



**Verified Carbon
Standard**

BÜYÜKDÜZ HYDROELECTRIC POWER PLANT, TURKEY



Document Prepared by Earthood Services Private Limited

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Prepared By	Earthood Services Private Limited
Contact	Emaar Digital Greens, Tower-B, Unit no.- 1203-1205, 12th Floor, Sector-61, Gurgaon- 122011, India Tel: +91 124 4204599 Website: www.earthood.in Email: info@earthood.in
Approved By	Dr. Kaviraj Singh
Work Carried Out By	Team Leader (new): Jahnabi Kalita Team Leader (old): Riya Sharma Technical Expert (TA 1.2): Deepika Mahala

Validator/Verifier: Jahnabi Kalita

Local Expert: Fikriye Seda Atabek

Trainee Validator/Verifier: Kerwyn Donald Dsouza

Technical Reviewer: Shreya Garg

Expert to Technical Reviewer: Shreya Garg

Summary:

- **A description of the project**

The project activity “Büyükdüz Hydroelectric Power Plant, Turkey” is a run-of-river type hydroelectric power plant. The project is located on the Harşit River in the Gümüşhane province in the Black Sea region of Türkiye. The project activity has a total installed capacity of 70.844 MWm / 68.862 MWe.

The project activity aims to reduce greenhouse gas emissions by producing power from a zero-carbon project as compared to the baseline scenario. In the baseline scenario, power sent to the Turkish national grid would have been generated by fossil fuel fired power plants. The baseline scenario is the same as the scenario existing prior to the implementation of the project activity.

- **A description of the validation and verification**

Earthood has performed a joint validation & verification of the project activity “Büyükdüz Hydroelectric Power Plant, Turkey” by “Ayen Enerji A.S.” in Türkiye. This assignment was performed on the basis of rules and requirements defined by VCS for the project activities.

The review of the joint PD & MR, supporting documentation and subsequent follow-up actions (on-site visit and interviews with end-users) have provided Earthood with sufficient evidence to determine the fulfilment of stated criteria. The project correctly applies the approved baseline and monitoring methodology ACM0002 “Large-scale Consolidated Methodology: Grid-connected Electricity Generation from Renewable Sources” Version 21.0 /07/.

The project results in reductions of CO₂e emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario and the emission reductions attributable to the project are, hence, additional to any that would occur in the absence of the proposed VCS project activity.

For the second crediting period (31/05/2022 - 30/05/2032), the estimated annual GHG emission reductions of the project were estimated to be around 88,708 tCO₂e/year and 887,088 tCO₂e for the whole second crediting period. The monitoring report identified for the second verification period is from 01/11/2017 to 31/12/2022, out of which the dates from 01/11/2017 – 30/05/2022 lies in the first crediting period and 31/05/2022 – 31/12/2022 lies in the second crediting period. The achieved emission reductions during this monitoring period is 361,957 tCO₂e. The calculations in the ER sheet were found to be accurate and appropriate.

- **The purpose and scope of validation and verification**

The scope of the services provided by the Earthood Services Private Limited is to perform joint validation & verification of the project activity “Büyükdüz Hydroelectric Power Plant, Turkey”. The scope is to assess the claims and assumptions made in joint project description & monitoring report /01/ against the VCS criteria, UNFCCC criteria, including but not limited to the VCS Standard /05/, VCS Validation and Verification Manual /06/, and other relevant rules and requirements established for Verra.

- **The method and criteria used for validation and verification**

This assignment is an independent and objective review for determination of the monitored reductions in GHG emissions. The joint validation & verification includes the implementation and operation of the project as reported in the project description & monitoring report /01/. The validation & verification process is undertaken by VVB that involves the following:

- The desk review of documents and evidence submitted by the project participant in context of the VCS criteria.
- Undertaking physical site visit, interview, or interactions with the representative of the project participant.
- Reporting audit findings with respect to clarification and non-conformities and the closure of the findings as appropriate.
- Preparing a draft joint validation & verification report of VCS program complying with the VCS requirements.
- Technical review of the draft validation & verification opinion along with other documents as appropriate by an independent competent technical review team for finalization of the joint validation & verification opinion (this report).
- An independent technical review team reviews this report made by the VVB. After the final report is accepted by the Technical Reviewer it is then approved by Earthood Services Private Limited which is processed further according to the VCS and CDM procedures.

- **The number of findings raised during validation and verification**

During joint validation and verification of the project, a total of 06 CLs, 06 CARs and 1 FAR were raised. These have been successfully resolved and have been provided in Appendix IV of this report.

- **Any uncertainties associated with the validation and verification**

VVB has undertaken an elaborate audit trail for validation of assumptions and claims contained in final joint PD-MR Version 7.0/01/ dated 05/12/2023. Each detail has been checked during remote site visit and document review which is not only confined to information provided by PP but also by undertaking an independent evaluation of relevant publicly available information by making use of technical expertise of the assessment team. Thus, there are no evident uncertainties associated with the validation.

- **Summary of the validation and verification conclusions**

The review of the project description & monitoring report, supporting documentation and subsequent follow up actions have provided Earthood with sufficient evidence to determine the fulfilment of stated criteria. Earthood is of the opinion that the project activity “Büyükdüz Hydroelectric Power Plant, Turkey” (VCS ID: 1322) meets all the VCS requirements and has correctly applied the VCS approved methodology ACM0002 “Large-scale Consolidated Methodology: Grid-connected Electricity Generation from Renewable Sources” Version 21.0

/07/. The GHG emission reductions were calculated correctly based on the approved methodology.

Earthood can certify that the emission reductions achieved in the project description & monitoring report for the monitoring period 01-11-2017 - 31-12-2022 by VCS project activity “Büyükdüz Hydroelectric Power Plant, Turkey” amount to 361,957 tCO₂e. Therefore, this is being submitted for request for issuance, as per VCS and UNFCCC procedures.

In summary, it is Earthood’s opinion that the project activity “Büyükdüz Hydroelectric Power Plant, Turkey” as described in the joint PD-MR Version 7.0/01/ dated 05/12/2023 meets all the relevant baseline and monitoring methodology. The monitoring plan adequately provides for the ex-post monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is Earthood’s opinion that Ayen Enerji A.S. shall be able to implement the monitoring plan and requirements of VCS standard/5/.

Therefore, Earthood requests the registration of the project as a VCS project activity and issuance of VCUs which is distributed under the second monitoring period of first crediting period and first monitoring period in the second crediting period.

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1 INTRODUCTION

1.1 Objective

Ayen Enerji A.S. (PP) has contracted Earthood Services Private Limited (VVB) for joint validation & verification services for the VCS project “Büyükdüz Hydroelectric Power Plant, Turkey” (project ID: 1322) located in Türkiye to jointly carry out validation and verification of the project against the requirements of VCS Program.

The objective of the validation assessment is to determine:

- The project conformity with all the applicable VCS requirements of the current version of the VCS Standard v4.5/03/ and program guide v4.4/ 02/.
- The project conformity with the applied methodology (ACM0002 v21/07/), including the procedure for the demonstration of additionality specified in the methodology.
- Likelihood that methods and procedures set out in the project description will generate verifiable GHG data and information when implemented.
- The data/information reported is accurate, complete, transparent, and free of material error or omission.

In order to fulfil above objectives, the VVB assigned the task of assessment to validation team that is collectively qualified as per Annex A.2.3.3 of ISO 14064-3 and other internal requirements.

The validation/ verification is an independent assessment of the project by a validation/verification body that determines whether the project complies with the VCS rules.

1.2 Scope and Criteria

The joint validation and verification scope of this assignment is defined as an independent and objective review of the VCS Project Description & Monitoring Report/01/ (VCS PD-MR) and supporting annexures, which is reviewed by the assessment team against the relevant criteria and decisions by the VCS Board, including but not limited to, the approved baseline and monitoring methodology/07/, applicable tools/08,09,10,11/, VCS Standard/05/ and guidance/04/. The assessment team has, based on the recommendations prescribed in the latest version of VCS Validation and Verification Manual/06/, employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of VCUs.

The scope of this assignment is to:

- Jointly conduct validation and verification in accordance with Earthood’s own QMS that is based on the VCS VVM along with the guidance provided by the VCS board to determine if the project

meets all applicable VCS requirements, including those specified in the VCS standard/05/, relevant methodology/07/, tools/08,09,10,11/, and guidelines and processing the same with VCS Program Guide/04/.

- Asses the accuracy, conservativeness, relevance, completeness, consistency, and transparency of the information provided by the project proponents.
- Determine whether the information provided by the project proponent is reliable and credible.
- Present information in the form of joint validation & verification report in a factual, neutral, coherent manner and referencing the sources and assumptions, other forms of validation mean employed.
- Report the findings and conclusions in an objective manner and conduct all validation & verification in accordance with VCS rules and procedures.
- Apply consistent validation and verification criteria in providing expert judgments to the requirements of applicable approved methodology, tools, and also cross check the same.
- Safeguard the confidentiality of all the information obtained during validation and verification.
- Adhere to the principles of independence, ethical conduct, fair presentation, and due professional care in assessment process.

1.3 Reasonableness of Assumptions and Level of Assurance

☐ Limited level of assurance

☒ Reasonable level of assurance

A draft joint validation and verification report that is prepared by the assessment team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood are duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable VCS requirements as appropriate. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the validation and verification team. The report approved by Technical Manager is endorsed by the Managing Director, who is overall responsible to ensure quality, before final release. The further details of applicable procedures and responsibilities about Earthood Quality Management System (QMS) are available on its website (www.earthood.in).

Earthood's validation approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the validation by obtaining evidence and other information and explanations that Earthood considers necessary to give reasonable level of assurance that reported estimated GHG emission reductions are fairly stated.

In our opinion the estimated and actual GHG emissions reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0002, Version 21/07/ and the VCS standard, Version 4.5 /05/.

The assessment result has a reasonable level of assurance in validation & verification that GHG assertions are free of material errors, omissions, and misrepresentations. The documents and evidence reviewed are included under Appendix I of this report.

1.4 Summary Description of the Project

The Büyükdüz Hydroelectric Power Plant is a run-of-the river type hydraulic renewable energy facility project which supplies clean power to the Turkish national grid. The project activity is located in the Gümüşhane province, and over Manastır (Dere kapı) creek that is a branch of Harşit River and confluences with that between Torul and Kürtün dams over Harşit River of Türkiye. It consists of two Alstom Hydro Pelton turbines that has a total installed capacity of 70.844 MWm / 68.862 MWe which is in line with the generation licence/09/. The electricity generated from the project will be delivered to the national grid thereby displacing the electricity which would have been generated from fossil fuel fired power plants.

The project was commissioned on 31/05/2012 which is in line with the provisional acceptance protocol/15/ and as per the estimations made at the time of installation, the expected annual emission reduction for the first crediting period of 10 years (31/05/2012 - 30/05/2022) by the project was calculated to be around 102,731 tCO₂e/year. For the first crediting period the expected emission reductions will be about 1,027,309 tCO₂e.

For the second crediting period (31/05/2022 - 30/05/2032), the estimated annual emission reduction of the project is estimated to be around 88,708 tCO₂e /year and 887,088 tCO₂e for the whole second crediting period. This joint validation and verification report also covers the verification of the second monitoring period from 01-11-2017 - 31-12-2022, out of which the dates from 01/11/2017 - 30/05/2022 lies in the first crediting period and 31/05/2022 - 31/12/2022 lies in the second crediting period, resulting in an actual emission reduction of 361,957 tCO₂e for the same period. The net electricity generation was achieved during the second monitoring period was 684,086.98 MWh.

CAR #01 was raised and successfully addressed.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

The joint Validation and Verification, from Contract Review to Verification Report & Opinion, was conducted using Earthood's internal procedures. The Project was verified against the latest requirements (Version 4.5) /05/ and guidance/04/ set out in VCS and CDM Standards as applicable.

The validation and verification of project activity process is conducted as per internal CDM Quality Manual and in accordance with criteria laid down by VCS. It includes the following steps:

Desk review:

- Review of data and information provided in the VCS joint PD-MR/01/ and corresponding annexures.
- Cross checks the information with the sources without limitations to the information provided by the project proponent.

Follow up actions:

- Remote-site audit to inspect the project design including, but not limited to, monitoring mechanism.
- Interview with relevant personnel and end-users responsible for information given in the VCS joint PD-MR/01/.

Reporting of findings:

- Resolution of findings
- Draft joint validation & verification report

Independent technical review:

The project documentation is reviewed by internal technical reviewer in order to independently confirm whether the applicable GHG program requirements were objectively met or not, in addition to whether internal procedures were followed while arriving at the validation and verification opinion. The technical reviewer may accept or reject the validation and verification opinion prepared by the assessment team and gives the reasons. The resolved findings may be opened at this stage or new findings may be identified that are required to be addressed by assessment team and/or project proponents, as appropriate. The technical reviewer is the decision maker on behalf of the Earthood. A positive opinion is issued if all the findings have been satisfactorily resolved and in all other cases a negative opinion is issued unless the contract is terminated by either party before reaching the final opinion.

Earthood keeps all documents and records in a secure and retrievable manner for at least two years after the end of the project crediting period.

2.2 Document Review

This joint validation & verification of the project is performed primarily as a document review of the VCS Joint PD-MR /01/ and associated documents as stated in detail in appendix I of this document. The assessment is performed by a validation & verification team using a protocol. The assessment team cross checks the information provided in the VCS Joint PD-MR/01/ and information from sources other than those used, if available, and also conducts independent background investigations. Earthood conducted a desk review as under.

- A review of the data and information presented to verify their completeness.
- A review of the monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, paying particular attention to the frequency

of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures.

- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions

2.3 Interviews

According to the VCS Standard v4.5/05/, section 4.1.11, “A site visit that includes a visit to facilities and/or project areas shall be conducted at validation and project crediting period renewal validation”. It states that a site visit is mandatory during a project crediting period renewal validation. However, the contact between Earthood Services Private Limited and Ayen Enerji Anonim Şirketi was signed on 21/12/2022 to conduct the VCS Renewal of Crediting Period + Verification of “Buyukduz Hydroelectric Power Plant, Turkey”. VCS standard v4.4 was valid at the time when the contract was signed.

VCS Standard (Version 4.4) /40/ under Section 4, paragraph 4.1.9 states that a site visit is not mandatory for renewal of crediting period. As the project activity is not undergoing initial validation, a joint revalidation for crediting period and verification for CPII-MP2 and CPII-MP1, it was decided that a physical site visit was not required. The PP had sent an email to VERRA on 05/02/2023 enquiring whether a physical site visit is necessary for the Crediting Period Renewal process which VERRA confirmed that a physical site visit is not required for a joint revalidation for CP-II + Verification of CP-II MP1. This was validated from the site visit exemption request letter/34/ dated 16/03/2023 sent by the PP to VERRA and VERRA Response to exemption request letter/35/ dated 07/08/2023 by granting the exemption of physical site visit. Hence, the VVB conducted a remote-site audit on 17/02/2023. The remote-site audit was conducted as a part of validating the project and also verifying the monitoring procedures followed in the project.

All the relevant documents related to the Project Activity were collected via email beforehand and the information associated with the verification of Project Activity implementation were collected through a remote audit conducted/16/ on 17/02/2023 held via Zoom. The O&M personnel at the plant site were interviewed via video call to confirm information regarding the installed technology, data recording and storage procedures, plant maintenance and staff competency. The name plate details covering the provider and the serial numbers of all the installed technology were reviewed by the assessment team during the video call.

The following points were discussed as the part of the interviews:

- a) Introduction, scope and objective of work, roles and responsibilities of audit team, resources required, and timetable of the onsite audit including venue for closing meeting and any concerns from PP.
- b) All the details about the project activity mentioned in the VCS joint PD-MR/01/ was cross-checked by discussion with the PP.
- c) Compliance of monitoring procedures followed at project site with registered PD and monitoring methodology.
- d) Conducting the remote-site visit by interviewing the end-users.

- e) And finally, submission of the audit findings to the client and agreement on the issues raised and agreement on timelines.

The details of the telephonic interview and video call inspection are as follows –

No.	Interviewee			Date	Topics	Team Members
	Last name	First name	Affiliation			
1.	Demir	Hakan	Carbon Manager, Ayen Enerji A.S.	17/02/2023	Installed capacity and technological details of the plant, data recording and storage, monitoring management, and staff competency.	Fikriye Seda Atabek, Riya Sharma, Deepika Mahala
2.	Iskender	Korkut	Plant Manager	17/02/2023	Monitoring management and data collection system. Site operations and monitoring management	Fikriye Seda Atabek, Riya Sharma, Deepika Mahala
3.	Narin	Tuncer	Maintenance	17/02/2023	Site operations and monitoring management	Fikriye Seda Atabek, Riya Sharma, Deepika Mahala
4.	Atalay	Cemil	Maintenance	17/02/2023	Site operations and monitoring management	Fikriye Seda Atabek, Riya Sharma, Deepika Mahala
5.	Narin	Fedai	Service Driver	17/02/2023	Site operations and monitoring management	Fikriye Seda Atabek, Riya Sharma, Deepika Mahala
6.	Yilmaz	Çetin	Electric Operator	17/02/2023	Site operations and monitoring management	Fikriye Seda Atabek, Riya Sharma, Deepika Mahala

The list of LSC participants Interviewed by the VVB are as follows:

Name	Affiliation	Date	Subject	Assessment team members
Ali Işık-Araköy	Village Head	17/02/2023	- Date of LSC Conducted	Fikriye Seda Atabek, Riya Sharma, Deepika Mahala
Mahmut Çakmak	Demirciler Villager Muhtar		-Feedback about the project	
Nurettin Yavuz	Local Stakeholder		-Continuous Grievance Mechanism	

2.4 Site Visits

According to the latest VCS Standard v4.5/05/, section 4.1.11, “A site visit that includes a visit to facilities and/or project areas shall be conducted at validation and project crediting period renewal validation”. It states that a site visit is mandatory during a project crediting period renewal validation. However, the contact between Earthood Services Private Limited and Ayen Enerji Anonim Şirketi was signed on 21/12/2022 to conduct the VCS Renewal of Crediting Period + Verification of “Buyukduz Hydroelectric Power Plant, Turkey”. VCS standard v4.4 was valid at the time when the contract was signed.

VCS Standard (Version 4.4) /40/ under Section 4, paragraph 4.1.9 states that a site visit is not mandatory for renewal of crediting period. As the project activity is not undergoing initial validation, a joint revalidation for crediting period and verification for CPI-MP2 and CPII-MP1, it was decided that a physical site visit was not required. The PP had sent an email to VERRA on 05/02/2023 enquiring whether site visit is necessary for the Crediting Period Renewal process which VERRA confirmed that a physical site visit is not required for a joint revalidation for CP-II + Verification of CP-II MP1. This was validated from the site visit exemption request letter/34/ dated 16/03/2023 sent by the PP to VERRA and VERRA Response to exemption request letter/35/ dated 07/08/2023 by granting the exemption of physical site visit. Hence, the VVB conducted a remote-site audit on 17/02/2023. The remote-site audit was conducted as a part of validating the project and verifying the monitoring procedures followed in the project.

The VVB conducted a remote-site audit on 17/02/2023. The remote-site audit was conducted as a part of validating the project and verifying the monitoring procedures followed in the project. This was deemed sufficient to confirm the plant’s operations and other aspects of the project operations. As stipulated in VCS Standard (Version 4.4) /40/ under Section 4 at paragraph 4.1.9 “A site visit that includes a visit to facilities and/or project areas shall be conducted at validation. Such a site visit shall be conduct at verification under the following circumstances: 1) The first verification of the project after validation; 2) Verification of project baseline reassessments; and 3) Verifications that assess a project description deviation where the deviation impacts the applicability of the methodology, additionality or the appropriateness of the baseline scenario”. Hence, for a joint revalidation for crediting period and verification for CPI-MP2 and CPII-MP1 does not require a physical site visit. The representatives of the PA were interviewed through video call (via Zoom Call), details of which is included in section 2.3 of this report.

Requirements	Means of verification/ source documents	Assessment opinion
Project implementation and operation	The project consists of capacity of 70.844 MWm / 68.862 MWe run-of-river type hydraulic renewable energy facility project installed in the Black Sea region of Türkiye which supplies renewable energy to the Turkish national grid. Supporting documents: 1. Generation License /13/ 2. VCS Registered PD/01/ 3. Technical specification /14/ 4. EPIAŞ data /24/ 5. Meter test protocols of all meters/26,27,28/ 6. Provisional Acceptance Protocol /15/ 8. Photographs of project site/38/ 9. Remote Site Visit/16/	The start date of the project activity has been verified through the provisional acceptance protocol/15/ provided by the PP. This is also found to be in compliance with the registered VCS PD/01/. The implementation of the project activity has been verified through Generation License /13/, meter test protocols of all meters/26,27,28/ and photographs of the project site/38/. PP were also interviewed during remote site visit and the project sites were visited remotely/16/. The continuous operation of the project activity has been verified through the EPIAŞ data/24/ issued by the PP. The electricity generated is being sold to the Turkish national grid which has been verified through the EPIAŞ data/24/ issued by the PP and same has been dictated in section 6.2 of MR. The source was found to be reliable and authentic. The verification team can confirm that the project activity is not registered under any other GHG and non-GHG program. This has been confirmed through declaration provided by Project proponent and verified through independent research in relevant publicly available data for other registries like CDM, GCC, Gold Standard/18/ and other international and domestic renewable energy schemes to achieve a higher level of assurance about the implementation of project activity.

		Through all the information provided and based on the remote site visit/16/ conducted it is evident that the project is implemented and is in operation as per registered PD/1/.
Monitoring systems and procedures	The approved reports from the validation and the project description could be one of the pieces of evidence for the compliance of the monitoring system. The EPIAŞ data/24/ can also act as supportive documents. The technical specification of the meter installed can be verified from the technical description/39/ and the meter test protocols of all meters/26,27,28/.	The frequency of monitoring of parameters listed under approved monitoring plan is verified through the EPIAŞ data/24/. The photographs of the monitoring equipment/38/ taken during the remote site visit and later shared by the PP has been verified and found to be appropriate. The PP were interviewed about the monitoring system and procedures during the RSV/16/. The documents were cross-checked by the VVB and the implementation of the monitoring system and procedure has been verified.
Calibration frequency	Calibration certificates/ meter test protocols of all meters/26,27,28/. VCS registered PD/02/	Calibration frequency and energy meter specifications has been verified through meter test protocols /26,27,28/ and joint VCS joint PD-MR/01/ and was found consistent. There was no delay found in the calibration frequency. The serial number of the energy meters has also been verified from the photographs of the energy meters/38/, calibration certificates /26,27,28/ and through remote site visit/16/ and found to be in line with the VCS joint PD-MR/01/. Responsibility of calibration and maintenance of the energy meters is done by TEIAS who decides when to carry out the next calibration.
Data and calculations	Monthly EPIAŞ data/24/. ER sheet/03/ VCS Registered PD/02/	Monthly values of the monitoring parameters used in the ER calculation are verified through EPIAŞ data/24/ and are found appropriate. The PP has taken the values reported in the EPIAŞ data/24/ for the calculation of emission reductions,

		since the EPİAŞ data/24/ is an official governmental document used to document the amount of electricity transferred to the grid, the approach has been assessed and found to be appropriate. Methods, formulae and emission factor for calculating baseline emissions have been followed in accordance with the VCS PD/2/ and applied methodology/07/.
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Based on the above assessment it can be concluded that the assessment team has verified sufficient data, to reduce audit risk to an acceptably low level as a requisite to achieve reasonable level of assurance for the current monitoring period.

FAR#01 has been raised for the next verifying VVB to conduct an on-site audit in line with para 4.1.2 of VCS Standard, version 4.5.

2.5 Resolution of Findings

The validation and verification protocols used for the assessment is designed in accordance with the latest version of latest VCS Program Documents. The validation and verification protocols are an internal document in Excel and available on request.

As an outcome of the joint validation and verification process, the assessment team can raise different types of findings. Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS/CDM requirements have been met. Where a non-conformance arises the validator/verifier raised a Corrective Action Request (CAR). A CAR is issued, where:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions.
- The CDM/VCS requirements have not been met.
- There is a risk that emission reductions cannot be monitored or calculated.

Forward Action Request (FAR) is raised during validation/verification to highlight issues related to project implementation that require review during the first verification of the project activity. FARs do not relate to the VCS/CDM requirements for registration.

Irrespective of the nature of findings, all of these are given to PP in a separate finding document. In this document, the project proponent(s) is/are given the opportunity to respond to the findings. Based on the responses by PP along with relevant supporting documents/evidence the validation team determines whether the findings are resolved or not. The findings may also be raised at later stage e.g., during internal technical review process and these are also communicated/dealt in the same manner as

described above. The draft joint validation & verification report is also prepared during this period reflecting the status of the findings, if any, as appropriate.

In summary, the type and total number of findings that were raised are indicted below:

Type of Finding	CAR	CL	FAR
Total Findings	06	06	00

All the findings raised during this joint validation & verification of the project are included under Appendix IV of this report.

2.5.1 Forward Action Requests

No Forward Action Requests (FARs) was raised during this assessment.

3 VALIDATION FINDINGS

3.1 Project Details

- Project type, technologies and measures implemented, and eligibility of the project**

The project “Büyükdüz Hydroelectric Power Plant, Turkey” is a grid connected run-of-river hydroelectric power plant with total capacity of 70.844 MWm/68.862 MWe located at the Gümüşhane province, and over Manastır (Dere kapı) creek that is a branch of Harşit River in Türkiye. The project activity consists of two vertical axis Alstom Hydro Pelton turbines each having a nominal output of 34.431 MWe, that provide electricity to the national grid thereby displacing the electricity which would have been generated from fossil fuel fired power plants.

During the remote site visit/16/, the assessment team witnessed that the proposed project activity is an operational hydroelectric power plant with using run-off river technology at the sites Elmalı Weir and Tasoba Weir, which utilize water of the Demirkapi and Kürtün River in the Gumushane province. It was observed that 2 Vertical Axis Pelton turbines of identical type, with total installed capacity of 68.862 MWe, are installed at the open power station. This confirms the information provided in the VCS joint PD-MR/01/ and substantiated by the generation licence/13/.

In addition, the validation team witnessed that the proposed project activity fulfils VCS program specific issues, i.e.

- Handle CO₂, one of the six Kyoto protocol greenhouse gasses
- VSC project design and validation report are provided in English, site inspection and interviews are also conducted in English.
- PP claims real and measurable emission reduction credits.

- PP applies for 10 years crediting period
- Project is submitted to VCS registry within 2 years after operation (Project was commissioned on 31/05/2012)

The technical specification of the turbines:

Rated Net Head (Two units)	488.512 m
Project Flow Rate (m ³ /s)	16.371 m ³ /s
Turbine Type	Vertical Axis Pelton
Number of Turbine	2 identical
Installed Capacity (MW)	34.431 * 2
Total Energy (GWh)	192.021 GWh

The same was also cross checked with technical specification report submitted by the PP/14/. It has been verified that all the equipment's of the project activity were installed and are fully functional.

The geographic co- ordinates of the project location mentioned in the VCS joint PD-MR/01/ were verified and are found to be accurate and acceptable.

- **Project design and eligibility criteria for grouped projects:**

The Project activity is not a group project activity.

- **Project Proponent and other entities involved in the project:**

AYEN ENERJI A.S. is identified as project proponent (PP) and project owner (PO) as stated in the VCS joint PD-MR/01/, generation licence /13/.

In addition, Life İklim ve Enerji Ltd. Şti. is the other entity involved as the project consultant.

- **Ownership**

AYEN ENERJI A.S. is the owner of the PA. This was substantiated by the Generation Licence/13/ and the Provisional Acceptance Protocol /15/.

- **Project start date**

The start date of the project activity is 31/05/2012 which is the date the project started delivering electricity to the Turkish national grid. The date is substantiated by the Provisional Acceptance Protocol /15/, which is issued by the Ministry of Energy and Natural Resources, the Republic of Türkiye.

- **Project crediting period**

The first crediting period was for 10 years, 31/05/2012– 30/05/2022 (both days included). The PP intends to renew the crediting period which is in accordance with VCS Standard v4.5/05/, Section 3.9. The second crediting period is for 10 years and is from 31/05/2022-- 30/05/2032 (both days included).

CL01 was raised and successfully addressed.

- **Project scale and estimated GHG emission reductions or removals**

The Büyükdüz HEPP is classified as large-scale project, as the project's installed capacity (68.862 MWe) which is more than 15 MW according to VCS standard v4.5/05/

The estimated annual GHG emission reduction for the first crediting period of 10 years (31/05/2012–30/05/2022) by the project was calculated to be around 102,731 tCO₂e/year. For the entire first crediting period the expected emission reductions will be about 1,027,309 tCO₂e as checked from the registered VCS PD/01/.

For the second crediting period (31/05/2022-- 30/05/2032), the estimated annual GHG emission reductions of the project were estimated to be around 88,708 tCO₂e /year and 887,088 tCO₂e for the whole second crediting period as checked from the ER Sheet/03/. The calculations in the ER sheet were found to be accurate and appropriate. There is a decline in estimated emission reductions for the second crediting period compared to the first crediting period, this is due to the reduction in emission factor of the Turkish grid which was recalculated for the second crediting period which is stated in section 5.1 of the joint VCS PD-MR/01/.

- **Project location**

The proposed project activity is located on the Harşit River, in the Kürtün district of Gümüşhane province (eastern Black Sea region) within the boundaries of Harsit Basin in Türkiye as mentioned in the VCS joint PD-MR/01/. This has been also verified during the remote audit/16/. The UTM coordinates provided were converted/39/ to degree decimal format and was verified using google maps. The provided coordinates are found to be accurate and acceptable.

- **Conditions prior to project initiation**

Electricity generation by fossil-fuel fired power plants (ACM0002/07/).

- **Project compliance with applicable laws, statutes and other regulatory frameworks**

The project activity compliance with the regulation of the host country (i.e. the Republic of Türkiye) was demonstrated within VCS joint PD-MR/01/. section 1.11, where all relevant legally binding regulation are listed. The EMRA Generation Licence /13/, the EIA Positive Certificate for Büyükdüz Hydroelectric Power Plant, Türkiye /17/ and the Water Usage Agreement/19/ are some of obligatory documents. Without legal compliance the PO would not have acquired those licenses and statements, hence it is assessed as proven that legal compliance has been established.

- **Participation under other GHG programs:**

- **Projects registered (or seeking registration) under other GHG program(s)**

The assessment team has confirmed that the project has not been registered to or seeking registration under any other GHG programs by reviewing the declaration from the PP that the

project has not claimed or will not claim carbon credits under any other scheme after registration of the project under VCS/18/.

- **Rejection by other GHG programs**

The project has not been registered by any other GHG programs as declared by the PP/18/. The same has been confirmed by the VVB through review of the registries of various GHG programs including CDM, GS4GG and GCC.

- **Other forms of credit and supply chain (Scope 3) emissions:**

- **Emissions trading programs and other binding limits**

Not applicable

- **Other forms of environmental credit sought or received and eligible to be sought or received**

The project activity did not seek or receive another form of GHG-related environmental credit. (Declaration form/18/)

- **Issuance of public statement(s) to help prevent Scope 3 emissions double claiming**

Not applicable

- **Email notification of the potential risk of Scope 3 emissions double claiming**

The project activity does not result in any Scope 3 emissions, hence not applicable.

- **Additional information relevant to the project, including:**

- **Leakage management for AFOLU projects**

This is not applicable.

- **Commercially sensitive information**

The VCS joint PD-MR/01/ does not indicate any information that is commercially sensitive in nature as confirmed by PP under section 1.18 of the joint PD-MR/01/.

- **Sustainable development contributions**

The project is expected to contribute 4 SDGs which are SDG 7, 8, 12 and 13 for the second crediting period.

SDG 7 Affordable and Clean Energy: The project contributes SDG Target 7.2 “By 2030, increase substantially the share of renewable energy in the global energy mix” and Indicator 7.2.1 by the utilization of hydro power as a renewable energy source. This was confirmed by the Provisional Acceptance Protocol /15/.

SDG 8 Decent Work and Economic Growth: During the operation phase of the project, job opportunities are created. Therefore, the project contributes to SDG Target 8.8 “Protect labour

rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment” and Indicator 8.8.2 by providing employment and job-related training to the employees. This was confirmed by the SGK (Social Security Institution) Records/20/ and HSE training certificates/21/ which were provided by the PP.

SDG 12 Responsible Consumption and Production: The project helps SDG Target 12.5 “By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse”, Indicator 12.5.1 by providing tons of material recycled. Waste declaration documents/22,23/ was reviewed and found acceptable.

SDG 13 Climate Change: The project produces clean renewable energy by diminishing CO₂ emissions. Therefore, it contributes SDG Target 13.3 “Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning” and Indicator 13.3.2. This was confirmed by reviewing the electricity EPIAŞ data/24/ and ER Sheet/03/.

All the SDGs listed in the joint PD-MR have been assessed by the VVB thoroughly by desk review and also cross checked during the remote-site visit/16/ done by VVB.

No further information is included in the VCS Joint PD-MR/01/. This is to confirm that the information in the project description is accurate, complete, and provides an understanding of the nature of the project.

CLO3 was raised and successfully addressed.

3.2 Participation under Other GHG Programs

The project activity has not been registered, and it has no plans to register under any other GHG program. The validation team has verified by reviewing the declaration from the PP that the project has not claimed or will not claim carbon credits under any other scheme after registration of the project under VCS/18/. Therefore, the project activity is in line with section 3.22.1 of VCS standard/05/ and is eligible to participate under the VCS Program.

3.3 Safeguards

3.3.1 No Net Harm

There has not been any observed/recorded significant environmental and socio-economic impacts of the project activity as indicated in the registered VCS joint PD/MR and this was also confirmed through the reviewed documents. The EIA positive decision/17/ dated as 08/02/2008 by the General Directorate of Environment and Urbanization was also provided by the PP.

Besides that, the signed letters about hazardous waste dated as 16/03/2020 /23/ and wastewater management dated as 04/09/2020 /22/ have been provided by the PP.

CL04 was raised and successfully addressed.

3.3.2 Local Stakeholder Consultation

The first local consultation meeting was first held 18/09/2007 in the Kurtun District Centre, the district where the project is located as stated in detail, by the Project Developer, in the registered in the registered VCS PD/02/. The project participant identified the relevant stakeholders and have also sought clearance from several authorities for the development of the Project Activity. The validation team was provided with extracts from the EIA report relevant to the stakeholders' meeting and pictures from the meeting. The stakeholders' meetings are reflected within the EIA report/17/ and evidence is included in the VCS PD/02/. It was confirmed that no grievances were registered during the first local consultation.

For the current validation, Stakeholder engagement was conducted during the remote-site visit/16/ which was conducted on 17/02/2023. Detailed description of the engagement is located in section 2.3 of this report. It was validated from the remote site visit that the mukhtars (heads of the village) of Demirciler Village and Demirkapı Village had already taken the contact information one of the executives in Büyükdüz Hydroelectric Power Plant. It was also concluded that the grievance mechanism is in place during the remote site visit/16/, it is validated that there were no negative comments on the implementation of the project from the stakeholders (Mukhtar and the locals).

CL #05 was raised and successfully addressed.

3.3.3 Environmental Impact

As per the host country rules, an Environmental Impact Assessment Study was performed according to the "Environmental Impact Assessment Regulation" of Türkiye. The assessment team was provided with the EIA report/17/, it was assessed by the team, and it was concluded that the project activity has an overall positive impact. A detailed summery of the EIA Assessment can be found in section 2.3 of the VCS PD/02/.

Assessment team opinion:

The project activity is expected to have positive impacts and no significant adverse environmental impact due to project activity is foreseen. The mandatory EIA/17/ was conducted in accordance with the host country – Türkiye rules and regulations. Thus, the validation team confirms that project activity is in compliance with VCS requirements.

3.3.4 Public Comments

There are no public comments.

3.3.5 AFOLU-Specific Safeguards

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

3.4 Application of Methodology

3.4.1 Title and Reference

The project, as given in the section 3.1 of VCS Joint PD-MR /01/, has applied the latest version of CDM approved baseline and monitoring methodology ACM0002 “Large-scale Consolidated Methodology: Grid-connected Electricity Generation from Renewable Sources” Version 21.0 /07/ (hereafter ACM0002 v21) is used to develop the proposed project activity under VCS. Additionally, methodology related tools and relevant guidelines are applied, namely.

1. Tool to calculate the emission factor for an electricity system (Version 07.0.0)/08/
2. Tool for the demonstration and assessment of additionality (Version 07.0.0) /09/
3. Tool to determine the remaining lifetime of the equipment (Version 01.0.0) /10/
4. Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)/11/

The validity of the versions of the applied methodology and tools were checked from VERRA websites. The above-mentioned methodology and tools as described in the VCS joint PD-MR/01/ are found to be correctly listed and latest available version is being applied during the validation of the PA.

3.4.2 Applicability

The project “Büyükdüz Hydroelectric Power Plant, Turkey” complies with each applicability condition of the identified methodology /07/. The assessment team has validated the applicability of the methodology, it is fully found to meet the eligibility criteria. The same has been justified in the following table.

The assessment of the applicability conditions are presented in the table below:

Applicability Condition	Justification of applicability	Means of assessment
1) This methodology is applicable to grid-connected renewable power generation project activities that: • install a Greenfield power plant; • involve a capacity addition to (an) existing plant(s); • involve a retrofit of (an) existing operating plants/units; • involve a rehabilitation of (an) existing plant(s)/unit(s) or • involve a replacement of (an) existing plant(s)/unit(s).	The Project activity is a Renewable Energy Project i.e. Hydro Power Project which falls under applicability criteria option- Install a Greenfield power plant; Hence the project activity meets the given applicability criterion.	Since the project is a grid connected greenfield power plant, criterion is fulfilled. This is verified by the generation licence/13/ and provisional acceptance protocol/15/ document.

2) In case the project activity involves the integration of a BESS, the methodology is applicable to grid-connected renewable energy power generation project activities that: • Integrate BESS with a Greenfield power plant; • Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic¹ or wind power plant(s)/unit(s); • Integrate a BESS to (an) existing solar photovoltaic or wind power plant(s)/unit(s) without implementing any other changes to the existing plant(s); • Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s).	The project activity does not involve the integration of a BESS, therefore this criterion is not applicable.	The project activity is a run-of-the river hydro power plant with a total capacity of a total installed capacity of 70.844 MWm / 68.862 MWe and does not involve the integration of a BESS. Hence, this criterion is not applicable. This is verified by the VCS registered PD/02/, generation licence/13/ and provisional acceptance protocol/15/ documents.
3) The methodology is applicable under the following conditions: • Hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; • In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity; • In case of Greenfield project activities applicable under paragraph 5 (a) above, the project participants shall demonstrate that the BESS was an integral part of the design of the renewable energy project activity (e.g. by referring to feasibility studies or investment decision documents);	The project activity is the installation of a new run of the river hydro power plant. Therefore, first option is applicable.	The project activity is a new run-of-the river hydro power plant with a total capacity of a total installed capacity of 70.844 MWm / 68.862 MWe. Hence, the first option is applicable. This is verified by the VCS registered PD/02/, generation licence/13/ and provisional acceptance protocol/15/ documents.

•The BESS should be charged with electricity generated from the associated renewable energy power plant(s). Only during exigencies may the BESS be charged with electricity from the grid or a fossil fuel electricity generator. In such cases, the corresponding GHG emissions shall be accounted for as project emissions following the requirements under section 5.4.4 below. The charging using the grid or using fossil fuel electricity generator should not amount to more than 2 per cent of the electricity generated by the project renewable energy plant during a monitoring period. During the time periods (e.g. week(s), months(s)) when the BESS consumes more than 2 per cent of the electricity for charging, the project participant shall not be entitled to issuance of the certified emission reductions for the concerned periods of the monitoring period.		
4) In case of hydro power plants, one of the following conditions shall apply: • The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or • The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m²; or • The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m². • The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply: ○ The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²;	Since this is a Greenfield project the first two options are not applicable. It is a new reservoir. Therefore, third option is applicable.	The project activity is a new grid connected greenfield power plant, whose Power Density is higher than 4 W/m². (The power densities for the whole project, and for Elmal and Tasoba Weirs is 852.61 W/m²). This is verified by the VCS registered PD/02/. Hence, the third option is applicable.

○ Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; ○ Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m³ shall be; a) Lower than or equal to 15 MW; and b) Less than 10 per cent of the total installed capacity of integrated hydro power project.		
5) In the case of integrated hydro power projects, project proponent shall: • Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or • Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	The project activity is constructed as a runoff-the-river hydropower project. Therefore, the said criteria is not applicable.	The project activity is a run-of-the river hydro power plant with a total capacity of a total installed capacity of 70.844 MWm / 68.862 MWe. This is verified by the generation licence/13/ and provisional acceptance protocol/15/ documents. Therefore, the criterion is not applicable.
6) Methodology is not applicable to the following • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;	The project activity is a greenfield activity which generates electricity from potential energy of water stored, there is no switching from fossil fuel	The project activity is a grid connected greenfield run-of-the river hydro power plant. The project activity is not biomass fired power plant nor does it involve the

• Biomass fired power plants/units	involved. The project activity is not biomass fired power plant.	switching of fossil fuels. This has been checked against the generation licence/13/, provisional acceptance protocol/15/ and electricity EPIAŞ data/24/.
7) In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.	This project activity is a greenfield activity which generates electricity from run-of-the- river, this is not the case of retrofits, rehabilitations, replacements or capacity additions.	The project activity is a grid connected greenfield run-of-the river hydro power plant that provides electricity to the Turkish national grid. This has been checked against the generation licence/13/, provisional acceptance protocol/15/ and electricity EPIAŞ data/24/.

Compliance with applicability conditions of “Tool to calculate emission factor for an electricity system”:

Applicability Condition	Justification of applicability	Means of assessment
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand side energy efficiency projects).	The project activity substitutes grid electricity by supplying renewable power to grid. Hence the tool is applicable. OM, BM and CM are estimated using the tool for calculating baseline emissions. This is verified thorough the generation licence with national grid/13/.	Since PA is grid connected as confirmed from the generation licence/13/ and Electricity EPIAŞ data/24/, criteria is met
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as	Since project activity is grid connected, this condition is applicable, and the emission factor	Since the PA involves the calculation of emission factor for grid power plants only, the criterion is met. This has been confirmed from the VCS

an option, can include off grid power plants. In the latter case, the conditions specified in “Appendix 2: Procedures related to off-grid power generation” should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	has been calculated accordingly. The emission factor for the project electricity system is calculated for grid power plants only.	joint PD/MR/01/ and the VCS registered PD/02/.
Under this tool, the value applied to the CO₂ emission factor of biofuels is zero.	Each project activity is grid connected renewable energy project and CO₂ emission factor is not considered for biofuels. No biofuels have been identified in the baseline grid emission factor determination	Since the PA does not involve any biofuel usage, the criteria is met. This has been confirmed from the VCS joint PD/MR/01/ and the VCS registered PD/02/.

CAR #04 was raised and successfully addressed.

3.4.3 Project Boundary

The project boundary and identified GHG sources, sinks and reservoirs for the project and baseline scenarios are appropriately defined in the joint VCS PD-MR /01/. The selection and justification for inclusion or exclusion is appropriate and duly supported in the joint VCS PD-MR/01/.

The PP has considered only CO₂ as the major GHG in the baseline scenario and project scenario. The approach was found to be in line with the applied methodology/07/. The exclusion of CH₄ & N₂O in the

baseline scenario is appropriate. The project activity involves the generation of electricity using hydro power. Hence, there are no project emissions associated with this project activity. Therefore, the exclusion of CO₂, CH₄ & N₂O in the project scenario are appropriate. There are no other sources of project emissions. Hence, the project participant has considered the project emissions as zero for project activity; this is in line with the methodology/07/.

The validation team is able to conclude that the project boundary and selected sources are applied as per the methodology /07/ and the applicable VCS criteria/05/.

3.4.4 Baseline Scenario

The project activity involves a grid-connected renewable power plant and supplying the generated electricity to Turkish national grid, hence, according to the applied ACM0002, version 21.0/07/, the baseline scenario is determined properly as:

“Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system/08/.”

As per VCS Standard v4.5/05/ section 3.9.8, paragraph 2b. “the GHG emissions associated with the original baseline scenario shall be reassessed using the latest version of the CDM “Tool to assess the validity of the original/ current baseline and to update the baseline at the renewal of a crediting period”.

According to the CDM tool Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)/11/. According to this tool, the following steps are applied.

Step 1: Assess the validity of the current baseline for the next crediting period

The validity of the current baseline is assessed using the following Sub-steps:

Sub Step 1.1 Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies.

The project current baseline is grid connected electricity generation plants and the project complies with the current legal framework of Türkiye. There are no new laws that have come into force that have an impact on the project activity and the project activity is still in line with the available law and regulations.

The baseline scenario identified by the PP was found to be in accordance with applied methodology and the registered PDD. Therefore, PP’s decision to not make changes in the current baseline was found to be acceptable by the validation team

Sub Step 1.2 Assess the impact of circumstances.

The new national circumstances have an impact on the EF of the grid and thus on the project’s current baseline emissions. Accordingly, the EF is updated for the second crediting period in conformity with the

latest version of the publication of the Türkiye's National Electric Grid Emission Factor for the year 2020. There has been no major deviation or change in the market characteristic during the first crediting period.

The EF of the grid has been updated by the PP in conformity with the latest version of the publication of the Türkiye's National Electric Grid Emission Factor for the year 2020. This has been stated in section 5.1 of the joint VCS PD-MR/01/. This was found to be acceptable with the validation team.

Sub Step 1.3 Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

The technical lifetime of the equipment, (hydro turbines) are 150,000 hours according to tool 10 V1.0 /10/ "Tool to determine the remaining lifetime of equipment". The PP has shown that the operation time in a year as 2,788.5 h/year. Finally dividing lifetime of the equipment (150,000 hours) to the operational time per year, lifetime of the equipment will be found in terms of year which is 53.7 years. The operational lifetime of the equipment exceeds the crediting period for which renewal is requested. The baseline scenario identified at the validation of the project activity was the continuation of grid-connected electricity generation. Under this scenario, no investment from the project's proponent or third party (or parties) has been envisioned later specifically for the project.

Sub Step 1.4 Assessment of validity of the data and parameters.

As per the requirement of the methodology/07/, only the grid emission factor needs to be updated during the crediting period renewal. The PP has updated the emission factor in conformity with the latest version of the publication of the Türkiye's National Electric Grid Emission Factor for the year 2020 and has been shown in section 5.1 of the joint VCS PD-MR/01/. This was found to be acceptable with the validation team.

Step 2: Update the current baseline and the data and parameters

Sub Step 2.1: Update the current baseline

As confirmed in Step 1, under the current context of the sectoral policies and circumstances, the project baseline for the next crediting period is the use of electricity from the national grid. This conforms to the provisions of the latest version of the approved applicable methodology. Therefore, there has been no deviation in the baseline scenario.

Sub Step 2.2: Update the data and parameters

The grid emission factor is updated according to the publication of Turkish Ministry of Energy and Natural Resources that is indicating Türkiye's National Electric Grid Emission Factor for the year of 2020.

Only parameter will be monitored for second crediting period is " $EG_{PJ, facility, y}$ " which is related to electricity production.

The PP has provided the calculation for the same in the ER calculation sheet/03/ and it was validated by the validation and verification team. The baseline emission factor for the electricity system has been calculated on ex-ante basis and will remain fixed for the entire project crediting period.

The discussion on baseline is comprehensive in the VCS Joint PD-MR Report/01/ and it is in line with the applied baseline and monitoring methodology ACM0002, version 21.0/07/. Also, the identified baseline for the project activity is the most likely scenario of what would have occurred in the absence of the project activity. The project participant has included all sources and references used for baseline determination for the project activity in the VCS Joint PD-MR Report /01/ and the identified baseline is justified appropriately by the project participant. The Baseline scenario and baseline emission calculations are found as per ACM0002, version 21.0/07/. The combined margin approach is the ex-ante approach as per tool to calculate the emission factor for an electricity system.

The validation team confirms that:

- (a) All the assumptions and data used by the PP are listed in the VCS Joint PD and MR Report/01/, including their references and sources.
- (b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the Joint PD and MR sheet/01/.
- (c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable.
- (d) Relevant national and/or sectoral policies and circumstances are considered and listed in the Joint PD and MR/01/.
- (e) The approved baseline methodology/07/ has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed project activity.

3.4.5 Additionality

According to paragraph 3.9.8(1) of the VCS Standard/05/, “A full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with the requirements set out in the VCS Program rules and the project description shall be updated accordingly.”

The energy sector in Türkiye is privatized and installation of power plants like hydro power plants are done by private companies. The legislation, laws or regulatory framework in Türkiye do not mandate the installation of hydro power plants. Thus, the project activity is not mandated by any state or national laws. The project proponent is not bound by any legislative mandate to implement the project activity. It can be concluded that there is no regulatory constraint in the operation of the project activity. Thus, it can be concluded that project activity is still regulatory surplus activity.

In the end there is no change in the additionality since it is a renewal of the crediting period.

3.4.6 Quantification of GHG Emission Reductions and Removals

As it has been identified in section 3.4.1 of this report, emission reductions and removals resulting from Büyükdüz HEPP are identified according to the approved CDM methodology ACM0002 v21 /07/ and the referred methodological tool “Tool to calculate the emission factor for an electricity system” v07 /08/ as,

$$ER_y = BE_y - PE_y,$$

Where:

ER_y : Emission reductions in year y (tCO₂/yr).

BE_y : Baseline emissions in year y (tCO₂/yr).

PE_y : Project emissions in year y (tCO₂/yr); validated value = 0.

The baseline emissions have been calculated as follows:

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

Where:

BE_y - Baseline emissions in year y (t CO₂/yr)

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

$EF_{grid,CM,y}$ - Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO₂/MWh)

Calculation of $EG_{PJ,y}$:

$$EG_{PJ,y} = EG_{facility,y}$$

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

$EG_{(facility,y)}$ - Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

Calculation of $EF_{grid,CM,y}$:

This parameter is calculated using the tool, ““Tool to calculate the emission factor for an electricity-system” (Version 07.0)/08/. Emission factor once calculated, shall remain fixed during the entire duration of the monitoring period. The tool provides procedure to determine the following parameters:

$EF_{grid,CM,y}$ - Combined margin CO₂ emission factor for the project electricity system in year y

$EF_{grid,BM,y}$ - Build margin CO₂ emission factor for the project electricity system in year y

$EF_{grid,OM,y}$ - Operating margin CO₂ emission factor for the project electricity system in year y

Calculation of emission factor:

The calculation of operating margin and build margin for the Turkish national grid is readily available and is published by the Turkish Ministry of Energy and Natural Resources from which the Türkiye's National Electric Grid Emission Factor/37/ for the year of 2020 is used. The publication contains the calculated Emission Factor values for Operating Margin (OM), Growth Based Margin (Build Margin-BM) and Combined Margin (CM) for the relevant year using CDM's Clean Development Methodology Tool 07-V07.0/08/.

The information sheet for Türkiye's National Electric Grid Emission Factor/37/ states that the operating margin, $EF_{grid,OM,year} = 0.7424 \text{ tCO}_2/\text{MWh}$ and to calculate the build margin, the Chronological order of power generation plants from TEİAŞ Load Dispatch Department with commissioning dates, plant names, fuel types, installed power values, electricity generation for the calculated year were used as input data. The Build Margin is taken as, $EF_{grid,BM,y} = 0.3680 \text{ tCO}_2/\text{MWh}$.

To calculate the Combined Margin, the "Tool to calculate the emission factor for an electricity system" (Version 07)/08/, Article 86 clause (b), calculation of the combined margin for renewable energy projects (except wind and solar) second crediting period, the following values need to be used for wOM and wBM. "All other projects [...] wOM = 0.25 and wBM = 0.75 for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool."

The combined margin is calculated as,

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times wOM + EF_{grid,BM,y} \times wBM$$

Where:

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (t CO₂/MWh)

$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (t CO₂/MWh)

wOM = Weighting of operating margin emissions factor (per cent)

wBM = Weighting of build margin emissions factor (per cent)

The combined margin for the second crediting period is calculated as,

$$EF_{grid,CM,y} = 0.25 \times 0.7424 + 0.75 \times 0.3680 = 0.4616 \text{ tCO}_2/\text{MWh}$$

The PP has provided the calculation for the same in the ER calculation sheet/03/ and it was validated by the assessment team. It was confirmed that PP has followed the step wise approach as given in applied tool/08/ to calculate emission factor. The baseline emission factor for the electricity system has been calculated on ex-ante basis and will remain fixed for the entire second crediting period.

The Baseline emissions in year y (t CO₂/yr) is calculated as,

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

$$BE_y = 192,021 \text{ MWh/year} \times 0.4616 \text{ tCO}_2/\text{MWh} = 88,636 \text{ tCO}_2/\text{year}$$

Year		Number of days	Estimation of project activity emissions (tCO ₂ e)	Estimation of baseline emissions (tCO ₂ e)	Estimation of leakage (tCO ₂ e)	Estimation of overall emission reductions (tCO ₂ e)
From	To					
31-05-2022	31-12-2022	215	0	52,210	0	52,210
01-01-2023	31-12-2023	365	0	88,636	0	88,636
01-01-2024	31-12-2024	366	0	88,879	0	88,879
01-01-2025	31-12-2025	365	0	88,636	0	88,636
01-01-2026	31-12-2026	365	0	88,636	0	88,636
01-01-2027	31-12-2027	365	0	88,636	0	88,636
01-01-2028	31-12-2028	366	0	88,879	0	88,879
01-01-2029	31-12-2029	365	0	88,636	0	88,636
01-01-2030	31-12-2030	365	0	88,636	0	88,636
01-01-2031	31-12-2031	365	0	88,636	0	88,636
01-01-2032	30-05-2032	151	0	36,669	0	36,669
Total (tCO ₂ e)			0	8,87,088	0	8,87,088

The total emission reductions are 8,87,088 tCO₂e over 10 years (second) crediting period.

Through the assessment process validation team confirmed that:

- All the assumptions and data used by the project participants are listed including their references and sources;
- All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the VCS Joint PD-MR Report/01/;
- All values used in the VCS Joint PD-MR Report/01/ are considered reasonable in the context of the VCS project activity;
- The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;

All estimates of the baseline emissions can be replicated using the data and parameter values provided in the VCS Joint PD-MR Report/01/.

CL06 was raised and successfully addressed.

3.4.7 Methodology Deviations

No deviation from methodology and tools was requested during the validation process.

3.4.8 Monitoring Plan

The project activity applies the monitoring plan according to the methodology “ACM0002: Grid-connected electricity generation from renewable sources — Version 21.0.0”/07/, the only parameter to be monitored is the “Quantity of net electricity generation supplied by the project plant/unit to the grid in year y”

This parameter will be calculated as difference between

- (a) The quantity of electricity supplied by the project plant/unit to the grid; and
- (b) The quantity of electricity received by the project plant/unit from the grid.

Parameters Determined ex-ante

The following parameters are determined ex-ante and mentioned in section 6.1 of the PD:

Parameter	Unit	Value applied	Means of assessment
$EF_{grid,BM,y}$	tCO ₂ /MWh	0.3680	The value of Build Margin is calculated on the basis of “Tool to calculate the emission factor for an electricity system” (Version 07)/08/. The value is sourced from publication of Turkish Ministry of Energy and Natural Resources for the year 2020 which is indicating Türkiye’s National Electric Grid Emission Factor. Thus, the value is found acceptable.
$EF_{grid,OM,y}$	tCO ₂ /MWh	0.7424	The value of Operating Margin is calculated on the basis of “Tool to calculate the emission factor for an electricity system” (Version 07)/08/. The value is sourced from publication of Turkish Ministry of Energy and Natural Resources for the year 2020 which is indicating Türkiye’s National Electric Grid Emission Factor. Thus, the value is found acceptable.
$EF_{grid,CM,y}$	tCO ₂ /MWh	0.4616	This has been calculated based on Operating Margin (OM) and Build Margin (BM) calculated using the “tool to calculate the emission factor for an electricity system” (Version 07)/08/. As the proposed project activity is hydro, the combined margin is calculated as $(EF_{grid,OM,y} \times 25\%) + (EF_{grid,BM,y} \times 75\%)$. The formula used and value provided is found to be appropriate. Therefore, it is accepted.

The parameters for ex-ante are found to be aligned with the applied methodology/07/ and are found to be correct, justified and consistent through all documents.

Data and parameter monitored:

In order to monitor the emission reduction of the project activity, the net electricity exported by the project activity to the grid is multiplied with the grid emission factor, to calculate the emission reduction achieved. The determination of the grid EF is as described in the above section 4.4 and the ex-ante method has been selected by the PP for the value of grid emission factor. Therefore, the monitoring plan includes monitoring of following parameters:

Parameter	Unit	Monitoring Frequency	Means of assessment
EG_{facility,y}	tCO ₂ /MWh	Continuous monitoring, hourly measurement, and at least monthly recording	The value for this parameter will be recorded monthly by the energy meters installed at the site by the EUCL representatives. The parameter will be monitored continuously as described in in the revised PD/02/. The same was also verified during the remote audit conducted by the assessment team/16/.

Electricity meter calibration details-

There are four meters at the TEIAS substation (two main and two back-up). These meters are sealed by TEIAS and intervention by project proponent is not possible. There was previously four meters (2 main and 2 back-up) with an accuracy class 0.5 S. The specifications of the previous meters are given below.

Name	Serial Number	Brand - Model	Accuracy Class	Protocol Date
Old Main Meter 1	419678	ELSTER & A1500	0.5 S	01/06/2012, 19/12/2013, 17/10/2014, 26/11/2015, 25/10/2016, 11/10/2017, 03/10/2018
Old Back-up meter 1	419679	ELSTER & A1500	0.5 S	01/06/2012, 19/12/2013, 17/10/2014, 26/11/2015, 25/10/2016, 11/10/2017, 03/10/2018
Old Main Meter 2	419680	ELSTER & A1500	0.5 S	01/06/2012, 19/12/2013, 17/10/2014, 26/11/2015, 25/10/2016, 11/10/2017, 03/10/2018
Old Back-up meter 2	419681	ELSTER & A1500	0.5 S	01/06/2012, 19/12/2013, 17/10/2014, 26/11/2015, 25/10/2016, 11/10/2017, 03/10/2018

The above meters were replaced on 07/10/2020 with the Article 9 of the 'Regulation of Metering and Testing of Metering Systems'¹. The details of the new meters are present in the first index protocol/27/ which were calibrated on 07/10/2020. The assessment team has also verified during the remote audit/13/ that the installed meters are sealed by TEIAS and the National authority TEIAS decides when to carry out the next calibration and the PP will have no role in meter calibration. The meters were further tested on 07/10/2022 and was verified by the meter test protocol/28/ provided by the PP. The new meter specifications are provided below.

¹ Please see, <http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch=>

Name	Serial Number	Brand - Model	Accuracy Class	Protocol Date
Main Meter 1	10013671	EMH & LZQJ-XC	P: C Q:1 S	07/10/2020, 07/10/2022
Back-up meter 1	10013672	EMH & LZQJ-XC	P: C Q:1 S	07/10/2020, 07/10/2022
Main Meter 2	10013673	EMH & LZQJ-XC	P: C Q:1 S	07/10/2020, 07/10/2022
Back-up meter 2	10013674	EMH & LZQJ-XC	P: C Q:1 S	07/10/2020, 07/10/2022

During the remote site audit/16/, the details regarding QA/QC procedures were discussed and it was found to be in line with the information mentioned in the PD/01/.

Conclusion:

The monitoring methodology applies consistently the choice of the option selected for monitoring of baseline emissions. The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period.

The electricity meters are meters are placed (two main and two reserve) at the Büyükdüz HPP which meters the electricity transferred to TEİAŞ substation. The Ministry of Trade and Industry (Ministry) is responsible from control and calibration of the meters. Article 9 of the 'Regulation of Metering and Testing of Metering Systems' (Regulation) of Ministry states that: 'Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done every 10 years.' Therefore, periodic calibration of the meters will be done every 10 years.

The validation team confirms that:

- The monitoring plan included in the VCS PD-MR/01/ is based on the baseline methodology ACM0002 version 21.0/07/ which has been applied to the proposed VCS project activity
- The monitoring arrangements described in the monitoring plan are feasible within the project design.

3.5 Non-Permanence Risk Analysis

This is not applicable for the proposed VCS project as it is Non AFOLU project.

4 VERIFICATION FINDINGS

4.1 Accuracy of GHG Emission Reduction and Removal Calculations

The project monitoring has been carried out in accordance with the registered VCS PD/02/. The monitoring plan laid on the registered VCS PD/02/ was being followed at the site. The verification team

has assessed the information flow (from data generation, aggregation, to recording, calculation and reporting for these including the values) in the Joint PD-MR /01/ as per VCS standard/05/. The EPIAŞ data/24/ is used as a main source for the meter readings. The EPIAŞ data has been provided to the assessment team that is used directly for the emission reduction calculations. The PP has taken the values reported in the EPIAŞ data for the calculation of emission reductions since EPIAŞ data is an official governmental document used to document the amount of electricity transferred to the grid. The approach has been assessed and found to be appropriate.

The calculation of the emission reduction is found to be correct. The details of the reported and the verified values for all the parameters are mentioned in section 4.2 of this report. The formulae and method used to calculate the baseline emissions, project emissions and leakage emissions are appropriate and in line with the approved methodology ACM0002/7/.

The parameters are directly sourced from monthly EPIAŞ data /24/ issued to the PP. The PP has provided complete set of data for all the monitored parameters in the ER Sheet/03/. This data has been verified as described in section 4.2 of this report. The formulae and method used to calculate the baseline emissions, project emissions and leakage emissions are appropriate and in line with the approved methodology ACM0002/07/.

The ex-ante parameters have been calculated at validation for the second crediting period and remains fixed throughout the crediting period, in accordance with the tool to calculate emission factor for an electricity system/08/ and are in-line with reported value in registered VCS joint PD-MR/01/.

As per ER sheet/03/ submitted by the PP, the net GHG emission reductions achieved during the current verification period i.e. 01/11/2017 to 31/12/2022, which were verified to be as 361,957 tCO_{2e}.

The calculation method and formulae used for calculating the baseline emission, project emission and leakage emission are found to be in compliance with the applied methodology ACM0002 v21/07/. The findings raised during the validation and verification process were satisfactorily resolved, the details of which can be found in appendix III.

In conclusion, VVB reviewed all the evidence submitted by PP related to GHG emission reduction calculations and confirmed that all the parameters are correctly applied. Default values used in the calculation were identified correctly. The emission reduction calculation has been done in line with the applied methodology /07/.

4.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

The ER's generated for the project activity is based on the electricity generation from the hydroelectric power plant. The PP has shared all the relevant evidence to substantiate the data related to the monitored parameter. The list of all the documents that were reviewed for the current verification has been listed down in appendix I of this report. The values of the parameter, electricity imported and exported has been checked by the verification team through the monthly EPIAŞ data /24/ to verify the values reported in the ER Sheet/03/ and were found to be appropriate. The PP has taken the values reported in the EPIAŞ

data for the calculation of emission reductions since EPIAŞ data is an official governmental document used to document the amount of electricity transferred to the grid. The approach is conservative after assessment and was found to be appropriate.

The monitoring of the project activity is found to be in accordance with the monitoring plan set out in the VCS joint PD-MR/01/ and the approved methodology ACM0002/07/. The verification of ex-ante and monitored parameter has been discussed below:

Ex-ante Data and parameters available at the time of validation are same as listed above under section 3.4.8. of this report

The assessment of monitored parameter has been carried out as per the method described in below table:

Parameter	EG _{facility,y} Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh													
Means of verification	Criteria/ Requirements	Assessment/Observation												
	Measuring /Reading /Recording frequency	Continuous measuring, monthly recording												
	Is Measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency is in line with the monitoring plan as set out in VCS joint PD-MR/01/ and monitoring methodology/07/.												
	Monitoring equipment	The previous energy meters were of accuracy class 0.5S and make ELSTER & model A1500 which has been verified from the first index detection protocol for the electricity meters/25/ and the meter test protocol reports/26/ were provided by the PP and were verified. The serial Nos. of the old energy meters are: <table><tr><th>Name</th><th>Serial Number</th><th colspan="2">Protocol Date</th></tr><tr><td>Old Main Meter 1</td><td>419678</td><td>01/06/2012, 17/10/2014, 25/10/2016, 03/10/2018</td><td>19/12/2013, 26/11/2015, 11/10/2017,</td></tr><tr><td>Old Back-up meter 1</td><td>419679</td><td>01/06/2012, 17/10/2014,</td><td>19/12/2013, 26/11/2015,</td></tr></table>		Name	Serial Number	Protocol Date		Old Main Meter 1	419678	01/06/2012, 17/10/2014, 25/10/2016, 03/10/2018	19/12/2013, 26/11/2015, 11/10/2017,	Old Back-up meter 1	419679	01/06/2012, 17/10/2014,
Name	Serial Number	Protocol Date												
Old Main Meter 1	419678	01/06/2012, 17/10/2014, 25/10/2016, 03/10/2018	19/12/2013, 26/11/2015, 11/10/2017,											
Old Back-up meter 1	419679	01/06/2012, 17/10/2014,	19/12/2013, 26/11/2015,											

			25/10/2016, 11/10/2017, 03/10/2018
	Old Main Meter 2	419680	01/06/2012, 19/12/2013, 17/10/2014, 26/11/2015, 25/10/2016, 11/10/2017, 03/10/2018
	Old Back-up meter 2	419681	01/06/2012, 19/12/2013, 17/10/2014, 26/11/2015, 25/10/2016, 11/10/2017, 03/10/2018

On 07/10/2020, the electricity meters were changed with EMH brand and model number LZQJ-XC with accuracy class P:C Q:1S in line with the Article 9 of the 'Regulation of Metering and Testing of Metering Systems'.

First index protocol/27/ & calibration date is 07/10/2020 for the new meters. The details of the new meters are present in the first index protocol/27/ which were verified by the assessment team. The meters were further tested on 07/10/2022 and was verified by the meter test protocol report/28/ provided by the PP.

The specification of new meters is provided below:

Name	Serial Number	Protocol Date
Main Meter 1	10013671	07/10/2020, 07/10/2022
Back-up meter 1	10013672	07/10/2020, 07/10/2022
Main Meter 2	10013673	07/10/2020, 07/10/2022
Back-up meter 2	10013674	07/10/2020, 07/10/2022

All the energy meter used are of same accuracy level and same make. The meters were changed on 07/10/2020 and same has been reported in the VCS joint PD-MR/01/. The same has been verified from the first index protocol /27/, photographs of energy meter/29/ and the meter test reports/26,27,28/ shared by the PP. Paragraph b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems' (Regulation) of Ministry states that: ‘ b) Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done every 10 years.’ Therefore, periodic calibration of the

		meters will be done every 10 years. Since the old meters were tested regularly as per the test reports/26/ and the new meters were first calibrated on 07/10/2020 and then tested on 07/10/2022 /27,28/, there are no gaps in calibration of the meters. Hence, it is found to be appropriate.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes, the accuracy of the monitoring equipment was 0.5S for the old meters and was replaced by new meters with accuracy class P:C Q:1S, which is in accordance with the VCS joint PD-MR /1/. This has been verified from the meter test reports/26,27,28/ provided by the PP.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy is valid for entire measuring range. The calibration certificates clearly shows that the accuracy level is valid for entire monitoring period/26,27,28/.
	Calibration frequency /interval:	As per the VCS joint PD-MR /01/, the calibration frequency is once in ten years. The calibration frequency was found to be in line with the conditions set out in the VCS joint PD-MR /01/. During the current monitoring period, calibration was performed as per the details provided in PD as checked with the calibration certificates/26,27,28/. The calibration certificates /26,27,28/ of each of the calibration dates has been checked and the meters are found to be within the stated error range. The calibration details of

		the energy meters have been stated in section 3.4.8 of this report.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	The calibration interval of all the meters is found to be in line with the frequency set out by the PP in the monitoring plan/01/. Hence, it is found to be appropriate.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration is carried out by TEİAŞ. This has been verified from the calibration certificates/26,27,28/ shared by the PP.
	How were the values in the monitoring report verified?	The cumulative values of the EG_{facility,y} for the entire monitoring period is reported in the VCS joint PD-MR /01/ as 684,086.98 MWh (for this monitoring period). and the monthly values are reported in the ER calculation sheet/03/. This value is checked from the monthly EPIAŞ data /24/ to verify the values reported in the ER Sheet/03/ and were found to be appropriate. The PP has taken the values reported in the EPIAŞ data for the calculation of emission reductions/24/ since it is an official governmental document used to document the amount of electricity transferred to the grid. The approach has been assessed and found to be appropriate.
	If applicable, has the reported data been cross-checked with over available data?	NA

	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the adequate QA/AC procedures were implemented by the PP. The joint meter reading is taken by the state utility in the presence of the PP in the form of EPIAŞ data. Monthly EPIAŞ data issued by state utility provide the value of parameter that is directly used for emission reduction calculations.
Findings	CL #01 and CL #02 were raised and successfully resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/01/ (as per measurement methods and procedures to be applied) and applied methodology/07/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

Assessment of Data and calculation of GHG emissions or net removal

The emissions are computed as follows using applicable methodology ACM0002 version 21.0/07/:

Baseline Emission:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad (1)$$

Where:

BE_y = Baseline emissions in year y (tCO₂/yr).

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

$EF_{grid,CM,y}$ (Second Crediting Period)= Combined margin CO₂ emission factor for grid connected power generation in year y and validated value = **0.4616 tCO₂/MWh**.

$EF_{grid,CM,y}$ (First Crediting Period)= **0.535 tCO₂/MWh**

Because the Project is a greenfield renewable energy power plant.

$$EG_{PJ,y} = EG_{facility,y}$$

$$ER_y = BE_y - PE_y \quad (2)$$

Where:

ER_y : Emission reductions in year y (tCO₂/yr).

BE_y : Baseline emissions in year y (tCO₂/yr).

PE_y : Project emissions in year y (tCO₂/yr); validated value = 0.

$$BE_y = EG_{\text{facility},y} * EF_{\text{grid,CM},y} = 629,669.36 \text{ MWh} * 0.535 \text{ tCO}_2/\text{MWh}^2 = 336,841 \text{ tCO}_2\text{e}$$

$$BE_y = EG_{\text{facility},y} * EF_{\text{grid,CM},y} = 54,417.62 \text{ MWh} * 0.4616 \text{ tCO}_2/\text{MWh}^3 = 25,116 \text{ tCO}_2\text{e}$$

$$\text{Total } BE_y = 336,841 \text{ tCO}_2 + 25,116 \text{ tCO}_2 = 361,957 \text{ tCO}_2\text{e}$$

Project Emissions:

The project activity involves no emissions, except emissions from a diesel generator used for emergency backup purposes. The possible emissions from the use of fossil fuels for the back up or emergency purposes by the operation of this diesel generator are neglected according to the methodology ACM0002 version 21.0/07/.

According to the applied methodology/07/, for hydropower plants if the power density of the reservoir is higher than 10 W/m², then P_{ey} = 0. The power density of the project is calculated as follows:

The power density (PD) for the Büyükdüz HEPP is calculated according to the directions given in the methodology:

$$PD(W/m^2) = \frac{\text{Installed Capacity}}{\text{Reservoir Surface Area}}$$

$$PD(W/m^2) = \frac{68,862,000}{80,766}$$

$$PD(W/m^2) = 852.6$$

As the power density is higher than 10W/m², the project emissions of the project are equal to zero. Therefore, the emission reductions generated during the monitoring period are equal to baseline emissions.

Leakage emissions:

Leakage emissions are neglected and assumed as zero as per the Methodology/07/.

The baseline emissions in the monitoring period are calculated using the following formula:

Emission reductions are calculated as per ACM0002/07/.

$$ER_y = BE_y - PE_y \quad \text{Equation (17)}$$

² EF for the 1st crediting period is taken from the VCS PD/02/.

³ EF for the 2nd Crediting period is mentioned in section 3.4.6 of this report.

Where:

ER_y: Emission reductions in year y (tCO₂/yr).

BE_y: Baseline emissions in year y (tCO₂/yr).

PE_y: Project emissions in year y (tCO₂/yr); validated value = 0.

BE_y = EG_{facility,y} * EF_{grid,CM,y}

$$ER_y = 361,957 - 0$$

$$ER_y = 361,957 \text{ tCO}_2\text{e}$$

The total emission reduction during the current monitoring period – **01/11/2017 to 31/12/2022** is **361,957 tCO₂e**. The net GHG emission reductions/removals are provided in the following table.

Table 1- The net GHG emission reductions/removals in First Crediting Period.

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
(01-November-2017 - 31-December-2017)	3,356.00	0.00	0.00	3,356.00
Year 2018	90,144.00	0.00	0.00	90,144.00
Year 2019	72,669.00	0.00	0.00	72,669.00
Year 2020	65,970.00	0.00	0.00	65,970.00
Year 2021	56,318.00	0.00	0.00	56,318.00
(01-January-2022 - 30-May-2022)	48,384.00	0.00	0.00	48,384.00
Total	336,841	0.00	0.00	336,841

Table 2- The net GHG emission reductions/removals in Second Crediting Period

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
------	---	--	--	--

(31-May-2022 - 31-December-2022) (2 nd CP)	25,116.00	0.00	0.00	25,116.00
Total	25,116	0.00	0.00	25,116

The assessment team confirms that the calculation and data is authentic. The quality of supporting documents submitted for validation and verification are adequate. The assessment team has checked the quality and maintenance of the supporting documents during the remote site visit to confirm the authenticity of the documents and to check the appropriate calculations. The assessment team confirms that the proper evidence is available for the whole monitoring period and the same is verifiable and the data collection system meets the requirement of the monitoring plan and the applied methodology according to the assessment carried out.

The assessment team confirms the quality of evidence to determine the GHG reductions are satisfactory and the detailed information regarding the roles and responsibilities have been provided in the Joint PD-MR/01/.

5 VALIDATION AND VERIFICATION OPINION

Earthood, contracted by Ayen Enerji A.S. (PP), has performed the independent joint validation & verification of the project activity “Büyükdüz Hydroelectric Power Plant, Turkey”. The PP is responsible for the information about the implementation of the project activity.

Earthood commenced the joint validation & verification based on the baseline and monitoring methodology ACM0002 version 21.0/07/ and joint VCS PD-MR/01/ and ERs estimated and calculation spreadsheet/03/.

Earthood’s validation approach is based on the understanding of the risks associated with reporting the project activity, estimates of GHG emission data and the controls to be implemented to mitigate these. Earthood planned and performed the validation and verification by obtaining evidence, remote site visit, other information, and explanations that ESPL considered necessary to give reasonable assurance that the estimated GHG emission reductions are fairly to be achieved.

Further, the validation and verification of the GHG statement was conducted in accordance with ISO 14064-3; 2019 by the ESPL assessment team.

Therefore, the VVB confirms that:

- The project activity is in accordance with all relevant host country criteria (Türkiye) and VCS rules and requirements.
- The project activity is in accordance with all conditions of the latest version of the applied methodology.
- The environmental assessment is appropriate and sufficient.
- the monitoring plan is transparent and adequate.
- All information has been consistently applied in the VCS Joint PD-MR/01/.
- The implementation of the project has been done as per description in the VCS Joint PD-MR/01/.

Quantity of GHG emission reductions or removals in tCO₂ equivalents are estimated to be 8,87,088 tCO₂ throughout the second crediting period and 88,708 tCO₂ is the annual average reduced ERs. The validated ex-ante emissions reductions are as follows:

Year	Estimated GHG emission reductions or removals for CPII (tCO ₂ e)
31-05-2022 - 31-12-2022	52,210
01-01-2023 - 31-12-2023	88,636
01-01-2024 - 31-12-2024	88,879
01-01-2025 - 31-12-2025	88,636
01-01-2026 - 31-12-2026	88,636
01-01-2027 - 31-12-2027	88,636
01-01-2028 - 31-12-2028	88,679
01-01-2029 - 31-12-2029	88,636
01-01-2030 - 31-12-2030	88,636
01-01-2031 - 31-12-2031	88,636
01-01-2032 - 30-05-2032	36,669
Total estimated ERs	887,088
Total number of crediting years	10
Average annual ERs	88,708

Quantity of GHG emission reductions or removals in tCO₂ equivalent achieved by the project during the verification period is as follows:

Verification period: **01/11/2017 to 31/12/2022**

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

Table 3- The net GHG emission reductions/removals in First Crediting Period.

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
(01-November-2017 - 31-December-2017)	3,356.00	0.00	0.00	3,356.00
Year 2018	90,144.00	0.00	0.00	90,144.00
Year 2019	72,669.00	0.00	0.00	72,669.00
Year 2020	65,970.00	0.00	0.00	65,970.00
Year 2021	56,318.00	0.00	0.00	56,318.00
(01-January-2022 - 30-May-2022)	48,384.00	0.00	0.00	48,384.00
Total	336,841	0.00	0.00	336,841

Table 4- The net GHG emission reductions/removals in Second Crediting Period

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
(31-May-2022 - 31-December-2022) (2 nd CP)	25,116.00	0.00	0.00	25,116.00
Total	25,116	0.00	0.00	25,116

The total Verified GHG emission reductions and removals for the Verification period (01/11/2017 to 31/12/2022) is **361,957 tCO_{2e}**.

Comparison between the estimated ex-ante GHG emission reductions and removals and the achieved emission reductions and removals for the current monitoring period is reported below:

<u>Ex-ante emissions reductions /removals</u>	<u>Achieved emissions reductions /removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
522,804	361,957	-30.77%	There is a -30.77% difference in the ex-ante estimates and the actual emission reductions obtained for the second monitoring period. This difference is observed due to external physical conditions such precipitation rates and the flow rate which are not under the control of the PP. As a result, the actual emission reductions are less than the estimated emission reduction amount. The difference is due to change in plant load factor and the same is dependent on water availability.

Approved by



Dr. Kaviraj Singh
Managing Director
Earthood Services Private Limited

Date: 07/12/2023

Place: Gurgaon, Haryana

APPENDIX I: LIST OF DOCUMENTS REFERRED

S.No.	Title of document	Version	Date
1.	VCS joint PD-MR	7.0	Dated: 05/12/2023
2.	First VCS registered PD	2.0	Dated: 29/05/2014
3.	Emission Reduction calculation sheet	Version 2.0	-
4.	VCS Program guide	4.4	Dated: 29/07/2023
5.	VCS Standard, Version 4.5	4.5	Dated: 04/10/2023
6.	VCS VVB Manual	3.2	Dated: 19/10/2016
7.	ACM0002 “Large-scale Consolidated Methodology: Grid-connected Electricity Generation from Renewable Sources” Version 21.0	Version 21	Dated: 02/11/2022
8.	Tool to calculate the emission factor for an electricity system (Version 07.0.0)	Version 7	-
9.	Tool for the demonstration and assessment of additionality (Version 07.0.0)	Version 7	
10.	Tool to determine the remaining lifetime of the equipment (Version 01.0.0)	Version 1	
11.	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)	Version 03.0.1	
12.	CDM Standard Sampling and surveys for CDM project activities and programmes of activities	Version 9	Dated: 13/09/2012
13.	Generation License	-	Dated: 20/03/2008
14.	Technical specifications of the hydroelectric turbines	-	-
15.	Provisional Acceptance Protocol	-	31/05/2012

16.	Remote audit for the project activity	-	17/02/2023
17.	EIA Certificate	-	08/02/2008
18.	Declaration/ confirmation by PP that the project activity will not seek credits under any other program	-	06/08/2020
19.	Water user agreement	-	-
20.	SGK (Social Security Institution) Records and	-	PP
21.	HSE training certificates	-	PP
22.	Wastewater declaration document	-	Dated: 04/09/2020
23.	Hazardous waste Declaration document	-	Dated: 16/03/2020
24.	EPIAŞ data	-	-
25.	Electricity meter first index detection protocol	-	Dated- 01/06/2012
26.	Old Meters Test Protocol reports		Dated- 01/06/2012, 19/12/2013, 17/10/2014, 26/11/2015, 25/10/2016, 11/10/2017, 03/10/2018.
27.	New meter change and first index protocol	-	Dated- 07/10/2020
28.	New meter test protocol	-	Dated- 07/10/2022
29.	Photographs of energy meter	-	-
30.	Ecosystem Marketplace State of the Voluntary Carbon Markets 2012 Report	-	2012
31.	Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy (Law No: 5346, Issuance Date: 18.05.2005)	-	Issuance Date: 18.05.2005
32.	Feasibility Study Report for Büyükdüz Hydroelectric Power Plant, Turkey. Latest (3rd) revision of FSR made by Mühendislik Müşavirlik Ltd. Şti.	-	October 2010
33.	"Guidelines on Common Practice" v02	Version 02	
34.	On-site visit exemption request		Dated- 16/03/2023
35.	Approved VERRA Response to On-site visit exemption request		Dated- 07/08/2023

36.	Damodaran, Aswath (2011) Country Default Spreads and Risk Premiums for 2010 http://people.stern.nyu.edu/adamodar/pc/archives/ctryprem10.xls		07/01/2011
37.	Turkey National Electric Network Emission Factor information sheet, 2020. Link- https://enerji.gov.tr//Media/Dizin/EVCED/tr/ÇevreVeİklîm/İklimDeğişikliği/TUESEmisyonFktr/Belgeler/Bform2020.pdf		Dated- 02/09/2022
38.	Site Photographs	-	-
39.	UTM to Latitude and Longitude Converter, link- UTM to Latitude and Longitude Converter (engineeringtoolbox.com)	-	-
40.	VCS Standard, Version 4.4	4.4	Dated: 17/01/2023

APPENDIX II: ABBREVIATIONS

Abbreviations	Full texts
BE	Baseline Emission
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CL	Clarification Request
VVB	Validation and Verification Body
ER	Emission Reduction
ESPL	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse gas(es)
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PE	Project Emission
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change

VCS	Verified Carbon Standard
VCS-PD	VCS – Project Description
VCU	Verified Carbon Unit
XLS	Emission Reduction Calculation Spread Sheet
SLD	Single Line Diagram
JMR	Joint Meter Reading
PPA	Power Purchase Agreement
ESIA	Environment and Social Impact Assessment
ESMP	Environment and Social Management Plan

APPENDIX III: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Competence Statement			
Name	Deepika Mahala		
Country	India		
Education	M. Sc. (Environment Management), GGSIP University B.Sc. Hons. (Chemistry), Sri Venkateshwar College, DU		
Experience	6 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	ACM0002, AMS.I.D., AMS.I.A, AMS.III.AV, AMS.II.G, AMS-II.C		
Local expert	YES (India, Bangladesh)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2 & TA 3.1)		
Reviewed by	Shifali Guleria (QM)	Date	28/04/2022
Approved by	Kaviraj Singh (MD)	Date	28/04/2022

Competence Statement	
Name	Jahnabi Kalita
Education	M.Sc. Environment Management

Experience	1 year		
Field	Environment, Climate change		
Approved Roles			
Team Leader	Yes (VM)		
Validator	Yes (VM)		
Verifier	Yes (VM)		
Local expert	Yes (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	Yes (TA 3.1)		
Reviewed by	Shifali Guleria, Quality Manager	Date	02/06/2023
Approved by	Deepika Mahala, Technical Manager	Date	02/06/2023

Competence Statement			
Name	Riya Sharma		
Education	M.Sc. Biodiversity & Conservation		
Experience	1+ years		
Field	Climate Change & Environment, Forestry		
Approved Roles			
Team Leader	Yes (VM)		
Validator	Yes (VM)		
Verifier	Yes (VM)		
Local expert	Yes (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Reviewed by	Shifali Guleria, Quality Manager	Date	29/11/2022
Approved by	Deepika Mahala, Technical Manager	Date	29/11/2022

Competence Statement			
Name	Fikriye Seda Atabek		
Education	M.Sc. Energy Science and Technology B.Sc. Chemical Engineer		
Experience	11 years		

Field	Energy Science and Technology		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	YES (Turkey)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Reviewed by	Deepika Mahala, Quality Manager	Date	22/12/2021
Approved by	Ashok Gautam, Technical Manager	Date	22/12/2021

Competence Statement			
Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	9 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS.I.A., AMS.I.C., AMS.I.D., AMS.I.F., AMS.II.D., AMS.II.G., AMS.II.J., AMS.III.AV., AMS.III.BL, ACM0002, ACM0012		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1)		
Reviewed by	Shifali Guleria	Date	21/12/2022
Approved by	Deepika Mahala	Date	21/12/2022

Competence Statement	
Name	Kerwyn Donald Dsouza
Education	B. E- Environmental Engineering M. Tech- Renewable Energy Engineering and Management
Experience	7 Years

Field	Renewable Energy, Climate Change, Environment		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	YES (TA 1.2)		
Trainee	YES		
Reviewed by	Shifali Guleria (Quality Manager)	Date	12/07/2023
Approved by	Deepika Mahala (Technical Manager)	Date	12/07/2023

APPENDIX IV: LIST OF FINDINGS

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

FAR ID	Section no.	Date : DD/MM/YYYY
Description of FAR		
No FARs were raised during last verification.		
Project participant response		Date : DD/MM/YYYY
NA		
Documentation provided by project participant		
NA		
VVB assessment		Date: DD/MM/YYYY
NA		

Table 2.CL from this verification

CL ID	01	Section no.	1.9	Date : 07/02/2023
Description of CL				
The crediting period mentioned in section 1.9 of the PD/MR states that the first crediting period was 10 years; 31/05/2012-30/05/2022 (both days included) and the crediting period was renewable twice. Please explain in reference to VCS Standard 3.9.1 whether the project crediting period is fixed or renewable. How is the project adhering to the above para of VCS standard?				
Project participant response				Date : 14/03/2023
Explained in reference to VCS Standard.				
Documentation provided by project participant				
See [VCS Standard v4.2], Section 3.9.				
VVB assessment				Date: 21/08/2023

The assessment team reviewed section 1.9 of the revised joint PD/MR version 2.0 and found that the PP has added a footnote indicating the version of the applied VCS standard as version 4.2. However, the latest version of the VCS standard available as per the VERRA website is version 4.4. As per the rules, the latest standard should be applied during validation.	
Hence this finding is Open	
Project participant response	Date : 29/08/2023
<i>Latest version of VCS standard 4.4 has been added as a footnote.</i>	
Documentation provided by project participant	
<i>Revised Joint PD&MR.</i>	
VVB assessment	Date: 05/09/2023
The assessment team reviewed section 1.9 of the revised joint PD/MR version 3.0 and found that the PP has updated the foot note to the latest version of the VCS standard, i.e., Version 4.4.	
Hence, this finding is closed.	

CL ID	02	Section no.	1.11, 3.4	Date : 07/02/2023
Description of CL				
In the section 1.11 of the PD/MR, it has been mentioned that “there is no descriptive information about the age and average lifetime of the equipment based on manufacturer’s specifications”. However, the generation license was granted for 49 years and 35 years is accepted as the expected lifetime of the project. PP shall justify how the lifetime of the project is in compliance with tool 10 "Tool to determine the remaining lifetime of equipment". Also, share sufficient evidence to substantiate it. In the same section, description of the equipment other than the turbine could not be found. Energy meters description is not included. Please refer VCS PD/MR section 1.11 template guidelines which says for non-AFOLU project, include a list and the arrangement of the main manufacturing/production technologies, systems and equipment involved. Include in the description information about the age and average lifetime of the equipment based on manufacturer’s specifications and industry standards, and existing and forecast installed capacities, load factors and efficiencies. In other section 3.4 of PD/MR, it was mentioned that “the technical lifetime of the equipment exceeds the crediting period for which renewal is requested. Equipment only requires regular maintenance”. (a) It is not clear when the lifetime of the project determined as 35 years, how is it exceeds the crediting period for which renewal? (b) When stating that “equipment only requires regular maintenance”, please specify the basis of it.				
Project participant response				Date : 14/03/2023
<i>Revised.</i> <i>Description of the equipments are added to Section 1.11.</i> <i>According to Tool 10, hydro turbines lifetime are 150,000 hours (18 years) which exceeds the crediting period. Section 3.4. of MR are revised due to this information.</i>				
Documentation provided by project participant				
NA				
VVB assessment				Date: 21/08/2023
The assessment team has reviewed the updated PD/MR and it is found that, The PP has revised the section 1.11 of the PD/MR, but it is still unclear how 35 years is accepted as the expected lifetime of the project. PP is requested to provide documentary evidence regarding the same. Hence this finding is Open. The PP has included the description of the systems and equipment involved in the project activity to section 1.11 of the updated PD/MR. Hence this finding is closed.				

In Section 3.4 of the revised PD/MR, The PP has mentioned that the technical lifetime of the equipment, (hydro turbines) are 150,000 hours (18 years) and lifetime exceeds the crediting period for which renewal is requested. If the commissioning date (31/05/2012) is taken as the start of the lifetime of the project and 18 years is taken as the technical lifetime of the equipment, (hydro turbines), then the 18 th year of the project lies within the second crediting period. PP is requested to explain how "lifetime exceeds the crediting period for which renewal is requested".	
Hence, this finding is Open	
Project participant response	Date :31/08/2023
The necessary explanation have been done in section 1.11. Moreover, the lifetime of 35 years is determined in the project description document in the first crediting period. Please see the registered Project Description. It has been explained how the "lifetime exceeds the crediting period for which renewal is requested" in section 3.4.	
Documentation provided by project participant	
Revised Joint PD&MR.	
VVB assessment	Date: 05/09/2023
The assessment team has reviewed the updated PD/MR and it is found that, The PP has revised section 1.11 of the MR, the same is also present in the registered Project Description. Hence, this finding is closed. The PP has revised section 3.4, which now clearly explains how the lifetime exceeds the crediting period for which renewal is requested. Hence, this finding is closed.	

CL ID	03	Section no.	1.17.1, 1.17.2	Date : 07/02/2023
Description of CL				
- Section 1.17.1 sustainable development contributions does not provide clarity on the achieved SDG impacts of second monitoring period and estimated SDG impacts of second crediting period. - The verification assessment is to be done for the monitoring period 01/11/2017 to 31/12/2022 which is falling under 1st crediting period (31/05/2012 to 30/05/2022) and second crediting period; and the renewal of crediting period is to be done for the second crediting period which is 31/05/2022 to 30/05/2032. Please provide clear information of each SDG for validation and verification scopes. - There are four SDGs reported in section 1.17.1 which are SDG 7, 8, 12 and 13. However, the same has not been clearly given project contributions in section 1.17.2 under table 3. - Current project contributions and contributions over project lifetime are given for the second monitoring period and first CP. There is no mention of SDG for the second crediting period which is a part of the current assessment. - In regard to description of SDG, please mention the correct description of the indicator 7.2.1 which is renewable energy share in the total final energy consumption. - For SDG 8, it is mentioned that project provided employment to more than 20 people in the monitoring period and provided H&S training to employees. However, the same could not be confirmed in table 3 sustainable development contributions				
Project participant response				Date : 14/03/2023
- Revised. a) SDG 7,8,12 and 13 are given in table 3. b) Revised. - Description of SDG 7.2.1 is corrected. - SDG 8 is added to table 3.				
Documentation provided by project participant				

NA	
VVB assessment	Date: 21/08/2023
The assessment team has reviewed the updated PD/MR and it is found that, 1. The PP has included the estimated SDG impacts for the current monitoring period under section 1.17.1 of the joint PD/MR. However, The SDG impacts estimated over the second crediting period have not been included. Hence, this finding is Open. 2. Under section 1.17.2, In table 3, PP has included the SDG 7, 8, 12 and 13. In the VCS Monitoring report template guidelines in table 1 under section 1.17.2, below the column "Current Project Contributions" it is stated that "Brief description of the quantifiable impact of the project's activities related to the SDG indicator, during the monitoring period.". However, the quantifiable impact of the applied SDG indicators for the current monitoring period and over the project lifetime of the project activity has not been mentioned in table 3 under section 1.17.1 of the joint PD/MR. Hence, the finding remains open. 3. The PP has revised and the correct description of the indicator 7.2.1 and has been included the description in table 3 of the joint PD/MR. Hence, this finding is Closed. 4. Under section 1.17.1 of the joint PD/MR, the PP mentioned that more than 20 people were employed and provided H&S training during the monitoring period. However, the same could not be confirmed in table 3 sustainable development contributions and through the documentary evidence provided by the PP. Also, the PP is requested to mention the quantifiable impact of the applied SDG 8.8 for the current monitoring period and over the project lifetime of the project activity. Hence, the finding remains Open.	
Project participant response	Date : 31/08/2023
1. The expected SDG contributions have been included now in section 1.17.1. SDG impacts for current monitoring period have been moved under Section 1.17.2. Sustainable Development Contributions Activity monitoring. 2. Table 3 has been revised. And additional supporting documents have been provided to VVB. 4. 24 people have been employed and H&S training have been provided to all employees during this MP. SGK records have been provided to VVB under additional documents.	
Documentation provided by project participant	
Revised Joint PD&MR and Additional supporting documents.	
VVB assessment	Date: 05/09/2023
The assessment team has reviewed the updated PD/MR and it is found that, 1) The PP has revised section 1.17.1 of the PD/MR and now has included the SDG impacts estimated over the second crediting period. Hence, this finding is Closed. 2) The PP has revised Table 3 under section 1.17.2 of the updated PD/MR and the table now contains the quantifiable impact of the project's activities related to the SDG indicator for the current monitoring period and over the project lifetime. Hence, this finding is Closed. 3) This finding is closed. 4) The revised Section 1.17.1 of the PD/MR now clearly states the number of people employed and provided H&S training for the current monitoring period and over the project lifetime of the project activity. Hence, this finding is Closed.	

CL ID	04	Section no.	2.1	Date : 07/02/2023
Description of CL				

In the section 2.1, it was found that PP has carried out Büyükdüz HEPP's social and environmental performance assessment. Please explain about the assessment and its conclusion. Also, clarify whether any further assessment conducted before the beginning of second crediting period. In line to the VCS PD/MR template guidelines of section 2.1, PP is required to summarize any potential negative environmental and socio-economic impacts and the steps taken to mitigate them.	
Project participant response	Date : 14/03/2023
<i>Social and environmental impacts are explained.</i>	
Documentation provided by project participant	
VVB assessment	Date: 21/08/2023
The assessment team has reviewed section 2.1 of the updated PD/MR and it is found that, The document that has been shared by the PP has been reviewed and all potential environmental impacts have been identified and is stated in the PD/MR and is found to be appropriate. However, PP is requested to clarify if any further assessment had been conducted before the beginning of second crediting period. Hence, the finding remains Open.	
Project participant response	Date : 29/08/2023
<i>Section 2.1 has been revised now.</i>	
Documentation provided by project participant	
<i>Revised Joint PD&MR.</i>	
VVB assessment	Date: 05/09/2023
The PP has updated section 2.1 of the updated PD/MR and has mentioned that no further social and environmental performance assessment had been conducted before the beginning of the second crediting period. Hence, this finding is Closed.	

CL ID	05	Section no.	2.2	Date : 07/02/2023
Description of CL				
1. In reference to template guidelines of section 2.2 local stakeholder consultation of PD/MR, PP shall clarify whether any grievance has been recorded in the logbook for the monitoring period 01/11/2017 to 31/12/2022. Also, share the evidence to demonstrate the same. 2. PP shall also share local stakeholder consultation report or any document to check the engagement procedures and consultation date (18/10/2017) and associated protocol signing date 24/07/2020.				
Project participant response				Date :14/03/2023
<i>It is clarified that no grievance has been recorded in the logbook for the MP.</i>				
Documentation provided by project participant				
VVB assessment				Date: 21/08/2023
1. The assessment team has reviewed the updated PD/MR and it is found that the PP has updated section 2.2 and has stated that there are no grievances recorded during the current monitoring period. Hence, this finding is closed. 2. The PP has not provided the share local stakeholder consultation report or any document to check the engagement procedures and consultation date (18/10/2017) and associated protocol signing date 24/07/2020. Hence, this finding is open.				
Project participant response				Date : 29/08/2023
<i>2- Section 2.2. has been revised now.</i>				
Documentation provided by project participant				
<i>Revised Joint PD&MR.</i>				

VVB assessment	Date: 05/09/2023
1) This finding is closed. 2) The assessment team has reviewed the updated PD/MR and it was found that the PP has updated section 2.2 and has revised the dates when the stakeholder engagement was conducted. Hence, this finding is closed.	

CL ID	06	Section no.	6.1, 6.2	Date : 07/02/2023
Description of CL				
1. Section 6.1 and 6.2 PD/MR 1) Parameters available at validation in the registered PDD v2.0 dated 26/05/2014 and Monitoring report v2.0 dated 09/02/2021 of first verifications are EGgross,y, EGy, EG gross,i,y, EG i,y, EG import,y, EFgrid,CM,y, FC i,y, NCV i,y, EF CO2,i,y, η i,y, and CAP BM. While the parameters mentioned in section 6.1 of the PD/MR are EFgrid,BM,y, EFgrid,OM,y, EFgrid,CM,y. PP shall explain the inconsistency in the reporting of the parameters. 2. The weblinks of government website provided in the parameter tables in row 'source of data' are not accessible. Please check and provide the active and accessible weblinks in the PD/MR. 3. In the ER calculation sheet, worksheet "ER of Buyukduz HPP", value of emission factor mentioned in cell G77 is 0.535 tCO2/MWh while the value applied given in PD/MR is 0.4616 tCO2/MWh.				

Project participant response	Date : 14/03/2023
1. Missing parameters are added. 2. Weblinks are checked. 3. For the first crediting period, value of emission factor mentioned in cell G77 (0.535) which is taken from PDD is used. However, for the second crediting period calculations, value of emission factor mentioned in worksheet "Emission Factors" in cell C7 (0.4616) is used.	

Documentation provided by project participant

VVB assessment	Date: 21/08/2023
The assessment team has reviewed the updated PD/MR and the following conclusions were found. 1. The PP has added the missing parameters to section 6.1 of the updated PD/MR. 2) Hence, this finding is closed. 2. The weblinks of government website provided in the parameter tables in row 'source of data' are still found to be not accessible. PP is requested to recheck the weblinks again. 3) Hence, this finding is Open. 3. The value of emission factor mentioned for the first crediting period is 0.535 tCO2/MWh and for the second crediting period is 0.4616 tCO2/MWh, which is mentioned clearly in the revised PD/MR. 4) Hence, this finding is closed. 5)	

Project participant response	Date : 28/08/2023
2- The source in the Web Link for the EF parameter is provided to VVB as an additional document.	

Documentation provided by project participant

Additional supporting documents

VVB assessment	Date: 05/09/2023
The PP has provided a PDF of the source for the EF parameters, where the values used to calculate the emission factor can be verified. Hence, this finding is closed.	

Table 3.CAR from this verification

CAR ID	01	Section no.	1.1	Date : 07/02/2023
Description of CAR				
In section 1.1 of the PD/MR, annual average GHG ERs of the second crediting period is not mentioned. Moreover, annual average and total calculated GHG ERs of the second monitoring period are not given. As per the VCS PD/MR section 1.1 template guidelines, it is required to provide an estimate of annual average and total GHG emission reductions and removals.				
Project participant response				Date : 14/03/2023
<i>ERs of the second crediting period and second monitoring period are mentioned in section 1.1.</i>				
Documentation provided by project participant				
VVB assessment				Date: 21/08/2023
The assessment team has reviewed the updated PD/MR and it is found that the PP has updated section 1.1 and has included the estimated ERs for the second crediting period which is 886,856 tCO ₂ e.				
Hence, this finding is closed.				

CAR ID	02	Section no.	1.3	Date : 07/02/2023
Description of CAR				
In line with the VCS PD/MR section 1.3 template guidelines, it is required to describe and justify how the project is eligible under the scope of the VCS Program. Section 1.3 of the current PD/MR does not provide the justification of project eligibility as per the VCS requirements. Please refer VCS Standard section 2.1 and 3.1 and provide the relevance of the justification of project eligibility against each applicability criterion.				
Project participant response				Date 15/03/2023
<i>Revised.</i>				
Documentation provided by project participant				
VVB assessment				Date: 21/08/2023
The assessment team has reviewed the updated PD/MR and it is found that the PP has updated section 1.3 according to the VCS guidelines.				
Hence, this finding is closed.				

CAR ID	03	Section no.	1.16.3	Date : 07/02/2023
Description of CAR				
Section 1.16.3 Supply Chain (Scope 3) Emissions was found missing from the submitted VCS PD/MR. Please refer VCS PD/MR template guidelines which says that "complete all sections using Franklin Gothic Book 10.5 pt, black, regular (non-italic) font. State if a section is not applicable it must be stated under the section (the section must not be deleted from the final document)".				
Project participant response				Date : 14/03/2023
<i>Section 1.16.3 is added and state that it is not applicable.</i>				
Documentation provided by project participant				
VVB assessment				Date: 21/08/2023
The assessment team has reviewed the updated PD/MR and it is found that the PP has included section 1.16.3, as per the latest VCS template guidelines.				
Hence, this finding is closed.				

CAR ID	04	Section no.	3.2, 3.3	Date : 03/02/2023
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Description of CAR	
Section 3.2 PD/MR 1. Applicability criteria 5, 6, 8, 10 and 11 of applied methodology ACM0002 could not be found demonstrated and justified as per the requirements. Project eligibility against the applicability criteria of applied tools have not been added in PD/MR. 2. As per VCS PD/MR template guidelines of section 3.2, it is required to demonstrate and justify how the project activity(s) meets each of the applicability conditions of the methodology(s), and tools (where applicable) applied by the project. Address each applicability condition separately. Section 3.3 PD/MR 3. Project boundary diagram is missing from the section 3.3 of the submitted PD/MR. According to VCS PD/MR template guidelines of section 3.3, in addition to the table, PP is required to provide a diagram or map of the project boundary, clearly showing the physical locations of the various installations or management activities taking place as part of the project activity based on the description provided in Section 1.11 (Description of the Project Activity) above. For non-AFOLU projects, include in the diagram the equipment, systems and flows of mass and energy. Include the GHG emission sources identified in the project boundary.	
Project participant response	Date : 14/03/2023
1-Section 3.2 is revised. 2- Revised. 3- Project boundary diagram is added in section 3.3.	
Documentation provided by project participant	
VVB assessment	Date: 21/08/2023
The assessment team has reviewed the updated PD/MR and it is found that, 1. The PP has revised section 3.2 of the PD/MR to add the Project eligibility against the applicability criteria of applied tools. 6) Hence, this finding is closed. 2. The PP has revised section 3.2 of the PD/MR as per VCS PD/MR template guidelines of section 3.2 and has demonstrate and justified how the project activity(s) meets each of the applicability conditions of the methodology(s), and tools (where applicable) applied by the project. 7) Hence, this finding is closed. 3. The PP has included the Project boundary diagram in section 3.3 of the revised PD/MR. 8) Hence, this finding is closed.	

CAR ID	05	Section no.	7.5	Date : 03/02/2023
Description of CAR				
Section 7.5 of the PD/MR In this section, the achieved ERs reported in table are higher while the statement given under the table is reflecting that actual ERs are lower. Please check. The percent difference is -30.76% for which the justification given is the physical condition flow rate. Please justify the identified difference and provide explanation in the PD/MR. VVB checked the last verification report (MP: 31/05/2012 to 31/10/2017) and it was found that the net GHG ERs was 364,219 tCO₂e. In the current MP (01/11/2017 to 30/05/2022), the ERs coming out are 522,804 tCO₂. The reason of higher ERs in this monitoring period is not clear.				
Project participant response				Date : 14/03/2023
Revised. Values are correctly named in the table. Explanation for the difference is added.				
Documentation provided by project participant				

VVB assessment	Date: 21/08/2023
The assessment team has reviewed the updated PD/MR and it is found that the PP has revised the values correctly in section 7.5 of the latest PD/MR. The correct value of achieved GHG ERs was 361,985 tCO ₂ e for the current monitoring period which is confirmed from the provided ER sheet.	
Hence, this finding is closed.	

CAR ID	06	Section no.		Date : 18/09/2023
Description of CAR				
1. In the ER sheet, tab "ER of Büyükdüz HPP", cell "C68". The value of electricity supplied to the grid for the month of October 2022 for Meter 1 is 69.28 MWh according to the EPIAS screen shorts evidence provided by the PP. The value provided in the ER sheet is 62.28 MWh. PP is requested to clarify. 2. In the ER sheet, tab "ER of Büyükdüz HPP", cell "C64 & E64". The value of electricity supplied to the grid for the month of June 2022 for Meter 1 is 16,054.381 MWh according to the EPIAS screen shorts evidence provided by the PP. The value provided in the ER sheet for meter 1 is 21,129.997 MWh which is the value of electricity supplied to the grid for Meter 2 of the same month. The two values of electricity supplied to the grid have been interchanged for meter 1 and meter 2. PP is requested to address the issue.				
Project participant response				Date : 20/09/2023
1. The value in the ER sheet, tab "ER of Büyükdüz HPP", cell "C68" has been revised as 69.28. All the changing values that came with this were also revised in Joint PD&MR. 2. The values in "C64 & E64" has been corrected now. All the changing values that came with this were also revised in Joint PD&MR.				
Documentation provided by project participant				
Revised Excel Sheet and revised Joint PD&MR.				
VVB assessment				Date: 23/09/2023
The PP has made the necessary corrections in the ER sheet and the data is found to be accurate.				
Hence, this finding is closed				

Table 4.FAR from this verification

FAR ID	01	Section No.	2.4	Date : 06/12/2023
Description of FAR				
The next verifying VVB shall conduct an on-site audit inline with para 4.1.2 of VCS standard, version 4.5 "A site visit that includes a visit to facilities and/or project areas shall be conducted at verification under the following circumstances: 1) The first verification of the project after validation"				
Project participant response				Date : DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
VVB assessment				Date: DD/MM/YYYY
NA				