



# Verified Carbon Standard

## BOYABAT HYDROELECTRIC POWER PLANT



Document Prepared by

LGAI Technological Center S.A. (Applus+ Certification)

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## Summary:

LGAI Technological Center S.A. (Applus+ Certification) (Hereafter referred as Applus+ Certification) has been appointed by “Boyabat Elektrik Uretim ve Ticaret A.S.” to perform the Joint RCP validation and verification of the “Boyabat Hydroelectric Power Plant”.

The project includes the installation of a dam and hydroelectric power plant (HEPP) with an installed capacity of 528 MWm / 513 MWe on Kızılırmak River in Sinop city of Turkey. The purpose of the project activity is to generate electricity and supply it into national grid of Turkey. The project activity reduces greenhouse gas (GHG) emissions that would have otherwise occurred in the absence of the project activity by avoiding electricity generation from fossil fuel sources and it includes the installation of three vertical axis Francis turbines each having installed capacity of 176 MWm / 171 MWe.

**Validation of the Renewal of Crediting Period purpose:** The project is registered with VCS Project ID 1345<sup>1/</sup>. The start date of the project activity is the 29-November-2012. This is the earliest date of commissioning of the project activity, The monitoring period is completely covering under 1<sup>st</sup> crediting period. The First Crediting Period was from 29-November-2012 to 28-November-2022 and 2<sup>nd</sup> Crediting Period chosen 29-November-2022 to 28-November-2032 (both days included). The project activity is estimated to generate 1,370,000 MWh of electricity annually; thus, reducing GHGs to the tune of 500,272 tCO<sub>2e</sub>/ annum for the entire second crediting period of 10 years.

**Verification purpose:** The main purpose of this verification activity is to have an independent third party for the assessment of the project design, monitoring report to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements.

The monitoring period covered under this periodic verification is 01-May-2020 to 28-November-2022 (including both days) under 1<sup>st</sup> crediting period (i.e 29-November-2012 to 28-November-2022) and the project activity achieved a total 544,660 tCO<sub>2e</sub> emission reductions during this monitoring period thereon displaced 1,286,967.88 MWh amount of electricity from the generation-mix of power plants connected to the National Grid of Turkey, which is mainly dominated by thermal/fossil fuel-based power plant.

The scope of the RCP Validation and verification is the independent and objective review of the Joint Project Description (PD) and Monitoring Report (MR). The joint PD & MR is reviewed against the relevant criteria (see above) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM validation and verification standard for project activities, version 03.0, review against previous registered project documents, VCS program guideline version 4.3 and VCS Standard version 4.4.

A risk-based approach has been followed to perform this RCP validation and verification activity. In the course of verification, 06 Corrective Action request (CAR) and 04 Clarification Requests (CLs) were raised and successfully closed. No FAR was raised during this RCP validation and verification. The review of the joint PD & MR and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and PP have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

The assessment team has employed a risk-based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of VCUs. The RCP validation and verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the Joint PD & monitoring report combined.

The only purpose of the verification is its usage during the issuance process as part of the VCS project cycle. Therefore, LGAI Technological Center S.A. (Applus+ Certification) can't be held liable by any party for decisions made or not made based on the verification opinion, which will go beyond that purpose.

The RCP validation and verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for document verifications. The entire documents checked/verification conducted to arrive at positive verification conclusions.

Applus+ certification confirms that the project is meeting the criteria specified by VCS joint PD and MR template version 4.2, VCS Standard version 4.4 and applied methodology ACM0002 Version 14 for crediting period 1<sup>st</sup> and ACM0002 Version 21 for 2<sup>nd</sup> crediting period. Hence the project activity is successfully validated and certified for emission reductions under VCS. Further confirms a positive validation opinion confirming the project complies with the applicable VCS requirements, thus recommending the project for Renewable of crediting period. Our opinion relates to the project's GHG emission and the resulting GHG emission reduction reported and related to the valid project baselines and monitoring and its associated documents.

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# 1 INTRODUCTION

## 1.1 Objective

LGAI Technological Center S.A. (Hereafter referred as Applus+ Certification) has been appointed by “Boyabat Elektrik Uretim ve Ticaret A.S.” to perform the RCP validation and verification of the “Boyabat Hydroelectric Power Plant” under guideline version 4.3 and VCS Standard version 4.4. The objective of this validation for renewal of crediting period and verification activity is to have an independent third party for the assessment of the project design, Joint PD & Monitoring Report and Final Joint Validation and Verification report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular.

The project's baseline is assessed against “ACM0002 Version 14.0<sup>/05/</sup> for 1<sup>st</sup> crediting period. (MP: 01-May-2020 to 28-November-2022)

The project's baseline is assessed against “ACM0002 Version 21 for 2<sup>nd</sup> Crediting period.

The projects compliance with the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline version 4.3 and standard version 4.4.

CDM validation and verification standard for project activities, Version 03.0

VCS program guideline v4.3

VCS standard v4.4

Joint validation and verification are seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of verified Carbon Units (VCUs) for the renewed crediting period & verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of verified Carbon Units (VCUs).

## 1.2 Scope and Criteria

The scope is defined as an independent and objective review of the Joint VCS PD and Monitoring Report (MR) is prepared as per the approved methodology ACM0002 Version 21.0<sup>/5/</sup> (2<sup>nd</sup> CP). The Joint VCS RCP PD and MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard Version v4.4<sup>/15/</sup> and guideline version 4.3, including the approved baseline and monitoring methodology ACM0002 Version 21.0<sup>/3/</sup>. The RCP validation & verification was based on the requirements in the CDM validation

and verification standard for project activities, Version 03.0/<sup>19/</sup> and VCS program guideline version 4.3/<sup>15/</sup> and VCS Standard version 4.4/<sup>15/</sup>.

The validation & verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the Joint VCD PD and Monitoring report. In line with Guidelines for Application of materiality in validation & verifications, the assessment team has conducted a complete verification of all the information presented in the Joint VCS PD and monitoring report and data presented ex-ante Emission reduction sheet and monitored data presented in the emission reduction calculation spread sheet. It invoices follows the paper trail back to the raw data such as meter reading records and invoices. There are no material errors, overestimation of ER, omission or misstatement. The validation/verification team has reviewed all the documents like commissioning certificates/<sup>2/</sup>, Monthly Meter Readings, electricity sales records etc.

### 1.3 Reasonableness of Assumption and Level of Assurance

The Joint revalidation and verification have been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. The entire documents checked/Power plant verification conducted through onsite visit to arrive at positive validation and verification conclusions.

### 1.4 Summary Description of the Project

The project activity is hydro based power generation by 513 MWe capacity Hydroelectric Power plant. The 528 MWm/513 MWe<sup>1</sup> Boyabat HPP produces electricity for transmission into the national grid at Central Black Sea Geographical Region/Sinop Province Turkey.

Location of project site is mentioned in the table below:

Name of the PP	Capacity (MW)	Commissioning Date	Latitude	Longitude
Boyabat Elektrik Üretim ve Ticaret A.S.	513 MWe	29-November-2012	41° 20.316' N	35° 0.068' E

Boyabat Hydroelectric Power Plant has been located on Kızılırmak River in Sinop city of Turkey and developed by Boyabat Elektrik Üretim ve Ticaret A.Ş. The project has three vertical axis Francis turbines each having installed capacity of 176 MWm / 171 MWe, so it has a total capacity of 528 MWm / 513 Mwe. The net electricity is measured continuously by three main electricity meters at the grid interface and recorded monthly. There are also three back up electricity meters. The generated electricity supplied to national grid of turkey.

The project activity is estimated to generate 1,370,000 MWh of electricity annually, thus reducing GHGs to the tune of 500,272 tCO<sub>2e</sub>/annum for entire crediting period of 10 years during the 2<sup>nd</sup>

<sup>1</sup> Please see, generation license

crediting period (i.e., 29-November-2022 to 28-November-2032). The start date of the project activity is the 29-November-2012. This is the earliest date of commissioning was 29-November-2012.

In current monitoring period (i.e., 01-May-2020 to 28-November-2022) of under 1<sup>st</sup> CP the project activity has supplied 1,286,967.88 MWh of electricity resulting in GHG emission reductions of 544,660 tCO<sub>2e</sub>.

## 2 VALIDATION AND VERIFICATION PROCESS

### 2.1 Method and Criteria

**Validation and Verification Scope:** The scope is defined as an independent and objective review of the Joint PD & Monitoring report. The RCP VCS PD and MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard, Version 4.4/<sup>15/</sup> and guideline version 4.3/<sup>15/</sup>, including the approved baseline and monitoring methodology ACM0002 (Version 21.0)<sup>5/</sup>. The validation and verification were based on the requirements in the Validation and Verification Standard for project activities, version 03.0/<sup>19/</sup>, and VCS guideline version 4.3/<sup>15/</sup> and standard, version 4.4/<sup>15/</sup>.

The validation and verification are not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the combined project description and the Monitoring report

**Validation and Verification Process:** The project assessment is based on the Clean Development Mechanism Validation and Verification Standard for project activities, version 03.0/<sup>19/</sup> and VCS Standard version 4.4/<sup>15/</sup> and VCS guideline, version 4.3/<sup>15/</sup> and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

Once the project is received by the assessment team, the members of the assessment team carried out:

- I. A desk review of the Joint RCP PD and MR;
- II. Onsite Visit with project participant;
- III. The resolution of outstanding issues and the issuance of the final verification report and opinion.

The prepared Joint RCP validation and verification report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the VCS executive board.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. LGAI Technological Center, S.A. (Applus+ Certification) has developed a specific checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from verifying the identified criteria.

**Appointment of the assessment team**

According to the sectoral scope / technical area and experience in the sectoral or national business environment, LGAI Technological Center S.A. (Applus+ Certification) has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of LGAI Technological Center S.A. (Applus+ Certification).

The composition of audit team shall be approved by the LGAI Technological Center S.A. (Applus+ Certification) ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT).
- Technical Expert (TE).
- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Dr. Atul Takarkhede	LA/TE	YES	YES	NA	YES
Mr. Denny Xue	TR	YES	YES	NA	NA

The complete list of CVs is included as Appendix 3 of this report.

**Document review**

The Joint PD and Monitoring Report version 1 submitted by the PP was reviewed against the approved methodology and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report below in Appendix 1.

## Onsite Visit

An onsite audit was conducted by LGAI Technological Center S.A. (Applus+ Certification) who performed site visit with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report in the below sections.

## Resolution of Clarification and Corrective Action Request

The objective of this phase of the Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the Appendix 2.

The final Joint PD and MR Version 03 dated: 29-March-2023 submitted by PP serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country

## Internal quality control

As final step of a Joint Validation & Verification of the final documentation including the final Joint validation & verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e., each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the project owners the positive verification opinion and relevant documents are submitted to the VCS secretariat through the VCS web-platform

## 2.2 Document Review

The details of the document observed during the RCP validation and verification process are listed in Appendix 1 of this report.

## 2.3 Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Terri	Mr. Mehmat Emre	Boyabat DamPlant Manager	11-February-2023 and 12-February-2023	Project Implementation, Energy Meter &	Dr. Atul Takarkhede

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
2.	Sarigig	Mr. Serkan	Boyabat HPP, Shift Manager		TEIAS, procedure, calibration, grievance mechanism, Management practices, data storage, QA/QC	
3.	Kılıç	Ms. Elif Ekin	Life Energy		GHG calculations, MR and ER preparation, Data collection, data storage, QA/QC	
4.	Odanen	Mr. Suat	Boyabat Dam, Sales Manager			
5.	Fatih	Mr. Gengbay	Boyabat Dam, Mechanical Engineer			

## 2.4 Site Inspections

Duration of Onsite Audit: 11-February-2023 and 12-February-2023				
No.	Activity performed on-site	Site location	Date	Team member
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring. Assessment team also checked that whether the monitoring plan as described in the VCS PD is actually practised onsite. Also, assessment team checked any change in host country criteria which may affect the baseline of the project activity.	Central Black Sea Geographical Region/ Sinop Province, Country: Turkey	11-February-2023 & 12-February-2023	Dr. Atul Takarkhede

## 2.5 Resolution of Findings

The objective of this phase of the Validation and Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues from previous validation which need to be clarified for Applus+ Certification's positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised, and responses given are summarized below in the Appendix 2.

The final joint PD & MR Version 03 submitted<sup>9/</sup> by PP serves as the basis for the final assessment

presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	01	01	00
Description of project activity	00	00	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
Applicability of methodology and standardized baseline	00	00	00
Deviation from methodology	00	00	00
Clarification on applicability of methodology, tool and/or standardized baseline	00	01	00
Project boundary	00	00	00
Establishment and description of baseline scenario	01	00	00
Demonstration of additionality	00	00	00
Emission reductions	01	01	00
Calibration details	00	01	00
Monitoring plan	02	01	00
No Net harm assessment	00	00	00
Local stakeholder consultation	00	01	00
Others (Participation in other GHG program)	00	01	00
<b>Total</b>	<b>04</b>	<b>06</b>	<b>00</b>

The list of findings and the resolution is presented in Appendix 2 of this report.

### 2.5.1 Forward Action Requests

No FAR was raised previously, as the project is undergoing validation and verification currently.

## 3 VALIDATION FINDINGS

### 3.1 Project Details

The project includes the installation of a dam and hydroelectric power plant (HEPP) with an installed capacity of 528 MWm / 513 MWe on Kızılırmak River in Sinop city of Turkey. The plant wise location including latitudes and longitudes are 41° 20.316' N and 35° 0.068' E respectively.

The project activity is estimated to generate 1,370,000 MWh of electricity per annum. The generated electricity will be supplied to national grid of Turkey. The project activity will help in greenhouse gas (GHG) emission reduction by using renewable resources (hydro power energy) for generating power which otherwise would have been generated using grid mix power plants, which is dominated by fossil fuel based thermal power plants. The project activity is a green field project aimed at utilizing hydro to produce power. The project activity is located in Central Black Sea Geographical Region/Sinop

Province Turkey. During Site visit, Geo coordinates checked on Google earth and verification team conclude geo coordinates of project locations are consistent with Joint PD and MR.

The details of Project's commissioning and location are as follows:

**Technical specifications:**

<b>Characteristics of the Reservoir</b>	
Max water level	335 m
Min water level	305 m
Active Volume	1,410,000,000 m <sup>3</sup>
Dead Volume	2,147,000,000 m <sup>3</sup>
Total Volume	3,557,000,000 m <sup>3</sup>
Area of the lake	65,400,000 m <sup>2</sup>
Length of Lake	60 km
<b>Characteristics of Dam Body</b>	
Dam Location	10 km SW of Duragan town centre over the kizilirmak river
Dam Type	Concrete Gravity Dam
Height from base	195 m
Height from river base	147 m
Crest Elevation	335 m
Volume of Body	2,300,000 m <sup>3</sup>
Crest Width	10 m
Crest Length	262 m
Thalweg Elevation	147 m
<b>Characteristics of spillways</b>	
Spillway Type	Concrete Gravity Dam
Number of Units	6
Cover Height	13 m
Cover Width	10 m

Capacity	9300 m <sup>3</sup> / sec
<b>Characteristic of power station</b>	
Type	Semi - Underground
Width	22.5 m
Length	103 m
Annual Generation	1500*106 kWh
Firm Energy Generation	925*106 kWh
Secondary Energy Generation	575*106 kWh

Component	Property
Turbine Type	Francis vertical axis (Three turbine)
Turbine firm	Andritz Hydro (Three Turbine)
Rotation	187.5 r/min
Production Year	2012
Average flow rate	157 m <sup>3</sup> /s
Number of turbines	3
Serial of turbine	BOY 10-01 & BOY 10-02 & BOY 10-03
Installed capacity of each turbine	171 Mwe * 3

The project activity does not involve any GHG emission sources. The estimated annual average and the total CO<sub>2</sub>e emission reduction by the project activity over the second crediting period of 10 years are expected to be 500,272 tCO<sub>2</sub>e/Annum. The validation team confirmed that emission reduction forecast is reasonable if the underlying assumptions do not change.

The validation team confirms that the project activity falls under the category 2 'Large Project' as per para 3.10.1 of the VCS Standard version 4.4/<sup>15</sup>, as it has potential to reduce GHG emission more than 300,000 tCO<sub>2</sub>e/year. The spatial extent of project boundary is the national grid. The project activity will supply electricity to the National Grid of Turkey through transmission lines connected through sub-stations.

Since the project activity generates electricity through hydro energy, a clean renewable energy source it doesn't cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

Validation team confirmed that the project activity is not a grouped project.

There are no laws and regulations governing the power generation using large hydro energy. The project is a voluntary effort by the project proponent. There is no legal requirement on the choice of a particular technology for power generation. The project activity conforms to all the applicable laws and regulations in Turkey

The project ownership is the legal right to control and operate the project activities. Boyabat Elektrik Uretim ve Ticaret A.S. is the project proponent (PP) of project activity and they have the legal right to control and operate the project activities

Assessment team checked onsite and confirms that the details of the project proponent areas below

<b>Organization name</b>	Boyabat Elektrik Uretim ve Ticaret A.S.
<b>Contact person</b>	Mr. Suat Odaman
<b>Title</b>	Sales Manager
<b>Address</b>	Cumhuriyet Caddesi Gürsel Plaza No:123 Kat:3 Kavacık/Beykoz/İstanbul Turkey
<b>Telephone</b>	0216 537 81 41
<b>Email</b>	sodaman@boyabatelektrik.com.tr

Assessment team also checked the details of other entity and found correct. The details are as below:

<b>Organization name</b>	Life İklim ve Enerji Ltd. Şti.
<b>Role in the project</b>	Project Consultant
<b>Contact person</b>	Ekin Kılıç
<b>Title</b>	Expert Carbon Consultant
<b>Address</b>	Oğuzlar Mah. 1377. Sk. No:19/9 Balgat, 06520 Çankaya/Ankara - Turkey
<b>Telephone</b>	+90 312 481 21 42
<b>Email</b>	<a href="mailto:ekin.kilic@lifeenerji.com">ekin.kilic@lifeenerji.com</a>

29-November-2012 is the project start date which has been already validated during the initial validation and VVB confirms that the start date based on the validated information in the initial validation of this VCS project activity.

PP has chosen 10-year renewable crediting period. The 1<sup>st</sup> crediting period was from 29-November-2012 to 28-November-2022. It was confirmed that current Joint PD & MR is being developed under the second crediting period which will start from 29-November-2022. Second crediting period is from 29-November-2022 to 28-November-2032.

The project activity is not a part of grouped project.

No commercially sensitive information has been excluded from the public version of the project description.

Estimated average annual GHG emission reductions from the project activity are 500,272 tCO<sub>2</sub>e per year, which is more than 300,000 tCO<sub>2</sub>e per year. Hence the project scale of the project activity will become “Large Project.”

The estimated GHG Emission Reductions will depend upon the actual energy supplied to grid by the project activity. The tentative Emission Reduction for the project activity instances being included in the grouped project activity are as follows:

Year	Estimated GHG emission reductions or removals (tCO <sub>2</sub> e)
29-November-2022 to 31-December-2022	45,230
01-January-2023 to 31-December-2023	500,272
01-January-2024 to 31-December-2024	500,272
01-January-2025 to 31-December-2025	500,272
01-January-2026 to 31-December-2026	500,272
01-January-2027 to 31-December-2027	500,272
01-January-2028 to 31-December-2028	500,272
01-January-2029 to 31-December-2029	500,272

01-January-2030 to 31-December-2030	500,272
01-January-2031 to 31-December-2031	500,272
01-January-2032 to 28-November-2032	455,042
<b>Total estimated ERs</b>	<b>5,002,720</b>
<b>Total number of crediting years</b>	<b>10</b>
<b>Average annual ERs</b>	<b>500,272</b>

Assessment team during the desk review and onsite assessment confirms that the project is an installation of hydropower plant and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal or destruction. The baseline scenario remains same as 1<sup>st</sup> as described in section 3.4.4 of this report and will continue to be the baseline in the absence of project activity.

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

Assessment team confirms that the Project has received necessary approvals for development and commissioning of the project from the Turkiye Government and is in compliance to the local laws and regulations. Assessment team checked the Commissioning certificate, power purchase agreement to confirm the project capacity and its relevant statutory requirements as per the host country regulations. The project is a voluntary initiative by the project proponent and has not been implemented to meet any local/national laws or regulatory compliances /09/. The project activity is in compliance with current laws and regulations and there are no legal and / or regulatory requirements that prevent the project implementation Also, the assessment team has confirmed that there is no such compliance requirement with an emission trading program or any binding limits on GHG emissions for the project activity in Turkiye. The project has obtained required licensees for installation and operation from the Government and is in compliance with local laws and regulations. The following Laws as relevant to the project are (Law No. and Publication Date in Official Gazette):

(1) Electricity Market Law (6446, 30-03-2013)<sup>2</sup>

<sup>2</sup> See: <https://www.resmigazete.gov.tr/eskiler/2013/03/20130330.pdf>

(2) Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy (5346, 18-05-2005)<sup>3</sup>

(3) Environment Law (2872, 11-08-1983)<sup>4</sup>

(4) Occupational Health and Safety Regulation (6331, 30-06-2012)<sup>5</sup>

(5) Forest Law (Nr. 6831)<sup>6</sup>

The renewable Energy generation license for Boyabat HPPs has been issued considering Electricity Law and Law in utilization of Renewable Energy Resources for generating electricity energy. The project activity is also within the scope of and in compliance with Energy Efficiency Law. Environment Law is also satisfied, and it has been confirmed by Ministry of Environment that the Boyabat HPPs is out of Environmental Impact Assessment Regulation. Forest Law, which specifies that forest areas can be allocated by Ministry of Environment and Forestry to institutions or individuals for energy, plants if the project implementation serves common good for public. As in Türkiye there is no applicable local regulations to HPP constructions the list above includes national regulation only.

**Project ownership: -**

**Boyabat Elektrik Uretim ve Ticaret A.S.** is project proponent (PP) of project activity and they have the legal right to control and operate the project activities.

The project ownership has been checked by the Assessment Team and demonstrated through below supporting documents:

- Electricity sales agreement/Power Purchase Agreement (PPA)<sup>14/</sup>
- Commissioning certificate (Provisional Acceptance protocol)<sup>01/</sup>

Further, individual compliance aspects will be provided for each of the project activity instance to be included in the project activity based on the clearances<sup>09/</sup>certificate received for implementation of project instance.

**Emission Trading programs & other binding limits: -**

The project activity has never participated or been rejected under any other GHG programs or trading programs like; CDM, GS4GG & GCC mechanisms<sup>7</sup>. However, PP has submitted a declaration that PP will not apply for the double accounting for current monitoring period rather than Verra. Hence accepted.

1. <https://register.evident.global/device-register>

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<sup>3</sup> See: <https://www.resmigazete.gov.tr/eskiler/2005/05/20050518-1.htm>

<sup>4</sup> See <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf>

<sup>5</sup> See: <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.6331.pdf>

<sup>6</sup> See: <https://www.mevzuat.gov.tr/MevzuatMetin/1.3.6831.pdf>

2. <http://cdm.unfccc.int/>
3. <http://www.goldstandard.org/>

Further, project has never received or sought any other form of environmental credit, or has become eligible to do so, Same has been verified by VVB team

Assessment team confirms that the Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits. Further, Declaration<sup>12/</sup> in effect of the same has been submitted by project proponent to audit team and found to be correct. Thus, it is concluded that the project activity not involved on other Emissions trading programs and other binding limits. Moreover, during desk review it was observed that, project has been validated under social carbon standards by TÜV Rheinland Energie und Umwelt GmbH dated 04-September-2014. However, Project was then under the Social Carbon registry, Same has been verified by VVB through respective registry portal ([https://bef.earth/social\\_carbon](https://bef.earth/social_carbon))

**Leakage Management for AFOLU project: -**

Not applicable to the project activity.

**Commercially Sensitive Information: -**

No commercially sensitive information has been excluded from the public version of the project description. The details are presented transparently to the assessment team for analysis which lead to positive conclusion for this validation and verification.

**Sustainable Development: -**

The project helps Türkiye to stimulate and commercialize the use of grid connected renewable energy technologies and markets. The specific economic, social and technological benefits are:

- Reducing Türkiye expanding energy deficit;
- Diversification of Turkish electricity generation mix and reduction of import dependency;
- Creation of local employment and income during construction and operation of HPP (directly as well as indirectly via contracts with local providers for supply of construction material);
- Foster infrastructural investments with connected development benefits to the local rural community in the remote project area;
- Making rural electricity supply more reliable, better available and cost efficient thanks to decreasing distances between generation and consumption points.

The project is located on the Central Black Sea Geographical Region/ Sinop Province. Electricity generated by the project is fed into the national electricity grid, displacing energy that would otherwise be generated by fossil fuels. The project facilitated 12,86,967.88 MWh renewable electricity generation and thus contributed 544,660 tCO<sub>2e</sub> of VCU during current monitoring period monitoring period,

Further, inline with VCS Standard v4.4, “The project proponent must demonstrate that a project contributes to at least three SDGs by the end of the first monitoring period, and in each subsequent monitoring period.” As per the provision of implementation deadline, “Projects registered before 20 January 2023 shall demonstrate contributions to at least three SDGs by 20 January 2025”. However, PP have provided the information on the SDG contributions by the project activity for SDGs:

1. SDG 7.2: Renewable energy share in the total final energy consumption.
2. SDG 8.8: Quantitative employment and income generation
3. SDG 13.0: Tonnes of greenhouse gas emissions avoided or removed.

VVB have assessed the SDG 7.2, SDG 8 and SDG 13.0 and supporting documents shared by PP and found values correct as provided in Section 1.17.2 of Joint VCS PD & MR version 3 04/.

Hence, in view of the assessment of VCS joint PD & MR /04/ and supporting documents are listed in Appendix 1 of this report. The assessment team is able to confirm that the description contained in the VCS Joint PD and MR for renewable of crediting period of the project activity and the technical aspects of its implementation. Consequently, assessment team confirms that the project description of the project contained in the joint VCS PD and MR /04/ to be complete and accurate. The VCS joint PD and MR complied with relevant forms and guidance for completing the VCS joint PD and MR. Moreover, CL 02, & CAR 01 were raised and closed successfully.

### 3.2 Participation under Other GHG Programs

The project has neither been registered nor seeking registration under any other GHG programs<sup>8</sup>. The project is seeking registration only in VCS program. PP has submitted the declaration that PP will not claim any GHG emission reductions of the project from different GHG programs for the current monitoring period of 01-May-2020 to 28-Nov-2022. Audit team checked the REC Mechanism database of Turkey and GS4GG project database and found that the project activity is neither registered under REC mechanism nor under GS scheme. Assessment team checked the following registries to confirm the same.

4. <https://register.evident.global/device-register>
5. <http://cdm.unfccc.int/>
6. <http://www.goldstandard.org/>

Rejection by other GHG program: -

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<sup>8</sup> [https://bef.earth/social\\_carbon](https://bef.earth/social_carbon)

The Project is not rejected by other GHG programs. A declaration for the same is checked and found correct by the assessment team. Also, assessment team checked the following registries to confirm the same. The details of the registries checked are as follows:

1. <https://register.evident.global/device-register>
2. <http://cdm.unfccc.int/>
3. <http://www.goldstandard.org/>
4. <https://verra.org/>

Renewable energy certificates are available for trading in the host country. However, the same is not availed by the project participant. The undertaking regarding the same is submitted by PP which is acceptable to the assessment team and assessment team also checked the I-REC web site (<https://register.evident.global/device-register>) and found the declaration to be correct. CAR 03 was raised on this section and closed successfully. Please refer Appendix 2 for further details.

### 3.3 Safeguards

#### 3.3.1 No Net Harm

There hadn't been any observed significant environmental impact of the project activity as indicated in the registered PD and this was also confirmed through the reviewed documents. The EIA positive decision dated as 11/03/2008 by the General Directorate of Environment and Urbanization was also provided by the PP. Besides that, the photos of waste storage areas and the hazardous waste declaration form submitted to the Ministry of Environment and Urbanization for 2015, 2016, 2017, 2018, 2019 and 2020 and waste water transfer and disposal records dated as 23/06/2014, 03/12/2015, 27/01/2016, 24/05/2019, 05/03/2020, 04/08/2020 and 12/03/2021 have been provided by the PP. The photographic evidences of domestic waste storage containers have also been provided to VVB. There hasn't been any fish passage within the context of the project activity and as similar there is also no life line water requirement in the project since the tail water of the project is discharged into the reservoir of Kızılırmak River, Boyabat Dam in the downstream in line with the information by PP and same has been verified during the site visit. However, PP has taken mitigation measures of environmental impact during operation and the same has been discussed in Section 2,3 of Joint PD and MR.

#### 3.3.2 Local Stakeholder Consultation

Local stakeholder consultation has been conducted at the time of project registration also on 5<sup>th</sup> January 2021, the project owner, the headman of Beybükü village and other villagers was hold a meeting. During this meeting, all details including environmental and social benefits of this project, sustainable development goals has explained again and taken their comments by project owner. hence not applicable in the current monitoring period. PP has provided information related to the mechanism for on-going

communication with local stakeholders and assessment team verified that PP use grievance register to register any grievance and suggestion at project site in order to maintain proper communication with local stakeholder. CAR 04 was raised during the monitoring period which was closed successfully, no grievance was received from the stakeholders in current monitoring period as verified from the grievance registered submitted by PP and thus no mitigation measure is required.

### 3.3.3 Environmental Impact

In Turkey, there are 35 Nature Preservation Area and 33 National Parks. The project is not located in any of these. Furthermore, in Turkey, there are 58-registered Monument of Nature and 16 registered Nature Park. None of these Monuments of Nature and Nature Parks is located in the project area.

#### **Environmental benefits:**

The project helps Turkey to stimulate and commercialize the use of grid connected renewable energy technologies and markets. The specific economic, social and technological benefits are:

- Reducing Turkey's expanding energy deficit;
- Diversification of Turkish electricity generation mix and reduction of import dependency;
- Creation of local employment and income during construction and operation of HPP (directly as well as indirectly via contracts with local providers for supply of construction material);
- Foster infrastructural investments with connected development benefits to the local rural community in the remote project area;
- Making rural electricity supply more reliable, better available and cost efficient thanks to decreasing distances between generation and consumption points.

### 3.3.4 Public Comments

The Global Stakeholder Consultation commenting period had been completed before first crediting period. No comments had been received in the commenting period

### 3.3.5 AFOLU-Specific Safeguards

Not applicable as this is non-AFOLU project.

## 3.4 Application of Methodology

### 3.4.1 Title and Reference

CDM Methodology:

For first Crediting period: -

ACM0002 – “Grid-connected renewable electricity generation (Version 14<sup>9</sup>)

Tool to calculate the emission factor for an electricity system, (Version 4.0.0)<sup>10</sup>,

For Second Crediting period: -

ACM0002 – “Grid-connected renewable electricity generation (21.0/<sup>5</sup>/ EB116-A01).

Tool no. 07 to calculate the emission factor for an electricity system, version 07.0<sup>11</sup>, EB 100 annex 4

Tool no. 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, EB 66 annex 47<sup>12</sup>

The assessment team has confirmed that the selected baseline methodology is the approved baseline methodology and tool available on UNFCCC web site. The applied methodology and tool are the latest version i.e., ACM0002 is correctly applied to this type of project. All the applicability criterion of applied methodology is appropriately justified in the updated Joint PD and MR by the project participant.

### 3.4.2 Applicability

Applicability criteria for the applied methodology in the VCS Joint PD and MR against these criteria are assessed by the validation team by means of document review and interviews. Thus, the validation team confirms that the Project Participant has correctly applied the approved methodology and the selected version of the methodology is valid at the time of validation. Thus, CL 03 was raised in this section and closed successfully.

Para No.	Applicability Conditions (With para no and reference)	Project Case	VVB Assessment
4	1. This methodology is applicable to grid-connected renewable energy power generation project activities that: <ul style="list-style-type: none"> <li>(a) Install a Greenfield power plant;</li> <li>(b) Involve a capacity addition to (an) existing plant(s);</li> <li>(c) Involve a retrofit of (an) existing operating plant(s)/unit(s);</li> <li>(d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or</li> </ul>	The project activity is a greenfield hydro power plant which is renewable energy generation. hence complies to the applicability condition (3.a).  Hence the project activity meets the applicability condition of the methodology.	The project activity is greenfield project. Thus, fulfil criteria.

<sup>9</sup> CDM: Grid-connected electricity generation from renewable sources --- Version 21.0 (unfccc.int)

<sup>10</sup> [https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.1.pdf/history\\_view](https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.1.pdf/history_view)

<sup>11</sup> [https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.1.pdf/history\\_view](https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.1.pdf/history_view)

<sup>12</sup> CDM: Tools (unfccc.int)

Para No.	Applicability Conditions (With para no and reference)	Project Case	VVB Assessment
	(e) Involve a replacement of (an) existing plant(s)/unit(s).		
5	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: <ul style="list-style-type: none"> <li>(a) Integrate BESS with a Greenfield power plant;</li> <li>(b) Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic or wind power plant(s)/unit(s);</li> <li>(c) 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);</li> <li>(d) Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s).</li> </ul>	The project activity includes installation of grid connected single dam power project without any Battery Energy Storage System (BESS). The electricity generated from the project activity is directly fed to the electricity grid. Therefore, the applicability condition 5 is not applicable/relevant to the project activity.	The project activity is grid connected single hydro power plant.  Hence, no battery is used.
6	3. The methodology is applicable under the following conditions: <ul style="list-style-type: none"> <li>(a) 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;</li> <li>(b) 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</li> </ul>	The project activity is a greenfield grid connected hydro plant with a single hydroreservoir and hence complies to the applicability condition (6.a) of the methodology.  Since the project activity does not include capacity additions, retrofits, rehabilitations or replacements of existing plant/unit, the applicability condition 6.b is not applicable/relevant for the project activity.	The current project activity is newly installed single hydro power plant with single reservoir.

Para No.	Applicability Conditions (With para no and reference)	Project Case	VVB Assessment
	<p>implementation of the project activity.</p> <p>(c) 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);</p> <p>(d) 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.</p>	<p>Although the project is a green field project activity but does not include Battery Energy Storage System (BESS). And therefore, the applicability condition 6.c is not applicable/relevant for the project activity.</p> <p>The project activity does not include Battery Energy Storage System (BESS). And therefore, the applicability condition 6.d is not applicable/relevant for the project activity.</p>	
7	4. In case of hydro power plants, one of the following conditions shall apply: <sup>13</sup>	The project is resulted in construction of a new single	The PD of the PA is threshold

<sup>13</sup> Project participants wishing to undertake a hydroelectric project activity that results in a new reservoir or an increase in the volume of an existing reservoir, in particular where reservoirs have no significant vegetative biomass in the catchments area, may request a revision to the approved consolidated methodology.

Para No.	Applicability Conditions (With para no and reference)	Project Case	VVB Assessment
	<p>(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or</p> <p>(b) 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 (7), is greater than 4 W/m<sup>2</sup>; or</p> <p>(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m<sup>2</sup>; or</p> <p>(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m<sup>2</sup>, all of the following conditions shall apply:</p> <ul style="list-style-type: none"> <li>(i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m<sup>2</sup>;</li> <li>(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;</li> <li>(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m<sup>2</sup> shall be:                             <ul style="list-style-type: none"> <li>(a) Lower than or equal to 15 MW; and</li> <li>(b) Less than 10 per cent of the total installed capacity of integrated hydro power project.</li> </ul> </li> </ul>	<p>reservoir with a power density greater than 4 W/m<sup>2</sup>.</p> <p>As in the case of Boyabat HPP this density is below the 10 W/m<sup>2</sup> threshold (7.844 W/m<sup>2</sup>; reservoir size: 65,400,000 m<sup>2</sup>, installed capacity: 513,000,000 W). Hence, the project emission (PE<sub>HP,y</sub>).</p> <p>project emission (PE<sub>HP,y</sub>). emissions have been calculated in section 3.4.6 according to the equation (10) of ACM0002 version 21.0.</p> <p>Thus, criterion (c) is applicable for this project activity.</p>	<p>7.844 W/m<sup>2</sup>; reservoir size: 65,400,000 m<sup>2</sup>, installed capacity: 513,000,000 W). Hence, the project emission (PE<sub>HP,y</sub>). emissions from the reservoir is calculated according to the equation (10) of ACM0002 version 21.0.</p> <p>Thus, criterion (c) is applicable for this project activity.</p>

Para No.	Applicability Conditions (With para no and reference)	Project Case	VVB Assessment
8	<p>5. In the case of integrated hydro power projects, project participants shall:</p> <p>(a) 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</p> <p>(b) 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 of five years prior to the implementation of the CDM project activity.</p>	<p>The project activity is a hydro power plant with a single river reservoir. Thus, this criterion is not applicable for this project activity.</p>	<p>The project activity is a hydro power plant with a single reservoir. PA is not an integrated hydro power. Thus, this criterion is not applicable for this project activity.</p>
9	<p>The methodology is not applicable to:</p> <p>(a) 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;</p> <p>(b) Biomass fired power plants/units.</p>	<p>The project activity is greenfield grid-connected hydro power project for generation of electricity hence the applicability condition 9" is not relevant as the same pertains to switching from fossil fuels to renewable energy sources or biomass fired power plants/units.</p>	<p>Hydro power is being utilized for electricity generation; no fossil fuel has been used.</p>

Para No.	Applicability Conditions (With para no and reference)	Project Case	VVB Assessment
10	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”.	Not applicable as the project activity already situated in single river dam .	The project activity is situated on single hydro power plant.

### 3.4.3 Project Boundary

As per ACM0002, version 21 “The spatial extent of the project extends to the project power plant and all power plant connected physically to the electricity system that the project power plant that connected to through the national grid and to be confined to physical, geographical site of renewable generating units. The boundary also extends to the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.” Therefore, the entire Turkiye grid and all connected power plants have been considered in the project boundary for the proposed VCS project activity. The grid is also part of the project boundary as the project units are connected to the grid through power evacuation at common point.

Source	Gas	Included?	Justification/Explanation	
Baseline	CO <sub>2</sub> emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO <sub>2</sub>	Yes	Main emission source
		CH <sub>4</sub>	No	Minor emission source
		N <sub>2</sub> O	No	Minor emission source
Project	Emissions due to project activity	CO <sub>2</sub>	No	No CO <sub>2</sub> emissions are emitted from the project
		CH <sub>4</sub>	No	Not applicable as project activity is Solar power project.
		N <sub>2</sub> O	No	Not applicable as project activity is Solar power project.

The assessment team confirms that the Joint PD& MR has correctly described the project boundary, including the physical delineation of the project activity and complies with VCS Standard version 4.4.

### 3.4.4 Baseline Scenario

National policies and circumstances relevant to the baseline of the project activity:

(1) Electricity Market Law (6446, 30-03-2013)

(2) Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy (5346, 18-05-2005)

The renewable Energy generation license for the project activities have been issued considering Electricity Law and Law in utilization of Renewable Energy Resources for generating electricity energy. The project is also within the scope of and in compliance with Energy Efficiency Law. Environment Law is also satisfied, and it has been confirmed by Ministry of Environment that the project activity is HPPs is out of Environmental Impact Assessment Regulation. Forest Law, which specifies that forest areas can be allocated by Ministry of Environment and Forestry to institutions or individuals for energy, plants if the project implementation serves common good for public. As in Türkiye there is no applicable local regulations to HPP constructions the list above includes national regulation only.

The assessment team assessed the validity of the updated baseline through an assessment of the following points:

The impact of new relevant national and/or sectoral policies and circumstances on the baseline considering relevant guidance from the Board with regard to renewal of the crediting period of the VCS project activity

The correctness of the application of the approved methodologies for the determination of the continued validity of the updated baseline and the estimation of GHG emission reductions for the applicable crediting period of the VCS project activity.

The assessment of estimation of emission reductions for the applicable crediting period.

The validity of the baseline has been assessed as per the methodological 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. The assessment is performed as follows:

The methodological 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) is adopted to assess the continued validity of the baseline and to update the baseline. This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism. 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 baseline is the “Grid-connected electricity generation”. It complies with the current legal framework. There are no additional laws that came into force that has an impact on the project activity and the project activity is still in line with the available law and regulations.

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 of 2020. There has been no major deviation or change in the market characteristic during the first crediting period.

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.

Operational lifetime of the HPP is calculated as 18 years for the Boyabat hydro power plant by using the ‘Tool to determine the remaining lifetime of equipment’(version 1). In the tool it is said that lifetime for the Hydro Turbines is 150,000 hours. In order to determine operational lifetime of the HPP firstly capacity factor of the HPP should be calculated because HPP will not be in operation for whole year. By dividing annual generation (13,70,0000 MWh/year) to the installed capacity (528 MWm), the operation time in a year will be found which is 2,594.69 hr/year. Since operation lifetime is related to the economic analysis, in the calculation of operational lifetime annual generation and installed capacity figures are taken from Generation License of the HPP. 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 18. To be conservative operational lifetime of the hydro turbines will be found as 31 years. Also, the operational lifetime is in line with the technical lifetime of the electromechanical equipment.

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

The emissions reduction calculations are based on two main parameters: the energy produced and the grid emission factor. The latter will be updated as explained in the next paragraph. As a requirement of the methodology, only the grid emission factor has been updated during the second crediting period renewal.

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 is conformed 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.

According to details of publication<sup>14</sup>

Parameter	Value	Source
EF <sub>grid, CM,y</sub>	0.7424 tCO <sub>2e</sub> /MWh	For the combined margin CO <sub>2</sub> emission factor that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Türkiye's National Electric Grid Emission Factor for the year of 2020 was used. Please see: <a href="https://enerji.gov.tr/evced-cevre-ve-iklim-turkiye-ulusal-elektrik-sebekesi-emisyon-faktoru">https://enerji.gov.tr/evced-cevre-ve-iklim-turkiye-ulusal-elektrik-sebekesi-emisyon-faktoru</a>
EF <sub>grid, OM,y</sub>	0.3680 tCO <sub>2e</sub> /MWh	For the emission BM factor, that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Türkiye's National Electric Grid Emission Factor for the year of 2020 was used. Publication includes calculated Emission Factor values that are Operating Margin (OM), Growth Based Margin (Build Margin-BM) and Combined Margin (CM) Emission Factors, for the relevant year with usage of the IPCC's Clean Development Methodology Tool 07-V07.0 <sup>15</sup> .
EF <sub>grid, BM,y</sub>	0.4616 tCO <sub>2e</sub> /MWh	For the combined margin CO <sub>2</sub> emission factor that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Türkiye's National Electric Grid Emission Factor for the year of 2020 was used. Please see: <a href="https://enerji.gov.tr/evced-cevre-ve-iklim-turkiye-ulusal-elektrik-sebekesi-emisyon-faktoru">https://enerji.gov.tr/evced-cevre-ve-iklim-turkiye-ulusal-elektrik-sebekesi-emisyon-faktoru</a>

In addition, there was no change for the capacity and reservoir area during the 1<sup>st</sup> crediting period. Therefore, Even, newest version of ACM0002 version 21.0 state as the monitoring frequency: "Once at the beginning of each crediting period" for CAP<sub>PJ</sub> and A<sub>PJ</sub> parameters. It is apparent that these two

<sup>14</sup>  $(0.7424 * 0.25 + 0.3680 * 0.75 = 0.4616 \text{ tCO}_2/\text{MWh})$   
<https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESemisyonFktr/Belgeler/Bform2020.pdf>

<sup>15</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

parameters, which are monitored in this (3<sup>rd</sup>) monitoring period under 1<sup>st</sup> crediting period, do not need to be monitored for the next verifications under 2<sup>nd</sup> crediting period. Thus, only parameter will be monitored for the next verification periods under 2<sup>nd</sup> crediting period will be “*EG<sub>PJ,y</sub>*,” which is related to electricity production.

### 3.4.5 Additionality

In accordance with the paragraph 3.8.9, a full reassessment of additionality is not required when renewing the project crediting period unless otherwise specified in the methodology. Project Proponent has submitted the Joint PD and MR for Joint validation & Verification for renewal of crediting period. The additionality of the project activity is same as per registered VCS PD for the first crediting period. Investments analyses show that the project is not economically feasible without VCU income. Moreover, the sensitivity analysis described in registered PD of 1<sup>st</sup> CP confirmed that the project activity is unlikely to be economically attractive without the revenues from VCUs as even the maximum IRR result for the best-case scenario (8.68%) is below the benchmark, which is 12.75%. Consequently, the project activity is still additional, and it still has ongoing financial need. Therefore, it is not applicable during the validation of renewal of crediting period.

Project compliance with applicable laws, statutes and other regulatory surplus / frameworks

Project proponent has demonstrated the regulatory Surplus in accordance with the requirements set out in the VCS Program V.4.3 and VCS standard v4.4 in Section 3,14.1 and Section 3.5 of revised Joint PD and MR submitted for RCP. Assessment team confirms that there is no any regulation to install the hydropower projects and the project activity is a voluntary step taken by PP. Baseline emission factor as mentioned in Section 3.4 of Joint PD and MR shows that the fossil fuel based power generation is dominant over the renewable based power generation, thus baseline scenario remains same as original. As discussed in section 3.5 of VCS Joint PD and MR, there is no any Impact of the national and/or sectoral policies and circumstances upon the baseline scenario of the project activity and project activity is additional as per CDM Tool for the demonstration and assessment of additionality and as per VCS Program rules.

Laws as relevant to the project are (Law No. and Publication Date in Official Gazette):

(1) Electricity Market Law (6446, 30-03-2013)<sup>16</sup>

(2) Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy (5346, 18-05-2005) <sup>17</sup>

(3) Environment Law (2872, 11-08-1983) <sup>18</sup>

<sup>16</sup> <https://www.resmigazete.gov.tr/eskiler/2013/03/20130330.pdf>

<sup>17</sup> <https://www.resmigazete.gov.tr/eskiler/2005/05/20050518-1.htm>

<sup>18</sup> <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf>

(4) Occupational Health and Safety Regulation (6331, 30-06-2012) <sup>19</sup>

(5) Forest Law (Nr. 6831) <sup>20</sup>

Assessment team confirms that any enforced law, statute, regulatory surplus, or other regulatory framework shall not mandate the project. 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

The project is in compliance with the given laws. Assessment team confirms that the description of the VCS project activity, as contained in the VCS Joint PD & MR sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the VCS project activity.

The additionality will be similar to the conditions mentioned in the registered and validated VCS PD of 1<sup>st</sup> crediting period. As per paragraph 3.9.8 of VCS standard, a full reassessment of additionality is not required when renewing the project crediting period. The validity of the original baseline scenario is demonstrated in Section 3.4, and it was concluded that the current baseline is still valid for the next crediting period. Only Grid emission factors have been updated for the second crediting period. The demonstration of Regulatory Surplus in line with the requirements set out in paragraph 3.9.8 of VCS standard, version 4.4/<sup>15/</sup> the VCS Program is given below:

There is no any regulation to install the Hydro power projects and the project activity is a voluntary step taken by PP. In Turkey, the fossil fuel based thermal power generation is dominant over the renewable based power generation, there is no any Impact of the national and/or sectoral policies and circumstances upon the baseline scenario of the project activity and project activity is additional as per CDM Tool for the demonstration and assessment of additionality and as per VCS Program rules.

### 3.4.6 Quantification of GHG Emission Reductions and Removals

#### Quantification of Baseline emissions

Assessment team checked the baseline, project and leakage calculation and confirm that the evaluation of baseline, project and leakage is as per the approved methodology and formula used to calculate the same is correct. The detail analysis is as below:

**Baseline Emissions:** As per para 47 of ACM0002, Grid-connected electricity generation from renewable sources ---Version 21.0/<sup>05/</sup>, the Baseline emissions for other systems are the product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.

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

where:

<sup>19</sup> <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.6331.pdf>

<sup>20</sup> <https://www.mevzuat.gov.tr/MevzuatMetin/1.3.6831.pdf>

BE <sub>y</sub>	Baseline emissions in year y (t CO <sub>2</sub> /yr)
EG <sub>PJ,y</sub>	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
EF <sub>grid,CM,y</sub>	Combined margin CO <sub>2</sub> emission factor for grid connected power generation in year y calculated using TOOL07 (t CO <sub>2</sub> /MWh)

Since the project is a green-field power plant therefore calculation of quantity of net electricity generation (EG<sub>PJ,y</sub>) is carried out in accordance to section 5.5.1.1, paragraph 49 of the approved consolidated Methodology ACM0002, Version 21.0 :

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

EG <sub>PJ,y</sub>	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
EG <sub>facility,y</sub>	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

#### Project Emissions: -

According to the applied methodologies, for hydropower plants if the power density of the reservoir is higher than 10 W/m<sup>2</sup>, then PE<sub>y</sub> = 0. The power density of the project is calculated as follows:

$$PD = \text{Cap}_{PJ} - \text{Cap}_{BL} / A_{PJ} - A_{BL}$$

Where;

PD = Power density of the project activity (W/m<sup>2</sup>)

Cap<sub>PJ</sub> = Installed capacity of the hydro power plant after the implementation of the project activity (W)

Cap<sub>BL</sub> = Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero

A<sub>PJ</sub> = Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m<sup>2</sup>)

A<sub>BL</sub> = Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m<sup>2</sup>). For new reservoirs, this value is zero.

The project activity is a green field Boyabat hydropower project dam structure crosses the Kizilirmak river, so Cap<sub>BL</sub> and A<sub>BL</sub> are equal to zero. For Boyabat HPP single damr Hydro Project:

A<sub>PJ</sub> = 65,400,000 m<sup>2</sup> (as per topography/satellite image)

Cap<sub>PJ</sub> = 513,000,000 W

PD = 513,000,000 W /65,400,000

PD = 7.844 W/m<sup>2</sup>

The reservoir related project emissions can be calculated according to the following formula:<sup>21</sup>

$$PE_{HP,y} = (E_{FRes} \times TEG_y) / 1000$$

Where:

- PE<sub>HP,y</sub>: Project emissions from water reservoirs (t CO<sub>2</sub>e/yr)

<sup>21</sup> <https://cdm.unfccc.int/UserManagement/FileStorage/AG07ZJQ3EXD42LT5YV9HR16M8KINPO>

EFRes: Default emission factor for emissions from reservoirs of hydro power plants in year y (kgCO<sub>2</sub>e/MWh) (Which is 90 kg CO<sub>2</sub>e/MWh<sup>22</sup>)

- TEGy : Total electricity produced by the project activity, including the electricity supplied the grid and the electricity supplied to internal loads, in year y (MWh)

Total Project emissions= (90 X 1,370,000 ) / 1000 =120,109t CO<sub>2</sub>e (Average value)

For detailed monthly basis project emission calculation of Boyabat HPP can be found ER excel of the project.

**Leakage Emissions:** - As per the methodology ACM0002 v21, para 61, no other leakage emissions are considered. In accordance to the methodology “The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected”.

Therefore, the net emission reduction is calculated as

$$ER_y = BE_y - PE_y$$

Year	Estimated baseline emissions or removals (tCO <sub>2</sub> e)	Estimated project emissions or removals (tCO <sub>2</sub> e)	Estimated leakage emissions (tCO <sub>2</sub> e)	Estimated net GHG emission reductions or removals (tCO <sub>2</sub> e)
29-November-2022 to 31-December-2022	57,175	11,945	0	45,230
01-January-2023 to 31-December-2023	632,392	132,120	0	500,272
01-January-2024 to 31-December-2024	632,392	132,120	0	500,272
01-January-2025 to 31-December-2025	632,392	132,120	0	500,272
01-January-2026 to 31-December-2026	632,392	132,120	0	500,272
01-January-2027 to 31-December-2027	632,392	132,120	0	500,272
01-January-2028 to 31-December-2028	632,392	132,120	0	500,272

<sup>22</sup> Default emission factor for emissions from reservoirs EB23

01-January-2029 to 31-December-2029	632,392	132,120	0	500,272
01-January-2030 to 31-December-2030	632,392	132,120	0	500,272
01-January-2031 to 31-December-2031	632,392	132,120	0	500,272
01-January-2032 to 28-November-2032	575,217	120,175	0	455,042
<b>Total</b>	<b>63,23,920</b>	<b>13,12,200</b>	<b>0</b>	<b>5,002,720</b>
Average annual ERs	500,272			

The total emission reductions are 50,02,720 tCO<sub>2</sub>e 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 Joint PD and MR;
- All values used in the Joint PD and MR 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 Joint PD and MR.

### 3.4.7 Methodology Deviations

The assessment team confirms that the Joint PD and MR complies with the requirements in the Approved consolidated methodology ACM0002, version 21.0<sup>5/</sup>. Hence, there is no any methodology deviation applicable for the project activity.

### 3.4.8 Monitoring Plan

The project monitoring plan is in compliance with the approved applied methodology ACM0002, version 21.0. In accordance with the applied methodology, project emission and leakage has not been consisted. Assessment team checked the monitoring practice onsite during physical site visit and confirmed that the monitor-able action plan for the same has been included in section 5.3 of the Joint PD and MR<sup>4/</sup>. Validation team confirms that the project participant is able to implement the monitoring plan

### **Parameters determined ex-ante:**

Emission factor calculations have been done for the second crediting period in accordance with “Tool to calculate the emission factor for an electricity system” (Version 07), para 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  $w_{OM}$  and  $w_{BM}$ .

According to Tool 07’s specifications, renewable energy projects – except for wind and solar ones – should calculate the CM factor for the second and third crediting period by taking  $w_{OM}$  as 0.25 and  $w_{BM}$  as 0.75.<sup>23</sup>

The data used to calculate the combined margin were published by Türkiye’s Energy and Natural Resources Ministry in 20-September-2022. The data -which includes build margin and operating margin factors - have been obtained from the ministry’s most recent factsheet. This document contains the latest available data in the country and is issued by the highest authority to make such calculations and determine the factors. The combined margin emission factor is calculated as follows:

$$EG_{grid,CM,y} = 0.25 * 0.7424 + 0.75 * 0.3680$$

$$= 0.4616 \text{ tCO}_2/\text{MWh}$$

### **Parameters determined ex-post:**

The project applies approved consolidated methodology ACM0002: Grid-connected electricity generation from renewable sources --- Version 21.0”, as per the applied methodology “Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)” i.e  $EG_{facility,y}$  is to be monitored. 13,70,000 is the estimated value for the project activity.

The  $EG_{facility,y}$  data are subject to the accounting quality systems of both parties to the power purchase agreement, TEİAŞ and Elen Enerji Üretimi Sanayi Ticaret A.Ş. With this, no additional structures or processes must be implemented to insure the availability of necessary data for monitoring. At the end of the monitoring period, the data from the monthly meter reading records by PMUM (as mentioned in Joint PD and MR, PMUM records were given as reference for electricity generation. However, the name of this institution was changed, and electricity generation records have been belonged to EPIAŞ) Therefore, EPIAŞ records are adding up to the yearly electricity generation and multiplied with the combined margin emission factor with the help of an excel spreadsheet that also contains the combined margin calculation. In addition to the EPIAŞ records, TEİAŞ is responsible for reading monthly on both main and backup meters. Meter reading protocols for the whole of the monitoring period have been provided as cross check values apart from the invoices.

The project owner has no right to intervene in electricity meters. The electricity meters are controlling remotely to ensure the uninterrupted electricity generation. Therefore, the calibration and/or test protocol of the electricity meters depend on whether project owner/TEİAŞ has any doubt on the electricity values that is steadily monitoring. TEİAŞ has a right to conduct the calibration procedure or the testing procedure if any mismatching occurs between the values monitored by themselves and values monitored by project owner. The other case is that project

<sup>23</sup> Tool 07 v.07, Section 6.6.1.

owner can request testing protocol or calibration protocol from TEİAŞ if any mismatching occurs between the values monitored by TEİAŞ and values monitored by project owner. No non-conformance has been identified between follow-up by TEİAŞ and project owner's internal auditing so far. As above mentioned, the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures must be established for the monitoring plan.

It is reported that the data will be kept for 2 years following the end of the crediting period or till the last issuance of VCU for the project activity whichever occurs later.

**EF<sub>Res</sub>**: Default emission factor for emissions from reservoirs.

Default value of emission factor from reservoirs, as per EB 23 decision. 90 kg CO<sub>2</sub>e/MWh.

**EG<sub>PP-GrossProduction, y</sub>**: Quantity of electricity exported by the power plant to the Grid, in year y.

**Total 1,370,000 MWh/y of electricity exported by the power plant to the Grid.**

Measurements are to be made by electricity meters that belong to the grid operator, TEİAŞ. There are three meters that record the electricity coming over three different lines identified as U1 ANA, U2 Ana and U3 Ana. The gross production data is the sum of the amount of electricity recorded to be exported to the grid via these three main meters. The meters are in compliance with the collected data. Data will be used to calculate the gross and the net electricity supplied to the grid. The meter readings are accessible via an Automatic Meter Reading Software remotely by the project owner, via a software, and data is automatically recorded to the EPIAS servers to be obtained as monthly screen outputs. Only the main meter readings are accessible but there are back up meters to ensure data recording in case of main meter failure.

**EG<sub>PP-self consumption, y</sub>**: Quantity of electricity imported by the power plant from the Grid for self-consumption in year y. Total 98,000 MWh/y Quantity of electricity imported by the power plant from the Grid.

Measurements are to be made by electricity meters that belong to the grid operator, TEİAŞ. There are three meters that record the electricity coming over three different lines identified as U1 ANA, U2 Ana and U3 Ana. The internal consumption data is the sum of the amount of electricity recorded to be imported from the grid by these three main meters. The meters are in compliance with the collected data. Data will be used to calculate the net electricity supplied to the grid. The meter readings are accessible via an Automatic Meter Reading Software remotely by the project owner, via a software, and data is automatically recorded to the EPIAS servers to be obtained as monthly screen outputs. Only the main meter readings are accessible but there are back up meters to ensure data recording in case of main meter failure.

**A<sub>PJ</sub>**: Area of the single reservoir is 65,400,000 m<sup>2</sup> · measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.

Indirectly determined using the Volume Area Depth curve presented in Annex-1. The Water level data is determined via the Water Level Measurement that consist of 5 transmitters for:

- 1x Head Water

- 3x Head Water after Trash Rack
- 1x Tail Water

Transmitter Type:

- Rittmeyer MPB - Submersible Pressure Transmitter 4-20mA 2-wire

The measured depth is than recorded via the SCADA system, and presented as an excel sheet to the carbon consultant

**Cap<sub>PI</sub>**: Installed capacity of the hydro power plant after the implementation of the project activity.

According to the monitoring plan in the registered PD, the installed capacity of the power plant is monitored supplier information on the equipment and the number of turbines. The project has three vertical axis Francis turbines each having installed capacity of 176 MWm / 171 MWe, so it has a total capacity of 528 MWm / 513 MWe in line with the electricity generation licence and provisional acceptance protocol. Re Carbon Ltd. hereby confirms that there hasn't been any change regarding the total installed capacity of the project

The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the interview. Moreover CAR 02 was raised in this section and closed successfully.

### 3.5 Non-Permanence Risk Analysis

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
NA	NA	NA	NA	NA

## 4 VERIFICATION FINDINGS

### 4.1 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the monitoring plan in the Joint PD & MR. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of JOINT PD & MR.
Findings	CL 01, CL 02 & CAR 04, CAR 05 was raised on this section and closed successfully. Please refer Appendix 2 for further details.
Conclusion	<b>Below are the parameter for 1<sup>st</sup> Crediting period.</b> <b>Ex-ante Parameter</b>

	<p><b>EF<sub>grid,BM,y</sub></b> : The Build margin emission factor of the grid is then calculated as a generation weighted average for the year 2010, 2011 and 2012. The resulting BM grid is: 0.34716 tCO<sub>2</sub>e/MWh.</p> <p><b>EF<sub>grid,OM,y</sub></b> : The Build margin emission factor of the grid is then calculated as a generation weighted average for the year 2010, 2011 and 2012. The resulting OM grid is : 0.6808 tCO<sub>2</sub>e/MWh</p> <p><b>EF<sub>grid,CM,y</sub></b> : For the combined margin CO<sub>2</sub> emission factor that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey’s National Electric Grid Emission Factor. 0.514 tCO<sub>2</sub>e/MWh.</p> <p><b>FC<sub>i,y</sub></b>: Amount of fuel i consumed by relevant power plants in Turkey in years, 2010, 2011, 2012. Volume Unit (cubic meter) Kindly refer annex 2-table 1 of -VCS registered PD</p> <p><b>NCV<sub>i,y</sub></b>: Net Calorific Values for fossil fuel type i in year, for the years 2010, 2011 and 2012. Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to date and reliable data available for the Turkish grid. Kindly refer annex 2-table 5 of -VCS registered PD</p> <p><b>EF<sub>CO2,i,y</sub></b> : IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. Kindly refer annex 2-table 2 of -VCS registered PD</p> <p><b>EG<sub>y</sub></b>: Net electricity generated in the project electricity system in other words, net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y. Kindly refer annex 2-table 3 &amp; table 4 of -VCS registered PD</p> <p><b>EG<sub>m,y</sub></b> : Net electricity generated and delivered to the grid by power unit m in year y. Turkish Electricity Transmission Company Web Site (<a href="http://www.teias.gov.tr">www.teias.gov.tr</a>). Data is extracted from the relevant annexes of the capacity projection reports for the years 2010, 2011 and 2012. Kindly refer annex 2-table 8 of -VCS registered PD</p> <p><b>η<sub>m,y</sub></b>: Average net energy conversion efficiency of power unit m in year y. The default values provided at the Annex 1 of the “Tool to calculate emission factor for an electricity sector (Version 04.0.0)” are used.</p> <p>Ex-ante parameter for CP 2:</p> <p><b>EF<sub>grid,BM,y</sub></b> : For the emission BM factor, that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey’s National Electric Grid Emission Factor for the year of 2020 was used.</p>
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	<p>0.3680 tCO<sub>2</sub>/MWh.</p> <p><b>EF<sub>grid,OM,y</sub></b> : For the combined margin CO2 emission factor that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey's National Electric Grid Emission Factor for the year of 2020 was used.</p> <p>0.7424 tCO<sub>2</sub>/MWh.</p> <p><b>EF<sub>grid,CM,y</sub></b> : For the combined margin CO2 emission factor that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey's National Electric Grid Emission Factor for the year of 2020 was used.</p> <p>0.4616 tCO<sub>2</sub>/MWh.</p> <p><b>Ex-post Monitored Parameter (under 1<sup>st</sup> CP):</b></p> <p>As per the registered monitoring plan and requirement of the registered methodology following parameters needs to be monitored:</p> <p><b>EG<sub>PP-self consumptionTEDAŞ, y</sub></b> : Quantity of electricity imported by the power plant from the 31.5 kVA grid for. (During this monitoring period achieved value is (11,234.88 MWh)</p> <p>Measurements are to be made by an electricity meter that belong to the distribution company TEDAŞ. The meter is located in Güngören Köyü. The meter measures the electricity imported from the grid continuously, and operators read the index monthly and invoice it to the Project Activity Management. The amount consumed is mentioned in the meter. The Primary source of data will be the main TEDAŞ meter readings recorded remotely and provided to the Boyabat HPP Management via monthly invoices. (During the monitoring period achieved value is</p> <p><b>EG<sub>PP-GrossProduction, y</sub></b> : Quantity of electricity exported by the power plant to the Grid, in year y. (Achieved value during this monitoring period 12,86,967.88 MWh)</p> <p>The Primary source of data is the main TEIAS bi-directional meter readings recorded remotely on the main meter monthly protocols and accessible via the EPIAS web site. The secondary source of data will be the back-up TEIAS bi-directional meters. But these are only recorded incase when the main meter malfunctions.</p> <p>Measurements are to be made by electricity meters that belong to the grid operator, TEIAŞ. There are three meters that record the electricity coming over three different lines identified as U1 ANA, U2 Ana and U3 Ana. The gross production data is the sum of the amount of electricity recorded to be exported to the grid via these three main meters. The meters are in compliance with the collected data. Data will be used to calculate the gross and the net electricity supplied to the grid. The meter readings are accessible via an Automatic Meter Reading Software remotely by the project owner, via a software, and data is automatically recorded to the EPIAS servers to be obtained as monthly screen</p>
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	<p>outputs. Only the main meter readings are accessible but there are back up meters to ensure data recording in case of main meter failure.</p> <p><b>Baseline Emission:</b>                  The baseline Emissions for a given year is calculated by multiplying the energy baseline with the grid emission factor. The grid in this case would be the 'National grid of Tureky'</p> <p><b>Formula Used for calculation of baseline emission for the 1<sup>st</sup> crediting period: -</b></p> $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ <p>Where:  <math>BE_y</math> = Baseline emissions in year y (tCO<sub>2</sub>/yr).  <math>EG_{PJ,y}</math> = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh).  <math>EF_{grid,CM,y}</math> = Combined margin CO<sub>2</sub> 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" v07.0. (tCO<sub>2</sub>/MWh).                  The project activity is the installation of a Greenfield power plant, Hence, <math>EG_{PJ,y} = EG_{facility,y}</math></p> <p>Where:  <math>EG_{PJ,y}</math> = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr).  <math>EG_{facility,y}</math> = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr).  <math>BE_y = EG_{Facility,y} \times EF_{grid,CM,y}</math>  <math>BE_y = 1,286,967.88 \text{ MWh/year} \times 0.514 \text{ tCO}_2/\text{MWh}</math>  <math>= 661,501 \text{ tCO}_2/\text{year}(\text{round down})</math></p> <p><b>Project emissions:</b>                  The project activity results in new reservoirs and the power density of the power plant, the power density calculates as follows <math>513,000,000 \text{ W} / 65,400,000 \text{ m}^2 = 7.844 \text{ W/m}^2</math>.                  Since power density (<math>7.844 \text{ W/m}^2</math>) is <math>&gt;4 \text{ W/m}^2</math> but <math>&lt; 10 \text{ W/m}^2</math> the project emissions need to be calculated.                  The reservoir related project emissions can be calculated according to the following formula<sup>24</sup>  <math>PE_{HP,y} = (EF_{Res} \times TE_{Gy}) / 1000</math></p> <p>Where:                  - <math>PE_{HP,y}</math>: Project emissions from water reservoirs (t CO<sub>2</sub>e/yr)                  - <math>EF_{Res}</math>: Default emission factor for emissions from reservoirs of hydro power plants in year y (kg CO<sub>2</sub>e/MWh) (Which is 90 kg CO<sub>2</sub>e/MWh<sup>25</sup>)</p>
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<sup>24</sup> <https://cdm.unfccc.int/UserManagement/FileStorage/AG07ZJQ3EXD42LT5YV9HR16M8KINPO>

<sup>25</sup> Default emission factor for emissions from reservoirs EB23

	<p>- <math>TE_{Gy}</math> : Total electricity produced by the project activity, including the electricity supplied the grid and the electricity supplied to internal loads, in year y (MWh)                  Total Project emissions= (90 X 1,298,203 ) / 1000 =116,838 t CO<sub>2</sub>e                  For detailed monthly basis project emission calculation of Boyabat HPP can be found ER sheet of the project.</p> <p><b>Leakage:</b>                  No Leakage emissions are considered. The main emission potentially giving rise to leakage in the context of electrical sector projects is emission arising due to activities arising such as power plant construction and upstream emission from fossil fuel use (e.g., extraction, processing, and transport). These emission sources are neglected.                  Therefore, <math>BE_y = ER_y</math>  <math>ER_y = BE_y - PE_y</math>  <math>ER_y = 661,501 - 116,840</math>  <math>ER_y = 544,661 \text{ tCO}_2/\text{year}</math></p> <p><b>Monitored Parameter:</b>  <math>EG_y/EG_{\text{facility}, y} = 12,86,967.88 \text{ MW/h}</math></p> <p>The verification team has checked the monthly settlement notification EPIAS screenshots submitted by PP for quantity of net electricity supplied to the grid and found correct. Assessment team has also crosschecked data with sales data from TEİAŞ receipts and found consistent. The parameter has been monitored and recorded as per the monitoring plan in the registered PD and joint PD &amp; MR. The verification team has crosschecked the revised emission reduction sheet and monitoring report data with the monthly Breakup sheet and invoice and found all the values are matching.</p> <p>Assessment team confirms that the monitoring has been carried out in accordance with the monitoring plan contained in the registered VCS PD and applied methodology.</p> <p>There haven't been any change on project's design and characteristics. However, the other entity involved in the project as carbon consultant was Rüzgar Danışmanlık Ltd. Şti. in the project description and it's been changed as Life İklim ve Enerji Ltd. Şti. at the time of this RCP Validation and verification process as indicated in the Joint PD&amp; MR.. Applus+ Certification hereby confirms that the change in the other entity involved in the project as carbon consultant has no impact on the project to be in compliance with the VCS rules and requirements and has no impact on the applicability of the methodology, additionality and the appropriateness of the baseline scenario. Secondly, all data in emission reductions table are checked with EPIAŞ records as the main source and crosschecked with TEAIS meter reading protocol (OSOS) records. The main source of data has been defined as PMUM records during the initial monitoring period but PMUM has been replaced by EPIAS system as of 01/09/2015 in Turkey as confirmed by the local knowledge of the verification</p>
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	<p>team and Re Carbon Ltd. hereby confirms that this change has no impact on the applicability of the methodology, additionality and the appropriateness of the baseline scenario. Finally, EG<sub>PP-selfconsumptionTEDA</sub>,<sub>y</sub> parameter hasn't been monitored separately in this monitoring period because this consumption is measured along with currently available three main and three back-up meters instead of the electricity meter with serial number 60023357 available during the initial verification process. Re Carbon Ltd. hereby confirms that the change in the monitoring practices of EG<sub>PP-selfconsumptionTEDA</sub>,<sub>y</sub> parameter has no impact on the project to be in compliance with the VCS rules and requirements and has no impact on the applicability of the methodology, additionality and the appropriateness of the baseline scenario.</p> <p>Above mentioned deviation for parameter was approved by VVB during previous verification of Monitoring period i.e., 01 August 2014 and 30 April 2020. However, regarding the change in the other entity involve in the project activity is approved by the VVB during the current verification. The above permanent changes does not have any impact on project design, baseline, scale of project, additionally &amp; monitoring practices as at site except common metering.</p>
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## 4.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

<b>Means of verification</b>	The verification team checked the Calibration details of the monitoring meters with the calibration certificates.
<b>Findings</b>	CAR 06 was raised on this section and closed successfully. Please refer Appendix 2 for further details
<b>Conclusion</b>	<p>The verification team checked meters details during site visit including the calibration certificates of the monitoring equipment's used during the current monitoring period.</p> <p>The serial number of the currently available main meter and backup meter been verified during the site visit and meter change protocol<sup>/22/</sup> dated 03-December-2012 and Dated 02-December-2022<sup>/22/</sup>.</p> <p>The first protocol date (first calibration record) date was on 03-December-2012 for current meters. Latest test record date is 11-March-2021 for both meters during this monitoring period. Assessment team has checked the Meter protocol and confirms that the calibration details of meters are provided I Appendix 5 of this report.</p> <p>Verification team confirms that main meter and backup meter are of accuracy class of 0.2s and are calibrated as per the calibration frequency mentioned in monitoring plan in registered PD and Joint PD &amp; MR<sup>/4/</sup>, No delayed calibrations were observed in the project activity for this monitoring period. All the meters are of same accuracy class i.e., 0.2s as per the requirement of the registered PD<sup>/15/</sup> and Joint PD &amp; MR<sup>/4/</sup>.</p>

	<p>The break down log is checked and there is no major breakdown during the monitoring period. No unforced error observed. No sampling procedure applied for monitoring of the data parameter and entire documents were checked by the assessment team to arrive at positive verification conclusions. The monitoring plan is followed at the project site. The monitoring meters were calibrated in line with the registered monitoring plan and there was no delay in calibration observed. Thus, assessment team concluded that the evidences are sufficient in quantity, and appropriate for the quality, to determine the GHG reductions and removals. Based on the above, the assessment team confirms the sufficiency and appropriateness of the quality of evidence provided by the PP to determine the GHG reductions and further deems them to be acceptable.</p> <p>Quantity of net electricity displaced as a result of the implementation of this project activity is the monitoring parameter as per the Joint VCS PD &amp; MR<sup>/01/</sup>. The net electricity is measured continuously by one main electricity meter at the grid interface and recorded monthly. There is also one back up electricity meter. The metering arrangement is bi-directional energy meters of accuracy class 0.2s. The meters to be used in the electricity market shall be compliant with the standards of Turkish Standards Institute or IEC and have obtained "Type and System Approval" certificate from the Ministry of Trade and Industry.' The calibration frequency of meters is once in 10 years in with paragraph (b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems' (Regulation) of Ministry states.</p> <p>The details of meters are as provided in Appendix 5 of the report.</p> <p>Onsite audit and interview with site personnel also confirms that the operational and organizational chart as mentioned in registered VCD PD and Joint PD &amp; MR is as per the site practice and thus assessment team confirms that the details are correct. No unforced error observed.</p>
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## 5 VALIDATION AND VERIFICATION CONCLUSION

### RCP Validation Conclusion:

Applus+ Certification has been engaged by Boyabat Elektrik Uretim ve Ticaret A.S. the Validation for Renewal of Crediting Period (RCP) and verification of the "Boyabat Hydroelectric Power Plant by Boyabat Elektrik Uretim ve Ticaret A.S. Ltd in Central Black Sea Geographical Region/Sinop Province Turkey.

The management of the project participant/owner is responsible for the preparation of the GHG emissions data and the reported/estimated GHG emissions reductions on the basis set out within the project's Monitoring Plan in the Joint VCS PD & MR and the applied methodology ACM0002 Version 14.0 and ACM0002 Version 21.0 for first and second CP resp.

Our Validation approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board and VCS board. Our approach is risk-based, drawing on an understanding of the risks associated with estimated GHG emissions data and the controls in place to mitigate these. The validation can confirm that:

- The projects description compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline version 4.3<sup>/15/</sup> and standard version 4.4<sup>/15/</sup>
- The project's baseline and additionality are assessed against ACM0002 Version 14.0 for first and ACM0002 Version 21.0 for second CP resp.<sup>/5/</sup>.
- The project's monitoring plan is assessed against ACM0002 Version 14.0 for first and ACM0002 Version 21.0 for second CP resp.<sup>/5/</sup>.
- A risk-based approach has been followed to perform this validation activity. The review of the project description and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews with Project Owner have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence for positive validation opinion as per the requirement of VCS.

The project is expected to generate 5,002,720tCO<sub>2</sub>e per year during the length of entire 2<sup>nd</sup> crediting period (29-November-2022 to 28-November-2032).

Year	Estimated GHG emission reductions or removals (tCO <sub>2</sub> e)
29-November-2022 to 31-December-2022	45,230
01-January-2023 to 31-December-2023	500,272
01-January-2024 to 31-December-2024	500,272
01-January-2025 to 31-December-2025	500,272
01-January-2026 to 31-December-2026	500,272
01-January-2027 to 31-December-2027	500,272
01-January-2028 to 31-December-2028	500,272
01-January-2029 to 31-December-2029	500,272

01-January-2030 to 31-December-2030	500,272
01-January-2031 to 31-December-2031	500,272
01-January-2032 to 28-November-2032	455,042
<b>Total estimated ERs</b>	<b>5,002,720</b>
<b>Total number of crediting years</b>	10
<b>Average annual ERs</b>	500,272

### Verification Conclusion:

Our Verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that

- The project is operated as planned and described in the registered VCS PD and MR;
- The monitoring plan is as per the applied methodology;
- The monitoring process in Monitoring Report is as per the PD.
- The development and maintenance of records and reporting procedures are in accordance with the monitoring plan;
- The installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately
- The monitoring system is in place and generates GHG emission reductions data;
- The GHG emission reductions are calculated without material misstatements.
- No limitation observed for the present verification

Verification period: 01-May-2020 to 28-November-2022 (first & last date included) under 1<sup>st</sup> CP. Verified GHG emission reductions and removals in the above verification period are reported the Joint PD & MR version 03, found correct.

Verified GHG emission reductions and removals in current periodic verification:

Net Emission Reduction from 01-May-2020 to 28-November-2022 (Monitoring Period 1<sup>st</sup> under First Crediting Period)

Year	Baseline emissions or removals (tCO <sub>2</sub> e)	Project emissions or removals (tCO <sub>2</sub> e)	Leakage emissions (tCO <sub>2</sub> e)	Net GHG emission reductions or removals (tCO <sub>2</sub> e)
01-May-2020 to 31-December-2020	194,601	34,357	0.00	160,244
01-January-2021 to 31-December-2021	288,988	50,985	0.00	238,003
01-January-2022 to 28-November-2022	177,911	31,498	0.00	146,413
<b>Total</b>	<b>661,501</b>	<b>116,840</b>	<b>0.00</b>	<b>544,660</b>

The total emission reduction for current monitoring period (01-May-2020 to 28-November-2022) is 544,660 tCO<sub>2</sub>e.

Year	Ex-ante emissions reductions/removals	Achieved emissions reductions/removals	Percent difference	Justification for the difference
01-May-2020 to 31-December-2020	389,907 tCO <sub>2</sub> e	160,244 tCO <sub>2</sub> e	58%	Reason behind the lower PLF is due to change in Yearly Rainfall and Rain Days Averages, & water availability during the monitoring period and is thus nature dependent and not in control of PP.
01-January-2021 to 31-December-2021	580,882 tCO <sub>2</sub> e	238,003 tCO <sub>2</sub> e	59%	
01-January-2022 to 28-November-2022	528,364 tCO <sub>2</sub> e	146,413 tCO <sub>2</sub> e	72%	
<b>Total</b>	<b>14,99,153 tCO<sub>2</sub>e</b>	<b>544,660 tCO<sub>2</sub>e</b>	<b>-63.67 %</b>	

The total emission reduction for current monitoring period (01-May-2020 to 28-November-2022) is 544,660 tCO<sub>2</sub>e.

The total monitoring period (01-May-2020 to 28-November-2022) is of 942 days under 1<sup>st</sup> CP).

The estimated annual emission reduction for 1<sup>st</sup> CP as per VCS PD and MR is 580,882 tCO<sub>2</sub>e.

The estimated emission reduction for the 942 days is 14,99,153 tCO<sub>2</sub>e (580,882 tCO<sub>2</sub>e\*942 days/365 days).

The estimated emission reduction in current monitoring period is 14,99,153 tCO<sub>2</sub>e.

The ERs achieved during the current monitoring period (942 days) is 544,660 tCO<sub>2</sub>e which is 63.67 % lower than the estimated values.

Assessment team checked the calculation in ER sheet and confirmed that estimated ER is calculated using the unitary method. The daily VCUs generation is calculated using the ratio of annual average generation of the commissioned plant by the number of days in a year, then the calculated daily VCUs generation is multiplied with the monitoring duration of the project.

# APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED (VERIFICATION)

No.	Author	Title	References to the document	Provider
1.	VCS	VCS webpage for the project, VCS ID 1345.	<a href="#">Verra Search Page</a>	-
2.	NA	Commissioning certificates of the project	-	PP
3.	UNFCCC	ACM0002. - "Grid connected renewable electricity generation",	version 21.0	
4.	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	PP
5.	NA			-
6.	NA	The operational lifetime of the project activity from the manufacturer = (Technical specifications)	Manufacturer technical specifications	PP
7.	NA	Registered VCS PD, version 1.01  VCS Validation report by Bureau Veritas, version 1.0 Report I.D.- SC21226301  Previous VCS Verification report by Applus, version 01.4 <i>Report I.D. <a href="#">Verra Search Page</a></i>	24-July-2014  04-September-2014  19-April-2022	PP
8.	NA	Calibration Certificates of energy meters	NA	PP
9.	NA	Joint Project Description and Monitoring Report, version 01 (Initial)  Joint Project Description and Monitoring Report, version 02 Joint Project Description and Monitoring Report, version 03	22-December-2022  22-March-2023  29- March-2023	PP
10.	NA	EF_and_ER_Estimation_1345_RCP (Initial)  EF_and_ER_Estimation_1345_RCP EF_and_ER_Estimation_1345_RCP (Final)	22-December-2022  22-March-2023 29-March-2023	PP
11.	NA	Emission reduction sheet version 01(Initial) Emission reduction sheet version 02 (Final)	22-December-2022  29-March-2023	PP

No.	Author	Title	References to the document	Provider
12.	NA	O & M Agreements	-	PP
13.	UNFCCC	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period, version 3.0.1		
14.	NA	Power Purchase Agreements (PPAs)	-	PP
15.	NA	Tools/ guidelines used in the project activity <ul style="list-style-type: none"> <li>• Glossary of CDM terms version 11</li> <li>• VCS Standard version 4.4</li> <li>• VCS Program Guide 4.3</li> <li>• VCS verification report template version 4.2</li> <li>• Tool to calculate the emission factor for an electricity system” version 07.0</li> </ul>	UNFCCC CDM/VCS web site	UNFCCC
16.	PP	EPIAS Screenshots and TEİAŞ (electricity sales receipts)/ topographical surveys, maps and satellite	- Meter Reading Report (JMR + Invoices) covering entire monitoring period	PP
17.	NA	Declaration regarding no participation in other GHG program for the concerned monitoring period	09-March-2023	PP
18.	NA	Grievance Register maintained at site	-	PP
19.	NA	CDM validation and verification standard for project activities, Version 03.0	-	UNFCCC
20.	NA	Employment and Training records	-	PP

# APPENDIX 2: CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS (CAR/CL/FAR)

**Table 1. Remaining FAR from previous verification**

<b>FAR ID</b>	NA	<b>Section no.</b>		<b>Date :</b>
<b>Description of FAR</b>				
<i>No FAR was raised during validation and previous verification of this project activity.</i>				
<b>Project participant response</b>				<b>Date :DD/MM/YYYY</b>
NA				
<b>Documentation provided by project participant</b>				
NA				
<b>VVBassessment</b>				<b>Date: DD/MM/YYYY</b>
NA				

**Table 2. CL from this RCP validation and verification**

<b>CL ID</b>	01	<b>Section no.</b>	4.1	<b>Date: 02-March-2023</b>
<b>Description of CL</b>				
During document review it was observed that; parameters EG, PP-Self-Consumption,y & EG, PP-Self-Consumption,TADAS y applicable to first crediting period's third verification found missing in the Joint VCS PD & MR. PP shall clarify the same including parameters separately for both CP 1 & CP 2 renewal. Kindly clarify and resubmit revised Joint VCS PD & MR.				
<b>Project participant response</b>				<b>Date: 22-March-2023</b>
<i>Missing parameters have been inserted to Joint VCS PD &amp; MR.</i>				
<b>Documentation provided by project participant</b>				
Joint PD & MR				
<b>VVB assessment</b>				<b>Date: 24-March-2023</b>
VVB team found that; PP has now inserted the parameters EG, PP-Self-Consumption,y & EG, PP-Self-Consumption,TADAS y in revised joint PD&MR. <b>Thus, CL is closed.</b>				

<b>CL ID</b>	02	<b>Section no.</b>	3.1	<b>Date: 02-March-2023</b>
<b>Description of CL</b>				
During documents review and onsite visit assessment team found that, generated electricity form the hydro power plant had been transfer to turkey national grid. Details about signed PPA between the parties is found missing in submitted Joint PD & MR. PP requested to clarify & submit PPA				
<b>Project participant response</b>				<b>Date: 22-March-2023</b>
<i>There is no PPA in Turkey. Generated electricity had been transferred to turkey national grid and the evidence of this is the connection agreement. This agreement has been provided to VVB now.</i>				
<b>Documentation provided by project participant</b>				
Agreement				

<b>VVB assessment</b>	<b>Date: 24-March-2023</b>
During onsite visit VVB team verified that; PP has signed an agreement with national grid and copy of the generation agreement has been submitted to the VVB team. <b>Thus, CL is closed.</b>	

<b>CL ID</b>	03	<b>Section no.</b>	3.4.2	<b>Date: 02-March-2023</b>
<b>Description of CL</b>				
Inline with VCS Standard, version 4.4, para 3.9.8 (2.b), demonstration of validity of the original baseline scenario in accordance with the requirements set out in the VCS Program rules found missing in the revised VCS PD for RCP. Kindly clarify.				
<b>Project participant response</b>				<b>Date: 22-March-2023</b>
<i>There is no change in the baseline scenario. Detailed explanation had already been provided in section 3.4. The only change is emission factor.</i>				
<b>Documentation provided by project participant</b>				
<i>Revised Joint PDMR</i>				
<b>VVB assessment</b>				<b>Date: 24-March-2023</b>
VVB team has found that, there is no change in baseline scenario of the project activity. VVB team verified that, emission factor has been updated and same change is now reflected in revised joint PDMR. <b>Thus, CL is closed.</b>				

<b>CL ID</b>	04	<b>Section no.</b>	4.1	<b>Date: 02-March-2023</b>
<b>Description of CL</b>				
1. Assessment team during document review it is found that, Monthly electricity generation details is provided in emission reduction sheet and moreover to verify the same crosscheck mechanism is found missing in ER sheet. Kindly clarify.				
<b>Project participant response</b>				<b>Date: 22-March-2023</b>
<i>Crosscheck was done with TEIAS receipts. Related data had already been provided in "ER of Boyabat HPP" sheet of ER excel. There is no difference between TEIAS and EPIAS values in any month.</i>				
<b>Documentation provided by project participant</b>				
<i>TEIAS and EPIAS document.</i>				
<b>VVB assessment</b>				<b>Date: 24-March-2023</b>
VVB team verified that; PP has submitted the TEIAS data and to verify the same PP has also submitted the EPIAS data to the assessment team. <b>Hence CL is closed.</b>				

<b>CAR ID</b>	01	<b>Section no.</b>	3.1	<b>Date: 02-March-2023</b>
<b>Description of CAR</b>				
During review of Joint PD & MR following inconsistencies were observed:				
<ol style="list-style-type: none"> <li>1. VVB team observed editorial and grammatical mistakes throughout the RCP PDD submitted by PP. Corrective action sought.</li> <li>2. Section 1.1 of RCP PD not in-line with the guideline to complete VCS PD &amp; MR template. Corrective action sought.</li> <li>3. VVB team observed that; PP has not mentioned the tool no. in section 3.1 of Joint PDMR PP shall update &amp; revised the joint PD&amp;MR.</li> <li>4. Details about the vintage wise is found inconsistent in section 7.5 of the joint PDMR. Thus, Correction sought.</li> <li>5. Information about implementation status and the operation of the project activity(s) during this monitoring period, emission reductions or removals and monitoring is missing.</li> <li>6. During document review VVB team found that, apportioning procedure is found missing in joint PD&amp;MR, in case mismatch of billing date and generation date.</li> <li>7. PP is request to submit; O&amp;M agreements, Project ownership documents &amp; lifetime evidence of the complete project activity to the assessment team. Kindly Submit.</li> </ol>				
<b>Project participant response</b>				<b>Date: 22-March-2023</b>

1. RCP PDD has been checked and revised as per comment. 2. Section 1.1 has been revised. 3. Tool no has been inserted. 4. Section 7.5 has been revised. 5. Section 4.1 has been revised. 6. Apportioning procedure has been inserted in monitoring plan section. 7. Generation license had already been provided as evidence for project ownership and lifetime. O&M services are not taken from outside.	
<b>Documentation provided by project participant</b>	
Joint PD&MR Version 02	
<b>VVB assessment</b>	<b>Date:</b> 24-March-2023
1. VVB team found that PP has updated the joint PDMR. 2. VVB team observed that; PP has updated the section 1.1 of joint PDMR. 3. VVB team verified that; PP has now inserted the missing tool no in section 3.1. 4. Vintage wise GHG emission reduction is demonstrated in section 7.5 of the revised PDMR. 5. VVB team verified that, Information about implementation status and the operation of the project activity(s) during this monitoring period, emission reductions or removals and monitoring is now updated in section 4.1 of the revised Joint PDMR. 6. Apportioning procedure has been inserted in monitoring plan section 7. During onsite audit it was found that, PP itself maintained the O&M services and Generation license is submitted by PP.	
CAR is closed in this section.	

<b>CAR ID</b>	02	<b>Section no.</b>	3.4.8	<b>Date:</b> 02-March-2023
<b>Description of CAR</b>				
Joint VCS PD & MR is found not clear about accuracy class of the project instances monitoring meters, sealing & custody of the meters and the responsibility of the calibration of the monitoring meters installed at project site. Corrective action sought.				
<b>Project participant response</b>				<b>Date:</b> 22-March-2023
Related information has been inserted.				
<b>Documentation provided by project participant</b>				
1)				
<b>VVB assessment</b>				<b>Date:</b> 24-March-2023
VVB team found that; PP has now provided the details about the accuracy class of the project instances monitoring meters, sealing & custody of the meters and the responsibility of the calibration of the monitoring meters installed at project site has been mentioned in revised joint PDMR version 02. <b>Thus, CAR is closed.</b>				

<b>CAR ID</b>	03	<b>Section no.</b>	3.2	<b>Date:</b> 02-March-2023
<b>Description of CAR</b>				
1. PP is requested to submit an undertaking for no double accounting for current monitoring period of project activity for participation in other GHG program, kindly submit.				
<b>Project participant response</b>				<b>Date:</b> 22-March-2023
Declaration related double accounting has been provided.				
<b>Documentation provided by project participant</b>				
No double declaration				
<b>VVB assessment</b>				<b>Date:</b> 24-March-2023
VVB team verify that, PP has submitted the no double accounting declaration dated 09-March-2023. <b>Hence CAR is closed.</b>				

<b>CAR ID</b>	04	<b>Section no.</b>	4.1	<b>Date:</b> 02-March-2023
<b>Description of CAR</b>				
<ul style="list-style-type: none"> <li>As per the VCS joint PD and MR template, PP has described about mechanism for on-going communication with local stakeholders along with the details of local stakeholder consultation conducted prior to the joint validation and verification. However, evidence to verify the same is found missing. Thus, corrective action sought.</li> <li>Joint PDMR is not clear about grievance readdressed mechanism. PP request to submit the copy of grievance mechanism register to the VVB team. Thus, Correction sought.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 22-March-2023
Current grievance mechanism has been explained with more details. In addition, details of local stakeholder consultation have been provided and related evidence has been shared. Moreover, declaration about the logbook delivering to headmen and related photographs have been shared. 2)				
<b>Documentation provided by project participant</b>				
<i>Revised PDMR</i>				
<b>VVB assessment</b>				<b>Date:</b> 24-March-2023
<ul style="list-style-type: none"> <li>VVB team verified that, PP has conducted the local stakeholder consultation on 05-january-2021, Moreover to verify the same PP has submitted the images and copy of LSC meeting.</li> <li>PP has now mentioned about the grievance redressal mechanism in revised PDMR. Copy of grievance register is also submitted to the VVB team. <b>Thus, CAR is closed.</b></li> </ul>				

<b>CAR ID</b>	05	<b>Section no.</b>	4.4	<b>Date:</b> 02-March-2023
<b>Description of CAR</b>				
<ol style="list-style-type: none"> <li>Assessment team during document review it is found that, Monthly electricity generation details is not in line with ER Sheet. Thus, Corrective action sought.</li> <li>Provide the ex-ante calculation (estimate) of baseline emissions/removals as per VCS joint validation + verification v.4.2</li> <li>PP requested to segregate the emission reduction calculation in section 5.1 of the joint PD&amp;MR. Correction sought for the same.</li> <li>Project Proponent shall demonstrate the baseline emission calculation for both CP 01 &amp; CP 02 separately as the applied methodology version is different for both the crediting period. Thus, Correction Sought.</li> </ol>				
<b>Project participant response</b>				<b>Date:</b> 22-March-2023
<ol style="list-style-type: none"> <li>RCP PD has been revised as per ER sheet.</li> <li>Provided.</li> <li>Section 5.1 has been revised.</li> <li>Baseline emission calculation for both CP 01 &amp; CP 02 has been demonstrated separately.</li> </ol>				
<b>Documentation provided by project participant</b>				
<i>RCP Joint PDMR V.02</i>				
<b>VVB assessment</b>				<b>Date:</b> 24-March-2023
<ol style="list-style-type: none"> <li>Assessment team found that, Monthly electricity generation details is now find consistent with ER Sheet.</li> <li>PP has provided the ex-ante calculation (estimate) of baseline emissions/removals as per VCS joint validation + verification v.4.2 in revised Joint PDMR.</li> <li>VVB team verify that, reduction calculation in section 5.1 of the joint PD&amp;MR is now segregate.</li> <li>VVB team found that, Project Proponent has demonstrated the baseline emission calculation for both CP 01 &amp; CP 02 separately as per version of applied methodology. Hence CAR is closed.</li> </ol>				

<b>CAR ID</b>	06	<b>Section no.</b>	4.2	<b>Date:</b> 02-March-2023
<b>Description of CAR</b>				

1. Assessment team found that, PP had submitted the calibration certificate and meter change certificate. PP need to bifurcate energy meter details for complete monitoring period. 2. Assessment team during document review observed that; Joint PDMR is not clear about calibration frequency of the energy meter kindly update the same details. Thus, Correction sought.	
<b>Project participant response</b>	<b>Date: 22-March-2023</b>
1. There is no separate document because once the meter was change it is the first index of that meter at the same time 2. Calibration frequency has been provided as per related regulation.	
<b>Documentation provided by project participant</b>	
Joint PD&MR Version 02	
<b>VVB assessment</b>	<b>Date: 24-March-2023</b>
1. VVB team verified that, there is no meter change during the monitoring period and PP has provided the meter details in revised Joint PDMR and calibration certificate is submitted to the VVB team. 2. PP has updated the details about the meter calibration frequency in revised PDMR version 02. <b>Thus, CAR in this section is closed.</b>	

Table 3.FAR from this RCP validation and verification

<b>FAR ID</b>	<b>Nil</b>	<b>Section no.</b>		<b>Date:</b>
<b>Description of FAR</b>				
No FAR is raised				
<b>Project participant response</b>				<b>Date:DD/MM/YYYY</b>
NA				
<b>Documentation provided by project participant</b>				
NA				
<b>VVB assessment</b>				<b>Date:DD/MM/YYYY</b>
NA				

## APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Lead Auditor/Technical Expert	OR	Takarkhede	Dr. Atul	TQC-Outsourced entity	Yes	Yes	Yes	Yes

## Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR) / Technical Expert (TE)	EI	Xue	Denny	Applus+ Certification
2.	Approver	IR	Calle de Miguel	Agustin	Applus+ Certification

## Short CVs of the Team:

- Dr. Atul Takarkhede** is Ph.D. (Environmental Sciences) from Institute of Science, RTM Nagpur University, Nagpur, and he has already published different technical papers related to environmental sciences. He counts with more than 11 years of experience in field of Environmental Auditing, consulting and accreditation. He is an expert in ISO 9001-14001, CO2/GHG Reporting, Carbon Foot Print, Energy, Water and Waste Management reporting for organizations' environmental performance. His professional portfolio is mainly related with carrying out EIA, conducting QA/QC of EIA Reports; conducting environmental/water audits; NABET requirements appliance, functional area expert in Water Pollution & Solid & Hazardous Waste management among others. Furthermore, he counts with solid experience on CDM-VCS-GS consultancy and auditing. Currently he is associated with True Quality Certifications Private Limited and empanelled with Applus+ Certification to carry out GHG audits in the aforementioned schemes. Dr. Atul Takarkhede is based in Nagpur, India Dr. Atul Takarkhede participate as part of the Audit Team as the Lead Auditor and Technical Expert for the assessment.
- Mr. Denny Xue**, (Master's Degree in Environmental Engineering, Bachelor's Degree in Thermal Engineering) is an Auditor appointed by Applus+ LGAI for the GHG project assessment, auditing and technical review. He has more than 6 years of work experience in CDM/GS4GG/VCS project assessment and technical review with Applus+. Before he joined Applus+ LGAI, he has been working for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development. Mr. Denny Xue is based in Shanghai, China. Mr. Denny Xue participates in the project's technical review team.

## APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification request
CM	Combined Margin
CMS	Central Monitoring system
CO <sub>2</sub>	Carbon dioxide
CO <sub>2e</sub>	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming potential
PP	Project Participant
VVB	Validation/Verification Body
VCUs	Verified Carbon Unit

## APPENDIX 5: METER CALIBRATION

Meter Details	Main Meter		
Meter Serial No	00452660	00452662	00452664
Meter Make	ELSTER A 1500	ELSTER A 1500	ELSTER A 1500
Accuracy Class	0.2 s	0.2 s	0.2 s
Date of Calibration	03-December-2012	03-December-2012	03-December-2012
Due date of next calibration	02-December-2022	02-December-2022	02-December-2022

Meter Details	Backup Meter		
UNIT'S	Unit 01	Unit 02	Unit 03
Meter Serial No	00452661	00452663	00452665
Meter Make	ELSTER A 1500	ELSTER A 1500	ELSTER A 1500
Accuracy Class	0.2 s	0.2 s	0.2 s
Date of Calibration	03-December-2012	03-December-2012	03-December-2012
Due date of next calibration	02-December-2022	02-December-2022	02-December-2022

VVB team during site visit found that, meter has been changed 11-March-2021, meter changed certificate has been submitted by PP to the VVB team, which found error free, and no discrepancies has been observed.

NEW METER:

Meter Details	Main Meter		
Meter Serial No	10013199	10013201	10013203
Meter Make	EMH	EMH	EMH
Accuracy Class	0.2 s	0.2 s	0.2 s
Date of Calibration	11-March-2021	11-March-2021	11-March-2021
Due date of next calibration	10-March-2031	10-March-2031	10-March-2031

Meter Details	Backup Meter		
Meter Serial No	10013200	10013202	10013204
Meter Make	EMH	EMH	EMH
Accuracy Class	0.2 s	0.2 s	0.2 s
Date of Calibration	11-March-2021	11-March-2021	11-March-2021
Due date of next calibration	10-March-2031	10-March-2031	10-March-2031