



Verified Carbon Standard

THE YOKUSLU- KALKANDERE HYDROELECTRIC POWER PLANT



Document Prepared by LGAI Technological Center, S.A. (Applus+ Certification)

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| Report Title | The Yokuslu- Kalkandere Hydroelectric Power Plant CP Renewal Validation Report |
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Summary:

Applus+ Certification has performed the VCS crediting period (CP) renewal validation of the The Yokuslu-Kalkandere Hydroelectric Power Plant in Turkey between 25/03/2022 and 20/12/2022.

The Yokuslu- Kalkandere Hydroelectric Power Plant involves installation and operation of licensed installation of two runoff river hydroelectric power plants (HEPPs) (Kalkandere HEPP and Kızılağaç HEPP) and has the installation of horizontal axis three Francis turbines with the installed capacity of 11.90 MWm / 11.68 MWe each and vertical axis two Kaplan turbines with the installed capacity of 2.70 MWm / 2.60 MWe each, so it has a total capacity of 41.19 MWm / 40.24 MWe. During the second crediting period which is 10 years, the project is expected to reduce 83,309 tCO_{2e} annually.

The purpose of this CP renewal validation activity is to determine whether the project complies with the applicable rules and regulations and to see whether the project still can be eligible to be a VCS project activity.

The scope of the CP renewal validation is the independent and objective review of the VCS-PD against the relevant criteria. The main focus of the CP renewal validation team is to identify whether the project is still eligible to be a VCS project activity, whether to check the baseline scenario is still valid, whether to check the emission reduction calculations are handled correctly and to whether to be able to continue with the generation of VCUs through the emission reduction.

The CP renewal validation was performed on the basis of VCS criteria, Host Party criteria as well as the criteria of Clean Development Mechanism methodologies and tools. An online (remote) site visit was performed on 23/09/2022. During the validation 08 CARs were raised all of which have resolved before the finalization of the CP renewal validation. There hasn't been any uncertainties involved during the CP renewal validation.

The review of the Project Description (PD) and the subsequent follow-up interviews have provided Applus+ Certification with sufficient evidence to determine the fulfillment of all stated criteria. In our opinion, the project meets all relevant VCS requirements. Therefore, Applus+ Certification recommends the renewal of CP of project by the VCS Program.

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center, S.A. (hereafter referred to as Applus+ Certification) has been appointed by “Sanko Enerji Sanayi ve Ticaret A.Ş.” to perform the crediting period (CP) renewal validation of the “The Yokuslu- Kalkandere Hydroelectric Power Plant” with the service agreement dated 25/03/2022. The objective of this validation activity is to have an independent third party for the assessment of the project design, and to ensure a thorough assessment of the proposed project activity against the applicable VCS and CDM requirements. In particular; the project's baseline is assessed against “ACM0002 version 21.0: “Consolidated methodology for grid-connected electricity generation from renewable sources the project’s monitoring plan is assessed against “ACM0002 version 21.0: “Consolidated methodology for grid-connected electricity generation from renewable sources VCS Version 4.3VCS Program Guide version 4.2

CP renewal validation 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 of the CP renewal validation is the independent and objective review of the VCS Project Description (PD). The PD is reviewed against the relevant criteria (please see section 1.1) and decisions by the VCS Organization, including the approved baseline and monitoring methodology. The validation was based on the guidance given in the CDM Validation and Verification Standard for project activities, version 3.0 and VCS Version 4.3.

The CP renewal validation team has employed a risk based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the PD. The main focus of the validation team is to identify whether the project is still eligible to be a VCS project activity, whether to check the baseline scenario is still valid, whether to check the emission reduction calculations are handled correctly and to whether to be able to continue with the generation of VCUs through the emission reduction. The validation is not meant to provide any consulting towards the project proponents. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project further implementation.

The only purpose of crediting period renewal validation is its usage during the crediting period renewal process as part of the VCS project cycle. Therefore, Applus+ Certification can't be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

1.3 Level of Assurance

Level of assurance of the validation report is defined as reasonable based on the handled validation process through the document review, online (remote) audit and the interviews.

1.4 Summary Description of the Project

The Yokuslu- Kalkandere Hydroelectric Power Plant is operated by Sanko Enerji Sanayi ve Ticaret A.Ş. The project is located on İyidere River in Rize city of Turkey. The project has the installation and operation of licensed installation of two runoff river hydroelectric power plants (HEPPs) (Kalkandere HEPP and Kızılağaç HEPP) and horizontal axis three Francis turbines with the installed capacity of 11.90 MWm / 11.68 MWe each and vertical axis two Kaplan turbines with the installed capacity of 2.70 MWm / 2.60 MWe each, so it has a total capacity of 41.19 MWm / 40.24 MWe in line with the electricity generation licence and provisional acceptance protocols and the project also supports the sustainable economic development in the region. The technical description of the project activity is as follows:

Table 1: Turbine and generator specifications

| Component | Property |
|------------------------------------|---|
| Turbine type | Francis-Horizontal shaft (3 turbines, Kalkandere HEPP) & Kaplan vertical shaft (2 turbines, Kızılağaç HEPP) |
| Turbine firm | Voith (Kalkandere HEPP) & Chongqing Water Turbine Works (CWTW) (Kızılagac HEPP) |
| Number of turbines | 3 (Kalkandere HEPP) & 2 (Kızılagac HEPP) |
| Average flow rate | 16.7 m ³ /s & 25 m ³ /s |
| Production year | 2010 & 2011 |
| Serial numbers of the turbines | 19743 & 19744 & 19745 Kalkandere HEPP) & 2011-10 & 2011-11 ((Kızılagac HEPP) |
| Installed capacity of each turbine | 11.68 MWe (Kalkandere HEPP) & 2.60 MWe (Kızılağaç HEPP) |
| Generator type | PSA-1600-X/14 (Kalkandere HEPP) & SF3150-24/3250 (Kızılağaç HEPP) |
| Generator firm | Indar (Kalkandere HEPP) & Chongqing Water Turbine Works (CWTW) (Kızılağaç HEPP) |
| Frequency | 50 Hz |
| Production year | 2010 (Kalkandere HEPP) & 2011 (Kızılağaç HEPP) |
| Number of generators | 3 (Kalkandere HEPP) & 2 (Kızılagac HEPP) |
| Serial numbers of the generators | 3010000202 & 3010000203 & 3010000204 (Kalkandere HEPP) & 2011-10 & 2011-11 ((Kızılagac HEPP) |

The project is in operation and started to produce electricity on 30/12/2010. The project fits in sectoral scope 1: Energy (Renewable Energy category).

The electricity generation of the proposed project is expected to be 180,480 MWh/year during the second crediting period. Since the project activity is a renewable energy project, it reduces greenhouse gases (GHGs) emissions that would have otherwise occurred in the absence of the project activity by avoiding electricity generation from fossil fuel sources. In the baseline scenario, the electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants. Since Turkey's grid mainly consists of thermal power plants, this would have resulted in GHG emissions. However, in the project scenario, the project will continue to generate electricity from hydro power and will result in emission reductions in parallel with its electricity generation figures. The average annual emission reductions of the proposed project for the crediting period are estimated to be 83,309 tonnes of CO₂e (tCO₂e). The emission reduction calculations have been validated by the VVB via a detailed review and check.

The project does not participate under any emission trading program and other GHG Programs including renewable energy certificates (RECs) and this is also confirmed through the signed and sealed declaration by PP and dated as 09/12/2022.

Furthermore, double counting issue has also been assessed and the CP renewal validation team has also checked the I-REC Registry (<https://evident.services/device-register>) wherein in total 354 projects from Turkey are listed as of this CP renewal validation report date and this project isn't available within I-REC Registry database. Similarly, Gold Standard project database (<https://registry.goldstandard.org/projects?q=&page=1>) and GCC project database (https://projects.globalcarboncouncil.com/pages/submitted_projects) were checked and this project isn't available within Gold Standard and GCC projects' databases, either. Given that CDM projects are not applicable in Turkey and the project does not appear on domestic REC scheme, I-REC, Gold Standard and GCC registries, it could be confirmed that no RECs and other VER carbon credits are being issued for the project at the time of this CP renewal validation.

That means, the only other eligible GHG programs in the host country is Gold Standard and Global Carbon Council (GCC) and the certification program is Renewable Energy Certification (REC), and the project hasn't been listed in any of them, hence Applus+ Certification confirms that the project has not participated or been rejected under any other GHG programs since the initial validation.

2 VALIDATION PROCESS

2.1 Method and Criteria

The scope of the CP renewal validation is the independent and objective review of the PD and the baseline calculations together with the supporting documents that are listed in Appendix 1 of this report. This review is handled according to rules and regulations set forth in the applied methodology, associated tools, program standards, guidelines and procedures.

During the review, the project's compliance with the host country's relevant laws and regulations are also assessed and deemed as appropriate. As the project is a hydro power plant, no sampling was deemed necessary and the validation process includes the whole project.

Applus+ Certification validate that the reported information in the Project Description are complete and accurate in question. This involved online (remote) site visit and a desk review of the PD and associated supporting documents.

Similarly, according to the sectoral scopes / technical area and experiences in the sectoral or national business environment, Applus+ Certification has composed the CP renewal validation team in accordance with the appointment rules in Applus+ Certification. The composition of CP renewal validation team has to be approved by the 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 as below:

- Leader Auditor (LA)
- Auditor (A)/ Auditor Trainee (AT)
- Technical Reviewer (TR)
- Technical Experts (TE)

| Name | Qualification | Coverage of scope | Coverage of Technical Area | Host country experience |
|-------------|---------------|-------------------|----------------------------|-------------------------|
| Anıl Söyler | LA/TE | Y | Y (TA 1.2) | Y |
| Denny Xue | TR | Y | Y (TA 1.2) | Y |

Mr. Anil Söyler has done Bsc. in Environmental Engineering. He has completed his Bachelor degree in Middle East Technical University, Turkey. He has about 20 years of professional experience in environmental management, monitoring and auditing, waste and waste water management, environmental and social impact assessment, GHG emission report and projects' validation and verification, environmental reports, team and client relationship management and quality management systems and has been involved in the validation/verification services of more than 100 GHG emission reduction projects in total. He has also been involved in both national and international projects supported by IFC, World Bank and EBRD.

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 had been working for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.

2.2 Document Review

The basis for the validation activity is the PD version 01, dated 28/07/2022 which was submitted to the validation team on the 10/09/2022. This PD was revised due to the raised CARs and CLs, version 03 dated 18/12/2022 being the final version. The PD was assessed against;

- the project's baseline is assessed against “ACM0002-Version 21.0: “Consolidated methodology for grid-connected electricity generation from renewable sources” and
- 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
- the project's monitoring plan is assessed against “ACM0002-Version 21.0: “Consolidated methodology for grid-connected electricity generation from renewable sources”
- CDM Validation and Verification Standard for Project Activities version 3.0
- VCS version 4.3
- VCS Program Guide version 4.2
- the Host Country criteria

The list of the documents which were reviewed during the CP renewal validation process is given in the Appendix 1 of the report.

2.3 Interviews

During the CP renewal validation period, follow-up interviews were realized by the validation team to further analyze the correctness and accurateness of the information provided.

The list of people who were interviewed during the CP renewal validation process is given in the Table 2 below:

Table 2: List of persons interviewed

| Reference Number | Means of Interview ¹ | Full Name | Title | Organization |
|------------------|---------------------------------|---------------------|------------------------|--|
| I01 | Online SV | İsmet Kaya | Plant Manager | Sanko Enerji Sanayi ve Ticaret A.Ş. |
| I02 | Online SV | Volkan Gümüşler | Administrative Staff | Sanko Enerji Sanayi ve Ticaret A.Ş. |
| I03 | Online SV | Müge Afacan Ural | Consultant | Gaia Finansal Danışmanlık Hizmetleri Ticaret Limited Şirketi |
| I04 | Online SV | Irmak Özdemir | Consultant | Gaia Finansal Danışmanlık Hizmetleri Ticaret Limited Şirketi |
| I05 | Online SV | Eyüp Güveli | Mukhtar (Village Head) | Huseyinhoca Village |
| I06 | Online SV | Mikail Erdemir | Villager | Huseyinhoca Village |
| I07 | Online SV | Abdülhamit Kurtuluş | Villager | Huseyinhoca Village |
| I08 | Online SV | Niyazi Kabaoğlu | Mukhtar (Village Head) | Yokuşlu Village |
| I09 | Online SV | Sinan Şeref | Mukhtar (Village Head) | Hurmalık Village |

2.4 Site Inspections

As a part of the verification activities an online (remote) site visit using remote audit techniques (by means of Information and Communication Technology (ICT) was executed to the project activity's location, details of which can be seen in Table 3 below:

Table 1: Online (remote) site visit details

| | | |
|--------------------|---|---|
| Date | 23/09/2022 | |
| Location | Online (remote) site visit through Zoom program | |
| Participant | Company Name | Role in the Organization / Role in the Online Site Visit |

¹ SV: Site visit; T: Telephone; E: E-mail

| İsmet Kaya | Sanko Enerji Sanayi ve Ticaret A.Ş. | Plant Manager |
|--|--|--|
| Volkan Gümüşler | Sanko Enerji Sanayi ve Ticaret A.Ş. | Administrative Staff |
| Müge Afacan Ural | Gaia Finansal Danışmanlık Hizmetleri Ticaret Limited Şirketi | Consultant |
| Irmak Özdemir | Gaia Finansal Danışmanlık Hizmetleri Ticaret Limited Şirketi | Consultant |
| Eyüp Güveli | Huseyinhoca Village | Mukhtar (Village Head) |
| Mikail Erdemir | Huseyinhoca Village | Villager |
| Abdülhamit Kurtuluş | Huseyinhoca Village | Villager |
| Niyazi Kabaoğlu | Yokuşlu Village | Mukhtar (Village Head) |
| Sinan Şeref | Hurmalık Village | Mukhtar (Village Head) |
| Points Verified | | Source of Information |
| To check the project development and operation including monitoring process | | Document review and online (remote) site visit |
| To interview with the local stakeholders about the project and its impacts | | Online (remote) site visit and interviews with the local stakeholders from Yokuşlu, Huseyinhoca and Hurmalık Villages |
| To confirm rightness of project description, as per PD including project components and location | | Document review, online (remote) site visit and interviews with the local stakeholders from Yokuşlu, Huseyinhoca and Hurmalık Villages |

The project owner representatives and local stakeholders had been interviewed as in above during the remote audit using Zoom program and some photographic evidences like electricity meters, waste storage areas etc. have been taken along with the document review process to achieve the reasonable level of assurance during the CP renewal validation as detailed in other sections of the report.

2.5 Resolution of Findings

In line with Applus+ Certification's internal terminology and VCS Version 4.3, the team reports the non-conformities in the forms of Corrective Action Requests (CARs), Clarification Requests (CLs) and Forward Action Requests (FARs).

When and for which type of non-conformities CARs, CLs and FARs are issued are explained below. The Validation team raises a **CAR** if one of the following occurs:

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

The Validation team raises a **CL** if information is insufficient or not clear or not transparent enough to determine whether the applicable CDM and/or VCS requirements have been met.

The Validation team raises a **FAR** during validation to highlight issues related to project implementation that require review during the first verification of the second crediting period of the project activity.

According to these principles total of 08 CARs were raised all of which are listed in Appendix 2. There hasn't been any CLs and FARs raised during the CP renewal validation.

2.5.1 Forward Action Requests

The validation team raises a FAR during the CP renewal validation to highlight issues related to project implementation that require review during the first verification of the second crediting period of the project activity as explained in the Section 2.5.

According to these principles, there hasn't been any FARs raised during the CP renewal validation.

3 VALIDATION FINDINGS

3.1 Project Details

The Yokuslu- Kalkandere Hydroelectric Power Plant is owned and operated by Sanko Enerji Sanayi ve Ticaret A.Ş. which is the project proponent. The project is located on İyidere River in Rize city of Turkey. The project has the installation and operation of licensed installation of two runoff river hydroelectric power plants (HEPPs) (Kalkandere HEPP and Kızılağaç HEPP) and horizontal axis three Francis turbines with the installed capacity of 11.90 MWm / 11.68 MWe each and vertical axis two Kaplan turbines with the installed capacity of 2.70 MWm / 2.60 MWe each, so it has a total capacity of 41.19 MWm / 40.24 MWe in line with the electricity generation licence and provisional acceptance protocols. The other entity involved in the project is Gaia Finansal Danışmanlık Hizmetleri Ticaret Limited Şirketi.

The project size (scale) is project in line with VCS rules and requirements due to its total capacity (40.24 MWe and estimated annual GHG emission reductions amount which is 83,309 tCO₂e) and since the project is a greenfield project activity, pre-project conditions are same with the baseline scenario as discussed in the Section 3.3.4 of this report. The installed capacity and the expected annual generation amount of the project have been checked through the provisional acceptance protocols dated as 30/12/2010, 28/01/2011 and 30/12/2012 and the electricity generation licence dated as 14/09/2006 (initial issuance), respectively.

The project start date of the project activity is the initial date of selling of the produced electricity which is 30/12/2010 and the project is in compliance with the relevant Turkish legal laws and regulations. The crediting period of the project activity is renewable crediting period of 10 years which can be renewed one more time since this will be the second crediting period of the project and the second crediting period is from 01/01/2021 to 31/12/2030². The project's expected technical lifetime is 35 years as confirmed through the registered PD and initial validation report.

The earlier registered PD takes into account all the relevant national and sectoral policies and circumstances that were applicable as on date. The discussion on the same has also been provided in the revised PD for the second crediting period as detailed in the Section 3.3.4 of this report. The baseline scenario has not changed and continues to be the same as earlier.

The proposed project's net GHG emission reductions or removals will neither be used for compliance with an emissions trading program or to meet binding limits on GHG emissions, nor for other forms of environmental credit. The project has neither been registered, nor is seeking registration under any other GHG programs other than VCS under VER scheme.

² The initial crediting period is from 01/01/2011 to 31/12/2020 as confirmed through the initial registered PD and validation report.

The project has been contributing to SDG-7 through net electricity generation by renewable source, SDG-8 through employment and SDG-13 through GHG emission reduction and such actual contributions will be checked during the second crediting period.

Besides that, there hasn't been any stated commercially sensitive information by the PP at the time of CP renewal validation except for the social and financial aids by PP due to the ethical reasons.

Through document review and interviews during the online (remote) site visit, Applus+ Certification confirms that the description provided of the project is accurate, complete, and provides an understanding of the nature of the project.

3.2 Safeguards

3.2.1 No Net Harm

There hadn't been any observed significant environmental and social impact of the project activity as indicated in the initial registered PD and revised PD for the second crediting period and this was also confirmed through the reviewed documents and online (remote) site visit in as detailed in Sections 3.2.2 and 3.2.3 of the report.

3.2.2 Local Stakeholder Consultation

There hasn't any additional local stakeholder consultation meeting handled by PP at the time of renewal of crediting period process.

There hadn't been any complaint raised by the interviewed local stakeholders during the online (remote) site visit as detailed in Sections 2.3 and 2.4 of the report.

The local stakeholders as stated in the Table 2 above were interviewed on 23/09/2022 about the following issues and there hadn't been any complaint by the interviewed local stakeholders during the online (remote) site visit:

- Noise due to the project activity
- Impact on the aquatic life where the project had been constructed
- Sufficiency of local employment (The interviewed local stakeholders were pleased about the provided local employment opportunities by the PP)
- Waste management practices implemented by PP

It was also concluded that the grievance mechanism is in place and this was also confirmed by the interviewed local stakeholders during the online (remote) site visit. The signed request/proposal forms by the local stakeholders from Yokuşlu, Huseyinli and Hurmalık Villages and dated as 25/09/2018, 01/10/2019, 09/01/2020, 07/02/2020 and 16/04/2020 were also provided to VVB.

CAR-05 was issued regarding the current status and method of the ongoing communication with the local stakeholders and it had been closed as detailed in Annex 2.

3.2.3 Environmental Impact

The EIA positive decision dated as 06/11/2009 by the General Directorate of Environmental Impact Assessment and Planning of Ministry of Environment and Forestry was also provided by the PP.

Besides that, the photos of waste storage areas and the hazardous waste declaration forms to Ministry of Environment and Urbanization dated as 17/02/2016, 24/02/2017, 09/02/2018, 31/01/2019, 07/02/2020 and 14/02/2022 and the package waste water treatment plant photos have been provided by the PP. The photographic evidences of fish passage and official signed lifeline water records dated as 18/02/2020 and 09/02/2021 have also been provided.

3.2.4 Public Comments

The public comment process hasn't been handled by PP since this is CP renewal validation process. However, the local stakeholder consultation details have been provided in the Section 3.2.2 of the report.

3.2.5 AFOLU-Specific Safeguards

Not applicable as the project isn't AFOLU project.

3.3 Application of Methodology

3.3.1 Title and Reference

The project activity was earlier registered using the methodology ACM0002 version 12.0. The PD has been updated using the latest approved version of the methodology ACM0002 version 21.0. The PPs have used the most recent version of the same methodology as the initial registered PD, i.e., the version that is valid at the time of submission of the revised PD for the renewal of the crediting period.

The project activity applies the following methodology and the associated tools:

- ACM0002 version 21.0: "Grid-connected electricity generation from renewable sources"
- Tool 07: Tool to calculate the emission factor for an electricity system, version 07.0
- Tool 11: 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

According to ACM0002 version 21.0, the latest approved tools shall be referenced in the PD like, "Tool to calculate the emission factor for an electricity system" version 07.0, and "Tool 11: 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 which are the latest versions of the mentioned tools valid at the starting time and the above tools are applied to in the PD. Therefore, it could be concluded by the CP renewal validation team that the title, version and reference of the methodology including the associated tools are correct and valid.

3.3.2 Applicability

The CP renewal validation team has assessed the relevant information contained in the PD through the online (remote) site visit and evidence obtained against the application criteria listed in the applied methodology. The applicability of this methodology is justified as below:

- The project activity is a greenfield, renewable (hydro power) electricity generation project, connected to the Turkish national grid
- The project activity is the installation of hydro power plant
- The project does not involve capacity addition, a retrofit of (an) existing plant(s) or a replacement of (an) existing plant(s)
- Project activity does not involve switching from fossil fuels to renewable energy sources at the site of project activity
- The project does not involve combined heat and power generation activity
- The geographic and system boundaries for the Turkish national electricity grid can be clearly identified and information on the characteristics of the grid is available.

The applicability of the methodology (ACM0002 version 21.0) and its assessment has also been included in Table 4 below:

Table 4: The applicability of the methodology (ACM0002 version 21.0) and its assessment

| Applicability Criteria | Analysis | CP Renewal Validation Team's Assessment |
|--|---|--|
| This methodology is applicable to grid-connected renewable energy power generation project activities that: <ul style="list-style-type: none"> (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s). | The project is the installation of a hydro power project. Therefore, (a) is applicable. | Through the online (remote) site visit, checking the generation licence of the project and through the local knowledge of the CP renewal team, it is confirmed that the project is a greenfield power plant. |
| In case the project activity involves the integration of a Battery Energy Storage System (BESS), the methodology is applicable to grid-connected renewable energy | The project does not involve BESS, so this is not applicable. | Through the online (remote) site visit, checking the generation licence and provisional acceptance protocols of the project, it is |

| Applicability Criteria | Analysis | CP Renewal Validation Team's Assessment |
|---|--|--|
| <p>power generation project activities that:</p> <ul style="list-style-type: none"> (a) Integrate BESS with a Greenfield power plant; (b) Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic¹ or wind power plant(s)/unit(s); (c) (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); (d) (d) Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s). | | <p>confirmed that the project does not involve BESS.</p> |
| <p>The methodology is applicable under the following conditions:</p> <ul style="list-style-type: none"> (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; (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 | <p>The project activity includes a hydro power plant with the reservoir. Therefore, (a) is applicable.</p> | <p>Through the online (remote) site visit and checking generation licence and provisional acceptance protocols, it is confirmed that the project is a Greenfield hydro power plant with the reservoir and does not involve BESS.</p> |

| Applicability Criteria | Analysis | CP Renewal Validation Team's Assessment |
|--|--|---|
| <p>five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.</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).</p> | | |
| <p>In case of hydro power plants, one of the following conditions shall apply:</p> <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</p> | <p>The project activity results in new single reservoir and the power density calculated is 3,517 W/m² at the start of the second crediting period, which is greater than 4 W/m² as in option (c).</p> | <p>Through the online (remote) site visit and checking registered initial PD, initial validation report and previous verification reports, it is confirmed that the power density of the project is 3,517 W/m² greater than 4 W/m².</p> |

| Applicability Criteria | Analysis | CP Renewal Validation Team's Assessment |
|---|----------|---|
| <p>the volume of the reservoir(s) is increased and the power density, calculated using equation (7), is greater than 4 W/m²; 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/m²; 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/m², all of the following conditions shall apply:</p> <p>(i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m²;</p> <p>(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;</p> <p>(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be:</p> | | |

| Applicability Criteria | Analysis | CP Renewal Validation Team's Assessment |
|---|---|--|
| a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project. | | |
| <p>In the case of integrated hydro power projects, project proponent 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</p> | <p>This is not applicable since the project is not an integrated hydro power project.</p> | <p>Through the online (remote) site visit and checking registered initial PD, initial validation report and previous verification reports and generation licence of the project, it is confirmed that the project is not an integrated hydro power project, so this is not applicable.</p> |

| Applicability Criteria | Analysis | CP Renewal Validation Team's Assessment |
|--|--|---|
| rainfall for minimum of five years prior to the implementation of the CDM project activity. | | |
| <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 does not involve switching from fossil fuel to renewable energy sources at the site of the project activity.</p> <p>The project is not a biomass fired power plant/unit.</p> | <p>Through the online (remote) site visit and checking registered initial PD, initial validation report and previous verification reports and generation licence of the project, it is confirmed that the project is a greenfield power plant and does not involve in switching from fossil fuel to renewable energy and biomass fired power plant.</p> |
| <p>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".</p> | <p>This is not applicable since the project is not retrofit, rehabilitation, replacement, or capacity addition project.</p> | <p>Through the online (remote) site visit and checking registered initial PD, initial validation report and previous verification reports and generation licence of the project, it is confirmed that the project is a greenfield power plant and does not include retrofit, rehabilitation, replacement, or capacity addition.</p> |

Tool 01: Tool for the demonstration and assessment of additionality, version 07.0 is not applicable at the time of crediting period renewal process since the project's additionality had been checked during the initial validation of the project activity and the project was found to be as additional at that time and there is no need new additionality assessment analysis at this stage.

Tool 07: Tool to calculate the emission factor for an electricity system, Version 07.0 has not been used directly since the operating margin (OM) emission factor ($EF_{grid,OM,y}$) and build margin (BM) emission factor ($EF_{grid,BM,y}$) had been calculated by the Ministry of Energy and Natural Resources in Turkey as detailed in the Sections 3.3.4 and 3.3.6 of this report and only combined margin emission factor ($EF_{grid,CM,y}$) had been calculated by PP using the default values of 0.25 and 0.75 for OM and BM, respectively in line with the “Tool 07: Tool to calculate the emission factor for an electricity system” version 07.0.

Tool 11: 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 has been checked and assessed in the Section 3.3.4 of this report.

Therefore, Applus+ Certification confirms that the selected baseline methodology including the associated tools is applicable to the project activity, the applicability criteria of the methodology and associated tools have been met and ACM0002 version 21.0 will be valid at the time of submission of the project activity for CP renewal.

3.3.3 Project Boundary

As clearly defined in the revised PD, the project boundary encompasses the physical, geographical site of the renewable generation source. The hydro power plant with all installation is the project boundary and this had been validated through the document review including the applied methodology (ACM0002 version 21.0) and during the online (remote) site visit.

The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the VCS project power plant is connected to as defined clearly in the applied methodology and there is no need for the further analysis.

As the project activity is connected to Turkish national grid, the baseline boundary is defined as the Turkish national grid. This includes the project site and all power plants connected physically to the Turkish national grid and there are no off-grid power plants in Turkish grid.

The baseline emission source is CO₂ and fossil fuels fired for electricity generation cause CO₂ emissions which is the main source. It is included to baseline calculation to find the displaced amount by the project activity. The other sources and gases are minor sources and excluded due to the simplification in line with the applied methodology.

The sources and GHG gases involved in the project activity are as follows in Table-5 below:

Table 5: The sources and GHG gases involved in the project activity

| Source | | Gas | Included? | Justification/Explanation |
|-----------------|---------------------------------------|------------------|-----------|---|
| Baseline | Grid connected electricity generation | CO ₂ | Yes | Main emission source |
| | | CH ₄ | No | Minor emission source |
| | | N ₂ O | No | Minor emission source |
| | | Other | No | No other emissions are emitted from the project |
| Project | Greenfield hydropower | CO ₂ | No | No CO ₂ emissions are emitted from the project |

| Source | | Gas | Included? | Justification/Explanation |
|--------|------------------|------------------|-----------|--|
| | project activity | CH ₄ | No | The power density of the reservoir is 3,517 W/m ² which is greater than 10 W/m ² |
| | | N ₂ O | No | Project activity does not emit N ₂ O |
| | | Other | No | Project activity does not emit other forms of GHG emissions |

As a result, Applus+ Certification confirms that the project boundary and associated GHG sources have been clearly and correctly identified in the PD by the PP and will be valid during the second crediting period.

CAR 06 (option c) was issued regarding the project boundary and it had been closed as detailed in Appendix 2.

3.3.4 Baseline Scenario

The project activity was earlier registered using the methodology ACM0002 version 12.0. The PD has been updated using the latest approved version of the methodology which is ACM0002 version 21.0. All the applicability conditions of the methodology have been justified appropriately in the revised PD, version 03 and dated as 18/12/2022.

There has been no significant change in the relevant policies and circumstances, which would impact the baseline scenario since 08/08/2011 (date of initial validation) till date. The earlier registered PD takes into account all the relevant national and sectoral policies and circumstances that were applicable as on date. The discussion on the same has also been provided in the revised PD for the second crediting period.

CAR 06 (option d) was issued regarding the baseline scenario and it had been closed as detailed in Appendix 2.

The steps from 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 as per VCS standard version 4.3 were also applied to assess the continued validity of the baseline and/or to update the baseline at the renewal of a crediting period:

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

VCS standard version 4.3 requires assessing the impact of new relevant national and/or sectoral policies and circumstances on the baseline. The validity of the current baseline is assessed using the following sub-steps:

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

Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy, No: 5346, ratified on 10/05/2005 by Grand National Assembly of Turkey, enacted on 18/05/2005, Electricity Market Law, No: 6446, ratified on 14/03/2013 by Grand National Assembly of Turkey, enacted on 30/03/2013 and Environment Law, No: 2872, ratified on 09/08/1983 by Grand National Assembly of Turkey, enacted on 11/08/1983 have been still applicable in Turkey and there are no significant changes which can impact the baseline scenario. There are no new relevant national and/or sectoral policies and/or circumstances in the electricity generation sector applicable to the project activity, in comparison to the time of the submission of the project activity for validation, which would affect the compliance of the current baseline scenario. Therefore, in the absence of the project activity electricity would still have been generated in the existing fossil fuel power plants or by the addition of new fossil fuel power plants connected to the Turkish grid.

Applus+ Certification confirms that no relevant mandatory national and/or sectoral policies applicable to the project activity came into effect after the submission of the project activity for validation.

Step 1.2: Assess the impact of circumstances

Through the document review including the revised PD for the second crediting period and local and sectoral knowledge of the CP renewal validation team, it could be confirmed that the electricity generation is predominantly composed by fossil fuel fired power plants in Turkey which is the same situation at time of initial validation. Therefore, the main market characteristics have no change. As the project is under normal operation which is in line with the original design thereby the condition used to determine baseline emissions in the initial crediting period is still valid.

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

No new additional investment from the project proponent or a third party (or parties) has been envisioned later specifically for the project. There is no change with respect to the technology and installed capacity of the project. Therefore, it could be confirmed by the CP renewal validation team that the baseline scenario in the initial crediting period is still valid and this step is not applicable.

Step 1.4: Assessment of the validity of the data and parameters

The grid emission factor ($EF_{grid,CM,y}$) calculated ex-ante for the first crediting period needs to be updated, as per the “Tool to calculate the emission factor for an electricity system” version 07.0.

Conclusion on step 1:

Applus+ Certification confirms that the current baseline is still valid as per methodology ACM0002 version 21.0. However, the grid emission factor ($EF_{grid,CM,y}$) needs to be updated for the subsequent crediting period.

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

Step 2.1: Update the current baseline

As the baseline scenario of the project activity is still sustained in this crediting period, no update would be required.

Step 2.2: Update the data and parameters

For the calculation of grid emission factor ($EF_{grid,CM,y}$) in Turkey “TOOL7: Tool to Calculate the Emission Factor for an Electricity System”, version 07 has been used and the same has been published by the relevant governmental authority, Ministry of Energy and Natural Resources in Turkey and the latest data belongs to 2020.

The operating margin (OM) emission factor ($EF_{grid,OM,y}$) is calculated as 0.7424 tCO₂/MWh by the Ministry of Energy and Natural Resources in Turkey as in the following link:

<https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/Bform2020.pdf>

Similarly, build margin (BM) emission factor ($EF_{grid,BM,y}$) is calculated as 0.3680 tCO₂/MWh by the Ministry of Energy and Natural Resources in Turkey as in the following link:

<https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/Bform2020.pdf>

Finally, the combined margin emission factor ($EF_{grid,CM,y}$) has been calculated by PP using the default values of 0.25 and 0.75 for OM and BM, respectively in line with the “Tool 07: Tool to calculate the emission factor for an electricity system” version 07.0 and the same ($EF_{grid,CM,y}$) is calculated as 0.4616 tCO₂/MWh for the second crediting period.

That means, VVB has checked the application of the aforesaid tool and confirms that it has been correctly applied.

VVB also confirms that the Turkish grid emission factor has been calculated to be in line with the “Tool to calculate the emission factor for an electricity system”, version 07.0.

As a result, it can be concluded that the baseline scenario has not changed and continues to be the same as earlier, as follows: “Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources” during the second crediting period.

3.3.5 Additionality

The project's additionality had been checked during the initial validation of the project activity and the project was found to be as additional at that time and there is no need new additionality assessment analysis at this stage

Applus+ Certification can also confirm that there is no law or any other regulation in Turkish legislation including Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy, No: 5346, ratified on 10/05/2005 by Grand National Assembly of Turkey, enacted on 18/05/2005, Electricity Market Law, No: 6446, ratified on 14/03/2013 by Grand National Assembly of Turkey, enacted on 30/03/2013 and Environment Law, No: 2872, ratified on 09/08/1983 by Grand National Assembly of Turkey, enacted on 11/08/1983 that mandates such power plants to be built so the project investment is voluntary and it can be concluded that regulatory surplus is demonstrated by PP appropriately.

CAR 06 (options e and f) was issued regarding the additionality and regulatory surplus and this CAR had been closed as detailed in Appendix 2.

3.3.6 Quantification of GHG Emission Reductions and Removals

a) Baseline Emissions:

The emission reduction calculation estimations have been included in the PD in line with the latest approved version of the methodology ACM0002 version 21.0. The baseline emissions are calculated based on the combined margin emission factor multiplied by the expected net electricity generation, which amounts to 83,309 tCO₂e per annum as in below:

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

Where:

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

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

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using TOOL07 (tCO₂/MWh)

The expected net annual electricity generation is 180,480 MWh as confirmed through the electricity generation licence and initial validation report, version 03 dated as 08/08/2011.

The operating margin (OM) emission factor ($EF_{grid,OM,y}$) is calculated as 0.7424 tCO₂/MWh by the Ministry of Energy and Natural Resources in Turkey as in the following link:

<https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/Bform2020.pdf>

Similarly, build margin (BM) emission factor ($EF_{grid,BM,y}$) is calculated as 0.3680 tCO₂/MWh by the Ministry of Energy and Natural Resources in Turkey as in the following link:

<https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/Bform2020.pdf>

Finally, the combined margin emission factor ($EF_{grid,CM,y}$) has been calculated by PP using the default values of 0.25 and 0.75 for OM and BM, respectively in line with the “Tool 07: Tool to calculate the emission factor for an electricity system” version 07.0 and the same ($EF_{grid,CM,y}$) is calculated as 0.4616 tCO₂/MWh for the second crediting period.

Therefore,

$$BE_y = 180,480 \text{ MWh} * 0.4616 \text{ tCO}_2\text{e/MWh} = 83,309 \text{ tCO}_2\text{e}$$

b) Project Emissions:

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

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where;

PD = Power density of the project activity (W/m²)

Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W)

Cap_{BL} = 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_{PJ} = 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 (m²)

A_{BL} = 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 (m²). For new reservoirs, this value is zero

The project activity is a green field run-of-river hydropower project, so Cap_{BL} and A_{BL} are equal to zero.

For The Yokuslu- Kalkandere Hydroelectric Power Plant:

A_{PJ} = 11,442 m² (according to the reservoir area layout drawing and previous verification reports)

$$\text{Cap}_{\text{PJ}} = 40,240,000 \text{ W}$$

The power density is calculated as follows:

$$\text{PD} = 40,240,000 / 11,442 = 3,517 \text{ W/m}^2$$

As the power density is higher than 10W/m^2 , the project emissions of the project are equal to zero.

Similarly, according to ACM0002, version 21.0, for all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generators can be neglected.

c) Leakage:

The leakage can be neglected in line with the applied methodology, ACM0002 version 21.0.

d) Emission Reductions:

The emission reductions are calculated as:

$$\text{ER}_y = \text{BE}_y - \text{PE}_y$$

Where,

ER_y = Emission Reduction in year y (tCO₂/ year)

BE_y = Baseline emission in year y (tCO₂/ year)

PE_y = Project emission in year y (tCO₂/ year)

Since both project emissions and leakage are equal to zero, the emission reductions generated are equal to baseline emissions.

$$ER_y = 83,309 - 0$$

$$ER_y = 83,309 \text{ tCO}_2\text{e}$$

That means, the project is expected to result in an average emission reduction of 83,309 tCO₂e/year during the second crediting period. Total emission reductions during the second crediting period are estimated to be 833,090 tCO₂e.

CAR 07 was issued regarding the emission reduction calculations and this CAR had been closed as detailed in Appendix 2.

Applus+ Certification confirms that the methodology ACM0002 version 21.0 and “Tool to calculate the emission factor for an electricity system” version 07.0 have been correctly applied to calculate baseline emissions, project emissions, leakage and net GHG emission reductions and removals. The estimation of the emission reductions are considered correct as the calculations have been reproduced by the CP renewal validation team with the attainment of the same results.

3.3.7 Methodology Deviations

No methodology deviations have been applied to the project.

3.3.8 Monitoring Plan

According to ACM0002 version 21.0, one of the parameters required to be monitored is the quantity of net electricity generation supplied by the project plant/unit to the grid in year y , $EG_{\text{facility},y}$, which will be continuously measured and recorded at least monthly.

The net electricity generation will be based on measured value of electricity export and import and recorded via meters sealed by TEIAS (the grid company) for billing purposes therefore no new additional protocol will be needed for monitoring emission reduction. According to meter reading protocols, the internal consumption of the facility was subtracted from the gross generation. EPIAS records will be used as the main source for the quantity of net electricity delivered to the grid, and it has been cross checked with the meter reading records (OSF forms) provided to the company by TEIAS.

The site electricity technicians and plant manager will be responsible for the electricity generated, gathering all relevant data and keeping the records.

There are two electricity meters one of which is main meter and the other one is back up meter. All meters are inspected and sealed by TEIAS before the commissioning of the power plant in order to be protected from interference by any of the parties and the relevant information about the electricity meters including the serial numbers have been provided by the PP. Installation of the meters and data monitoring will be carried out according to the relevant regulation by TEIAS

which will record the meter readings via EPIAS system and through remote reading. The main data source will be EPIAS data and TEIAS meter records will be used for cross checking purpose.

The details about the currently available electricity meters are as follow as in the Table 6 below:

Table 6: Electricity meter details

| Model | Serial Number | Accuracy Class |
|-------------|------------------------|---------------------|
| EMH-LZQJ-XC | Main Meter: 9674574 | Main Meter: C-1s |
| EMH-LZQJ-XC | Back-up Meter: 9674575 | Back-up Meter: C-1s |

All data will be kept for at least two years after the crediting period for QA/QC purposes. The calibration and maintenance of the meters will be carried out in line with the “Regulation of Metering and Testing of Metering Systems”. The meters will be calibrated by TEIAS when there is an inconsistency between main and back-up meters. Although, re-calibration is required after ten years, nevertheless, in case of irregular difference between main and cross-check spare meters, the relevant TEIAS staff is informed for the intervention.

The second parameter to be monitored is installed capacity (Cap_{PJ}) of the project. The parameter is monitored once at each monitoring period by supplier information on the equipment and turbine name plates. It has been validated during the CP renewal validation through the provisional acceptance protocol, the turbine name plates’ documents and online (remote) site visit that the installed capacity is 40.24 MWe as indicated in the PD.

The third and final parameter to be monitored is the area of the reservoir (A_{PJ}) is monitored via topographical surveys, maps and satellite pictures. It has been validated that the reservoir area has been checked during the CP renewal validation through the reservoir layout drawing of the project as in the previous verification reports and the reservoir area is taken as 11,442 m².

CAR 08 was raised regarding the monitoring during the CP renewal validation and it had been closed as detailed in Appendix 2.

Therefore, Applus+ Certification can confirm that the list of parameters that need to be monitored ex post for the second crediting period is complete and consistent with the relevant applied methodology which is ACM0002 version 21.0.

By document review and online (remote) site visit observations, it is also confirmed by the validation team that the monitoring plan can be properly implemented, all monitoring arrangements are feasible within the project design, and the means of implementation of the monitoring plan, including data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions to be achieved by the project activity can be properly reported and verified.

3.4 Non-Permanence Risk Analysis

N/A (The project is not an AFOLU project).

4 VALIDATION CONCLUSION

Applus+ Certification has performed the CP renewal validation of the “The Yokuslu- Kalkandere Hydroelectric Power Plant” (VCS project ID: 905) between 25/03/2022 and 20/12/2022. The validation was performed on the basis of VCS criteria, UNFCCC criteria for the CDM and Host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project activity was checked against the applicable rules and regulations of CDM including CDM Validation and Verification Standard for Project Activities version 03.0 and VCS Version 4.3 by the CP renewal validation team.

Applus+ Certification hereby confirms that the proposed project activity “The Yokuslu- Kalkandere Hydroelectric Power Plant” has applied all relevant applicable guidance documents as the selected baseline methodology and the associated methodological tools have been applied correctly. Total emission reductions from the project are estimated to be on the average 83,309 tCO_{2e} per year and a total estimated emission reduction of 833,090 tCO_{2e} over the selected 10 year second crediting period which is between 01/01/2021 and 31/12/2030. The emission reduction calculations have been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

As a result, Applus+ Certification also concludes that the proposed project activity “The Yokuslu- Kalkandere Hydroelectric Power Plant”, as described in the PD, version 03 and dated as 18/12/2022:

- meets all relevant Host Country criteria;
- meets all relevant requirements of the VCS and CDM project activities including VCS Version 4.3
- applies correctly the baseline and monitoring methodology ACM0002 version 21.0;
- is likely to achieve estimated emission reductions;

Therefore, Applus+ Certification recommends the renewal of crediting period of the project activity.

APPENDIX 1: REFERENCE LIST

| Document Number | Document/Evidence/Reference/Web link, Version, Date |
|-----------------|--|
| D01 | Registered Initial PD version 08 dated 05/08/2011 |
| D02 | Final Initial Validation Report version 03 dated 08/08/2011 |
| D03 | Second Verification Final Report version 1.1 dated 16/06/2021 |
| D04 | ACM0002: Grid-connected Electricity Generation from Renewable Sources version 21.0 |
| D05 | CP Renewal Service Agreement dated 25/03/2022 |
| D06 | Revised PD version 01 dated 28/07/2022 |
| D07 | Revised PD version 02 dated 08/12/2022 |
| D08 | Final PD version 03 dated 18/12/2022 |
| D09 | ER Calculation Excel Sheet version 01 dated 28/07/2022 |
| D10 | ER Calculation Excel Sheet version 02 dated 08/12/2022 |
| D11 | ER Calculation Excel Sheet version 03 dated 18/12/2022 |
| D12 | CDM Validation and Verification Standard for Project Activities version 3.0 |
| D13 | VCS Standard version 4.3 dated 22/06/2022 |
| D14 | VCS Program Guide version 4.2 dated 22/06/2022 |
| D15 | EIA Positive Decision dated 06/11/2009 |
| D16 | Electricity Generation Licence dated 14/09/2006 (Initial Issuance) and dated 10/10/2012 (Last Amendment) |
| D17 | Electricity Meters Test Reports for Current Meters dated 10/08/2020 |
| D18 | Electricity Meters Photos |
| D19 | Hazardous Waste Storage Area Photos |
| D20 | Domestic Waste Container Photos |
| D21 | Package Waste Water Treatment Plant Photos |
| D22 | Sample Hazardous Waste Transfer and Disposal Records dated 17/02/2016, 24/02/2017, 09/02/2018, 31/01/2019, 07/02/2020 and 14/02/2022 |
| D23 | Lifeline Water Official Records (Signed by State Hydraulic Works) dated as 18/02/2020 and 09/02/2021 |
| D24 | Fish Passage Photos |
| D25 | Signed Declaration by the PP (About Double Counting) dated 09/12/2022 |

| Document Number | Document/Evidence/Reference/Web link, Version, Date |
|-----------------|--|
| D26 | Signed Declaration by the PP (About Renewable Energy Certification (REC) dated 09/12/2022 |
| D27 | Turbine and Generator Nameplates |
| D28 | Sample Signed Request/Proposal Forms by the Local Stakeholders from Yokuşlu, Huseyinhoca and Hurmalık Villages dated 25/09/2018, 01/10/2019, 09/01/2020, 07/02/2020 and 16/04/2020 |
| D29 | Provisional Acceptance Protocols dated 30/12/2010, 28/01/2011 and 30/12/2012 |
| D30 | Reservoir Area Layout |
| D31 | Trade Registry Gazette (About Project Ownership) dated 28/09/2012 |
| D32 | Site Photos dated 23/09/2022 |

APPENDIX 2 CLARIFICATION REQUESTS (CLS), CORRECTIVE ACTION REQUESTS (CARS), FORWARD ACTION REQUESTS (FARS)

| | | | |
|--|---|-------------------|------------|
| Type: | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL/CR <input type="checkbox"/> FAR | Number: | 01 |
| Raised by: | Anıl Söyler | Ref. checklist to | - |
| Description of the audit finding | | Date: | 05/12/2022 |
| a) Please provide all items in the box at the bottom of the cover page completed using Arial 10.5 pt, black, regular (non-italic) font in line with the relevant PD template. b) Please provide PD with the appropriate font size and colour in line with the relevant PD template including Content part. c) Please clarify if there is Appendix in the PD. | | | |
| Project Participant's response | | Date: | 08/12/2022 |
| a) Revised. b) Revised. c) There is no annex in the PD. | | | |
| Documentation provided as evidence by Project Participant | | | |
| Revised PD | | | |
| Auditor's assessment comment | | Date: | 12/12/2022 |
| a) Ok Closed (The cover page of the PD has been revised accordingly). b) Ok Closed (PD has been revised accordingly). c) Ok Closed (PD has been revised accordingly). | | | |

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| Type: | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL/CR <input type="checkbox"/> FAR | Number: | 02 |
| Raised by: | Anıl Söyler | Ref. checklist to in GS4GG PDD: | - |
| Description of the audit finding | | Date: | 05/12/2022 |
| a) Please correct the ER calculation in the ER Calculation Excel spreadsheet considering latest available published data and latest applicable version of "Tool to calculate the emission factor for an electricity system". b) Please provide the reference source for annual generation value in the ER Calculation Excel spreadsheet and in the PD. c) Please provide the reference source for $EF_{grid.OM,y}$, $EF_{grid.BM,y}$ and $EF_{grid.CM,y}$ values in the ER Calculation Excel spreadsheet and PD. d) Please correct ER calculation considering number of days for 2020 and 2030 vintages. e) Please provide all ER values as an integer value in the ER Calculation Excel spreadsheet. | | | |

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| f) Please include round down function in vintage sub-total and final ER values in the ER Calculation Excel spreadsheet. | | |
| g) Please correct all ER values throughout the PD accordingly. | | |
| Project Participant's response | Date: | 08/12/2022 |
| a) ER calculation corrected with the newest EF value. | | |
| b) Generation Licence | | |
| c) Source sheet added to calculation excel. | | |
| d) Revised. | | |
| e) Revised. | | |
| f) Revised. | | |
| g) Revised. | | |
| Documentation provided as evidence by Project Participant | | |
| Revised ER Calculation Excel Spreadsheet and PD | | |
| Auditor's assessment comment | Date: | 12/12/2022 |
| a) Ok Closed (ER Calculation Excel spreadsheet has been revised accordingly). | | |
| b) Ok Closed (MR and ER Calculation Excel spreadsheet have been revised accordingly). | | |
| c) d) Ok Closed (ER Calculation Excel spreadsheet has been revised accordingly). | | |
| e) Ok Closed (PD has been revised accordingly). | | |
| f) Ok Closed (ER Calculation Excel spreadsheet has been revised accordingly). | | |
| g) Ok Closed (PD has been revised accordingly). | | |

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| Type: | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL/CR <input type="checkbox"/> FAR | Number: | 03 |
| Raised by: | Anıl Söyler | Ref. to checklist in GS4GG PDD: | - |
| Description of the audit finding | | Date: | 05/12/2022 |
| a) Please correct the sectoral scope name in the Section 1.2 of the PD. | | | |
| b) Please correct the scale of the project in the Section 1.10 of the PD. | | | |
| c) Please include the generator details in the Section 1.11 of the PD. | | | |
| d) Please include turbine serial numbers and MWm and MWe capacities in the Section 1.11 of the PD. | | | |
| e) Please remove unnecessary details in the Section 1.11 of the PD. | | | |
| f) Please include the reference source for the provided technical details of the project in the Section 1.11 of the PD. | | | |
| g) Please include the reference source for the provided coordinates in the Section 1.12 of the PD. | | | |
| h) Please revise the Section 1.13 in line with the relevant PD template. | | | |
| Project Participant's response | | Date: | |
| a) Revised. | | | |
| b) Revised. | | | |
| c) Included. | | | |
| d) Included. | | | |
| e) Revised. | | | |
| f) Included. | | | |
| g) Included. | | | |
| h) Revised. | | | |
| Documentation provided as evidence by Project Participant | | | |

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| Revised PD | | |
| Auditor's assessment comment | Date: | 12/12/2022 |
| a) Ok Closed (Section 1.2 of the PD has been revised accordingly). b) Ok Closed (Section 1.10 of the PD has been revised accordingly). Bölüm 1.10'da large project değil project olacak. c) Ok Closed (Section 1.11 of the PD has been revised accordingly). d) e) f) Ok Closed (Section 1.11 of the PD has been revised accordingly). g) Ok Closed (Section 1.12 of the PD has been revised accordingly). h) Ok Closed (Section 1.13 of the PD has been revised accordingly). | | |

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| Type: | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL/CR <input type="checkbox"/> FAR | Number: | 04 |
| Raised by: | Anıl Söyler | Ref. to checklist in GS4GG PDD: | - |
| Description of the audit finding | Date: | 05/12/2022 | |
| a) Please provide the signed and sealed letter by PP on company letterhead that the project hasn't been registered, or hasn't been seeking registration under any other GHG programs. b) Please provide the signed and sealed letter by PP on company letterhead that project hasn't been included in an emissions trading program; or any other mechanism that includes GHG allowance trading. | | | |
| Project Participant's response | Date: | 08/12/2022 | |
| a) Provided. b) Provided. | | | |
| Documentation provided as evidence by Project Participant | | | |
| Signed Declarations by PP | | | |
| Auditor's assessment comment | Date: | 12/12/2022 | |
| a) b) Ok Closed (The signed and sealed declarations by PP and dated as 09/12/2022 have been provided). | | | |

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| Type: | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL/CR <input type="checkbox"/> FAR | Number: | 05 |
| Raised by: | Anıl Söyler | Ref. to checklist in GS4GG PDD: | - |
| Description of the audit finding | Date: | 05/12/2022 | |
| a) Please describe how the project contributes to achieving any nationally stated sustainable development priorities in the Section 1.17 of the PD. b) Please include the current status and method of the ongoing communication with the local stakeholders in the Section 2.2 of the PD. c) Please include all local stakeholder communication details associated with the current crediting period in the Section 2.2 of the PD. d) Please include the date of EIA decision date and relevant details in the Section 2.3 of the PD. | | | |

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| e) Please include the waste management process details in the Section 2.3 of the PD. | | |
| f) Please revise the Section 2.4 in line with the relevant PD template. | | |
| Project Participant's response | Date: | 08/12/2022 |
| a) Revised. | | |
| b) A meeting will be planned, and a public announcement will be made in the next period. | | |
| c) A meeting will be planned, and a public announcement will be made in the next period. | | |
| d) Added. The date of the EIA report is 06.11.2009. Provided to the DOE. | | |
| e) Included. | | |
| f) Revised. | | |
| Documentation provided as evidence by Project Participant | | |
| Revised PD | | |
| Auditor's assessment comment | Date: | 12/12/2022 |
| a) Ok Closed (Section 1.17 of the PD has been revised accordingly). | | |
| b) Ok Closed (Section 2.2 of the PD has been revised accordingly). | | |
| c) Ok Closed (Section 2.2 of the PD has been revised accordingly). | | |
| d) e) Ok Closed (Section 2.3 of the PD has been revised accordingly). | | |
| f) Ok Closed (Section 2.4 of the PD has been revised accordingly). | | |

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| Type: | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL/CR <input type="checkbox"/> FAR | Number: | 06 |
| Raised by: | Anıl Söyler | Ref. to checklist in GS4GG PDD: | - |
| Description of the audit finding | | Date: | 05/12/2022 |
| a) Please correct the applied methodology version throughout the PD. | | | |
| b) Please include the compliance of the project with the applicable version of "Methodological Tool: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" in the Section 3.2 of the PD. | | | |
| c) Please include all applicability conditions of the applied methodology in the Section 3.2 of the PD. | | | |
| d) Please clarify how the project boundary has been determined in the Section 3.3 of the PD. | | | |
| e) Please include details of the baseline scenario in line with the applied methodology in the Section 3.4 of the PD. | | | |
| f) Please clarify clearly whether any new additionality assessment has been handled in the Section 3.5 of the PD. | | | |
| g) Please clarify the regulatory surplus compliance of the project in the Section 3.5 of the PD. | | | |
| Project Participant's response | | Date: | |
| a) Revised. | | | |
| b) Revised. | | | |
| c) Revised. | | | |
| d) Revised. | | | |
| e) Revised. | | | |
| f) Revised. | | | |
| g) Revised. | | | |
| Documentation provided as evidence by Project Participant | | | |
| Revised PD | | | |
| Auditor's assessment comment | | Date: | 12/12/2022 |

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| a) Ok Closed (PD has been revised accordingly). |
| b) Ok Closed (Section 3.4 of the PD has been revised accordingly). |
| c) Ok Closed (Section 3.2 of the PD has been revised accordingly). |
| d) Ok Closed ((Section 3.3 of the PD has been revised accordingly). |
| e) Ok Closed (Section 3.4 of the PD has been revised accordingly). |
| f) Ok Closed (Section 3.5 of the PD has been revised accordingly). |
| g) Ok Closed (Section 3.5 of the PD has been revised accordingly). |

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| Type: | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL/CR <input type="checkbox"/> FAR | Number: | 07 |
| Raised by: | Anıl Söyler | Ref. to checklist in GS4GG PDD: | - |
| Description of the audit finding | | Date: | 05/12/2022 |
| a) Please correct the baseline emission calculation details in the Section 4.1 of the PD in line with the latest emission factor details. b) Please correct the ER calculation details in the Section 4.4 of the PD in line with the latest emission factor details. c) Please correct the EFgrid,CM,y parameter details in the Section 5.1 of the PD in line with the latest emission factor details including the reference links. | | | |
| Project Participant's response | | Date: | 08/12/2022 |
| a) Revised. b) Revised. c) Revised. | | | |
| Documentation provided as evidence by Project Participant | | | |
| Revised PD | | | |
| Auditor's assessment comment | | Date: | 12/12/2022 |
| a) Ok Closed (Section 4.1 of the PD has been revised accordingly). b) Ok Closed (Section 4.1 of the PD has been revised accordingly). Ok Closed (Section 5.1 of the PD has been revised accordingly). | | | |

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| Type: | <input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL/CR <input type="checkbox"/> FAR | Number: | 08 |
| Raised by: | Anıl Söyler | Ref. to checklist in GS4GG PDD: | - |
| Description of the audit finding | | Date: | 05/12/2022 |
| a) Please include all relevant monitoring parameters in the Section 5.2 of the PD. b) Please correct the meter details in the Sections 5.2 and 5.3 of the PD. c) Please provide the main and back up meter details (serial numbers, accuracy class etc.) in a tabular format in the Section 5.2 of the PD. d) Please clarify the applicability of PMUM in the Section 5.2 of the PD. e) Please include clearly the main and cross check sources for EG _{PJ,y} parameter in the Section 5.2 of the PD. f) Please include the data/parameter storage and archiving details in the Section 5.3 of the PD. g) Please clarify the procedures for handling non-conformances in the Section 5.3 of the PD. h) Please clarify the procedures for internal auditing in the Section 5.3 of the PD. i) Please correct the inaccessible hyperlinks in the Section 5.3 of the PD. | | | |

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| j) Please clarify the following sentence: “The company is not responsible for calibration of the meters in Turkey according to the local standards” in the Section 5.3 of the PD. | | |
| Project Participant’s response | Date: | 08/12/2022 |
| a) Included. b) Revised. c) Revised. d) PMUM is no longer used, instead there are EPIAŞ records. e) Included. f) Revised. g) It’s already mentioned in section 5.3 of the PD. h) Added in section 5.3 of the PD. i) Revised. j) The relevant sentence has been changed as “The project owner is not responsible for calibration of the meters in Turkey according to the local standards” | | |
| Documentation provided as evidence by Project Participant | | |
| Revised PD | | |
| Auditor’s assessment comment | Date: | 12/12/2022 |
| a) Ok Closed (Section 5.2 of the PD has been revised accordingly). b) Ok Closed (Sections 5.2 and 5.3 of the PD have been revised accordingly). c) Ok Closed (Section 5.2 of the PD has been revised accordingly). d) Ok Closed (Section 5.2 of the PD has been revised accordingly). e) Ok Closed (Section 5.2 of the PD has been revised accordingly). f) g) h) i) j) Ok Closed (Section 5.3 of the PD has been revised accordingly). | | |