification procedure are described parameter-wise in the project specific verification checklist (Appendix 5).	
Findings	CAR 4-1	
Conclusion	☐	No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	After correction, it could be concluded that all monitoring parameters have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements.	

4.4.3 Assessment of in Compliance with monitoring plan

Means of verification	The verification team conducted a review of Section 4.3 of the draft monitoring report for the monitoring plan of the PA by means of comparison with: (i) the applied CDM methodology (ii) all applicable CDM Meth tools (iii) registered and approved revised PD

	(iv) VCS standard The monitoring system diagram figure 3 was crosschecked with the single line and meter location diagram. The meters specification, management system for data collection, roles and responsibilities, data archiving, training, calibration and quality control are describe in section 4.3 are verified though documents review and interview with project personnel and project consultant. The following sources of information have been used in this context: • /MR/ • /PD1/ • /ACM2/ • /VCSS/ • /E4/ • /C1/ • /O3/ • /IM01/IM02/IM03/IM04/	
Findings	☒	The monitoring implementation is completely in accordance with the approved methodology applied by the project and monitoring plan in the registered PD.
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The monitoring system is in compliance to the approved revised PD.	

4.4.4 Compliance with the calibration frequency requirements for measuring instruments

Means of verification	During the verification the relevant monitoring equipment has been checked whether the calibration requirements have been met; especially if the calibration frequency is in line with the requirements of the approved revised PD and manufacturer requirements. The calibration of the monitoring instruments was cross-checked with calibration reports. The calibration records covering the monitoring period were maintained and verified by the verification team. The results as well as the verification procedure are described equipment-wise in the project specific verification checklist (Appendix 6). The following sources of information have been used in this context: • /MR/ • /C1/ • /PD1/

Findings	☐	Based on the details listed in Appendix 6 the verification team can confirm that all installed monitoring equipment has been duly calibrated for this entire monitoring period.
	☒	Based on the assessment and information as per appendix 6 delay(s) in calibration have been identified. The PP has applied the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration. From the related calibration certificates and emission reduction calculation the verification team confirms that the maximum permissible error has been applied in a conservative manner so that the adjusted measured values due to the delayed calibration result in fewer claimed emission reductions. For details please refer to Appendix 6
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The calibrations of the monitoring instruments installed have been verified as listed in Appendix 6 of this report. The calibration is carried out according to national regulations of the grid operator. The VVB could conclude the instruments have been duly calibrated for the monitoring period.	

4.4.5 Assessment of data and calculation of emission reductions or net removals

4.4.5.1 Calculation of baseline GHG emissions or removals

Means of verification	During the verification the calculation of baseline GHG emissions has been checked in detail the following has been verified: • *Transparency:* It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae. • *Parameter consistency:* It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet. • *Correctness:* It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology. • *Completeness:* It has been checked whether all calculations are complete and without omissions. The baselines emissions for the project activity in accordance to the applied methodology as follows:

	$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ Where: BE_y : Baseline emissions in the monitoring period (tCO_{2e}). $EG_{PJ,y}$: Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in the reported monitoring period (MWh) $EF_{grid,CM,y}$: Combined margin CO_2 emission factor for grid connected power generation in the reported monitoring period tCO_2/MWh Therefore baseline emissions for this monitoring period: $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ = 674,039.09 MWh x 0.869 tCO_2e/MWh = **585,739 tCO_2e (round down)** The equations applied for the determination of baseline GHG emissions are consistent with the approved revised PD and applied methodologies: The following sources of information have been used in this context: • /MR/ • /ER/ • /PD1/ • /AM2/	
Findings	☐	The calculation of the baseline emissions was found to be fully compliant with the above stated principles. The calculations of baseline GHG emissions or baseline net GHG removals have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified.
	☒	The verification team has identified mistakes in the baseline emissions calculation or the underlying calculation approaches.
	☒	In this context the following CARs, CLs, FARs have been raised: CAR 5-2; CAR 5-4
Conclusion	☐	No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The calculations of baseline GHG emissions have been carried out in accordance with the equations and methods described in the approved revised PD and applied methodology. Any assumptions used in emission or removal calculations have been justified. Appropriate factors and other reference values have been correctly applied. After minor corrections, it can be concluded the baseline calculation is overall correct.

4.4.5.2 Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	During the verification the calculation of project GHG emissions has been checked. in detail the following has been verified: • Transparency: It has been checked whether the calculation of project emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae. • Parameter consistency: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet. • Correctness: It has been checked whether the applied formulae and methods for calculating project emissions are in accordance with the monitoring plan and the approved methodology. • Completeness: It has been checked whether all calculations are complete and without omissions. The project emissions are described and demonstrated in Section 5.2 of the MR as follows: $PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$ Where: PE_y = Project emissions in year y (tCO_2e) $PE_{FF,y}$ = Project emissions from fossil fuel consumption in the year y (tCO_2e) There is no usage of fossil fuel therefore 0 emissions $PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO_2e) The project activity is not a geothermal power plant. Therefore, is 0 $PE_{HP,y}$ = Project emissions from water reservoirs in year y (tCO_2e) According to the methodology ("for hydropower project activities that result in new single or multiple reservoirs and hydropower project activities that result in the increase of single or multiple existing reservoirs"), project proponents shall account for CH_4 and CO_2 emissions from the reservoirs. If the power density of the project activity (PD) is greater than 10 W/m^2, the $PE_{HP,y} = 0$. According to the registered VCS PD version 3.0 dated 30/10/2017, the power density has been calculated as per equation 7 of applied methodology. The capacity of power plant 50 MW and area of the run-of-river reservoir 178,000 m^2. The calculated power density is 281 W/m^2. Therefore, $PE_{HP,y}$ need not to be considered. The verification team had checked to verify the data as describe in MR section 5.2 and crosschecked against the registered and approved revised PD to confirm as correct. The following sources of information have been used in this context: • /MR/ • /PD1/ • /AM2/ • /ER/	
Findings	☐	The calculation of the project emissions was found to be fully compliant with the above stated principles.

		The calculations of project GHG emissions or actual net GHG removals have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information have been identified.
	☒	The verification team has identified mistakes in the project emissions calculation or the underlying calculation approaches.
	☒	In this context the following CARs, CLs, FARs have been raised: CAR 5-3
Conclusion	☐	No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The project GHG emissions have been carried out in accordance with the approved revised PD and applied methodology. After minor corrections, it can be concluded the PE justification is overall correct	

4.4.5.3 Calculation of leakage GHG emissions

Means of verification	During the verification it has been checked whether leakage emissions have to be considered and, in cases where leakage emissions have to be calculated, the respective calculation of leakage GHG emissions has been checked. In such cases the same verification principles have been considered as for the baseline and project emissions calculation. According to the approved revised PD and applied methodology ACM0002: "Grid-connected electricity generation from renewable sources", version 17.0" the project activity equipment is not transferred from another activity therefore, leakage is considered to be zero ($LE_y = 0$). The following sources of information have been used in this context: • /MR/ • /PD1/ • /AM2/ • /ER/	
Findings	☒	No leakage emissions were to be considered (LE = 0).
	☐	The calculation of the leakage emissions was found to be fully compliant with the above stated principles. The calculations of leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in leakage emissions calculations have been justified. Where applicable, appropriate emission factors and other reference values have been correctly applied.

		No errors, miscalculations, omissions, misstatements or incomplete information have been identified.
	☐	The verification team has identified mistakes in the leakage emissions calculation or the underlying calculation approaches.
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	No leakage has to be considered according to the approved revised PD since the project activity does not involve equipment transfer to or from another activity.	

4.4.5.4 Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification

The verification team has checked MR section 5.4 includes a summary table of the emission reductions calculation specifying separately

- Total baseline emissions,
- Total project emissions,
- Total leakage,
- Total emission reductions.

According to the applied methodology ACM0002 version 17, the procedure of determining emission reduction for the project activity are as follows.

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y: Emission reductions achieved by the project activity based on monitored values for year y (tCO_2e)

BE_y: Baseline emissions calculated ex post monitored values

PE_y: Project emissions in year y

Summary of emission reductions during the monitoring period as follows:

Emission Reductions Calculation

Parameters	Baseline Emissions BE_y	Project Emissions PE_y	Leakage Emissions LE_y	Emission Reductions ER_y
Period (both dates inclusive)	(tCO_2e)	(tCO_2e)	(tCO_2e)	(tCO_2e)

	01/05/2017 – 31/12/2017	106,776	0	0	106,776
	01/01/2018 – 31/12/2018	181,982	0	0	181,982
	01/01/2019 – 31/12/2019	143,197	0	0	143,197
	01/01/2020 – 31/12/2020	153,784	0	0	153,784
	Total	**585,739**	**0**	**0**	**585,739**

Note: The value for this monitoring period is a rounddown value after sum monthly basis of the period.

All the figures as per the monitoring report were cross-checked by the verification team against basic monitored data. Refer to Appendix 5 for details.

Findings	☒	Section 5.4 of the MR includes in a summary table of the emission reductions calculation.
	☒	The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately.
	☐	The values as specified in the ER summary table are correct; no issues have been identified during the verification which requires changes in the ER calculation.
	☒	During the verification issues with impact on the ER calculation have been identified.
	☒	In this context the following CARs, CLs, FARs have been raised: CL 5-1; CAR 5-3; CAR 5-4;
Conclusion	☐	No CARs/CLs/FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs/CLs/FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	After corrections, it can be concluded that the emission reductions calculation is overall correct.	

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Refer to Appendix 5 for the detail assessment of each monitoring parameters and Appendix 3 for the supporting evidence applied to determine the GHG emission reductions.

For each reported data, the evidence is provided and verified as sufficient and quality is appropriate. Also, the cross-checks has been performed on the reported data with different source of evidence. The information flow from data generation and aggregation, to recording, calculation and final transposition into the monitoring report has been assessed by VVB in Appendix 5 for each parameter and the calibration have been conducted as per the frequency of monitoring equipment defined in the registered PD and national regulation.

Therefore, it is concluded that the evidence provided are verified as sufficient and quality is appropriate and thus the evidence can be used to determine the GHG reductions and removals for this monitoring period.

Refer to Appendix 5 for the detail assessment.

4.6 Non-Permanence Risk Analysis

N/A

5.0 VERIFICATION CONCLUSION

South Pole Carbon Asset Management Ltd has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Verified Carbon Standard (VCS) CPII 2nd periodic verification of the project activity *50 MW Sipansihaporas Hydro Power Plant, North Sumatra* VCS ID. 486, for the period 01/05/2017 to 31/12/2020 (both days inclusive), with regard to the relevant requirements for VCS version 4.1.

Based on the documented evidence and corroborated by an on-site assessment, TÜV NORD could confirm that:

- the project has been implemented and operated as per the approved revised PD;
- the project complies with the validation criteria for projects set out in VCS Version 4.1;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS requirement;
- the monitoring is in place as per the applied baseline and monitoring methodology;
- the monitoring complies with the monitoring plan in the validated PD;
- the monitoring plan in the validated PD is as per the applied baseline and monitoring methodology.
- there is no double accounting and claim for the VCU generated for this project.

Verification period: From 01/05/2017 to 31/12/2020 (both days inclusive)

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

Year (Both dates inclusive)	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01/05/2017 – 31/12/2017	106,776	0	0	106,776
01/01/2018 – 31/12/2018	181,982	0	0	181,982
01/01/2019 – 31/12/2019	143,197	0	0	143,197
01/01/2020 – 31/12/2020	153,784	0	0	153,784
Total	**585,739**	**0**	**0**	**585,739**

Puchong, 10/11/2021

Cheong, Chun Yuen (Robert)
TÜV NORD JI/CDM CP
Verification Team Leader

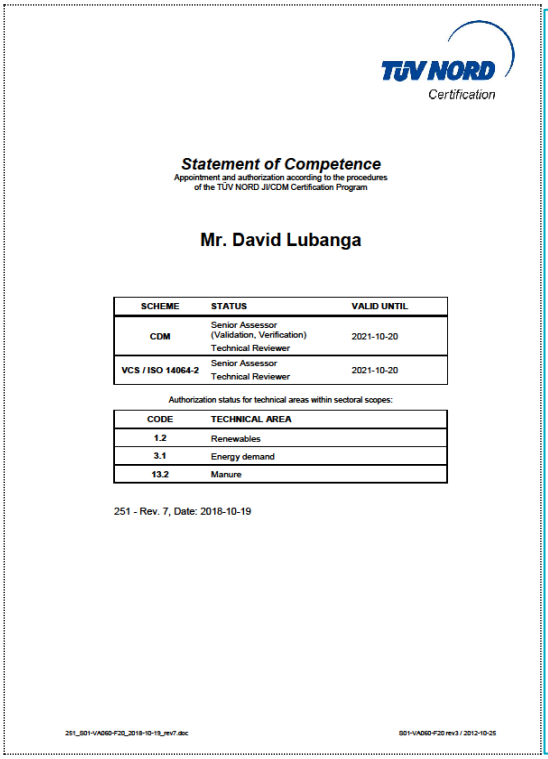
Essen, 29/06/2022

Kunal Rami
TÜV NORD JI/CDM CP
Final Approval

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
BAU	Business as usual
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CP	Certification Program / Crediting Period
DEDE	Department of Alternative Energy Development and Efficiency
DNA	Designated National Authority
ER	Emission Reductions
EIA	Environmental Impact Assessment
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
LK	Laboriatorium Kalibrasi
MP	Monitoring plan
MR	Monitoring Report
PD	Project Description
PLN	PT. PLN (Persero)
PP	Project Participant
QC/QA	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VVB	Validation / Verification Body

APPENDIX 2: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS



TÜV NORD Certification

Statement of Competence
Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

Mr. David Lubanga

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2021-10-20
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2021-10-20

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
3.1	Energy demand
13.2	Manure

251 - Rev. 7, Date: 2018-10-19

TÜV NORD Certification

Statement of Competence

Mr. Robert Cheong

APPENDIX 3: DOCUMENTS REVIEWED OR REFERENCED

No.	Author	Reference	Title	References to the document	Provider
1	UNFCCC	/AM2/	ACM0002: "Grid-connected electricity generation from renewable sources", version 17.0"	https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG	Others
2	DOE	/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)		Others
3	Verra	/VCSPD/	VCS Program Definitions, v4.1	https://verra.org/project/vcs-program/rules-and-requirements/	Others

No.	Author	Reference	Title	References to the document	Provider
4	Verra	/VCSPG/	VCS Program Guide, v4.0	https://verra.org/project/vcs-program/rules-and-requirements/	Others
5	Verra	/VCSS/	VCS Standard, v4.0 & v4.1	https://verra.org/project/vcs-program/rules-and-requirements/	Others
6	Verra	/MRF/	Monitoring Report Form v4.0	https://verra.org/project/vcs-program/rules-and-requirements/	Others
7	Verra	/PD1/	Initial Project Description for VCS project 50 MW Sipansihaporas Hydro Power Plant, North Sumatra dated 10/11/2009 version 3.0 Approved revised Project Description for VCS project: "50 MW Sipansihaporas Hydro Power Plant, North Sumatra dated 30/10/2017 version 3.0	https://registry.verra.org/app/projectDetail/VCS/486	Others
8	Verra	/VAL/	Initial Validation Report for VCS project 50 MW Sipansihaporas Hydro Power Plant, North Sumatra dated 18/11/2009 Validation Report for Renewal Crediting Period VCS project "50 MW Sipansihaporas Hydro Power Plant, North Sumatra dated 31/10/2017 version 01.1	https://registry.verra.org/app/projectDetail/VCS/486	Others
9	UNFCCC	/TL/	TOOL07 – "Tool to calculate the emission factor for an electricity system", version 05.0	http://cdm.unfccc.int/Reference/tools/index.html	Others
10	**Monitoring Report**				
	PP	/MR/	Monitoring Report version 01 dated 13/08/2021 Monitoring Report version 02 dated 01/10/2021 Monitoring Report version 03 dated 15/10/2021 Monitoring Report version 04 dated 24/06/2022		PP

No.	Author	Reference	Title	References to the document	Provider
11	**ER spreadsheet**				
	PP	**/ER/**	ER calculation spreadsheet version 01 dated 13/08/2021 ER calculation spreadsheet version 02 dated 17/09/2021 ER calculations spreadsheet version 03 dated 11/10/2021 ER calculations spreadsheet version 03 dated 19/10/2021 ER calculations spreadsheet version 04 dated 24/06/2022		PP
	Calibration Reports				
12	LK	**/C1/**	Electricity meter Unit 1 Serial no. 36027177 calibration by Laboriatorium Kalibrasi Electricity meter unit 2 serial no: 36027137 calibration by Laboriatorium Kalibrasi Details of calibration refer Appendix 6 below		Others
	Electricity records				
13	PLN	**/GR1/**	Electricity Invoices 01/05/20 17 to 31/12/2020		Others
	Equipment				
14	PP	**/E1/**	Specification and name plate for turbines		PP
15	PP	**/E2/**	Specification and name plate for generators		PP
16	PP	**/E3/**	Specification and name plate for transformers		PP
17	PLN	**/E4/**	Specification and name plate for electricity meters		Others
	Regulatory & Approvals				
18	MoE	**/RA1/**	EIA Approval dated 03/07/1996		Others
19	PLN	**/RA2/**	Certificate of Operation for unit 2 dated 24/02/2016 Certificate of Operation for Unit 1 17/07/20171 dated		Others
	Project Operation				
20	PP	**/PO1/**	Maintenance records 2020		PP

No.	Author	Reference	Title	References to the document	Provider
21	PP	/P02/	Quarterly environmental quality monitoring report		PP
22	PP	/P03/	Training records 2017 to 2021		PP
	Local Stakeholders Consultation				
23	PP	/LSC1/	Stakeholders Socialise Meeting dated 11/08/2021		PP
	Others				
24	PP	/01/	Site layout diagram		PP
25	MoE	/02/	Decree of the Ministry of Environment No.17year 2001 for EIA requirements for HPP		Others
26	PP	/03/	Single line electricity diagram units 1 and 2		PP
27	PP	/04/	Site photos for units 1 and 2		PP
28	PP	/05/	Site video for units 1 and 2		PP
29	PP	/06/	Site photos for regulating ponds and water intake at units 1 and 2		PP
30	VVB	/ge/	Site Location by google earth		Others
Website Used					
31		/vcs/	VCS	https://verra.org/project/vcs-program/	
32		/unfccc/	UNFCCC	http://cdm.unfccc.int	
33		/ipcc/	IPCC publications	www.ipcc-nggip.iges.or.jp	

APPENDIX 4: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

Table 1. Summary of findings for this verification

Verification topic [1)]	No. of CAR	No. of CL	No. of FAR
1. Project Details: 1.1 Summary Description of the Implementation Status of the Project 1.2 Sectoral Scope and Project TypeReference of applied methodology 1.3 Project Proponent 1.4 Other Entities Involved in the Project 1.5 Project Start Date 1.6 Project Crediting Period 1.7 Project Location 1.8 Title and Reference of Methodology 1.9 Participation under other GHG Programs 1.10 Other Forms of Credit 1.11 Sustainable Development	3	0	0
2. Safeguards 2.1 No Net Harm 2.2 Local Stakeholder Consultation 2.3 AFOLU-Specific Safeguards	0	0	0
3. Implementation Status 3.1 Implementation Status of the Project Activity 3.2 Deviations 3.2.1. Methodology Deviations 3.2.2. Project Description Deviations 3.3 Grouped Projects	1	0	0
4. Data And Parameters 4.1 Data and Parameters Available at Validation 4.2 Data and Parameters Monitored 4.3 Monitoring Plan	1	0	0
5. Quantification Of GHG Emission Reductions And Removals 5.1 Baseline Emissions 5.2 Project Emissions 5.3 Leakage 5.4 Net GHG Emission Reductions and Removals	3	1	0
SUM	**8**	**1**	**0**

Table 2. FAR from validation and/or previous verification

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

Table 3. CL from this verification

CL ID	5-1	Section no.	5.1	Date	14/09/2021
Description of CL					
MR version 01, Section 5.1: It is unclear for the unit of measure is tCO_2e/4 years instead of tCO_2e/y.					
Project participant response (1st round)				**Date**	21/09/2021
The unit measure of tCO_2e per 4 years has been revised to use unit of tCO_2e per year according to the applied equation of Baseline Emission (BE_y). The MR has been revised.					
Documentation provided by project participant (1st round)					
☒ Changes in MR		Section(s): 5.1		New version No.: 2.0	
☐ Changes in XLS		Worksheet(s):		New version No.:	
☐ Other:					
VVB assessment (1st round)				**Date**	22
MR version 02, Section 5.1: The unit of measure is updated as tCO_2e/y.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

Table 4. CAR from this verification

CAR ID	1-1	Section no.	All Sections	Date	14/09/2021
Description of CAR					
MR version 01 All sections: All dates period shall be described both dates inclusive.					
Project participant response (1st round)				**Date**	21/09/2021
The phrase of "both dates included" has been added next to all of the dates period.					
Documentation provided by project participant (1st round)					
☒ Changes in the MR		Section(s): 1.1. ; 1.6 ; 3.1 ; 5.1		New version No.: 02	
☐ Changes in XLS		Worksheet(s):		New version No.:	
☐ Other:					
VVB assessment (1st round)				**Date**	22/09/2021
MR version 02 All sections: All dates period shall be describe both dates inclusive.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	1-2	Section no.	1.1	Date	14/09/2021
Description of CAR					
MR version 01, Section 1.1: The project was validated under the VCS and final validation report was issued on 31/10/2017 represents the renewal crediting period validation. The initial validation date of the project should be reflected.					

Project participant response (1st round)			Date	21/09/2021
The date of initial registration for the 1st crediting period of the project has been added.				
Documentation provided by project participant (1st round)				
☒	Changes in the MR	Section(s): 1.1	New version No.: 02	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☐	Other:			
VVB assessment (1st round)			Date	22/09/2021
MR version 02, Section 1.1: The initial validation date of the project 1st crediting period is added				
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed			

CAR ID	1-3	Section no.	1.2	Date	09/10/2021
Description of CAR					
MR version 02, Section 1.2: The methodology title to be corrected.					
Project participant response (1st round)				Date	15/10/2021
The methodology updated and deleted category					
Documentation provided by project participant (1st round)					
☒	Changes in the MR	Section(s): 1.2	New version No.: 03		
☐	Changes in XLS	Worksheet(s):	New version No.:		
☐	Other:				
VVB assessment (1st round)				Date	15/10/2021
MR version 02, Section 1.2: The methodology title updated accordingly and deleted category which not relevant.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	3-1	Section no.	3.1	Date	14/09/2021
Description of CAR					
MR version 01, Section 3.1: 1. The project was validated under the VCS and final validation report was issued on 31/10/2017 represents the renewal crediting period validation. The initial validation date of the project should be reflected. 2. Table 1: The serial number for the generator is not listed 3. Table 1: The brand for the turbine and generator is not consistent with the name plate and specification. 4. Table 2: The dates and events should describe following: a. Date of project implementation b. Date of initial registration with VCS c. Date of renewal crediting period date submitted to VCS d. Date of CPII MP1					
Project participant response (1st round)				Date	21/09/2021

1. The initial registration date of the project for the 1st Crediting Period has been added.
2. Table 1: The serial number for the generators have been listed.
3. Table 1: The brand for the turbines and generators have been revised to be consistent with the name plates and specifications.
4. Table 2: The following dates and events have been described:
   a. Date of project implementation (project start date)
   b. Date of initial registration with VCS
   c. Date of renewal crediting period date submitted to VCS and consistent with the registry
   d. Date of CPII MP1

Documentation provided by project participant (1st round)		
☒ Changes in the MR	Section(s): 3.1	New version No.: 02
☐ Changes in XLS	Worksheet(s):	New version No.:
☐ Other:		

VVB assessment (1st round)	**Date**	22/09/2021

MR version 02, Section 3.1:

1. The initial validation date of the project is added.
2. Table 1: The serial number for the generator is not listed
3. Table 1: The brand for the turbine and generator updated and consistent with the name plate and specification.
4. Table 2: The dates and events should describe following:
   a. Date of project implementation added
   b. Date of initial registration with VCS added and consistent with the registry
   c. Date of renewal crediting period date submitted to VCS added
   d. Date of CPII MP1 added

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	4-1	**Section no.**	4.2	**Date**	14/09/2021

Description of CAR

MR version 01 Section 4.2, Parameter $EG_{PJ,y}$: The monitored value shall reflect the decimal points

Project participant response (1st round)	**Date**	21/09/2021

The monitored value of parameter of $EG_{PJ,y}$ has been revised in the MR version 02 to reflect the decimal points.

Documentation provided by project participant (1st round)		
☒ Changes in the MR	Section(s): 4.2	New version No.: 02
☐ Changes in XLS	Worksheet(s):	New version No.:
☐ Other:		

VVB assessment (1st round)	**Date**	09/10/2021

MR version 02 Section 4.2, Parameter $EG_{PJ,y}$: The monitored value updated to reflect the decimal points

Description of CAR (2nd round)	**Date**	**09/10/2021**

MR version 02, Section 4.2: The error in the delayed calibration and contrast it with the MPE in line with the referenced guideline

Project participant response (2nd round)	**Date**	15/10/2021

The error in the delayed calibration has been revised and contrast with the MPE

Documentation provided by project participant (1st round)			
☒	Changes in the MR	Section(s): 4.2	New version No.: 03
☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		
VVB assessment (2nd round)		**Date**	15/10/2021
MR version 03, Section 4.2: The calibration error is updated for both meters, Calibration error is lower than meter accuracy error. MPE applied is meter accuracy error which is conservative.			
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	5-2	Section no.	5.1	Date	14/09/2021
Description of CAR					
MR version 01, Section 5.1: 1. $EG_{PJ,y}$ value should reflect the decimal points. 2. The source for parameter $EF_{grid,CM,y}$ is not calculated. It shall reflect the correct reference.					
Project participant response (1st round)				**Date**	21/09/2021
1. $EG_{PJ,y}$ value has been revised to reflect the decimal points. 2. The source for parameter $EF_{grid,CM,y}$ has been revised to reflect the source of the value from revised approved PD version 3.0.					

Documentation provided by project participant (1st round)			
☒	Changes in the MR	Section(s): 5.1	New version No.: 02
☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		
VVB assessment (1st round)		**Date**	22/09/2021
MR version 02, Section 5.1: 1. $EG_{PJ,y}$ value updated to reflect the decimal points. 2. The source for parameter $EF_{grid,CM,y}$ is updated to reflect derived from revised approved PD version 3.0.			
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	5-3	Section no.	5.2	Date	14/09/2021
Description of CAR					
MR version 01, Section 5.2: 1. Refer parameter $PE_{HP,y}$ the source is incorrect as not applicable. 2. The reference for the power density of the project activity (PD) is greater than 10 W/m^2 is not described clearly.					
Project participant response (1st round)				**Date**	21/09/2021
1. The source for parameter $PE_{HP,y}$ has been corrected to be reflected as per registered VCS PD. 2. The reference for the power density of the project activity (PD) is greater than 10W/m^2 has been added to provide clear description.					

Documentation provided by project participant (1st round)			
☒	Changes in the MR	Section(s): 5.2	New version No.: 02
☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		
VVB assessment (1st round)		**Date**	22/09/2021

MR version 02, Section 5.2: 1. Parameter $PE_{HP,y}$ source is correct to reflect as derived from registered PD. 2. The reference for the power density of the project activity (PD) is greater than 10 W/m^2 is describe clearly.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	5-4	**Section no.**	ER spreadsheet	**Date**	14/09/2021
Description of CAR					
ER version 01, tab 1 Emission Reduction: Cells E17 to I17 and R17 to V17 shall reflect the decimal point for the net annual power exported.					
Project participant response (1st round)				**Date**	21/09/2021
Tab 1 Emission Reduction: Cells E17 to I17 and R17 to V17 values have been revised in ER version 02 to reflect the decimal point for the net annual power exported.					
Documentation provided by project participant (1st round)					
☐	Changes in the MR	Section(s):		New version No.:	
☒	Changes in XLS	Worksheet(s): 1.Emission Reduction		New version No.:02	
☐	Other:				
VVB assessment (1st round)				**Date**	22/09/2021
ER version 02, tab 1 Emission Reduction: Cells E17 to I17 and R17 to V17 updated to reflect the decimal point for the net annual power exported.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

Table 5. FAR from this verification

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

APPENDIX 5 MONITORED PARAMETERS

Table 5: Periodic Verification Checklist – Monitored Parameters

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
1. $EG_{PJ,y}$		**Description: Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y**		
a) Measurement / Determination method ***(VVS, §§ 363-367)*** *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /PD1/ /ACM2/ /ER/ /GR1/ /C1/ /E4/	*Description:* The parameter monitors the electricity generated and export to the national grid of Indonesia and monitored by 2 meters continuously. The electricity data is read and recorded in the monthly electricity invoice. There is a delay in the calibration from 01/05/2017 to 09/01/2018 for unit 1 meter and 01/05/2017 to 10/01/2018 for unit 2 meter. *Verifier´s action:* The data in the ER spreadsheet is crosschecked with the data in the electricity invoices. The MPE applied to the data for the delay in calibration in ER spreadsheet is crosscheck with the calibration report and meter accuracy. There is calibration error and lower than meter accuracy. The MPE applied is the meter accuracy of 0.5%. *Conclusion:* It is concluded the parameter is monitored in accordance with the approved revised PD and applied methodology ☒ In this context the following findings have been raised: ☒ CAR 4-1 ☐	~~CAR 4-1~~	OK

Checklist Item (incl. guidance for the verification team)	Refe-rence	Verification Team Comments (Means and results of assessment)		Draft Concl.	Final Concl.
b) Accuracy, correctness and QA/QC Procedure ***(VVS, §§ 368-374)*** *In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.* *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.* *Include calibration dates and information in validity of the installed monitoring equipment in the table in Appendix 6.*	/MR/ /PD1/ /ER/ /GR1/ /C1/	☒	It is confirmed that the accuracy of the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan		~~CAR 4-1~~	OK
		☒	For details regarding the accuracy and calibration details please refer to Appendix 6			
		☐	No delayed calibration has occurred			
		☐	As per the initial assessment the monitored value is deemed to be correct.			
		☒	Based on calibration certificates checked it can be confirmed that the monitoring equipment has been duly calibrated for this entire monitoring period.			
		☒	Based on calibration certificates checked a delay in calibration has been identified for the following period: Start date of delay: Refer Appendix 6 End date of delay: Refer Appendix 6			
		☒	A delay in calibration has been identified, the PP applied related actions and therefore the DOE can confirm that the:			
			☒	The maximum permissible error of the instrument has been applied to the values during the period between scheduled date of calibration and the actual date of calibration		
			☒	The result of the delayed calibration did not identify an error beyond the maximum permissible error of the instrument		
			☐	The error as identified during the delayed calibration has been applied as the error is beyond the maximum permissible error of the instrument		
			☒	The error has been applied in a conservative manner, such that the adjusted measured values of the delayed		

Checklist Item (incl. guidance for the verification team)	Refe-rence	Verification Team Comments (Means and results of assessment)			Draft Concl.	Final Concl.
				calibration shall result in fewer claimed GHG emission reductions or net anthropogenic GHG removals		
			☒	The error has been applied all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.		
		☒	In this context the following findings have been raised:			
			☒	CAR 4-1		

APPENDIX 6: Calibration Dates and Validity of Installed Monitoring Equipment

Monitoring equipment	Related monitoring parameter as per applicable registered monitoring plan	Serial number	Type	Accuracy or accuracy class	Previous calibration date	Current Calibration date(s)	Frequency of calibration	Delay in calibration: yes/no	Period of delayed calibration
Electricity Meter – Unit 1	$EG_{PJ,y}$	36027177	ACTARIS SL7000 - Actaris	0.2s	10/04/2010	09/01/2018	5 years	☐ No ☒ Yes	From: 01/05/2017 To: 09/01/2018
Electricity Meter – Unit 2		36027137				10/01/2018		☐ No ☒ Yes	From: 01/05/2017 To: 10/01/2018