THE YOKUSLU- KALKANDERE HYDROELECTRIC POWER PLANT

Document Prepared by Gaia Finansal Danışmanlık Hizmetleri Ticaret Limited Şirketi (Gaia Climate)

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The Yokuslu-Kalkandere Hydroelectric Power Plant is a registered Project under Verra Registry with ID Number 905. The project activity involves the installation of a 41.19MWm / 40.24MWe hydroelectric power plant (HEPP) located on the İyidere River basin in the Black Sea Region of Turkey, within the province of Rize. The water diverted from the weir will be transferred to "Kalkandere Powerhouse" through a tunnel. The total installed capacity of the turbines in Kalkandere Powerhouse is 35.04 MWe (3x11.68 MWe). The turbined water will be transferred to "Kizilagac Powerhouse" through another tunnel. The total installed capacity of this plant is 5.2 Mwe (2 x 2.60 MWe). The project comes under Type-I Renewable Energy Project as per Appendix B of the procedures for CDM project activities.

Conditions prior to the project activity is the continuation of the current situation, which is the continuation of energy supply by grid-connected units which are mainly fossil fired power plants. Therefore, the main purpose of the project is to generate approximately 180,480 MWh/year of electricity to supply the national grid using a renewable resource and tap the significant hydropower potential in the region. The project activity 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. The average annual emission reductions of the proposed Project during its second crediting period are estimated to be 83,309 tons of CO_2e (tCO_2e). The Yokuslu- Kalkandere Hydroelectric Power Plant reduces greenhouse gas emissions that would have otherwise occurred in the absence of the project activity by avoiding electricity generation from fossil fuel sources both in the operating margin and build margin of the system. The average annual emission reductions of the proposed Project are estimated to be 83,309 tons of CO_2e (tCO_2e) and a total of 833,090 tCO_2e over 10 years of the second crediting period.

1.2 Sectoral Scope and Project Type

The Project fits in;

Sectoral Scope Number:1

Sectoral Scope: Energy industries (renewable - / non-renewable sources)

Yokuslu- Kalkandere Hydroelectric Power Plant is not a grouped project.

1.3 Project Eligibility

1. The Project is developed as per ACM0002 Version 21.0, which is an approved methodology under Verra.
2. Yokuslu- Kalkandere Hydroelectric Power is a hydropower plant; thus is an eligible Project type as per Eligible Project Types & Scope under Renewable Energy Activity Requirements.

3. The project displaces the same amount of electricity generated by fossil-fired power plants; thereby helping reduce the weight of electricity generation by fossil-fired power plants in the national grid. This means the Project is eligible under VCS Program.
4. The Project meets the General Eligibility Criteria under Renewable Energy Activity Requirements as described below:
5. Project Type: Hydro, as discussed above, the project type is eligible.
6. Project Location: The project is in Rize province of Turkey. Thus, the project is eligible.
7. Project scale: The project activity is a 41.19MWm / 40.24MWe hydropower plant and thus qualifies as project in line with the VCS terminology.
8. The Project is not registered under different standards or I-REC; therefore, no double-counting is made.

1.4 Project Design

This is the project's second crediting period and there is no design change. This is not a grouped project. The project includes a single location and installation only.

Eligibility Criteria

N/A

1.5 Project Proponent

Organization name	Sanko Enerji Sanayi ve Ticaret A.Ş.
Contact person	Muhsin Dervişoğulları
Title	Project Development Manager
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1.6 Other Entities Involved in the Project

Organization name	Gaia Finansal Danışmanlık Hizmetleri Ticaret Limited Şirketi (Gaia Climate)
Role in the project	Consultant
Contact person	Gediz Kaya
Title	Manager
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1.7 Ownership

The legal ownership of the plant and the products generated by the project activity is Sanko Enerji Sanayi ve Ticaret A.Ş.[1]

Gaia Finansal Danışmanlık Hizmetleri Ticaret Limited Şirketi (Gaia Climate) acts as the consultant to the Project.

1.8 Project Start Date

The start date of the project activity is 30-12-2010 which is the date when the project is commissioned, and the electricity was first supplied to the grid.

1.9 Project Crediting Period

The first crediting period was from 01-01-2011[2] until 31-12-2020 with two times renewable crediting period of 10 years. The second crediting period is between 01-01-2021 and 31-12-2030.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

[1] Generation Licence

[2] Crediting period has been started January 2011 in first validated PDD.

Project Scale	
Project	X
Large project	

Year	Estimated GHG emission reductions or removals (tCO_2e)
From January 1 st to 31st Dec 2021	83,309
2022	83,309
2023	83,309
2024	83,309
2025	83,309
2026	83,309
2027	83,309
2028	83,309
2029	83,309
From January 1 st to 31st Dec 2030	83,309
Total estimated ERs	833,090
Total number of crediting years	10
Average annual ERs	83,309

1.11 Description of the Project Activity

The plant has been designed to generate electricity by utilizing the 100.2 m of head between the tailwater level of the upstream existing Cevizlik HEPP and the Incirlik HEPP project which is under project stage and will be located downstream. The total installed capacity of the turbines in Kalkandere Powerhouse is 35.04 MWe (3x11.68 MWe). The turbined water will be transferred to “Kizilagac Powerhouse” through another tunnel. The total installed capacity of this plant is 5.2 Mwe (2 x 2.60 MWe).

The purpose of the project is to produce renewable electricity and to contribute to Turkey's growing electricity demand through sustainable and low-carbon technology. The project displaces the same amount of electricity generated by fossil-fired power plants; thereby helping reduce the weight of electricity generation by fossil-fired power plants in the national grid.

According to the initial registered PDD and validation report, the average lifetime of the equipment and Project is 35 years.

There is no change with respect to the technology of Yokuslu- Kalkandere Hydroelectric Power Plant. Since there are neither changes with regard to the investment nor changes in its technology, the validity of the baseline scenario during the first crediting period has been justified.

In addition, the project has positive environmental and economic contributions as the following;

1. By means of low carbon technology, environmental pollution and GHG emissions are significantly reduced,
2. Contributing to the economic development of the country by providing sustainable energy,
3. Increasing the income and local standard of living by providing job opportunities for the local people.

With respect to the Project technologies, please see below the full detail of the project's technical specifications:

Table 1. Technical specifications of the Project

Property	Unit	Amount
Powerhouse		
Project Discharge	m^3/s	50.00
Tailrace Elevation	m	119.00
Turbine Brand		VOITH
Turbine Type		Horizantal Axis Francis
Turbine Axis Level	m	117.5
Gross Head	m	100.2
Net Head	m	76.09
Installed Capacity	MWe	35.04
Unit Capacity	MWe	11.68
Number of Units		3
Serial No of Units		19743-19744-19745
Generator Brand/Type		INDAR/PSA-1600-X/14
Serial No of Generators		3010000202,3010000203, 3010000204

Table 2: Technical specifications of the Kizilagac Power Plant

Property	Unit	Amount
Powerhouse		
Project Discharge	m^3/s	50.00
Tailrace Elevation	m	102.60
Turbine Axis Level	m	98.00
Brand		Chongqing Water Turbine Works
Turbine Type		Vertical Kaplan Turbine
Maximum Head	m	14.45
Rated Head	m	12.00
Installed Capacity	MWe	5.20
Unit Capacity	MWe	2.60
Number of Units		2
Serial No of Units		2011-10/2011-11
Generator Brand/Type		CWTW/SF3150-24/3250
Serial No of Generators		2011-10, 2011-11

1.12 Project Location

The Yokuslu-Kalkandere hydroelectric power plant (HEPP) located on the İyidere River basin in the Black Sea Region of Turkey, within the province of Rize. Kalkandere Powerhouse between 40º53'47"-north latitudes and 40º25'45" east longitudes. Kizilagac Powerhouse between 40 º 54' 27,81" -north latitudes and 40 º 25' 16,97" east longitudes. [3]

Please see below the project's location:

[3] Google Earth screenshot of the coordinates has been provided to the DOE.

Figure 1: Satellite image of the Project

1.13 Conditions Prior to Project Initiation

The Yokuslu-Kalkandere Hydroelectric Power Plant reduces greenhouse gas emissions that would have otherwise occurred in the absence of the project activity by avoiding electricity generation from fossil fuel sources both in the operating margin and build margin of the system. The average annual emission reductions of the proposed project are estimated to be 83,309 tonnes of CO_2e (tCO_2e). Baseline scenario is the same as the conditions existing prior to the project initiation. Please see Section 3.4.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The applicable mandatory laws that have been applied for the project are:

1. Electricity Market Law No:6446[4]: This Law aims to ensure the development of a financially sound and transparent electricity market operating in a competitive environment under the provisions of civil law. It also underlines the need to produce sufficient, high quality, low cost, and environmentally friendly electricity to consumers. The text also provides guidelines to structure the autonomous regulation and the supervision of the market.
2. Law on the use of renewable energy sources for electric energy generation[5] (Law No: 5346): The purpose of this law is to expand the utilization of renewable energy sources for generating electric energy, to benefit from these resources in a secure, economic, and qualified manner, to increase the diversification of energy resources, to reduce

[4] https://www.resmigazete.gov.tr/eskiler/2013/03/20130330-14.htm

[5] https://www.mevzuat.gov.tr/mevzuatmetin/1.5.5346.pdf

greenhouse gas emissions, to assess waste products, to protect the environment and to develop the related manufacturing industries for realizing these objectives.

3. Environmental Law[6] (Law No 2872): This law came into force in 1983, it considers the environment as a single domain, aiming not only to prevent and eliminate environmental pollution but also to allow the management of land and natural resources in an integrated manner. According to its basic principles, and as also stated in the Constitution, citizens as well as the State bear responsibility for environmental protection.

The project complies with all aforementioned laws as its activity aims at generating electricity by using a renewable resource: hydroelectric power; in a sufficient, low-cost, and environmentally friendly manner, using the latest technology available on the market. Moreover, an Environmental Impact Assessment (EIA) had been carried out and the results of this study concluded that the project activity has no significant impacts on the environment.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

Yokuslu- Kalkandere Hydroelectric Power has not been registered under any other GHG programs.

1.15.2 Projects Rejected by Other GHG Programs

As Yokuslu- Kalkandere Hydroelectric Power has not been registered under any other GHG programs, it has also not been rejected by any other GHG programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

Yokuslu- Kalkandere Hydroelectric Power is neither included in an emissions trading program or any other mechanism that includes GHG allowance trading. It is not registered to standards such as Gold Standard, Global Carbon Council operating in Turkey, and the CDM program does not accept projects originating in Turkey.

1.16.2 Other Forms of Environmental Credit

Yokuslu- Kalkandere Hydroelectric Power is not registered with any I-REC or environmental credit program.

[6] https://www.mevzuat.gov.tr/mevzuatmetin/1.5.2872.pdf

1.17 Sustainable Development Contributions

Sustainable Development Goals Targeted	Most relevant SDG Target	Indicator
• 13 Climate Action (mandatory)	• Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	• Number of countries that have communicated the strengthening of institutional, systemic, and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions
• 7 Affordable and Clean Energy	• By 2030, increase substantially the share of renewable energy in the global energy mix	• Renewable energy share in the total final energy consumption
• 8 Decent Work and Economic Growth	• By 2030, achieve full and productive employment and decent work for all women and men	• Unemployment rate, by sex, age and people with disabilities

Table 3: Impacted SDGs

SDG 7: Affordable and Clean Energy

The baseline scenario for the project is no project, thus leading to generation into the relevant grid which is dominated by fossil fuel. The clean energy generated by the project is calculated based on the amount of electricity generated by the project per annum. The project is expected to generate 180,480 MWh of clean energy per annum. The net generation has

been calculated as below: Net Generation (MWh) = Electricity Supplied to the Grid (MWh)– Electricity Consumption from the Grid (MWh)

Both electricity supplied to the grid and electricity consumption from the grid has been identified and approved by EPIAS. By means of electricity generation through hydropower, Yokuslu- Kalkandere Hydroelectric Power contributes to the following target 7.2 “By 2030, increase substantially the share of renewable energy in the global energy mix”.

SDG 8: Decent Work and Economic Growth

There are 22 employees in the operation phase of the project thereby contributing to the following indicators 8.5.2 “Unemployment rate, by sex, age and persons with disabilities” and following target: “8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value”

SDG13: Climate Action

The project leads to an emission reduction of 83,309 tCO_2 per annum. The project contributes to the following indicator 13.3.2 “Number of countries that have communicated the strengthening of institutional, systemic and individual capacity- building to implement adaptation, mitigation, and technology transfer, and development actions” and to the following target 13.3 “Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning”

The project is expected to generate 180,480 MWh of clean energy, leads to an emission reduction of 83,309 tCO2 per annum and there are 22 employees in the operation phase of the project. In this way, it achieves the goals of nationally stated sustainable development priorities of Turkey (INDC)[7].

1.18 Additional Information Relevant to the Project

Leakage Management

Potential leakage emissions in the context of power sector projects are emissions that arise from the project activities such as power plant construction, fuel handling, and land inundation. According to ACM0002 / Version 21.0, such emissions do not need to be considered.

Commercially Sensitive Information

Sanko Enerji Sanayi ve Ticaret A.Ş. does not find it ethical to announce these social and financial aids, therefore this is commercially sensitive information that needs to be excluded from the public version of the VCS PD that will be displayed on the VCS Project Database.

Further Information

N/A

[7] https://unfccc.int/sites/default/files/NDC/2022-06/The_INDC_of_TURKEY_v.15.19.30.pdf

2 SAFEGUARDS

2.1 No Net Harm

Throughout its construction and operational phase during its first crediting period, Yokuslu-Kalkandere Hydroelectric Power has not created any harm neither environmentally nor socio-economically; on the contrary, the project contributed to the socio-economic development in the project area significantly as:

1. Clothing and stationery aid was given to primary and high school students.
2. Scholarships were given to needy undergraduate students.
3. Every year during the month of Ramadan, food aid was given.
4. Furnishing aid was provided to the social facility for women in the Kalkandere district.

With respect to the second crediting period,

1. Fish passages are regularly controlled by DSI, Nature Conservation, and Provincial Environment Directorate officials.
2. Streambed downstream and upstream water analyses are taken every 3 months and monitoring studies are carried out.

2.2 Local Stakeholder Consultation

The Article 9 of the EIA Regulation stipulates a public participation process in order to provide participation of the communities in EIA process, to inform the communities about the proposed facility and to gather their opinions. In order to satisfy this requirement, announcements were published in two newspapers (Zümrüt Riza and Dünya Gazetesi) – one national and one local- declaring the date, time, venue and topic of the meeting.

Under EIA regulation project owner organized a stakeholder consultation meeting on 21st of May 2009. Two major questions asked during meeting first one was about economic advantages of the project and second is environmental impacts of the project. It is confirmed that project owner hired local employees during construction and used local companies to buy the needs of the project site if possible. For the environmental issues project owner fully met the legal requirements. It was verified during the site visit through the interviews with local people and village heads that the project has a positive impact to the region' s sustainable development. All the stakeholders that were interviewed were content with the project activity and the general opinion was that the project was beneficial for the surrounding villages.

There is an active grievance mechanism. In summary, the mechanism works as follows. In addition, a digital platform was created for demands and requests. All requests are tracked digitally. With the hierarchy of Operations Manager, Corporate Communications Officer, CFO, CEO, Coordinator, demands are evaluated in the digital environment, and solutions

are sought. There are no updates to the project design. And the work done to collect public grievances is mentioned below

- There is a “Public Relations Team” that will act as a bridge between the project and those affected by the project (regional people, non-governmental organizations, national and local organizations, and authorities, other parties related to the project, etc.). The team is work throughout the business to create a positive relationship based on open communication and mutual respect.
- The Public Relations team consist of a team of 4 people, namely the Public Relations Officer and the Operations Manager.
- Obtaining information, requests, and complaints to be handled and examined within a maximum of 7 working days.
- Corrective actions, if any, to be taken as a result of the examination of the requests are notified to the requesters by the Public Relations Officer.
- Requests other than those related to infrastructure will be finalized within 30 days.
- Complaints about the infrastructure will be finalized as soon as possible so that they do not cause problems in the daily lives of the people of the region.
- For each request received, the Information, Request, and Complaint Form is filled out. After the form is filled out by the Public Relations Officer, the Operations Manager is informed to take the necessary action.
- After the applicable action is finalized as a result of the request/complaint, the Information Acquisition, Request, and Complaint Closing Form is filled, and the relevant person will be informed.

No negative comments have been received regarding the project until now and the grievance mechanism continues to work and will continue throughout the crediting period.

A meeting/discussion will be planned to collect the grievances and a public announcement will be made in the upcoming monitoring period.

2.3 Environmental Impact

According to the Turkish law, a comprehensive EIA is required to the projects which have a 25 MW or exceeding amount of installed capacity. 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. In terms of its dimension, Yokuslu- Kalkandere Hydroelectric Power Plant falls under the EIA requirement zone. Hence, an EIA report has been carried out and it has concluded that the project activity will not lead to significant negative impacts. The lenders of the Project are Equator Principles

Financial Institutions (EPFIs) which have adopted these Principles in order to ensure that the projects financed by themselves are developed in a manner that is socially responsible and reflect sound environmental practices. Within this framework, besides the Turkish Legislation, the Project is also required to comply with the International Finance Corporation (IFC) Performance Standards (PS') on Social and Environmental Sustainability which form the basis of these Principles.

Furthermore, it will contribute to improve the environmental situation in the region and in the country. Avoiding fossil fuel-based electricity, it will enhance the air quality and help reduce the adverse effects on the climate. Renewable technologies for the electricity generation will be introduced and sustainable development will be promoted.

The EIA report did not only assess the environmental impacts, but it also presented a monitoring plan to be implemented during construction and operation phases. Therefore, the project will voluntarily prepare monitoring forms and these forms will be presented to the Ministry within periods of three months. The summary of potential negative environmental impacts and measures to be taken by the project participant to mitigate them had been presented in the validated PDD for the first crediting period.

As for the second crediting period, since there is no change in the design or technology of the power plant, the situation described in the EIA assessment continues; and that is, the Project Owner complies with all relevant environmental laws and regulations and there is no negative impact during its operational phase and required monitoring has been carried out.

The parameters that will be monitored during the second crediting period are:

Impacts on the aquatic life

The impact on aquatic life will be managed by the installation of a fish passage to provide an upstream and downstream movement. Its design was based on the study of the fish species, their size, migration season and the river's annual flow rates.

In addition, upstream and downstream water analyzes are monitored once every 3 months in the Yokuslu- Kalkandere Hydroelectric Power Plant.

All wastes were handled in accordance with the relevant legislation. Sample recordings were submitted to VVB.

2.4 Public Comments

The new public comment process was not executed because this is renewal of crediting period process.

2.5 AFOLU-Specific Safeguards

N/A

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The approved baseline and monitoring methodology selected for the proposed project activity is: ACM0002 Version 21.0 “Grid connected electricity generation from renewable sources” The methodology also refers to the latest approved versions of the following tools, which are applied by the project:

TOOL01: “Tool for the demonstration and assessment of additionality”, Version 7.0

TOOL07: "Tool to calculate the emission factor for an electricity system” version 7.0

TOOL11: "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.

3.2 Applicability of Methodology

The choice of the ACM0002 methodology is accurate since the proposed project activity respects all the applicability conditions required. Details of “Methodological Tool: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” are given under section 3.4.

Table 2. Applicability Conditions

ACM0002 Version 21.0 applicability conditions	Project activity applicability
This methodology is applicable to grid-connected renewable energy power generation project activities that: (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 activity is a Greenfield grid connected run-of-river hydropower project.
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: (a) Integrate BESS with a Greenfield power plant;	The project activity is not integrate with BESS. Because of that this condition is not applicable.

(b) Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic or wind power plant(s)/unit(s); (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) Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s).	
In case of Greenfield project activities applicable under paragraph 5 (a) above, the project participants shall demonstrate that the BESS was an integral part of the design of the renewable energy project activity (e.g. by referring to feasibility studies or investment decision documents);	The project activity is not integrate with BESS. Because of that this condition is not applicable.
In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (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) of the methodology ACM0002, is greater than 4 W/m2; or	This condition is not applicable to the project activity as it does not result in a new reservoir. However, the project activity involves the construction of a weir and behind this weir there will be a water pond with a surface area of 11,442 m^2. The power density (PD) for this regulation pond is calculated as follows: PD = 40,240,000 W/11,442 m^2 PD = 3,517 W/m^2 PD > 4 W/m^2 PD > 10 W/m^2, therefore, according to the methodology, there will be no emissions from the pond.

(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7) of the methodology ACM0002, is greater than 4 W/m2; or (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) of the methodology ACM0002, is lower than or equal to 4 W/m2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (8) of the methodology ACM0002, is greater than 4 W/m2 ; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m2 shall be: a.)Lower than or equal to 15 MW; and b.) Less than 10 percent of the total installed capacity of integrated hydro power project.	As there is no change in the project technology or design, the power density of the project has not been changed.

In the case of integrated hydro power projects, the project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute the generation capacity of the integrated hydro power project; or (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 a specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration must 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 consider seasonal flows from river, tributaries (if any), and rainfall for a minimum five years prior to implementation of CDM project activity.	Not applicable as the proposed project activity does not involves integrated hydro power projects
The methodology is not applicable to: (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; (b)Biomass fired power plants/units.	This condition is not applicable to the project activity as it does not involve switching from fossil fuel to renewable energy at the site of the project activity, nor biomass fired power plants/units.
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”.	The project activity does not involve capacity additions, retrofits, rehabilitations, or replacements
In addition, the applicability conditions included in the tools referred to below apply.	Applicability conditions of the applied tools are justified

From the above, it is concluded that the project activity meets all the applicability conditions of the methodology ACM0002 Version 21.0 “Grid connected electricity generation from renewable sources”.

The total installed capacity of project activity is 41.19MWm / 40.24MWe which is applicable as per large-scale project activities methodology and the capacity will remain the same hence the project activity will always be large-scale activities throughout the crediting period and thereafter.

Selected methodology has been applied together with the “tool to calculate the emission factor for an electricity system, version 7.0” and “tool for assessment and demonstration of additionality, version 7.0” 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 03.0.1

Tool 01 “Tool for the demonstration and assessment of additionality”: The project uses relevant tool together with ACM0002 methodology. No new methodology is used. Since the tool is included in ACM0002, its application is mandatory.

According to the methodology baseline scenario has been identified as “the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources”.

Tool 07 “Tool to calculate the emission factor for an electricity system”: This tool is used for the calculation of OM, BM and CM and applicable since the project activity includes grid power plants and supplies electricity to the grid and the project is not a CDM project but a voluntary project following CDM rules. CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system is determined by Ministry of Energy and Natural Resources Turkey, OM & BM values.

Tool 11 “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period”: This tool is used to determine the validity of the current baseline and in the case of invalid baseline for the next crediting period, the tool provides an approach to update the baseline as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism.

3.3 Project Boundary

According to the ACM0002 methodology version 21.0, the project boundary is defined as the spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to.

The greenhouse gases and emission sources included in or excluded from the project boundary are shown in Table 3.

Table 3. Emission Sources Included in the Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	CO2 emissions from electricity generation in	CO_2	Yes	*Main emission source:* Fossil fuels fired for electricity generation cause CO_2 emissions. It is included to baseline calculation to find the displaced amount by the project activity.

Source		Gas	Included?	Justification/Explanation
	fossil fuel fired power plants that are displaced due to the project activity.	CH_4	No	*Minor emission sources:* Even though there may be some CH_4 and N_2O emissions during electricity generation, these emissions are negligible and not included in baseline calculation to be conservative.
		N_2O	No	
Project	For hydro power plants, emissions of CH_4 from the reservoir.	CO_2	No	Minor emission source
		CH_4	Yes	CH_4 emissions are neglected as the project activity's power density is above 10.
		N_2O	No	Minor emission source

The following figure shows the plant operation diagram:

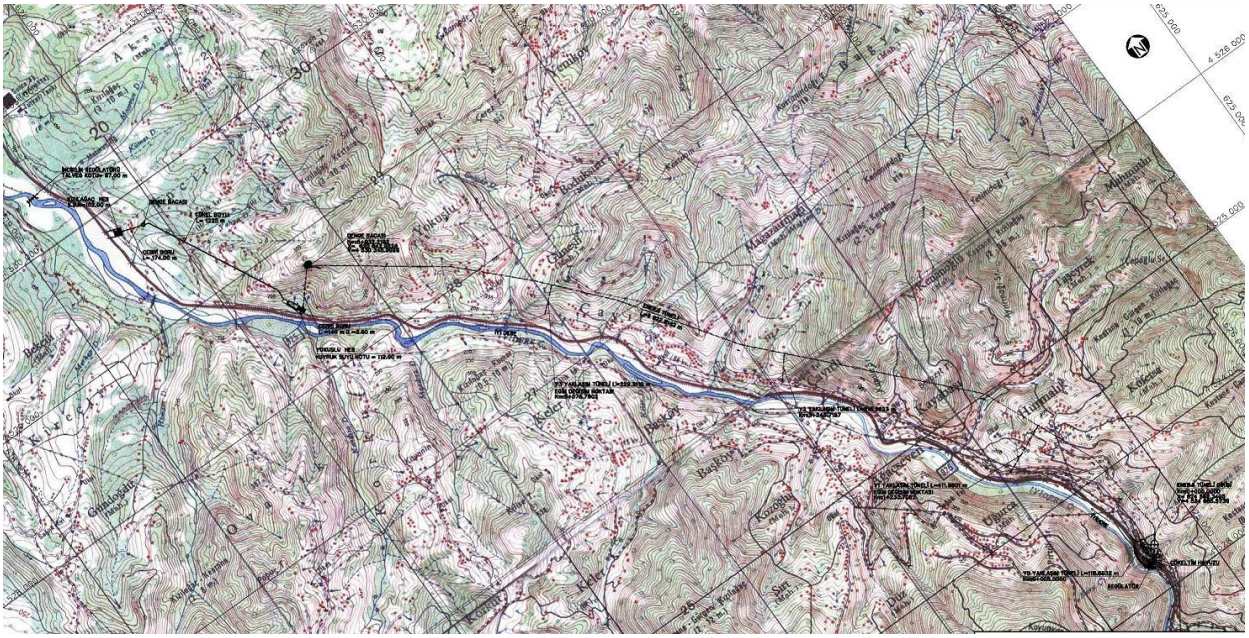


Figure 1. **Yokuslu-Kalkandere Hydroelectric Power Plant Operation Diagram**

3.4 Baseline Scenario

In this project, version 21.0 of the ACM0002 methodology was applied and the basic scenario was defined in accordance with the procedure specified in the relevant tools. How each step in the procedure in the applied methodology is implemented is explained and the outcome of each step is clearly documented. Project complies with all the requirements of the methodology.

Project activity is Greenhouse Power Plant installation as defined in the methodology, baseline scenario is electricity supplied to the grid by the project activity; It is generated by

operating grid-connected power plants and adding new generation sources, as reflected in the combined margin (CM) calculations described in TOOL07.

The project applies for a renewal of the crediting period under the requirements of VERRA Foundation; therefore, 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 has been applied to demonstrate that the baseline of the project is still valid.

The Tool proceeds as follows:

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

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

STEP 1.2: Assess the impact of circumstances

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.

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

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

STEP 2.1: Update the current baseline

STEP 2.2: Update the data and parameters

Step 1: The "Procedures for the renewal of the crediting period of a registered CDM project activity" approved by the CDM Executive Board require 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.

The Project baseline is the "grid-connected electricity generation from renewable sources". The Project is still in compliance with Electricity Market Law with Number 4628 and dated 03/03/2001, with the recent Electricity Market Law numbered 6446 dated 14/03/2013[8] and Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy with Number 5346 and dated 18/05/2005[9]. There are no changes or revisions of these laws and legislation.

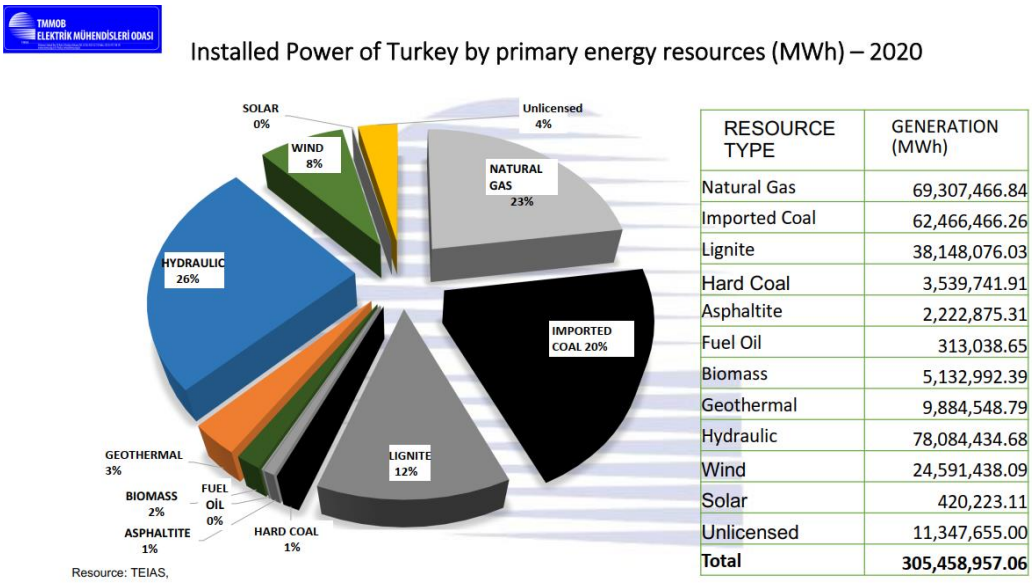
[8] https://www.resmigazete.gov.tr/eskiler/2013/03/20130330-14.htm

[9] http://eski.jmo.org.tr/mevzuat/mevzuat_detay.php?kod=131

The conclusion is that the baseline of the project activity complies and will continue to comply with the laws and regulations in the sector for the next crediting period.

Step 1.2: Assess the impact of circumstances

The electricity generation is predominantly composed by fossil fuel fired power plants in Turkey. Please see below the diagram delineating Turkey's total installed power by primary energy sources.



RESOURCE TYPE	GENERATION (MWh)
Natural Gas	69,307,466.84
Imported Coal	62,466,466.26
Lignite	38,148,076.03
Hard Coal	3,539,741.91
Asphaltite	2,222,875.31
Fuel Oil	313,038.65
Biomass	5,132,992.39
Geothermal	9,884,548.79
Hydraulic	78,084,434.68
Wind	24,591,438.09
Solar	420,223.11
Unlicensed	11,347,655.00
Total	**305,458,957.06**

Figure 3: Installed power of Turkey by primary energy sources in 2020

In addition, as stated in the 5-year projection of TEIAS (Turkish Electricity Transmission Company), it is obvious that fossil fuels would continue to be the main source for electricity generation. High growth rate of energy demand is forecasted to continue over coming decade. The report justifies that fossil fuels will be dominant in the electricity generation mix, with an expected share of 30% in 2025. Wind energy will only have a limited share of 10.6 % by 2025. Please see below the Figure 4 illustrating the capacity projection of Turkey for years 2020-2025.[10]

10 https://www.teias.gov.tr/ilgili-raporlar

(%)

YILLAR	2020	2021	2022	2023	2024	2025
LİNYİT	10,6	10,1	9,7	9,4	9,6	9,9
T.KÖMÜR+ASFALTİT	1,3	1,2	1,2	1,2	1,1	1,1
İTHAL KÖMÜR	9,4	10,2	9,8	9,5	9,2	8,9
DOĞALGAZ	26,8	25,5	24,7	24,0	23,2	22,5
URANYUM	0,0	0,0	0,0	1,1	2,1	3,1
DİĞER	0,7	0,7	0,7	0,6	0,6	0,6
JEOTERMAL	1,7	1,7	1,9	1,9	1,9	1,8
BİYOKÜTLE	1,2	1,8	1,8	1,7	1,7	1,6
HİDROLİK	32,3	31,2	31,1	30,4	29,6	28,8
RÜZGAR	9,2	9,6	10,3	10,2	10,2	10,6
GÜNEŞ	7,0	8,0	8,9	9,9	10,7	11,0
TOPLAM	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Figure 4: **Capacity projection of Turkey for years 2020-2025**

In conclusion, the conditions that were used to determine the baseline emissions in the first crediting period are still valid; therefore, Step 1.2 is justified.

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

The baseline scenario identified at the validation of the project activity during the first crediting period was the continuation of grid-connected electricity generation from renewable sources. As for Yokuslu- Kalkandere Hydroelectric Power Plant , the same circumstances are still valid. No investment from the project's proponent or a third party (or parties) has been envisioned later specifically for the project. Thus, this step is not applicable. There is no change with respect to the technology of Yokuslu- Kalkandere Hydroelectric Power Plant.

Since there are neither changes with regard to the investment nor changes in its technology, the validity of the baseline scenario during the first crediting period has been justified; therefore Step 1.3 has been justified.

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

As per the methodology ACM0002 version 21.0, the baseline scenario has been identified as "the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources". Therefore, the emissions reduction calculations are based on two main parameters: the energy generation and the grid emission factor.

As for the continuation of the baseline scenario during the second crediting period, only the grid emission factor should be updated for the purpose of the crediting period renewal and the new grid emission factor shall be multiplied by the energy generation that has always been monitored.

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

Step 2.1: Update the current baseline

As justified above, the project baseline for the next crediting period is the use of electricity from the national grid, and the latest version of the approved applicable methodology ACM0002 version 21.0, "Large-scale Consolidated baseline methodology for grid-connected electricity generation from renewable sources" has been followed.

Step 2.2: Update the data and parameters

The emission factor of the grid has been updated as per the Tool, "Tool to calculate the emission factor for an electricity system" version 07.0.

According to the Tool 07, three options have been provided in paragraph 17 (a). For Yokuslu-Kalkandere Hydroelectric Power Plant Option 1 for national EF by the Turkish Republic Ministry of Energy as 0.4616 tCO2/MWh has been selected. Combined margin (CM) emissions factor calculation with national values of operating margin (OM) and build margin (BM) is shown below.

For the emission factors, 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. 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. The Ministry has calculated the factors as using the "Tool to calculate the emission factor for an electricity system". Since it was updated in 20/09/2022 by the Ministry, these factors have been used for emission reduction calculation.

Operating Margin (OM) has been published as 0.7424 tCO2/MWh by the Ministry of Energy and Natural Resources.[11]

Build Margin (BM) has been published as 0.3680 tCO2/MWh by the Ministry of Energy and Natural Resources.[12]

Combined Margin (CM) (Hydroelectric): 0.4616 tCO2/MWh[13]

3.5 Additionality

Project is additional and there is no need additionality assessment analysis since this is crediting period renewal process.

The additionality analysis carried out in the PDD of the first crediting period proves that the project activity is additional.

[11]https://enerji.gov.tr//Media/Dizin/EVCED/tr/ÇevreVeİklim/İklimDeğişikliği/TUESEmisyonFktr/Belgeler/Bform2020.pdf

[12]https://enerji.gov.tr//Media/Dizin/EVCED/tr/ÇevreVeİklim/İklimDeğişikliği/TUESEmisyonFktr/Belgeler/Bform2020.pdf

[13]https://enerji.gov.tr//Media/Dizin/EVCED/tr/ÇevreVeİklim/İklimDeğişikliği/TUESEmisyonFktr/Belgeler/Bform2020.pdf

As per 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, demonstration of additionality is not required unless Step 1 is justified.

The HEPP project is a project that is not required to be implemented within the scope of any legal legislation in Turkey. It is a voluntarily made project.

In respect to the regulatory surplus requirement as part of the additionality assessment at renewal of crediting period, please see below the following applicable mandatory laws and regulations:

-Electricity Market Law: This Law aims to ensure the development of a financially sound and transparent electricity market operating in a competitive environment under the provisions of the civil law. It also underlines the needs to produce a sufficient, high quality, low cost and environmentally friendly electricity to consumers.

-Environmental Law, considers the environment as a single domain, aiming not only to prevent and eliminate environmental pollution, but also to allow the management of land andnatural resources in an integrated manner.

-Regulation on procedures and principles of signing the agreement of water resources utilization to generate electricity for the electricity market,

-Regulation on Environmental Impact Assessment,

During the second crediting period, the Project Proponent acknowledges and ensures that the project complies with all aforementioned laws as its activity aims at generating electricity by using a renewable resource: hydroelectric power; in a sufficient, low-cost and environmentally- friendly manner, using the latest technology available on the market.

3.6 Methodology Deviations

No deviation occurred from the related methodology used in this project.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid connected power plants and the addition of new grid connected power plants. The baseline emissions are to be calculated as follows:

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

Where:

BE_y	=	Baseline emissions in year *y* (t CO_2/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 CDM project activity in year *y* (MWh/yr)
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of "TOOL07: Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

Calculation of $\mathbf{EF_{grid,CM,y}}$ Based on pre-calculated values by Turkish Government, Ministry of Energy and Natural Resources, document "TURKEY NATIONAL ELECTRICITY NETWORK EMISSION FACTOR INFORMATION FORM[14]", the applicable grid emission factor value to calculate the emission reductions of the Hydro power plant project(other renewables) is 0.4616 tCO_2/MWh.

Since the BM, OM and CM values are calculated by Turkish Ministry of Energy and Natural Resources, those factors are calculated and updated regularly.

For Build margin factor calculation, Chronological order of power generation plants from TEİAŞ Load Dispatch Department with commissioning dates, plant names, fuel types, installed power values, electricity generation for the calculated year were used as input data. Consequently, Turkish Ministry of Energy and Natural Resources calculated; $EF_{,grid,BM,y}$: 0.3680

For Operating margin factor calculation, Chronological order of power generation plants from TEİAŞ Load Dispatch Department with, fuel types, electricity generation for the calculated year were used as input data. By using all the data which were mentioned above, Turkish Ministry of Energy and Natural Resources calculated; $EF_{,grid,OM,y}$: 0.7424

[14] https://enerji.gov.tr//Media/Dizin/EVCED/tr/ÇevreVeİklim/İklimDeğişikliği/TUESEmisyonFktr/Belgeler/Bform2020.pdf

The combined margin emission factor is calculated by using weighted average CM as per tool formula below:

$$EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM} \quad \textbf{(2)}$$

BE_y = Baseline emissions in year *y* (t CO_2)

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

$EF_{grid,y}$ = Combined margin CO_2 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" (t CO_2/MWh)

According to the Tool for hydro power generation project activities for the second crediting period: w_{OM} = 0.25 and w_{BM} = 0.75

CM (OM*0.25 + BM*0.75)	**0.4616**
(0.7424 * 0.25) + (0.3680 * 0.75)	

4.2 Project Emissions

Project emissions are calculated as follows:

$$PEy = PE_{FF,y} + PE_{GP,y} + PE_{HP,y} \quad \textbf{(3)}$$

Where:

PE_y = Project emissions in year *y* (t CO_2e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year *y* (t CO_2/yr)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year *y* (t CO_2e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year *y* (t CO_2e/yr)

Fossil fuel consumption ($PE_{FF,y}$)

The project's internal consumption is approximately 500 kVA, which can be considered negligible. This consumption will be satisfied from the electricity generation when the plant is in operation or from the grid when the plant is not in operation. Eventually, if there is no

electricity available in the grid and the plant is not in operation the internal consumption will be satisfied from a diesel generator, but this could rarely occur. If diesel engines would be used, emissions associated would be calculated according to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" and considered as project emissions. Therefore:

$PE_{FF,y} = 0$

Emissions of non-condensable gases from the operation of geothermal power plants ($PE_{GP,y}$)

Since the project activity does not involve the operation of a geothermal power plant,

$PE_{GP,y} = 0$

Emissions from water reservoirs of hydropower plants ($PE_{HP,y}$)

The project activity is a Greenfield run-of-river hydropower project. The water is diverted using a diversion wall structure to the power canal and then to the powerhouse. The water will be fed back to the river through the tailrace canal. The diversion structure results in a regulation pond with a surface area of 11,442 m^2, which does not affect in any way the volumes of existing reservoirs downstream of the project.

The power density (PD) for this regulation pond is calculated as follows:

PD = 40,240,000 W/11,442 m^2

PD = 3,517 W/m^2

PD > 10 W/m^2

Therefore, $PE_{HP,y}=0$

Hence, $PE_y = 0$

4.3 Leakage

As per ACM0002 Version 21.0, leakage emissions do not need to be considered.

4.4 Net GHG Emission Reductions and Removals

$$ER_y = BE_y - PE_y \quad \textbf{(4)}$$

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e/yr)
BE_y	=	Baseline emissions in year *y* (t CO_2/yr)
PE_y	=	Project emissions in year *y* (t CO_2e/yr)

As per the tool, the PE_y equals to zero. Thus, the project emissions are equal to the baseline emissions.

Total installed capacity = 41.19MWm / 40.24MWe

Net electricity delivered to grid ($EG_{PJ,y}$) = 180,480 MWh / yr

Grid emission factor ($EF_{grid,CM,y}$) = 0.4616

Baseline emissions (BE_y) = Emission reductions (ER_y), since Project emissions (PE_y) is zero.

$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$ = 180,480 * 0.4616 = 83,309 tCO_2e

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
From January 1 st to 31st Dec 2021	83,309	0	0	83,309
2022	83,309	0	0	83,309
2023	83,309	0	0	83,309
2024	83,309	0	0	83,309
2025	83,309	0	0	83,309
2026	83,309	0	0	83,309
2027	83,309	0	0	83,309
2028	83,309	0	0	83,309
2029	83,309	0	0	83,309
From January 1 st to 31st Dec 2030	83,309	0	0	83,309
Total	**833,090**	**0**	**0**	**833,090**

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor for grid-connected power generation in year y
Source of data	Turkish Government Ministry of Energy and Natural Resources
Value applied	0.4616
Justification of choice of data or description of measurement methods and procedures applied	$EF_{grid,CM,y}$ was calculated by the Turkish Ministry of Energy and Natural Resources using Version 7.0 of TOOL 7: "Tool to calculate the emission factor for an electricity system" and published in "TURKEY NATIONAL ELECTRICITY NETWORK EMISSION FACTOR INFORMATION FORM".[15]
Purpose of Data	Calculation of baseline emissions
Comments	-

5.2 Data and Parameters Monitored

Data / Parameter	$EG_{PJ,y}$
Data unit	MWh/year
Description	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
Source of data	EPİAŞ records.
Description of measurement methods and procedures to be applied	Continuous measurements are to be made by two sets (one main and one reserve) of meters. These meters are sealed and fully controlled by TEIAS . Measurements will be used for the calculation of the net electricity generation supplied by the project to the grid.

[15] https://enerji.gov.tr//Media/Dizin/EVCED/tr/ÇevreVeİklim/İklimDeğişikliği/TUESEmisyonFktr/Belgeler/Bform2020.pdf

<table>
<tr><td>Frequency of monitoring/recording</td><td>Continuous measurement, monthly recording</td></tr>
<tr><td>Value applied</td><td>180,480</td></tr>
<tr><td>Monitoring equipment</td><td>Meters are in compliance with the communiqué for Metering Devices to be used in Electricity Market. Two metering tests were performed on 08/11/2017 and 28/09/2018 respectively, for the changed meters.[16]

The main and back meters were changed on 10/08/2020. The specification of currently used electricity meters are as follows and 10/08/2020 is also initial calibration date of current meters:

<table><tr><td>Name</td><td>Serial Number</td><td>Brand – Model</td><td>Accuracy class</td></tr><tr><td>Main Meter</td><td>9674574</td><td>EMH-LZQJ-XC</td><td>C-1s</td></tr><tr><td>Backup meter</td><td>9674575</td><td>EMH-LZQJ-XC</td><td>C-1s</td></tr></table>
Since Kızılağaç power plant is under the same license as Kalkandere, the energy produced is transferred to the system through the same meters. A separate meter has not been installed in the Kızılağaç power plant.</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>TEIAS obtains the readings from the meters remotely and reports them in a spread sheet (for measurement control and will store the data discharged from the meters electronically) to the Plant engineer. EPİAŞ records are main source, TEİAŞ meter readings are cross-check source.

Re-calibration periods are defined by national metrology institutes country by country and in Turkey this period is defined as 10 years[17].</td></tr>
<tr><td>Purpose of data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Calculation method</td><td>N/A</td></tr>
<tr><td>Comments</td><td>Estimated net electricity generation was taken from Generation License.</td></tr>
</table>

[16] The metering test results have been submitted to the VVB.

[17] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

Data / Parameter	A_{PJ}
Data unit	m^2
Description	Area of the regulation pond measured in the surface of the water, after the implementation of the project activity when is full
Source of data	Project site
Description of measurement methods and procedures to be applied	Measured from topographical surveys, maps, satellite pictures etc.
Frequency of monitoring/recording	Yearly
Value applied	11,442 m^2
Monitoring equipment	Measured from topographical surveys, maps, satellite pictures, etc
QA/QC procedures to be applied	The reservoir area map has been provided to the VVB.
Purpose of data	*Calculation of project emissions*
Calculation method	The reservoir area mentioned above (11,442 m2) is the maximum reservoir area at 224.92 m altitude. This water level only occurs at the Q500 flood discharge. The reservoir area was calculated with using AutoCAD programs.
Comments	N/A

Data / Parameter	Cap_{PJ}
Data unit	MW
Description	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data	Project site
Description of measurement methods and procedures to be applied	The installed capacity will be determined based on recognized standards.

Frequency of monitoring/recording	Yearly
Value applied	40.24 MWe (3*11.68+2*2.60MWe)
Monitoring equipment	The data is monitored from the electricity generation license which was granted by Energy Market Regulatory Authority.
QA/QC procedures to be applied	The current Generation License and turbine specification documents have been provided to the VVB.
Purpose of data	Calculation of project emissions
Calculation method	The installed capacity figure is 35.04 MWe (3x11.68 MWe) for Kalkandere Powerhouse and 5.20 MW (2 x 2.60 MWe). The total installed capacity of the project is 40.24MWe.
Comments	N/A

5.3 Monitoring Plan

The purpose of the monitoring plan is to ensure that the monitoring and calculation of emission reductions of the proposed Project within the crediting period is complete, consistent, clear, and accurate.

Data and parameters that are listed below as well as in Section 5.2., will be monitored in accordance with ACM0002 – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources":

i. Quantity of net electricity generation supplied by the project plant to the grid ($EG_{Facility,y}$),

Data is recorded for each crediting period and maintained at least 2 years after its end. The company will establish a dedicated maintenance system to ensure the data availability for the required period. According to the Turkish Law and Regulations, the methods of monitoring the net electricity fed to the grid and quality control and assures are explained below:

Monitoring data is collected in accordance with the agreement done between the project owner and Turkish Electricity Transmission Company (TEIAS) which provides the infrastructure for the connection to the national grid. The metering system is defined in the agreement as two groups: main meter and spare meter. The design of the metering system is checked and approved by TEIAS before commissioning of the plant. The technical specifications of the power meters should be in line with Measure and Metering Devices Regulation by Ministry of Industry and Trade. In addition, the Communiqué for Power Meters announced by Energy Market Regulations Authority (EMRA) requires all meters to be in line with either Turkish Standards Institution or International Electro technical Commissions Standards. The meters are placed at the point the electricity is fed to the grid and sealed on behalf of both parties. This prevents any intervention and assures the accuracy and quality of the measurements. Concerning metering system accuracy, project participants have to

comply with relevant national legislation According to b) paragraph of the 9th Article of the Regulation of Metering and Testing of Metering Systems “periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformer are done every 10 years. Since the meters are within TEIAS’ province, TEIAS executes all the procedures for handling non-conformities. Therefore, the Project Participant does not have any internal auditing for this purpose. Data will be stored electronically, during the crediting period and at least two years after the last issuance of credits for the wind farm project activity in the concerning crediting period. The Project Proponent is responsible for storage of data received from the measuring devices.

There is no sampling approaches applied for this project.

The project is operated by Sanko Enerji Sanayi ve Ticaret A.Ş. which ensures the overall site management in accordance with Turkish Laws and technology providers' guidelines.

The monitoring has been performed in-house by the project proponent:

1. Plant Engineer is responsible for the control of the electricity supplied to the grid and imported from the grid with TEIAS. The electricity measurements are made by TEIAS remotely. In addition to the measurements made by TEIAS, the internal SCADA system (MIKRONIKA program of SYNDES ENERGIA) measures the produced electricity. The plant engineer checks these electricity measurement records and reports to the Operations Manager of the plant.

2. Accounting Manager is in charge of providing the electricity sales receipts to the Operations Manager of the plant.

3. Operations Manager is the VER coordinator. He is in charge of:

   a. Ensuring that instrumentations and devices are available and properly suited to perform efficiently the monitoring.

   b. Communicating and coordinating the monitoring tasks of all business units.

   c. Developing, executing, analyzing and improving the VER Monitoring/Reporting Procedures. This includes the crosschecking and consolidation (with multiple sources whenever possible) of the data obtained from the plant engineer and the accounting manager. He also records this operation properly to be able to provide it to the VVB during the verification process.

   d. Calculating and reporting the emission reductions.

The organizational chart of the facility is given in the figure below.

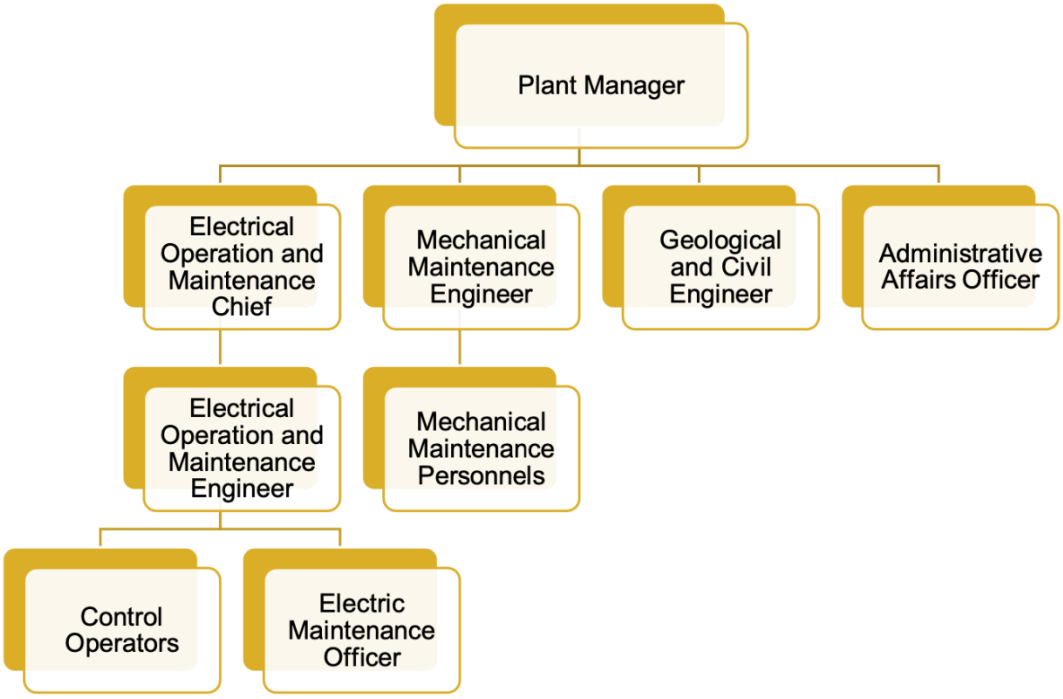


Figure 5: Organizational Chart

Each year, the monitoring report is submitted to VVB for the verification. The report covers the monitoring of grid-connected power generation, check report; report on calculation of the emission reductions and records of monitoring instrument repair and calibration, etc.

TEIAS obtains the readings from the meters remotely and reports them in a spread sheet (for measurement control and will store the data discharged from the meters electronically) to the Plant engineer.

In line with the EMRA requirements, the company purchased and installed two electricity meters to the Yokuslu- Kalkandere Hydroelectric Power Plant.

The recalibration of these equipments will be done in line with the equipment requirements but re- calibration periods are defined by national metrology institutes country by country and in Turkey this period is defined as 10 years[18].

As mentioned above there are two sets of meters in the transformer station. (The meters are electronic meters with an accuracy class of 0.2.) One of is the main meter for measuring and the other is the check meter for control. Both meters are metering the energy in two directions (consumption and production). If there is a measuring difference between these two meters and one of the parties (TEIAS or the company) requests for calibration of the meters, in this case, the meters will be calibrated without waiting for the periodic calibration date. (TEIAS

[18] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

System Usage Agreement, Art 3, B./2. /b))[19] . There is no need for any additional internal audit process since this calibration process is done by another third party under the control of TEIAS. The project owner is not responsible for calibration of the meters in Turkey according to the local standards.

All production figures which are subject to sales to the grid are agreed with PMUM (Market Financial Reconciliation Centre). These figures can be accesses from PMUM's web site by the seller. Therefore, net electricity production figures announced by PMUM will be used in emission calculation figures. These figures will also be cross checked with the production and internal electricity usage figures provided from the OSF forms which are provided to the company by TEIAS after the remote measurement of the meters.

On the other hand, the emission reductions will be calculated according to the measurements of the main electricity meter since the electricity production invoices are made out based on this meter. EPİAŞ records are main source, TEİAŞ meter readings are cross-check source. During each monitoring period, the invoices will be presented to the VVB, together with the calculation details.

The Electrical Engineers will receive sufficient and continuous training in terms of monitoring and verification on aspects such as meter's reading and calibration and reading's recording, adjustment, and reporting. If new personnel are hired, they will have to follow up a training program and will be trained in the specific skills required to carry out the Monitoring Plan.

Data is recorded for each crediting period and maintained at least 2 years after its end. The company will establish a dedicated maintenance system to ensure the data availability for the required period.

[19] TEİAŞ System Usage Agreement