FINAL VERIFICATION REPORT

"GULLUBAG HEPP"

RINA Services S.p.A.

Project Title	GULLUBAG 96 MW HYDRO ELECTRIC POWER PLANT PROJECT, Turkey
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Summary:

RINA Services S.p.A. (RINA), commissioned by Senerji Enerji Uretim A.S., has verified the greenhouse gas emission reductions reported for the project activity "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" in Turkey, VCS Registration Reference N° 391, for the period 01/09/2013 to 30/04/2020, with regard to the relevant requirements for CDM and VCS activities.

The objective of the verification is to have an independent review ex post determination of the monitored reductions in GHG emission reductions, reported for the "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" project in Turkey for the period 01/09/2013 to 30/04/2020.

Verification was conducted using RINA procedures in line with the requirements specified in the VCS Version 4 Requirements, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques. The verification consisted of desk review, on-site assessment and the resolution of outstanding issues and the issuance of the final verification report and certification. The verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable VCS Version 4 requirements, which refer to CDM rules, in order to be certified.

In conclusion, it is RINA's opinion that the project activity "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey", in "Turkey", as described in the Monitoring Report version 02 of 14/05/2020, meets all relevant requirements for VCS and CDM activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology "ACM0002", "Consolidated baseline methodology for grid-connected electricity from renewable sources", version 10 of 28/05/2009. Hence, RINA is able to certify that the emission reductions from the project during the monitoring period 01/09/2013 to 30/04/2020 amount to 800,935 tCO2e.

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1 INTRODUCTION

1.1 Objective

The objective of the verification is to have an independent review ex post determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered VCS project activity during a defined monitoring period. Certification is the written assurance by the DOE that, during a specific time period, a proposed VCS project activity achieved the reductions in anthropogenic emissions by sources of GHGs as verified.

The objective of this verification/certification was to verify and certify emission reductions and effective implementation of the monitoring of sustainable development indicators and mitigation measures, reported for the "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" project in Turkey for the period 01/09/2013 to 30/04/2020.

1.2 Scope and Criteria

The verification scope is:

- to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- to evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;
- to verify that reported GHG emission data is sufficiently supported by evidence;
- to evaluate whether all the mitigation measures have been effectively put in place according to the monitoring plan and that all the sustainable development indicators have been correctly monitored.

Verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable VCS Version 4 requirements, which refer to CDM rules, in order to be certified.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

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

1.3 Level of Assurance

All the revisions of the verification report, before being submitted to the client, were subjected to an independent internal technical review to confirm that all verification activities had been

completed according to the pertinent RINA instructions. All evidence had been confirmed during remote site visit with the invoices of electricity generation. The level of assurance is reasonable.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for VCS and CDM validation and verification. The verification team and the technical reviewers consist of the following personnel:

Role/Qualification	Last Name	First Name	Country
VCS Team Leader – VCS Verifier – Technical Expert	Kiratli	Tugce	Turkey
Independent Technical Reviewer	Carvalho	Thaís	Brazil

1.4 Summary Description of the Project

Senerji Enerji Uretim A.S. has commissioned RINA to carry out the verification and certification of emission reductions reported for the registered "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" project in Turkey, VCS Registration Reference N° 391, for the period 01/09/2013 to 30/04/2020.

The project is hydro power project located in Eastern Anatolia Region, Ispir District of the Erzurum Province, Turkey.

The project activity is a hydro power plant consists of 3 turbines with a 33 MWm / 32 MWe capacities making the total installed capacity of 99 MWm / 96 MWe as confirmed through the Generation License /12/. The turbines were commissioned on 23/03/2012 /13/.

The generated electricity is supplied to the National Electricity Transmission Grid of Turkey via 154 kV transmission line, through ISPIR HEP substation.

Project Participant(s)	Senerji Enerji Uretim A.S.		
Project Title	Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey		
Location of the project	Eastern Anatolia Region, Ispir District of the Erzurum Province, Turkey.		
Methodology(ies)	ACM0002", "Grid-connected electricity generation from renewable sources", version 10 of 28/05/2009 /6/		
Sectoral Scope(s)	1	**RINA's Technical Area(s)**	1.2
Registered VCS PD	Version 05 of 30/01/2010		
VCS Registration Reference No	391		
Starting date of the crediting period	23/03/2012 (as confirmed through the Temporary Acceptance Protocol /13/)		

Project's crediting period	23/03/2012 and 22/03/2022
Monitoring period	01/09/2013-30/04/2020 (both days included)
Project documentation link	https://registry.verra.org/app/projectDetail/VCS/391

2 VERIFICATION PROCESS

The project was verified by Bureau Veritas on 03/04/2014 and it was registered under the VCS registration reference N° 391. This is the second verification assessment for the monitoring period 01/09/2013-30/04/2020 by RINA.

2.1 Method and Criteria

Verification was conducted using RINA procedures in line with the requirements specified in the VCS Version 4 Requirements, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The verification consisted of the following three phases:

- Document review;
- On-site assessment;

The resolution of outstanding issues and the issuance of the final verification report and certification.

2.2 Document Review

The monitoring report, version 02 of 14/05/2020 /2/, the emission reduction calculations provided in the form of a spreadsheet, "Gullubag_VER_Calcs_2nd_Monitoring_Report_v02.xlsx" version 02 of 05/06/2020 /8/, the approved baseline and monitoring methodology ACM0002 version 10 /6/ and all the documentation provided to support the monitoring period /01 – 26/ were assessed as part of the verification. In addition, the VCS Project Description (VCS PD) /1/, in particular as regards the baseline estimations and the monitoring plan, and the Validation Report of 03/02/2010 /7/ for the project, were reviewed.

The following table lists the documentation that was reviewed during the verification.

/1/	GTE Karbon: VCS PD for "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" in Turkey, version 05 of 30/01/2010

/2/	GTE Karbon: Monitoring report for "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" in Turkey, version 02 of 14/05/2020 related to the monitoring period 01/09/2013 to 30/04/2020 GTE Karbon: Monitoring report for "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" in Turkey, version 01 of 02/04/2020 related to the monitoring period 01/09/2013 to 30/04/2020
/3/	VCS Verified Carbon Standard: VCS Program Guide, VCS Version 4 of 19/09/2019
/4/	VCS Verified Carbon Standard: VCS Standard, VCS Version 4 of 19/09/2019
/5/	VCS Verified Carbon Standard: Validation and Verification Manual, version 3.2 of 19/10/2016
/6/	CDM Executive Board: Baseline and monitoring methodology "ACM0002", "Grid-connected electricity generation from renewable sources", version 10 of 28/05/2009
/7/	Bureau Veritas: Validation Report for "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey", of 03/02/2010
/8/	GTE Karbon: Emission Reduction Calculation Spreadsheet "Gullubag_VER_Calcs_2nd_Monitoring_Report_v02.xlsx" version 02 of 05/06/2020 GTE Karbon: Emission Reduction Calculation Spreadsheet "Gullubag_VER_Calcs_2nd_Monitoring_Report_v01.xlsx" version 01 of 02/04/2020
/9/	VCS Verified Carbon Standard: VCS Verification Report Template Version 4 of 19/09/2019
/10/	CDM Executive Board: Methodological Tool "Tool to calculate the emission factor for an electricity system", version 01.1 of 29/07/2008
/11/	Website: https://registry.verra.org/app/projectDetail/VCS/391 Argument: Verra Database Language: English; Retrieved on: 22/06/2020
/12/	Energy Market Regulatory Authority: Generation License numbered EU/1054-1/770 of 11/07/2007
/13/	The Ministry of Energy and Natural Resources: Temporary Acceptance Protocol of 23/03/2012 (3 Turbines)
/14/	TEIAS: Monthly Meter Reading Protocols for the monitoring period 01/09/2013 to 30/04/2020
/15/	EPIAS: Monthly Meter Reading Protocols for the monitoring period 01/09/2013 to 30/04/2020
/16/	The Turkish Ministry of Trade and Industry: Regulation of Metering and Testing of Metering Systems of 24/07/1994
/17/	Turkish Energy Market Regulatory Authority: Communiqué for Measurement Devices used in the Electricity Market of 22/03/2003
/18/	The Energy Market Regulatory Authority: Electricity Market Balancing and Settlement Regulation of 14/04/2009
/19/	Bureau Veritas: Verification Report for "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey", of 03/04/2014
/20/	General Directorate of State Hydraulic Works (DSI): Monitoring and Control Report of 03/12/2015
/21/	Social Security Institution: Recruitment Documents for All Employees, submitted on 26/03/2020
/22/	Social Security Institution: SGK Service List to Confirm the Number of Employees for the monitoring period 01/09/2013 to 30/04/2020
/23/	TEIAS: First Index Protocols for the new electricity meters of 03/12/2019

/24/	TEIAS: Change Sheet of the Back-up Meter of 03/01/2020
/25/	VCS: Screenshot of the Project Issuance Representation Date of 25/06/2014
/26/	Gold Standard Foundation: Impact Registry, retrieved on 02/07/2020

2.3 Interviews

The Plant Manager was interviewed by phone during remote audit. To see how the monitoring procedures were implemented, the whole process was explained to the verification team. The carbon consultant was interviewed about the monitoring report and related parameters. Whole process related emission reduction calculation was explained. The mukhtar was interviewed. He confirmed that no grievance was announced by the stakeholders.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	05/05/2020	Ece AKAY DEMIR *Carbon Consultant*	GTE Karbon	Monitoring plan Monitoring methodology Monitoring data Implementation status of the project Monitoring equipment and operation Calibration certificates Emission Reductions calculation Expropriation
/b/	05/05/2020	Burcu ERIK *Project Responsible*	Senerji Enerji	
/g/	01/06/2020	Murat Sinek *Mukhtar*	Yedigoze Village	Benefit of the project to the village Project Effects Local employment Expropriation

2.4 Site Inspections (Remote Audit)

On 05/05/2020, RINA performed a remote audit for the wind power plant located in Ispir District, Erzurum province of Turkey. During the video conference for the project, it was confirmed that all the equipment and the systems were accessible. RINA assessed the implementation and operation of the proposed project activity, reviewed the information flows for generating, aggregating and reporting the monitoring parameters, interviewed key personnel of the plant to confirm the operational and data collection procedures, cross-checked between information provided in the monitoring report and data plant, checked the monitoring equipment including calibration performance, reviewed calculations and assumptions made in determining the GHG data and emission reductions, checked the quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

The objective of this phase of the verification is to resolve any outstanding issues, which need to be clarified for RINA's positive conclusion on the monitoring report and emission reductions.

To guarantee transparency a verification protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of verification and the results from verifying the identified criteria. The verification protocol consists of three tables; the different columns in these tables are described in the figure below (see Figure 1). The completed verification protocol is enclosed in Appendix 4 to this report.

A corrective action request (CAR) is raised if one of the following occurs:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions;
- Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CR) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements, which refer to CDM rules, have been met.

CARs, CRs identified are included in the verification protocol in Appendix A of this report.

During this monitoring period, 2 CARs and 1 CR is raised. All findings are closed.

Figure 1 Verification protocol tables

Verification Protocol, Table 1 - Requirement checklist					
Checklist Question	**Ref.**	**MoV**	**Comments**	**Draft Conclusion**	**Final Conclusion**
Checklist questions organized in seven different sections.	Makes reference to documents where the answer to the checklist question or item is found.	Explain how conformance with the checklist question is investigated. Examples are document review (DR), interview or any other follow-up actions (I), cross checking (CC) with available information relating to projects, (N/A) means not applicable.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with checklist question so far.	For CAR, CR and FAR see the definitions above.	OK is used if the information and evidence provided is adequate to demonstrate compliance with VCS requirements which refer to CDM rules.

Verification Protocol, Table 2: Resolution of Corrective Action Requests and Clarification			
Corrective action requests and/or clarification requests	**Reference to Table 1**	**Response by project participants**	**Verification Conclusion**
The CAR and/or CRs raised in table 1 are repeated here.	Reference to the checklist question number in Table 1 where the CAR or CR is explained.	The responses given by the project participants to address the CARs and/or CRs.	The verification team's assessment and final conclusion of the CARs and/or CRs.

Verification Protocol, Table 3 - Forward Action Requests		
Forward action request	**Reference to Table 1**	**Response by project participants Verification Conclusion**
The FAR raised in table 1 is repeated here.	Reference to the checklist question number in Table 1 where the FAR is explained.	Response by the project participants on how forward action request will be addressed.

2.5.1 Forward Action Requests

According to the previous verification report /19/, no FAR is raised.

2.6 Eligibility for Validation Activities

The project activity is registered under VCS registration reference Number 391 /11/; hence this section is not applicable.

3 VALIDATION FINDINGS

In the registered VCS PD for "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" in Turkey, version 05 of 30/01/2010 /1/, the installed capacity is defined as 96 MWe as confirmed through the Generation License /12/ and Temporary Acceptance Protocol /13/. *T*he average electricity generation is estimated as 281 GWh initially which is expected to be increase up to 313.898 GWh after commissioning of plants at the upstream as per the registered VCS PD /1/. The additionality of the project activity is demonstrated by applying investment analysis registered VCS PD /1/.

The project was validated by Bureau Veritas (Validation Report of 03/02/2010) /7/ and it was registered under the VCS registration reference N° 391.

3.1 Participation under Other GHG Programs

The project activity is not participated under other GHG Programs as confirmed through the websites of the standard /26/.

3.2 Methodology Deviations

Project emissions from fossil fuel consumption from diesel generator (PEFF, y) and fuel type quantity parameter burned in diesel power (FCi, j, y) were calculated and approved in the first monitoring period. According to the new version of the methodology, these parameters did not need to be monitored because they were not monitored and were not included in this monitoring period.

3.3 Project Description Deviations

In registered PDD, the crediting period was expected to start in 01/12/2011. However, since the facility has been commissioned later, the start date of crediting period was updated as 23/03/2012.

3.4 Grouped Project

This project is not a grouped project. Hence, this section is not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

It was verified during the remote audit conducted on 05/05/2020 that the proposed project activity has been implemented and it is in operation in accordance to the project activity described in the registered VCS PD /1/.

The project activity has been implemented in 1 phase. On 23/03/2012, the power plant has started operation with 3 turbines as confirmed through the Temporary Acceptance Protocol /13/. The carbon crediting period and therefore the monitoring starts when the plant commences electricity generation. Therefore, the crediting period starts on 23/03/2012.

The project activity is a hydro power plant consists of 3 turbines with a 33 MWm / 32 MWe capacities making the total installed capacity of 99 MWm / 96 MWe as confirmed through the Generation License /12/. The project boundary in the registered VCS PD /1/ is in line with the actual project boundary. The generated electricity is fed to the national grid. The generated electricity is transmitted to the National Electricity System through 154 kV transmission line, through ISPIR HEP substation. The geographic coordinates of the project activity are confirmed through the Generation License /12/.

4.2 Safeguards

4.2.1 No Net Harm

There is not any potential negative environmental and socio-economic impacts identified by the project proponent

4.2.2 Local Stakeholder Consultation

The Stakeholder meeting of the project was held on 21/05/2019 at Gullubag Village meeting room, in Ispir, Erzurum. The project activity is in operation since 2012 and there is an ongoing

communication with locals. As a result of the meeting, there are no negative comments. This situation was confirmed during the meeting with the mukhtar.

4.3 AFOLU-Specific Safeguards

This project is not an "Agriculture, Forestry and Other Land Use (AFOLU)" project.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The emission reduction calculations provided in the spreadsheet /8/ have been verified to be correct and in line with the registered VCS PD /1/.

According to the applied methodology "ACM0002", "Grid-connected electricity generation from renewable sources", version 10 of 28/05/2009 /6/, the emission reductions have been calculated based on the following formula:

$ER_y = BE_y - PE_y - LE_y$

Where:

BE_y = Baseline emissions in year y (tCO_2e/yr)

PE_y = Project emissions in year y (tCO_2e/yr)

LE_y = Leakage emissions in year y (tCO_2e/yr)

Baseline emissions

The baseline emissions include the CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, multiplying the electricity supplied to the grid (MWh) with the combined margin CO_2 emission factor for grid connected power generation in year.

$BE_y = EG_y \times EFy$

Where:

EG_y = Net electricity delivered to the grid by the project activity in year y excluding transmission losses of the grid (MWh)

EFy = Combined margin grid emission factor (tCO_2/MWh)

Project emissions

Project emissions has been assumed to be zero as per the ACM0002 version 10 of 28/05/2009 /6/ as defined in the validated VCS PD /1/.

Leakage emissions

The leakage emissions are assumed to be zero as per the ACM0002 version 10 of 28/05/2009 /6/ as defined in the validated VCS PD /1/.

The data presented in the monitoring report /2/ were assessed by reviewing in detail project documentation, collection of monitored data, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. Sufficient evidence was presented and verified by RINA for the reported emission reductions.

Parameters Available at Validation and Data Fixed Ex-ante

DATA/PARAMETER	Source of data	Reported value for the project period	Assessment/Observation
EF_y CO2 emission factor	TEIAS statistics	0.616 tCO_2/MWh	According to the approved methodology ACM0002 version 10, the combined emission factor has been determined using the ex-ante option and so it is not requested to monitor and recalculate the emission factors during the crediting period. The emission factor is determined to be 0.616 tCO_2/MWh in the VCS PD /1/ and validation report /7/.

Parameters and Data Monitored

DATA/PARAMETER	$EG_{facility,y}$
Data Unit	GWh/year
Description	Quantity of net electricity generated and delivered to the grid by Gullubag Hydroelectric Power Plant in year y
Source of data	Metering devices installed in the power plant and EPIAS records obtained by TEAIS monthly
Description of measurement methods and procedures to be applied	Generation data were recorded by three main, three back-up metering devices continuously. These records provided the data for the monthly invoicing to TEIAS which form the basis for EPIAS data. EPIAS data is developed remotely by TEIAS and includes grid loss. According to meter reading protocols, the internal consumption of the facility was subtracted from the gross generation. EPIAS data and site records are both used for cross-check. Whichever is smaller between the site records and EPIAS, it is used for quantification of emissions due to conservative approach. Relevant documents were provided.
Frequency of monitoring/recording	Continuous measurement at the site and daily and monthly recording were applied. The plant manager and the staff extracted the records regularly every day. The monthly records recorded by TEIAS and the plant were used for monitoring emission reductions.

Value monitored	For 80 months period, total generation has been 1,300,224.42 MWh. Average annually generation corresponds to 195,034 MWh
Monitoring equipment	Six electricity meters (three main and three backup meter) are installed at the project site. The previous main and back-up meters are ELSTER 1500 with serial number for main meters 424835, 424837, 424839 and for back-up meters 424836, 424838, 424844. The old counters were dismantled on 03/12/2019 and six new counters were replaced. The new meters are EMH with serial number for main meters 8923726, 8923728, 8923730 and for back-up meters 8923727, 8923739, 8923731. The meters have the accuracy of 0.5s as confirmed through the first index protocols /23/. The accuracy class of the meters complies with the "Communiqué for Measurement Devices used in the Electricity Market" /17/.
QA/QC procedures to be applied	TEIAS is responsible for calibration and maintenance of the meters as per the registered VCS PD /1/. The project owner has no control on the meters since the meters are sealed by the TEIAS as confirmed during the site visit. If any major discrepancy occurs between the main and back-up meters, TEIAS performs necessary calibration. The new meters were calibrated by TEIAS on 03/12/2019 as confirmed through the first index protocol /23/. As per the "'Regulation of Metering and Testing of Metering Systems" /16/, the meters shall be calibrated every 10 years, therefore the calibration of meters is deemed appropriate and in compliance with the national regulation. It was confirmed that the meters are in place and functions well as per the provided photos of the meters.
Purpose of the data	To calculate the baseline emission value
Calculation method	Net Electricity generated and delivered to the grid by the project during the monitoring period is calculated by subtracting the internal consumption of the facility from the gross power generation.
Comments	-

DATA/PARAMETER	APJ
Data Unit	m^2
Description	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data	The value of the parameter is confirmed as per the topographic map
Description of measurement methods and procedures to be applied	Measured from topographical surveys

Frequency of monitoring/recording	Yearly
Value monitored	1,210,000 m^2
Monitoring equipment	Topographical studies
QA/QC procedures to be applied	Calibration and Maintenance of equipment are made regularly by authorized service companies.
Purpose of the data	Emission reduction calculation
Calculation method	-
Comments	-

DATA/PARAMETER	**Minimum flow**
Data Unit	m^3/sec
Description	The project releases the required flow as per the regulations.
Source of data	The values of the parameter is confirmed as per the DSI Report /20/.
Description of measurement methods and procedures to be applied	Remote gauging stations installed within the framework of Water Utilization Rights Protocol record the level of water continuously at real time. DSI extracts data remotely and checks.
Frequency of monitoring/recording	Continuous measurement at the site
Value monitored	8.189 m^3/s (Report date:03.06.2015) 7.306 m^3/s (Report date:21.07.2015) 8.478 m^3/s (Report date:06.10.2015) According to the report of Turkey State Hydraulic Works , minimum flow should be 5 m3/s at least. Data above are higher than this value.
Monitoring equipment	Gauging stations
QA/QC procedures to be applied	-
Purpose of the data	Conservation of regional ecology
Calculation method	-
Comments	-

Emission Reductions Achieved

The emission reductions calculation reported in the Monitoring Report version 02 of 14/05/2020 /2/ and calculation spreadsheet

"Gullubag_VER_Calcs_2nd_Monitoring_Report_v02.xlsx " version 02 of 05/06/2020 /8/ have been verified to be correct.

The emission reductions from the project for the monitoring period from 01/09/2013 to 30/04/2020 as reported in the Monitoring Report version 02 of 14/05/2020 /2/ is equivalent to 800,935 tCO_2e. According to the registered VCS PD /1/, the estimated emission reductions are equivalent to 1,289,426,5 tCO_2e. The reported averaged emission reductions are 37.8% lower than the estimated emission reduction.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

The generated electricity monitored continuously by six unit meters that were sealed by TEIAS. Six unit electricity meters (three main meter and three backup meter) are installed at the project site. The previous main and back-up meters are ELSTER 1500 with serial number for main meters 424835, 424837, 424839 and for back-up meters 424836, 424838, 424844. The new meters are EMH with serial number for main meters 8923726, 8923728, 8923730 and for back-up meters 8923727, 8923739, 8923731. The meters have the accuracy of 0.5s as confirmed through the first index protocols /23/. The accuracy class of the meters complies with the "Communiqué for Measurement Devices used in the Electricity Market" /17/.

TEIAS is responsible for calibration and maintenance of the meters as per the registered VCS PD /1/. The project owner has no control on the meters since the meters are sealed by the TEIAS as confirmed during the site visit. If any major discrepancy occurs between the main and back-up meters, TEIAS performs necessary calibration.

The new meters were calibrated by TEIAS on 03/12/2019 as confirmed through the first index protocol /23/. As per the "'Regulation of Metering and Testing of Metering Systems" /16/, the meters shall be calibrated every 10 years, therefore the calibration of meters is deemed appropriate and in compliance with the national regulation. The calibration frequency has been respected.

The electricity generation figures are based on the EPIAS records /15/ and the TEIAS Monthly Meter Readings /14/ are used for crosscheck from 01/09/2013 to 30/04/2020. The records and emission reduction calculation spreads sheet /8/ are consistent.

4.6 Non-Permanence Risk Analysis

There is no non-permanence risk rating determined by the project proponent.

5 VERIFICATION CONCLUSION

RINA Services Spa (RINA) has performed verification of the emission reductions reported for the project activity "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" in Turkey, VCS Registration Reference N° 391, for the period 01/09/2013-30/04/2020, with regard to the relevant requirements for CDM and VCS activities.

It is RINA's opinion that the GHG emission reductions stated in the Monitoring Report version 02 of 14/05/2020 for the "Gullubag 96 Mw Hydro Electric Power Plant Project, Turkey" project in Turkey for the period 01/09/2013 to 30/04/2020 are fairly stated. The GHG emission reductions were calculated correctly, on the basis of the approved monitoring methodology "ACM0002", "Grid-connected electricity generation from renewable sources", version 10 of 28/05/2009 and the monitoring plan contained in the registered VCS PD.

Hence, RINA is able to certify that the emission reductions from the project during the monitoring period 01/09/2013-30/04/2020 amount to 800,935 tCO_2e.

Verification period: From 01/09/2013-30/04/2020

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

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
Year 2013	13,247	0	0	13,247
Year 2014	68,606	0	0	68,606
Year 2015	92,690	0	0	92,690
Year 2016	162,035	0	0	162,035
Year 2017	129,771	0	0	129,771

Year 2018	148,565	0	0	148,565
Year 2019	147,097	0	0	147,097
Year 2020	38,924	0	0	38,924
Total	800,935	0	0	800,935

APPENDIX 4

VERIFICATION PROTOCOL

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

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

FAR ID	1	Section no.		Date:
Description of FAR				
Project participant response				Date:
Documentation provided by project participant				
DOE assessment				Date:

Table 2. CR from this verification

CR ID	1	Section no.		Date: 12/05/2020
Description of CR				
• Since the milestone is not provided in the CDM-PDD, please provide supporting documents of the dates given in the monitoring report milestone table. • Please separate the table of electricity generation and emission reduction values from the milestone table. • The given information about project crediting period (in Section 1.6 and 3.1 of the MR) is not in line with the registered CDM-PDD, please correct. • The given coordinates in project location are not correct. Please make sure that degrees are displayed properly. • In Section 2.2 of the MR, the given year for operation of the project activity is not correct. Please check. • VCS Review document should be provided to check if there is a FAR or not for this monitoring period.				
Project participant response				Date: 14/05/2020

• Milestones were verified in first monitoring period. Verification report as a supporting document is provided in the attachment. • The table of electricity generation and emission reduction values is separated from the milestone table and new table is added (Table 2). • The start date of crediting period was expected to start in 01/12/2011 in the registered PDD but the facility has been commissioned later, so the start date of crediting period was updated as 23/03/2012. This is explained in project description deviations part (Section 3.2.2). Length of the crediting period is corrected as in line with the registered PDD. • The degrees of coordinates are corrected. • The year for operation of the project activity in Section 2.2 is corrected. • No review document was sent by VCS. Screenshot of VCS system is provided in the attachment.
Documentation provided by project participant
• Verification report • Screenshot of VCS system

DOE assessment	**Date:** 03/06/2020
• The milestone could now be confirmed with the provided previous verification report. • The table of electricity generation and emission reduction values are now separated from the milestone table. • The given information about project crediting period (in Section 1.6 and 3.1 of the MR) is now in line with the registered CDM-PDD. • The given coordinates in project location are now corrected. • In Section 2.2 of the MR, the given year for operation of the project activity is now corrected. • It is now confirmed that no FAR/FARs are raised for this monitoring period. Hence, CR 1 is closed.	

Table 3. CAR from this verification

CAR ID	1	Section no.		**Date:** 12/05/2020
Description of CAR				
• **$EG_{facility,y}$:** The "unit" and "description" of the parameter are not in line with the registered CDM-PDD. In addition, "description of measurement methods and procedures to be applied" is not in line both CDM-PDD and previous monitoring report. According to the verification report of the first monitoring report, it is clearly confirmed that PMUM readings were used as the main source of calculation of electricity generation and emission reductions. Please check and correct the whole report. • **$PE_{FF,y}$:** The parameter is not added to MR. Please explain. If the project owner has decided to change the monitoring plan, please explain this in the deviation section of the MR. • **$FC_{i,j,y}$:** The parameter is not added to MR. Please explain. If the project owner has decided to change the monitoring plan, please explain this in the deviation section of the MR. • **$W_{C,i,y}$:** This process is confirmed in the previous monitoring period. Therefore, there is no need to monitor this parameter in this monitoring period. Please remove. • **Cap_{PJ}:** This process is confirmed in the previous monitoring period. Therefore, there is no need to monitor this parameter in this monitoring period. Please remove. • **Expropriation and other benefits for locals:** This process is confirmed in the previous monitoring period. Therefore, there is no need to monitor this parameter in this monitoring period. Please remove.				

Project participant response	Date: 13/05/2020
• The "unit" and "description" of the $EG_{facility,y}$ parameter are corrected in line with the registered CDM-PDD. "description of measurement methods and procedures to be applied" is not in line both CDM-PDD and previous monitoring report because PMUM system is not active anymore, now TEIAS keeps records by EPİAS. PMUM readings are not used as the main source of calculation of electricity generation and emission reductions. EPIAS data and site records are both used for cross-check. Whichever is smaller between the site records and EPIAS, it is used for quantification of emissions due to conservative approach. This explanation is given in methodology deviations part (Section 3.2.1). • Project emissions from fossil fuel consumption due to diesel generator ($PE_{FF,y}$) was calculated and approved in the first monitoring period. Since it was found insignificant and it is not required to monitor this parameter in the new version of the methodology, it is not monitored and not included in this monitoring period and this is explained in methodology deviations part (Section 3.2.1). • The parameter of $FC_{i,j,y}$ is not added MR due to same reason with $PE_{FF,y,}$ it is related with quantity of fuel type combusted in diesel power. • The parameter of $W_{C,i,y}$ is removed. • The parameter of Cap_{PJ} is removed. • The parameter of expropriation and other benefits for locals is removed.	
Documentation provided by project participant	
DOE assessment	**Date:** 03/06/2020
• **EG_y:** The parameter is now in line with the registered CDM-PDD. • **$PE_{FF,y}$:** The parameter is now added to Section 3.2.1 Deviations of the MR and suitable. • **$FC_{i,j,y}$:** The parameter is now added to Section 3.2.1 Deviations of the MR and suitable. • **$W_{C,i,y}$:** This parameter is now removed from the monitoring plan. • **Cap_{PJ}:** This parameter is now removed from the monitoring plan. • **Expropriation and other benefits for locals:** This parameter is now removed from the monitoring plan. Hence, CAR 1 is closed.	

CAR ID	2	Section no.		Date: 12/05/2020
Description of CAR				
The calibration date of the new meters is given as December 2019 in the monitoring report. However, all meters (old + new), understood from the supporting documents provided, were calibrated on 03/12/2019. Since there is no document showing the disassembled-installed meters, the photo of the meters that are currently actively used in the site is expected. A detailed description should also be included in the report.				
Project participant response				**Date:** 14/05/2020
The photo of the meters that are currently actively used in the site are provided in the attachment. The date of first and last index detections protocols of the old and new meters is added to monitoring report.				
Documentation provided by project participant				

The photo of the meters	
DOE assessment	**Date:** 03/06/2020
According to the provided photos of the electricity meters and first-end index protocols, the given information is now confirmed. Hence, CAR 2 is closed.	

Table 4. FAR from this verification

FAR ID	1	**Section No.**		**Date:**
Description of FAR				
Project participant response				**Date:**
Documentation provided by project participant				
DOE assessment				**Date:**

Document information

Version	*Date*	*Description*
01.0	10/06/2016	Initial publication.

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is qualified as:

TEC, VAL, VER, TL, ITRP
LOCAL EXPERT

per le seguenti aree tecniche:
for the following technical areas:

AREE TECNICHE *TECHNICAL AREAS*	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
1.2	Renewables	1
13.1	Solid waste and wastewater	13

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	19/07/2016	First issue with new template
1	09/06/2017	Added qualification as ITRP and Local Expert

Responsabile di schema
Scheme Leader
Laura Severino

*SCHEMI VOLONTARI/ VOLUNTARY SCHEMES: ACR American Carbon Registry, CCB The Climate, Community & Biodiversity Alliance, GS Gold Standard, JI Joint Implementation, SCS Social Carbon Standard, VCS Verified Carbon Standard.

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Ecologica Institute	per condurre la Validazione e la Verifica di rapporti SCS *to carry out Validation and Verification of SCS Reports*
American Carbon Registry ACR	per condurre la Validazione e la Verifica di Progetti ACR *to carry out Validation and Verification of ACR projects*
The Climate, Community & Biodiversity Alliance CCB	per condurre la Validazione e la Verifica di Progetti co-benefit CCB *to carry out Validation and Verification of co-benefit CCB projects*

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Thais De Lima Carvalho

è qualificato come:
is qualified as:

TEC, VAL, VER, TL, ITRP

per le seguenti aree tecniche:
for the following technical areas:

AREE TECNICHE *TECHNICAL AREAS*	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
1.1	Thermal energy generation	1
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)

Responsabile di schema
Scheme Leader
Rita Valoroso

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The Climate, Community & Biodiversity Alliance CCB	per condurre la Validazione e la Verifica di Progetti co-benefit CCB *to carry out Validation and Verification of co-benefit CCB projects*