CIRAKDAMI HYDRO ELECTRICITY POWER PLANT

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Karadeniz Hidroelektrik Enerjiden Elektrik Üretim Santrali Ltd (KARHES) which is owned by Aydem Yenilenebilir Enerji A.S. constructed Cirakdamıı Regulator and Hydro Electric Power Plant (HPP) on the Aksu River, within the jurisdiction of Dereli Town of Giresun Province. The purpose of the project is electricity production using the potential energy of Aksu River as a renewable resource. The purpose of the project is to supply electricity to the Turkish power grid, from a renewable source.

The Project Activity (PA) utilizes the Aksu River to generate electricity with zero carbon emissions for the Turkish Power Grid. The PA is displacing electricity that would otherwise be generated by the existing grid of the host country. The project was designed as a runoff river reservoir type power plant as per EPDK license states (EÜ/365-2/478). The installed capacity of the project is 49.10 MWe with two turbines each having installed capacity of 24.55 MWe (29.33 MWm). The total estimated electricity generation for the crediting period is 1,400,000 MWh, and the total emission reduction is 646,239 tCO_2e. The annual generation is estimated to be 140,000 MWh and the annual emission reduction is estimated to be 64,624 tCO_2e.

In the first crediting period, the estimated annual electricity generation was taken as 165,990 MWh/year. This value was obtained from the feasibility report prepared for this project activity, as was stated in the PDD of the first crediting period. However, since the Generation License is a government approved, and a more reliable source, the value has been updated as in the Generation License, which is 140,000 MWh/year for the second crediting period. Addition to this, during the first crediting period, the estimated 165,990 MWh/year electricity generation was not achieved. Since this value is not realistic for the project activity, the value in the generation license has been used for the second crediting period.

The Environmental impact of the project is kept to a minimum and all the regulations that are in act in Turkey is obeyed during the operation stages of the Cirakdami HPP project.

Table 1. Milestones of ÇIRAKDAMI HYDROELECTRIC POWER PLANT

Milestone	Date
The Electricity Production License is granted	14/09/2004
Project Registration Date	11/01/2018
EIA Exemptions certification issued	27/04/2006 06/05/2009

Milestone	Date
Amendment to the Water Usage Agreement Signed	26/08/2004
Grid Connection	07/12/2010
Revised TEİAŞ Agreement	25/01/2019
Commissioning Date for Unit 2	28/06/2012
Commissioning Date for Unit 1	26/04/2013
Project Start Date	28/06/2012
The first crediting period	28/06/2012 – 27/06/2022 (10 years)
The second crediting period	28/06/2022 – 27/06/2032 (10 years)

The Cirakdami HPP is made up of two units. There is a regulating body that is taking up the water from the 492 m elevation level and the tail water level is 475 m. The potential energy of water at approximate gross head level of 23 m is utilized and the electricity is produced by the power plant. The project start date is 28/06/2012, which is the commissioning date of Unit-II.

The plant has two turbine-generator units which are Harbin Brand and HLA936-LJ-149 type. The generator has 10.5 kV voltage.[1] There are two electricity meters; one main and one spare which are EMH brand and type LZQJ-XC.

The water is entering to the regulatory body and the water collecting area over the Aksu River at the 492 m elevation level. Then the water is settled at the sedimentation pool and is transferred to a tunnel. The water that passes this tunnel is transferred to a canal and transferred to the loading pool via penstock and passed to the hydro power plant building where the electricity is produced. The water is than be left back to the Aksu River at the 475 m elevation level. How the project activity operating is shown below in Figure 1.

The generation voltage is 10,5 kV and the produced electricity is fed to the Turkish National Power Grid via one of the Transformer Substations by 17.5 km long 154 kV transmission line at the Ordu-Giresun Transfer Station[2].”

[1] Photos of the turbine-generators have been shared with VVB

[2] System Use Agreement

According to the section 5.2.1 and para 24 of the applied methodology[3], the baseline scenario was identified as "the electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in TOOL07.".

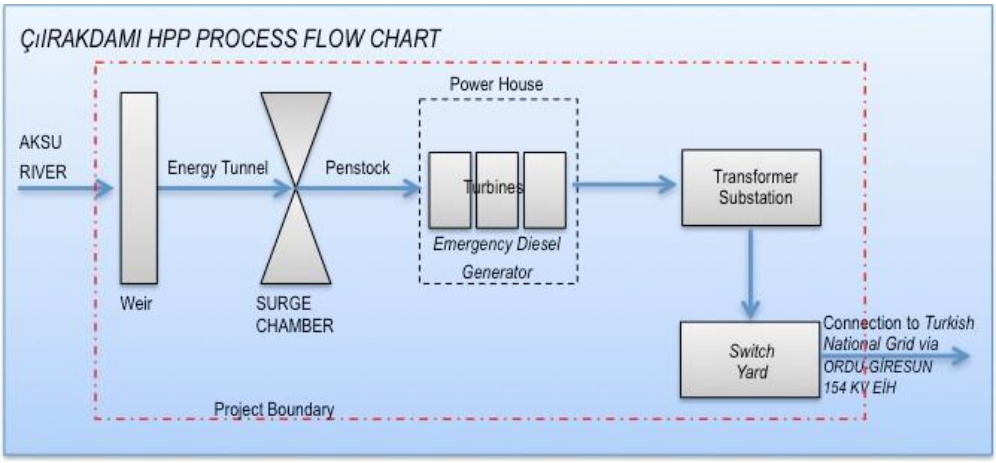

Figure 1. Project boundary

1.2 Audit History

Audit Type	Period	Program	VVB Name	Number of years
Validation	28-June-2012 – 27-June-2022 (1st crediting period)	VCS	RINA S.p.A (RINA)	10
Verification	28-June-2012 – 30-September-2020 (1st monitoring period)	VCS	Carbon Check	~8
Verification	01-October-2020 – 31-December-2021	VCS	Carbon Check	15 months

[3] https://cdm.unfccc.int/UserManagement/FileStorage/ZPFJL01OU2RYC6N3HASIXV7K84QBG9

	(2nd monitoring period)			
Verification	01-January-2022 to 27-June-2022 (3rd monitoring period)	VCS	Re-carbon Ltd.	6 months
Validation	28-June-2022 – 27-June-2032 (2nd crediting period)	VCS	Re-carbon Ltd.	10
Total	-	-	-	-

1.3 Sectoral Scope and Project Type

Sectoral scope[4]	1
Project activity type	Energy Industries (renewable/non-renewable sources)

The project is not an AFOLU project. Hence the following table is not applicable.

Sectoral scope	
AFOLU project category[5]	
Project activity type	

1.4 Project Eligibility

1.4.1 General eligibility

The concept of hydropower projects undertaken by private sector is a very immature concept in the country. In this sense, the project helps Turkey to stimulate the commercial application of grid connected renewable energy technologies and markets. It is also be a crucial sample of establishing the feasibility of larger grid connected small to medium scale runoff-river HEPPs as a tool to support energy security, improved air quality, alternative sustainable energy, improved local source of income and sustainable renewable energy industry development. The specific benefits of the project are:

[4] *Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes*

[5] *See Appendix 1 of the* VCS Standard

- Reduce greenhouse gas emissions in Turkey compared to the business-as-usual scenario,
- Help to stimulate private sector participation in hydro power industry in Turkey,
- Create employment during the construction and the operation phase of the plant,
- Relatively reduce some other pollutants from power generation industry in Turkey, compared to a business-as-usual scenario,
- Help to diminish Turkey's increasing energy deficit,
- Diversify the electricity generation portfolio and reduce dependency on import of other energy sources.

Hydropower presents significant environmental benefits:

- Generating electricity from hydropower energy does not result in emissions of pollutants into the atmosphere with zero residuals that carry adverse impacts on soil, water etc. Regular emissions from conventional electricity generation such as sulphur dioxide, nitrogen oxide and particulates does not occur in this case.
- As a renewable energy source hydropower can be used without jeopardizing the supply of primary energy sources in the future.
- The proposed project significantly contributes to the reduction of GHGs.

The project is eligible under the scope of VCS therefore the project meets the requirements below.

- Cirakdami HEPP project is grid-connected renewable power generation project that applies a methodology (ACM0002) eligible under VCS program.
- The implementation of the project activities does not cause the violation of any applicable law.

This is the renewal of crediting period stage of project activity thereby its eligibility had been already demonstrated at the start of the first crediting period.

1.4.2 AFOLU project eligibility

The project is not an AFOLU project. Hence, this section is not applicable.

1.4.3 Transfer project eligibility

This is not a transfer project or CPAs seeking registration. Hence, this section is not applicable.

1.5 Project Design

☒ Single location or installation

☐ Multiple locations or project activity instances (but not a grouped project)

☐ Grouped project

1.5.1 Grouped project design

The project is not a part of grouped project. Hence, this condition is not applicable.

1.6 Project Proponent

Organization name	Aydem Yenilenebilir Enerji A.Ş.
Contact person	Özgün Gül Koparan
Title	Environmental Affairs Manager
Address	Gazi Mustafa Kemal Bulvarı 15 Mayıs Mah. 832 Sok. No:2 75.Yıl Esnaf Sarayı K:2 Denizli-Turkey
Telephone	+90 258 242 27 76
Email	ozgun.gulkoparan@aydemenerji.com.tr

1.7 Other Entities Involved in the Project

Organization name	GTE Karbon Sürdürülebilir Enerji Eğitim Danişmanlik Ve Ticaret A.Ş
Role in the project	Consultant
Contact person	M. Kemal DEMİRKOL
Title	Director

Address	Mustafa Kemal Mah. Barış Sitesi 2111. Sokak. No: 5 Çankaya - Ankara – TURKEY
Telephone	+90 312 514 63 63
Email	kemal.demirkol@gte.com.tr

1.8 Ownership

As per the license issued by Energy Market Regulatory Authority (EMRA), all legal rights of the project are given to Aydem Yenilenebilir Enerji A.Ş. In the generation license which is granted by EMRA with license no EÜ/365-2/478, and date 14/09/2004, the owner name is "Karhes Elektrik Üretim Anonim Şirketi". However, in page 3 of the generation license, it is mentioned that the Bereket Enerji Üretim A.Ş. is the parent company of the Karhes Elektrik Üretim Anonim Şirketi. Additionally, in the Turkey Trade Registry Gazette released on 27/12/2019 (9982) page 219, the name of Bereket Enerji Üretim A.Ş. has been changed as Aydem Yenilenebilir Enerji A.Ş.[6]

GTE KARBON SURDURULEBILIR ENERJI EGT. DAN. VE TIC. A.S. is a project proponent that is the project developer and consultant.

1.9 Project Start Date

Project start date	28-June-2012
Justification	The commissioning date of Unit-II of Çırakdamı HEPP

1.10 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☐ Ten years, fixed

[6] Generation License and the Official Gazette provided to VVB

	☒ Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)
Start and end date of first or fixed crediting period	28-June-2022 to 27-June-2032 (Ten years, twice renewable)

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

☒ < 300,000 tCO2e/year (project)

☐ ≥ 300,000 tCO2e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO_2e)
28-June-2022 to 31-December-2022	33,108
01-January-2023 to 31-December-2023	64,624
01-January-2024 to 31-December-2024	64,624
01-January-2025 to 31-December-2025	64,624
01-January-2026 to 31-December-2026	64,624
01-January-2027 to 31-December-2027	64,624
01-January-2028 to 31-December-2028	64,624
01-January-2029 to 31-December-2029	64,624
01-January-2030 to 31-December-2030	64,624
01-January-2031 to 31-December-2031	64,624

01-January-2032 to 27-June-2032	31,515
Total estimated ERRs during the first or fixed crediting period	646,239
Total number of years	10
Average annual ERRs	64,624

1.12 Description of the Project Activity

Çırakdamı HEPP is a hydro power project type, greenfield, grid connected renewable electricity generation project. Çırakdamı HEPP, which is built on Aksu River. The regulator is approximately at the elevation of 485.00 m. Çırakdamı HEPP utilizes approximately (gross) 177 m of potential energy difference to produce electricity.

Çırakdamı HEPP with 49.10 MW installed capacity, is connecting to the Turkish National Power Grid via one of Transformer Substations by 28 km long 154 kV Giresun transmission line. As the project is operational, a reliable, continuous, independent from imported fossil fuels, and an uninterrupted high quality power at 154 kV voltage level is supplied to consumers in Turkey. Thus, the implementation of the project has positively affected both Turkey's and the region's economy.

The project involves collecting of water, at the 485 m level, by the help of a regulator and a water intake body. After that the water is kept at the settling tanks and passes to two small tunnels of 130 m each that carries the water to the surge chamber from which it enters into the penstock and transferred to two turbines each having installed capacity of 24.55 MWe (29.33 MWm) according to the generation license which is dated 14/09/2004. In the first crediting period, the estimated annual electricity generation was taken as 165,990 MWh/year. This value was obtained from the feasibility report prepared for this project activity, as was stated in the PDD of the first crediting period. However, since the Generation License is a government approved, and a more reliable source, the value has been updated as in the Generation License, which is 140,000 MWh/year for the second crediting period. Addition to this, during the first crediting period, the estimated 165,990 MWh/year electricity generation was not achieved. Since this value is not realistic for the project activity, the value in the generation license has been used for the second crediting period.

The two turbines are housed within the Hydro Electricity Power Plant (HEPP) building. The water that hits these two turbines, then leave the turbines via the tail water canal and a spillway which is going to be located at a level of 308 m. The following are the facilities have been constructed[7].

- Çırakdamı regulator constructed at approximately 485 m elevation level
- Water intake body and the settling tank
- Conveyor tunnels
- Penstock
- Surge Chamber
- Hydro Electricity Power Plant building
- Tail water canal and spillway
- The switch gear area and the transformer

General technical characteristics of Çırakdamı HEPP are given in Table 2.

Table 2. General technical characteristics of Çırakdamı HEPP

The Regulator	
Place	The Regulator is located on the Aksu River, at the close proximity of the Dereli Town of Giresun Province.
Purpose	According to water flow direction, diverting the Aksu River's water to water intake structure.
Elevation of the river bed	488.00 m
Elevation of the foundation	486.00 m
Type	Tirol Type
Height from the foundation of the regulator	6.00 m (Approximately)
Height of the regulator from the River Bed	4.00 m
Normative water level	492 m
Environmental Elevation	488 m
Operation Elevation	485 m
Full Body Crest Length	32 m (including the middle feet)
Water Intake Body	
Width of Mesh	1.00 m
Length of Mesh	28.00 m
Mesh interval	4 cm
Sedimentation Pool	
Length	60.00 m
Width	5.00 m

[7] The information provided at this chapter is taken from the revised feasibility study (March 2007) that was prepared according to host country's relevant authorities (DSI-State Hydraulic Works) set rules, and was presented to and acknowledged by the host country government authorities

Height	4.5 m
Water Level	4.0
Number of Sections	6
Grain size	0.3 mm
Conveying Tunnels of the Sedimentation Pool	
Type	Horse shoe type
Number of units	2
Length	2X130 = 260.00 m
Height	6.00 m
Width	20.00 m
Sedimentation Pool Access tunnels	
Type	Horseshoe
Length	85.00 m and 110 m
Height	6.00
Energy Building	
Power Plant Type	Over the surface
Elevation	280.00 m
Gross fall	211.5 m
Net fall	210.00 m
Length	44 m
Width	16 m
Total Installed Capacity (Bar)	49.1 MW
Project Flow Rate	16 m^3/s
Annual Energy Production:	
Total Energy	140,000 MWh/year
Number of Turbines	3
Type	Vertical Axis Francis Type
Unit Flow Rate	27.50 m^3/s

The meter details are given in the following table.

Table 3. Information of Meters

	Main Meter	Spare Meter
Serial no.	9798711	9798712
Brand-Type	EMH LZQJ-XC	EMH LZQJ-XC
First Index Date	19/11/2020	19/11/2020
Next Calibration date	19/11/2030[8]	19/11/2030[9]
Calibration frequency	10 years	10 years
Test Date	22/06/2020	22/06/2020
Test frequency	2 years	2 years
Class	0.2S - 0.5S	0.2S - 0.5S

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

The project uses Vertical Francis type turbines. The Francis type of turbine is a reaction type of turbine. In case of reaction turbines, the water approaches a set of curved blades mounted on a shaft and glides over them thereby changing direction and so imparting pressure on the blades due to centrifugal force, i.e. the force experienced by a passenger in a car when turning very fast. The water enters the blades nearly at a tangent and for the highest efficiency leaves the blades radially and at a reduced velocity. Francis turbines was invented by an English engineer J.B.Francis (1815 – 1892) water is delivered into a volute casing which completely surrounds the runner and is under pressure as well as velocity. The water is guided through both fixed and adjustable veins in the casing and glides onto the runner blades at an angle. The water then turns in the runner to exit parallel with the axis of rotation. Load changes are catered for by the adjustable vanes. Sudden load changes are dealt with by a bypass valve or a surge tank. In a Francis turbine the entire wheel assembly is immersed in water and surrounded by a pressure casing. In a Francis turbine the pressure casing is spiral shaped and is tapered to distribute water uniformly around the entire perimeter of the runner. It uses guide vanes to ensure that water is fed into the runners at the correct angle.
The manufacturer does not state a set estimated technical lifetime. Therefore, the default values have been used. For hydro turbines, the technical lifetime is 150,000 hours.

The project is expected to be producing 140,000 MWh of electricity per year, as per the Generation License. This is the annual electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. Based on this, a combined margin emission reduction factor is calculated as detailed below in this document.

According to the methodology, baseline scenario was 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”.

1.13 Project Location

The project is located at the Northern Black Sea region of Turkey at the Giresun Province as shown in the location map below (Figure 2). The coordinates of the weir and the powerhouse are indicated in the below table (Table 4). The nearest settlement to the Project Activity is Çırakdamı village.

Table 4. The geographical coordinates indicating the location of the major components of the project activity[10]

Component's name	Latitude	Longitude
Powerhouse	40.732587°	38.454185°

Figure 2. Project location

[10] Coordinates of the Powerhouse are taken from the KMZ file of the Project activity.

Figure 3. Location of the project activity[11]

1.14 Conditions Prior to Project Initiation

The project is a renewable energy project, prior the project initiation, there was no other hydroelectric power plant installation at the project site.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

Addition of a new power generation capacity to the grid is regulated by Energy Market Regulatory Authority (EMRA) who issues the licenses for electricity generation and is responsible for ensuring that new capacity applies with its rules and regulations. The list of the rules and regulations of the host country that a new electricity generation project has to comply is given in Appendix 2 of this report.

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

[11] The KMZ file of the Project Activity provided by the PO

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.16.2 Registration in Other GHG Programs

Has the project registered under any other GHG programs?

☐ Yes ☒ No

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 1.12 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

1.18 Sustainable Development Contributions

The project aims to generate energy source by reducing the dependence on fossil fuels without producing air pollution or toxic by-products. Hydroelectric Power Plant supplies the increasing national electricity demand in a cleaner and sustainable manner.

The following is a list of the project's contribution to the UN SDG:

- SDG-7 on access to affordable, reliable, and sustainable energy, as the project is not relying on imported fossil fuels.
- SDG-8 is to promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all. In this project, occupational trainings and occupational health trainings were given regularly. The project providing decent and secure work environment.
- SDG-12 Responsible consumption and production as the hydroelectric power plants are producing clean source of energy. They are replacing the fossil fuel based national grid. Because of that these plants drive people to consume more sustainable type of energy.
- SDG-13 On urgent action to combat climate change, as the project is replacing the fossil fuel based national grid and it is producing emission reductions.

1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

There are no leakage management. Hence, this section is not applicable.

1.19.2 Commercially Sensitive Information

There is no commercially sensitive information. Hence, this section is not applicable.

1.19.3 Further Information

There is no further information about project activity. Hence, this section is not applicable.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	**Through consultation meetings, stakeholders are identified. Project manager is accessible by locals all the time. There is no problem encountered about the project/way of communication so far. If there is an input or grievance, locals can express them directly or via mukhtar.** **In addition to locals and mukhtars, people from the company have attended the consultation meetings.[12]**
Legal or customary tenure/access rights	No expropriation was required during the implementation period. There are no lands which was occupied by IPs. The project site is not a private land. On the contrary it is a government land that classified as forestry area. The property is leased to the project owner by the government until the end of the generation license.
Stakeholder diversity and changes over time	There was no indication that the diversity in stakeholders takes place over time.
Expected changes in well-being	According to registered PD Version 2, the project would not have any negative impacts on stakeholders' well-being.
Location of stakeholders	Çırakdamı HEPP is located approximately 5 km southwest of Dereli District of Giresun Province, and Çırakdamı HEPP is located within the borders of Dereli district.

[12] Refering to registered PDD Version 2 Section 6 Stakeholder Comments

	 **Figure 4. Location of the project activity[13]**
Location of resources	Çırakdamı HEPP is located within the borders of Dereli district.

2.1.2 Stakeholder Consultation and Ongoing Communication

Date of stakeholder consultation	09-April-2006
Stakeholder engagement process	The meeting was announced by announcements placed at the Muhktarship board and several places at the nearby settlements. These announcements were given to the Muhktar on 20/03/2006, and announced the meeting time and place.
Consultation outcome	The outcomes of the consultation meeting were as follows[14]; • Stakeholders were wondering if the project will provide job opportunities. The company HR was answered that the job opportunities were created. • The board, where elderly people are involved, expressed their gratitude about the sales of their land. The land acquisition agreements have been made upon agreed protocols.
Ongoing communication	There is a grievance box in a market in Dereli where anyone can provide feedback about the project activity. The grievance box have

[13] The KMZ file provided by the PO

[14] Referring to registered PDD version 2 Section 6 Stakeholder Comments

	been regularly checked, and if there are demands or complaints, the project owner is addressing these.
Stakeholder input	There is no input received from the stakeholders during the consultation.[15]

2.1.3 Free Prior and Informed Consent

Obtaining consent	As a part of the EIA process, in line with the article 9 of EIA Regulation, to obtain consent of the stakeholders, the community meetings were organized. In these meetings general information about the construction site, duration of the construction and cost of the project, technical information about the equipment's to be used at the project, the potential environmental impacts and the measures to be taken are presented to the stakeholders. At the end of these meetings, all stakeholders were content that environment-friendly energy production was going to be realized.
Outcome of FPIC	EIA not required decision has been made for Çırakdamı HEPP on 27/04/2006.

2.1.4 Grievance Redress Procedure

Development process	Contact information of the project owner is given to the Dereli Village Mukhtar's Office. Project manager is accessible by locals all the time. There is no problem encountered about the project/way of communication so far. If there is an input or grievance, locals can express them directly or via mukhtar. PP will resolve all the grievances during whole crediting period.
Grievance redress procedure	The grievance, negative or positive, can be provided by local stakeholders related to operation of the project activity. PP will resolve all the grievances during whole crediting period.

2.1.5 Public Comments

[15] A signed document by AYDEM that there is no comment received has been provided to VVB.

Comments received	Actions taken
No comment received from the stakeholders.	-

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

The project owner periodically provides necessary trainings to employees. The records of the trainings have been provided to VVB.

2.2.2 Risk Assessment

	Risks identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing	No risk identified	-
Risks to stakeholder participation	No risk identified	-
Working conditions	• Occupational accidents due to the use of vehicles, machinery and equipment • Fire risk	• Basic occupational health and safety training • Emergency drill Training • Training on working at height • Training on safe driving techniques The training records are shared with the VVB.
Safety of women and girls	No risk identified	-
Safety of minority and marginalized groups, including children	No risk identified	-

Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	Risks identified with generation of wastewater and solid wastes	- Domestic wastewater will be collected in a septic tank to prevent the spread of wastewater to the environment. - Domestic solid wastes are collected in closed sealed containers and sent to appropriate landfill area by municipality. - It is not possible to have air emissions during operational activities. - During operational activities, noise from the power plant will be generated. However, this noise is an indoor noise and is not expected to have a negative impact on the environment. - To prevent the negative impact of the power plant on the stream bed, life water will be released to the stream.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified[16]	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	Türkiye has ratified ILO convention 100, 111, 122 and 142. All the workers are socially secured by the PO and protected by employment agreements.

[16] The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

Sexual harassment	No risk identified	Türkiye has ratified ILO convention 100, 111, 122 and 142. All the workers are socially secured by the PO and protected by employment agreements.
Equal pay for equal work	No risk identified	Türkiye has ratified ILO convention 100, 111, 122 and 142. All the workers are socially secured by the PO and protected by employment agreements.
Gender equity in labor and work	No risk identified	Türkiye has ratified ILO convention 100, 111, 122 and 142. All the workers are socially secured by the PO and protected by employment agreements.
Forced labor	No risk identified	Türkiye has ratified ILO convention 100, 111, 122 and 142. All the workers are socially secured by the PO and protected by employment agreements.
Child labor	No risk identified	Türkiye has ratified ILO convention 100, 111, 122 and 142. All the workers are socially secured by the PO and protected by employment agreements.
Human trafficking	No risk identified	Türkiye has ratified ILO convention 100, 111, 122 and 142. All the workers are socially secured by the PO and protected by employment agreements.

2.3.2 Human Rights

The PO recognizes, respects, and promotes the protection of the rights of LCs, and customary rights holders in line with applicable international human rights law. Türkiye has ratified ILO convention[17]. PO will never be complicit in violence or human rights abuses. If any complaint is received by the PO, they will act on the issue right away throughout the lifetime of project activity.

[17] https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---ilo-ankara/documents/genericdocument/wcms_645630.pdf

Risks identified	Mitigation or preventative measure(s) taken
No risks identified	-

2.3.3 Indigenous Peoples and Cultural Heritage

There are no lands which was occupied by IPs. This section is not applicable.

Risks identified	Mitigation(s) or preventative measure taken
No risks identified	-

2.3.4 Property Rights

No expropriation was required during the implementation period. There are no lands which was occupied by IPs. The project site is not a private land. On the contrary it is a government land that classified as forestry area. The property is leased to the project owner by the government until the end of the generation license.

Risks identified	Mitigation or preventative measure(s) taken
No risks identified	-

2.3.5 Benefit Sharing

As explained in Section 2.3.4, the project does not impact property rights. Therefore, this section is not applicable.

Process used to design the benefit sharing plan	-
Summary of the benefit sharing plan	-
Approval and dissemination of	-

benefit sharing plan	

2.4 Ecosystem Health

	Risks identified	Mitigation or preventative measure(s) taken
Impacts on biodiversity and ecosystems	No risk identified	-
Soil degradation and soil erosion	No risk identified	-
Water consumption and stress	No risk identified	-

2.4.1 Rare, Threatened, and Endangered Species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☐ Yes ☒ No

Since the project is not located in or adjacent to habitats for rare, threatened, or endangered species, the following tables are not applicable.

Species and habitat	-
Areas needed for habitat connectivity	-
...	...

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No risk identified	The project is not located in or adjacent to habitats for rare, threatened, or endangered species.
Areas for habitat connectivity	No risk identified	The project is not located in or adjacent to habitats for rare, threatened, or endangered species.

2.4.2 Introduction of Species

There are no species introduced. Hence, this section is not applicable.

Species introduced	Classification	Justification for use	Adverse effects and mitigation

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species

	Risks identified	Mitigation or preventative measure(s) taken
Invasive species		

2.4.3 Ecosystem Conversion

The project is not an ARR, ALM, WRC or ACoGS project. Hence, this section is not applicable.

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion		

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	ACM0002	Grid-connected electricity generation from renewable sources	22.0
Tool	01	Tool for the demonstration and assessment of additionality	07.0
Tool	07	Tool to calculate the emission factor for an electricity system	07.0
Tool	10	Tool to determine the remaining lifetime of equipment	01.0
Tool	11	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	03.0.1

3.2 Applicability of Methodology

Methodology ID	Applicability condition	Justification of compliance
ACM0002 (1)	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);	CIRAKDAMI HEPP is a hydro power project type, greenfield, grid connected renewable electricity generation project. So, the project meets (a) Install a Greenfield power plant.

	(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). (f) Install a Greenfield power plant together with a grid-connected Greenfield pumped storage power plant. The greenfield power plant may be directly connected to the PSP or connected to the PSP through the grid.	
(2)	In case the project activity involves the integration of a BESS, the methodology is applicable to grid-connected renewable energy power generation project activities that: (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) Integrate a BESS to (an) existing solar photovoltaic or wind power plant(s)/unit(s)	This project does not include an integration of a BESS. Hence, this condition is N/A. a) This project does not include an integration of a BESS. Hence, this condition is N/A. b) This project does not include integration a BESS together with implementing a capacity addition to (an) existing solar photovoltaic1 or wind power plant(s)/unit(s). Hence, this condition is N/A. c) This project does not include integration of

	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). (e) Integrate a BESS together with a Greenfield power plant that is operating in coordination with a PSP. The BESS is located at site of the greenfield renewable power plant.	a BESS to (an) existing solar photovoltaic or wind power plant(s)/unit(s) without implementing any other changes to the existing plant(s). Hence, this condition is N/A. d) This project does not include integration of a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s). Hence, this condition is N/A. e) This project does not include integration of a BESS together with a Greenfield power plant that is operating in coordination with a PSP. Hence, this condition is N/A.
(3)	The methodology is applicable under the following conditions: (a) Hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power	(a) Çırakdamı HEPP is a hydro power plant unit with reservoir. (b) There were no capacity additions. (c) This project does not include an integration of a

	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 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; (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	BESS. Hence, this condition is N/A. (d) This project does not include an integration of a BESS. Hence, this condition is N/A. (e) The project activity does not involve PSP. Hence, this condition is N/A.

	or investment decision documents); (d) The BESS should be charged with electricity generated from the associated renewable energy power plant(s). Only during exigencies may the BESS be charged with electricity from the grid or a fossil fuel electricity generator. In such cases, the corresponding GHG emissions shall be accounted for as project emissions following the requirements under section 5.4.4 below. The charging using the grid or using fossil fuel electricity generator should not amount to more than 2 per cent of the electricity generated by the project renewable energy plant during a monitoring period. During the time periods (e.g. week(s), months(s)) when the BESS consumes more than 2 per cent of the electricity for charging, the project participant shall not be entitled to issuance of the certified emission reductions for the concerned periods of the monitoring period. (e) In case the project activity involves PSP, the PSP shall utilize the electricity generated from the renewable energy power	

	plant(s) that is operating in coordination with the PSP during pumping mode.	
(4)	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), is greater than 4 W/m^2; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m^2; 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), is lower than or equal to 4 W/m^2, all of the	The project is a hydro power plant. (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs.

	following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m^2; (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/m^2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
(5)	In the case of integrated hydro power projects, project participants shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation	The project is not an integrated hydro power project. Hence, this condition is N/A.

	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 specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum of five years prior to the implementation of the CDM project activity.	
(6)	In the case of PSP, the project participants shall demonstrate in the PDD that the project is not using water which would have been used to generate electricity in the baseline.	The project does not include a PSP. Hence, this condition is N/A.
(7)	The methodology is not applicable to:	a) The project does not involve switching from fossil

	(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.	fuel use to renewable energy at the site of the project activity. b) The project is not a biomass fired power plant.
(8)	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 does not involve retrofits, rehabilitations, replacements, or capacity additions. Hence, this condition is N/A.
(9)	In addition, the applicability conditions included in the tools referred to below apply.[18]	Given below.

Methodology ID	Applicability condition	Justification of compliance

[18] The condition in "TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality" that all potential alternative scenarios to the proposed project activity must be available options to project participants; does not apply to this methodology, as this methodology only refers to some steps of this tool.

TOOL07	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g., demand-side energy efficiency projects).	The project activity supplies electricity to a grid. Hence, this condition is met.
	Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e., option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 1: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power	CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system is determined by calculating the "combined margin" emission factor (CM) of the electricity system.

	plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	
	In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The project electricity system is not located partially or totally in an Annex I country. Hence, this condition is N/A.
	Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	The project does not involve biofuels in any way.

Methodology ID	Applicability condition	Justification of compliance
TOOL01	The use of the "Tool for the demonstration and assessment of additionality" is not mandatory for project participants when proposing new methodologies. Project participants may propose alternative methods to demonstrate additionality for consideration by the Executive Board. They may also submit revisions to approved methodologies using the additionality tool.	Tool for the demonstration and assessment of additionality is applied in this project since there is no new methodologies proposed. Hence, this condition is N/A.
	Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	The additionality tool is applied using this methodology.

Methodology ID	Applicability condition	Justification of compliance
TOOL10	Option (a): Use manufacturers information for the technical lifetime of equipment and compare to the date of first commissioning. In this option, the remaining lifetime is determined as a difference between the technical lifetime and the operational time. This option can only be applied if: (i) Manufacturer s information for the technical lifetime of the equipment is available; (ii) The project participants can demonstrate that the equipment has been operated and maintained according to the recommendation s of the equipment supplier to ensure that the technical lifetime specified by the manufacturer is not reduced; and	The manufacturer does not provide an information for the technical lifetime of equipment. This option is N/A.

	(iii) There are no periodic replacement schedules or scheduled replacement practices specific to the industrial facility, that require early replacement of equipment before the expiry of the technical lifetime; (iv) The equipment has no design fault or defect and did not have any industrial accident due to which the equipment cannot operate at rated performance levels.	
	Option (b): Obtain an expert evaluation. In this option, an independent expert having relevant experience in evaluating the remaining lifetime for the type of equipment can be requested to determine the remaining lifetime of the equipment. The information that could be	An evaluation from an expert did not obtained. This option is N/A.

	evaluated includes an analysis of • The operational history of the equipment to identify the past performance, equipment retrofits, failures/accidents, capacity upgrades/degradations, replacements etc.; • The current operation and maintenance practices; • Documented specific sectoral/industry practices for replacements; • Conducting tests on the equipment, such as magnetic particle examinations, ultrasonic testing, metallurgical analysis, etc.	
	Option (c): Use default values. In this option, project participants may use the following default values for the technical lifetime and determine the remaining lifetime as the difference of the technical lifetime and the operational time. This option can only be applied if: (i) The project participants can	The default values have been used. For hydro turbines, the technical lifetime is 150,000 hours[19].

[19] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf

		demonstrate that the equipment has been operated and maintained according to the recommendations of the equipment supplier; (ii) There are no periodic replacement schedules or scheduled replacement practices specific to the industrial facility, that require early replacement of equipment before the expiry of the technical lifetime; and (iii) The equipment has no design fault or defect and did not have any industrial accident due to which the equipment cannot operate at rated performance levels.	

Methodology ID	Applicability condition	Justification of compliance

TOOL11	This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism. The tool consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.	This is the renewal of the crediting period. Therefore this tool is applicable.

3.3 Project Boundary

CO_2 emission is included in the baseline but the project activity does not emit any of the gases listed, in the table below.

The project boundary is considered as the National Electricity Grid of Turkey according to applied tool. The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the power plant is connected to.

Source		Gas	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source

Source		Gas	Included?	Justification/Explanation
	that are displaced due to the project activity			
Project	For dry or flash steam geothermal power plants, emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	No	N/A
		CH_4	No	N/A
		N_2O	No	N/A
	For binary geothermal power plants, fugitive emissions of CH4 and CO2 from noncondensable gases contained in geothermal steam	CO_2	No	N/A
		CH_4	No	N/A
		N_2O	No	N/A
	For binary geothermal power plants, fugitive emissions of hydrocarbons such as nbutane and isopentane (working fluid) contained in the heat exchangers	CO_2	No	N/A
		CH_4	No	N/A
		N_2O	No	N/A
	CO2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	No	N/A
		CH_4	No	N/A
		N_2O	No	N/A

Source		Gas	Included?	Justification/Explanation
	For hydro power plants, emissions of CH4 from the reservoir	CO_2	No	Minor emission source
		CH_4	No	Minor emission source (Power density is 12,634.11 W/m^2 and is greater than 10 W/m^2)
		N_2O	No	Minor emission source
	Charging of BESS using electricity from the grid or from fossil fuel electricity generators.	CO_2	No	N/A
		CH_4	No	N/A
		N_2O	No	N/A
	Utilization of electricity from grid or from fossil fuel generators by PSP for pumped mode.	CO_2	No	N/A
		CH_4	No	N/A
		N_2O	No	N/A
	For PSP, emissions of CH4 from the reservoir	CO_2	No	N/A
		CH_4	No	N/A
		N_2O	No	N/A

The project boundary can be seen in the figure below.

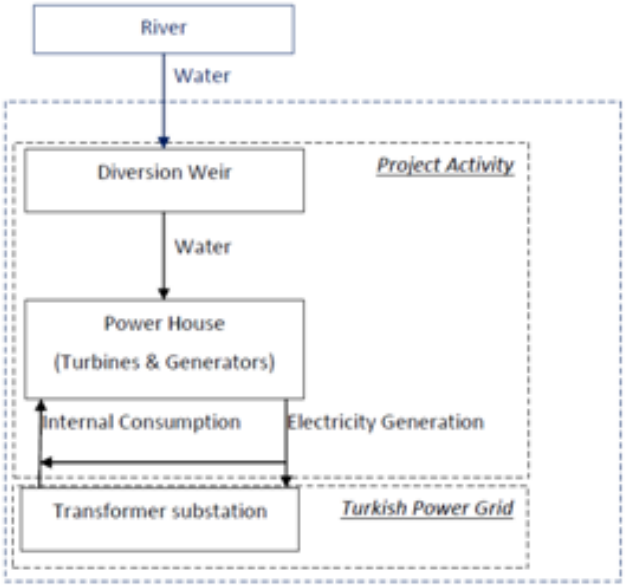

Figure 5. Project boundary

The single line diagram of the project activity has been given in the figure below.

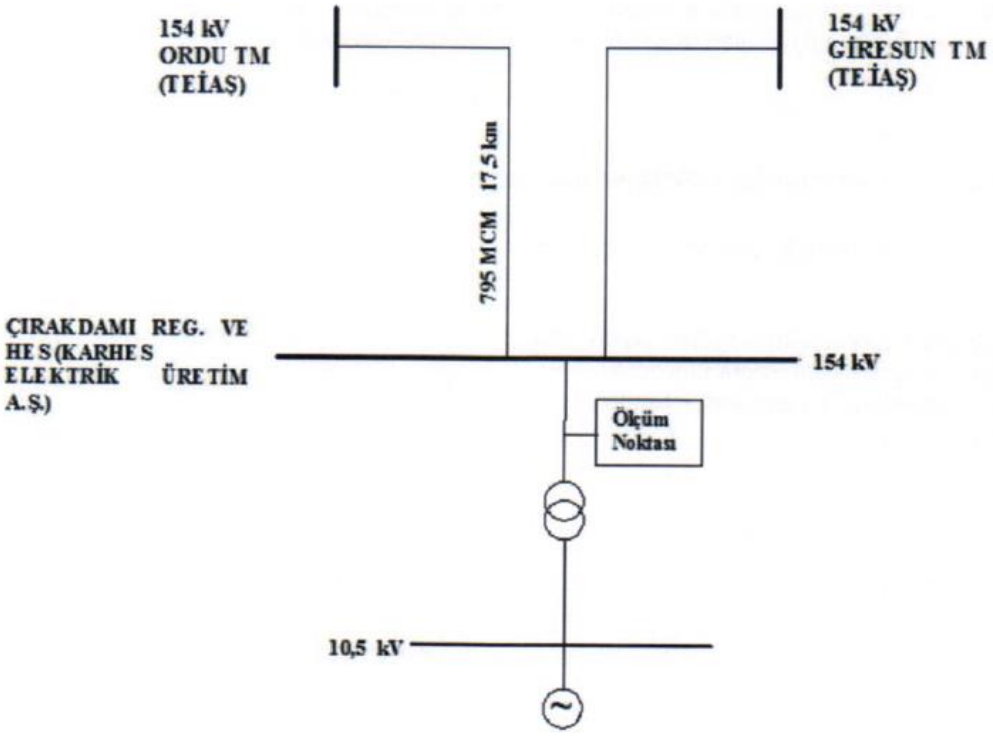

Figure 6. Single line diagram of the project activity

3.4 Baseline Scenario

According to the 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, there are some requirements:

The tool offers 2 steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.

The sub-steps for the Step 1 are:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies: There is no change in national/sectoral policies affecting project implementation. All policies are still valid in the second crediting period.

Step 1.2: Assess the impact of circumstances: The baseline circumstances are not valid in the second crediting period since the national grid properties / shares of each technology, etc. have been changed.

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: There is no change in the investment type and technology in the second crediting period.

Step 1.4: Assessment of the validity of data and parameters: The default values and ex-ante values have been changed.

Although there is no change in national/sectoral policies affecting project implementation (Step 1.1), investment and technology (Step 1.3), the current situations such as margin calculations (Step 1.2) and parameters not monitored (Step 1.4) have been changed. Therefore, Step 2 has been applied.

Step 2.1: Update current baseline: The latest version of the applicable methodology and current circumstances have been used for the second crediting period.

The applicability conditions of Tool 11 are given below in detail:

No	Applicability Conditions	The Project
Step 1.1	If the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting	There is no change in national/sectoral policies affecting project implementation.

	period and are applicable at the time of requesting renewal of the crediting period, go to Step 1.2. If the current baseline does not comply with relevant mandatory national and/or sectoral policies, then assess based on the examination of current practice in the country or region in which the policies apply, whether those policies are systematically not enforced and that non-compliance with those requirements is widespread in the country or region.	Hence Step 1.2 can be evaluated.
Step 1.2	Assess the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario. In the situation where the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, an assessment of the changes in market characteristics is required for the renewal of the crediting period. Evaluate whether the conditions used to determine the baseline emissions in the previous crediting period are still valid. Assess the availability of new fuels or raw materials and the impact of electricity or fuel prices in the identification of the current practice for the baseline emissions.	The combined margin is updated as per OM & BM calculations by Ministry of Energy and Resources.
Step 1.3	This sub-step should only be applied if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology. Assess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD or CDM-PDD-REN, exceeds the crediting period for which renewal is requested. Take into consideration the market penetration of different technologies. Evaluate the penetration rate of different technologies that are available in the market and evaluate how they could affect the baseline.	The project is a greenfield activity. Since it includes a new investment and the use of new equipment, this step is not applicable.

Step 1.4	Assess whether data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated. Updates should be undertaken in the following cases: Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC; Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values, or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity. If the application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline as well as data and parameters are still valid for the subsequent crediting period, then this baseline, data and parameters can be used for the renewed crediting period. Otherwise, proceed to Step 2.	The combined margin is updated as per OM & BM calculations by Ministry of Energy and Resources. Hence the assessment should proceed to Step 2.
Step 2.1	Update the current baseline emissions for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity. The procedure should be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period.	The latest version of the applicable methodology and current circumstances have been used for the second crediting period
Step 2.2	If the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters, following the guidance in Step 1.4.	The data and the parameters are updated for the second crediting period.

According to the methodology, baseline scenario was 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”.

Turkish electricity generation is mainly composed of thermal power plants and the share of renewable resources. Since Turkey is an advanced developing country, there is an increasing demand for electricity which is fully expected to continue in the foreseeable future.

The trend in Turkey to date and given historically slow development of alternative energy resources is to build an increasing number of thermal power plants in the future to satisfy the annual growth in energy consumption demand. Turkey as an advanced developing nation has looked at dealing with energy security by developing and constructing high-capacity coal and natural gas power plants. The development of thermal power plants has been also encouraged by the large natural resource availability in Turkey, especially the abundance of economically accessible lignite. The statistics from TEIAS webpage show that the installed capacity that utilize lignite in Turkey has always showed an increasing trend, based on the available information covering the years from 1940 to 2019[20] [21] [22].

In the absence of the project activity, the same amount of electricity is required to be supplied via either the current power plants or by increasing the number of thermal power plants thus increasing GHG emissions.

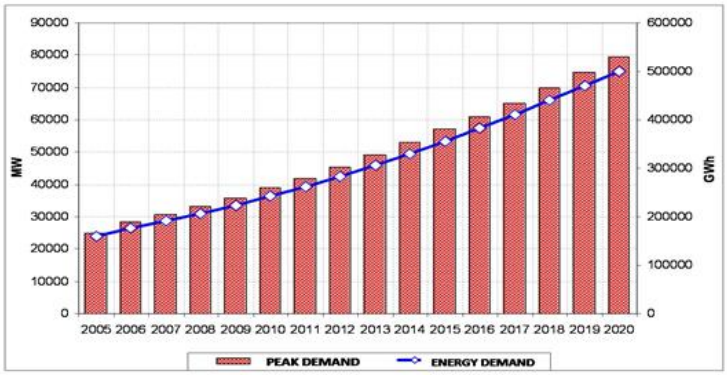

Figure 7. Peak Load and consumption projection for Turkish electricity system between 2005-2020[23]

According to the Ministry of Energy and Natural Resources statistics24, share of WPPs together with geothermal power plants could hardly reach 11% in 2020 whereas share of Coal and natural gas are

[20] https://webapi.teias.gov.tr/file/18800125-dc32-4c4e-8a3e-c771863e5a49?download
[21] https://webapi.teias.gov.tr/file/07f76c00-d256-4ccb-b25e-9478c9dedc04?download
[22] https://webapi.teias.gov.tr/file/163dfadf-80d8-4271-baf8-bc0b76710177?download

[23] http://www.teias.gov.tr/apkuretimplani/veriler.htm

[24] https://webapi.teias.gov.tr/file/39abb292-4b3e-4e70-9e08-914d0ba9bd43?download

20.46% (lignite and imported coal together) and 22.53%, respectively. When we look at the annual development of Turkey's gross generation in recent years, we see that grid is dominated by thermal power plants and which is boosted by increasing energy demand in parallel to increase population and per capita income. Hence, baseline of Turkey's electricity grid will continue to be dominated by fossil fuel power plants which is seen as the quickest solution in short term to meet the demand and enable energy security in supply side.

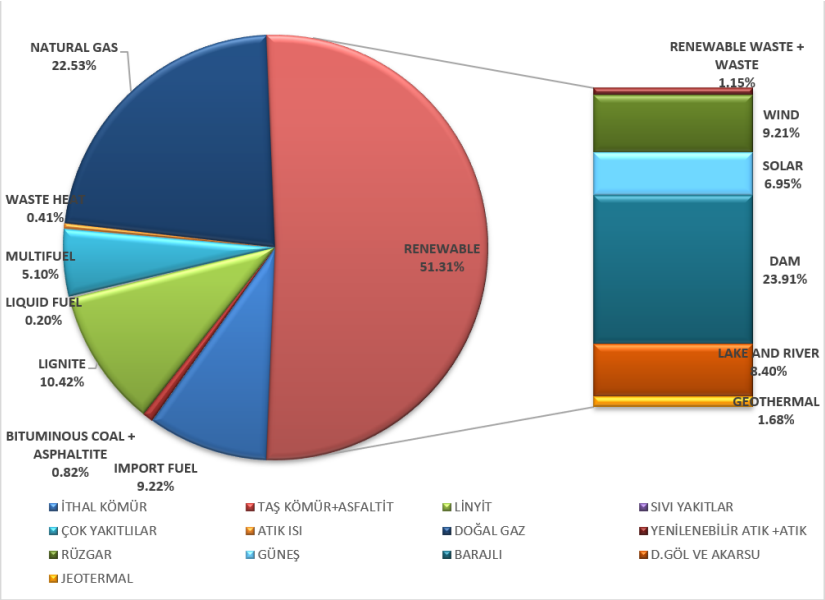

Figure 8 Distribution of installed capacity by primary energy resources[25]

Step 2.2.: Update data and parameters: Default values and ex-ante values have been revised. Combined margin is revised as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times 0.25 + EF_{grid,BM,y} \times 0.75$$

$$EF_{grid,CM,y} = 0.7424 \times 0.25 + 0.3680 \times 0.75 = 0.4616\ tCO_2/MWh$$

Therefore, new combined margin is calculated using values by Ministry of Energy and Natural Resources which is 0.4616 tCO_2/MWh[26].

3.5 Additionality

[25] https://webapi.teias.gov.tr/file/39abb292-4b3e-4e70-9e08-914d0ba9bd43?download

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

The proposed project activity reduces GHG emissions by substituting fossil fuel based electricity generation by renewable resources (hydro) based electricity generation.

This part refers to the "Tool for the Demonstration and Assessment of Additionality Version 7.0.0"[27] and the numbering in this section reflects the Tool's Guidelines provided at EB 39.

This is the second crediting period. In the first crediting period, additionality of the project was presented. There has been no capacity change in the project between the first and the second crediting period. The Project is in compliance with all required relevant regulations but is not a mandatory Project. There is no change in the relevant national and/or sectoral regulations with respect to project activity or its technology until date through which the project activity is not found mandated by regulations. There is no breach of any legislation and all required permits are obtained. Laws and regulations that apply for power generation facilities in the host country are mentioned in section 1.14 of this PD. Hence this project is a regulatory surplus. here has been no capacity change in the project between the first and the second crediting period. The Project is following all required relevant regulations but is not a mandatory Project. There is no change in the relevant national and/or sectoral regulations with respect to project activity or its technology till date through which the project activity is not found mandated by regulations. There is no breach of any legislation, and all required permits are obtained. Laws and regulations that apply for power generation facilities in the host country are mentioned in section 1.14 of this PD. Hence this project is a regulatory surplus.

3.5.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☒ Annex 1 country ☐ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes ☐ No

3.5.2 Additionality Methods

[27] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

There are no additionality methods. Hence, this section is not applicable.

3.6 Methodology Deviations

There are no methodology deviations. Hence, this section is not applicable.

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emission is calculated according to the formula

$$BE_y = EG_y \times EF_y$$

Where:

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

EF_y = Emission factor calculated according to selected methodology

$$BE_y = 140{,}000 \frac{\text{MWh}}{\text{year}} \times 0.4616 \text{ tCO2/MWh}$$

$$BE_y = 64{,}624 \text{ tCO2/year}$$

4.2 Project Emissions

As per ACM0002 "Grid-connected electricity generation from renewable sources", v22.0[28], page 14,

[28] https://cdm.unfccc.int/UserManagement/FileStorage/R0IJ1X9LQ7W2GOYHSMBFCPE3VKZ685

"For most renewable power generation project activities, PEy = 0. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PEy = PEFF,y + PEGP,y + PEHP,y + PEBESS,y + PEPSP,y$$

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 geothermal power plants due to the release of non-condensable gases 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)

$PE_{BESS,y}$ = Project emissions from charging of a BESS using electricity from the grid or from fossil fuel electricity generators (t CO_2e/yr)

$PE_{PSP,y}$ = Project emissions from utilizing electricity from the grid for pumping operation of PSP in excess to the production of the renewable power plant operating in coordination with the PSP (t CO_2e/yr

- Since this project uses hydroelectric power, $PE_{GP,y}$ is "0" (t CO_2/yr).
- The only emission source in the plant is the diesel generator which is used as auxiliary power source when there is no electricity generation in the plant or supply by the grid. In urgent cases, a diesel powered generator will be operated for the daily consumption of personnel and the building, which is negligible. Project emissions are taken as zero. The same is also stated in para 30 of "ACM0002: Grid-connected electricity generation from renewable sources" ver 22. Hence it is neglected. Therefore; $PE_{FF,y}$ = 0 (t CO_2/yr).
- Since this project does not include BESS, $PE_{BESS,y}$ is "0" (t CO_2/yr).
- Since this project does not include PSP, $PE_{PSP,y}$ is "0" (t CO_2/yr).

Beside of the diesel generator, other potential project emission for this proposed project is $PE_{HP,y}$.

However, if the power density of the project activity is greater than 10 W/m^2 than $PE_{HP,y}$ = 0.

Therefore, as per ACM0002: Grid-connected electricity generation from renewable sources, v22.0;

The proposed project activity involves the generation of electricity by hydroelectric power plant therefore project activity does not result in greenhouse gas emissions. Power density of the projects higher than 10 W-m^2 for 49.110 MWe installed capacity and 2,827m^2 maximum lake area.

The power density of the project activity (PD) is calculated as follows:

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

Where:

PD = Power density of the project activity (W-m^2)

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 reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2)

A_{BL} = Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.

For proposed project HEPP,

Cap_{PJ} = 49,100,000 We

Cap_{BL} = 0.0 W

A_{PJ} = 2,827 (m^2)[29]

A_{BL} = 0.0 (m^2)

Therefore, PD is calculated as;

$$PD = \frac{49{,}100{,}000 - 0}{2{,}827 - 0}$$

$$PD = 17{,}368.23\ W - m^2$$

4.3 Leakage Emissions

The energy generating equipment is not transferred from or to another activity. Therefore, leakage is also considered as "0".

$$LE_y = 0$$

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

[29] Çırakdamı HEPP reservoir area, Annex 6 of registered PD

$$ER_y = BE_y - PE_y - LE_y$$

Where;

ER_y = Emission reductions in year y (tCO_2)

BE_y = Baseline emissions in year y (tCO_2)

PE_y = Project Emissions in year y (tCO_2)

LE_y = Leakage emissions in year y (tCO_2)

The project emissions and leakage are considered as "0". Thus, $ER_y = BE_y$

The project activity does not require a permanence risk assessment. Hence, the following table has been used.

Vintage period	Estimated baseline emissions (tCO_2e)	Estimated project emissions (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated reduction VCUs (tCO_2e)	Estimated removal VCUs (tCO_2e)	Estimated total VCUs (tCO_2e)
28-June-2022 to 31-December-2022	33,108	0	0	33,108	33,108	33,108
01-January-2023 to 31-December-2023	64,624	0	0	64,624	64,624	64,624
01-January-2024 to 31-December-2024	64,624	0	0	64,624	64,624	64,624
01-January-2025 to 31-December-2025	64,624	0	0	64,624	64,624	64,624

01-January-2026 to 31-December-2026	64,624	0	0	64,624	64,624	64,624
01-January-2027 to 31-December-2027	64,624	0	0	64,624	64,624	64,624
01-January-2028 to 31-December-2028	64,624	0	0	64,624	64,624	64,624
01-January-2029 to 31-December-2029	64,624	0	0	64,624	64,624	64,624
01-January-2030 to 31-December-2030	64,624	0	0	64,624	64,624	64,624
01-January-2031 to 31-December-2031	64,624	0	0	64,624	64,624	64,624
01-January-2032 to 27-June-2032	31,515	0	0	31,515	31,515	31,515
Total	**646,239**	**0**	**0**	**646,239**	**646,239**	**646,239**

For projects required to assess permanence risk, the following two table should be filled. Since this project does not require a permanence risk assessment. Hence, the following two tables has not been used, and not applicable for this project.

State the non-permanence risk rating (%)	*Example: 20%*
Has the non-permanence risk report been attached as either an appendix or a separate document?	☐ Yes ☐ No
For ARR and IFM projects with harvesting, state, in tCO2e, the Long-term Average (LTA).	
Has the LTA been updated based on monitored data, if applicable?	☐ Yes ☐ No If no, provide justification.
State, in tCO_2e, the expected total GHG benefit to date.	
Is the number of GHG credits issued below the LTA?	☐ Yes ☐ No If no, provide justification.

Vintage period	Estimated baseline emissions (tCO_2e)	Estimated project emissions (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated buffer pool allocation (tCO_2e)	Estimated reduction VCUs (tCO_2e)	Estimated removal VCUs (tCO_2e)	Estimated total VCU issuance (tCO_2e)
DD-MMM-YYYY to 31-Dec-YYYY	*Example: 50,000*	*Example: 20,000*	*Example: 10,000*	*Example: 4,000*	*Example: 8,000*	*Example: 8,000*	*Example: 16,000*
01-Jan-YYYY to 31-Dec-YYYY							
01-Jan-YYYY to DD-MMM-YYYY							
Total							

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,y}$
Data unit	tCO_2/MWh
Description	CO_2 emission factor of the grid electricity in year y
Source of data	Combined margin emission factor calculated by Turkey Ministry of Energy and Natural Resources[30]
Value applied	0.4616
Justification of choice of data or description of measurement methods and procedures applied	"Tool to calculate the emission factor for an electricity system", version 07.0[31].
Purpose of Data	Baseline emission calculation
Comments	$EF_{grid,CMy}$ value (0.4616 tCO_2/MWh) is valid for the duration of the crediting period.

5.2 Data and Parameters Monitored

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

[31] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

Data / Parameter	EG_y
Data unit	MWh
Description	Quantity of net electricity generation per year supplied by the project plant to the grid in this crediting period
Source of data	Electricity Meters
Description of measurement methods and procedures to be applied	Data is measured directly from meters and records on TEİAŞ readings protocol papers.
Frequency of monitoring/recording	Annually
Value monitored	140,000 MWh
Monitoring equipment	Data is monitored continuously by redundant metering devices. The recording meter is in compliance with the communiqué for Metering Devices to be used in the Electricity Market. By regulation, the accuracy class is 0.5%The two electricity metering devices were replaced with new ones on 19/11/2020 as the previous ones reached their end of validity period of 10 years. The electricity meters used till 19/11/2020 are: Main Electricity Meter: Actaris,Serial Number: 53077777 Back-up Electricity Meter: Actaris-Serial Number: 53077778 Both meters are in compliance with the communiqué for Metering Devices to be used in the Electricity Market[8]. They have an accuracy class of Class 002 indicating an accuracy range of 0,5%. The electricity meters used after 19/11/2020 are: Main Electricity Meter: EMH-Serial Number: 9798711 Back-up Electricity Meter: EMH-Serial Number: 9798712 Both meters are in compliance with the communiqué for Metering Devices to be used in the Electricity Market[8]. They have an accuracy class of Class 005 indicating an accuracy range of 0,5%.
QA/QC procedures to be applied	There are two meters that backup each other. Generated electricity is also monitored via the operator by the help of EPİAŞ trading software for internal monitoring.

The Calibration dates of the meters and their validity is as follows:

	Main Meter (Replaced on 19/11/2020)	Spare Meter (Replaced on 19/11/2020)	Main Meter	Spare Meter
Serial no.	53077779	53077780	9798711	9798712
Brand-(Type)	Actaris (SL761B071)	Actaris (SL761B071)	EMH-(LZQJ-XC)	EMH-(LZQJ-XC)
Next Calibration date	-	-	19/11/2030[32]	19/11/2030[33]
Calibration frequency			10 years	10 years
Test Date			19/11/2022	19/11/2022
Test frequency			2 years	2 years
Class	0.5S	0.5S	0.5S	0.5S

Purpose of the data	Data to be used for the calculation of Baseline Emissions.
Calculation method	Direct Continuous Measurement
Comments	The collected data is kept by Aydem Yenilenebilir Enerji AS. During the crediting period and until two years after the last issuance of VERs for the "Çırakdamı Hydroelectricity Power Plant" project activity for that crediting period.

Data - Parameter	Cap_{PJ}
Data unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity

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

Source of data	Project site computers with SCADA system and the turbine name plates.
Description of measurement methods and procedures to be applied	Observed via the SCADA system of the project activity.
Frequency of monitoring-recording	Once for each monitoring period
Value monitored	49,100,000 W
Monitoring equipment	SCADA System of the Project activity
QA-QC procedures to be applied	Turbine labels checked with SCADA System reading.
Purpose of the data	To monitor capacity of the project
Calculation method	N-A
Comments	

Data / Parameter	AP_J
Data unit	m^2
Description	Area of the reservoir measured in the surface of the water, after the implementation of the Project Activity, when the reservoir is at its maximum fullness.
Measured/Calculated /Default	Indirectly measured based on the reservoir area map provided in Appendix-3.
Source of data	Surface area determined using the lake surface area map provided in Appendix-3.
Description of measurement methods and procedures to be applied	The reservoir area corresponding to maximum operational level has been determined via the topographic satellite images showing the lake area, presented in Appendix-2.
Frequency of monitoring/recording	Once during each monitoring period
Value applied	2,827 m^2
Monitoring equipment	-
QA/QC procedures to be applied	The value was checked and compared to satellite imagery available by Google Earth.
Purpose of the data	Data to be used for the calculation of Baseline Emissions.
Calculation method	N/A
Any comment	-

5.3 Monitoring Plan

Objectives of the monitoring program

The Monitoring plan is developed to ensure that the Project Activity is well organized from the start in terms of the collection and archiving of complete and reliable data that is needed to ensure reliable and accurate measurements of actual emission reductions.

Data to be monitored

Given that the emission factor is calculated on an ex-ante basis, the first data to be monitored is the net electricity supplied to the grid.

The second data to be monitored is the installed capacity of the Project Activity. Using the SCADA system installed capacity was measured automatically.

The third data to be monitored is the reservoir area of the Project Activity. The reservoir area corresponding to maximum operational level has been determined as a certain value according to the topographical maps. In order to make verification of the reservoir area, the reservoir lake was compared to the reservoir area map, presented in Appendix 2.

The electricity produced is sold to TEİAŞ. Therefore, TEİAŞ measures the electricity produced by two meters placed on the switchgear station where the power plant gets connected to the Turkish national grid. Those meters provide official data which is read and recorded monthly by TEİAŞ officers for invoicing. TEİAŞ also conducts the calibration and maintenance of these meters and thus, ensures the accuracy and quality of the measurements. The quality standards that the meters need to comply is "The ICE/TSE 62053-22: Electricity metering equipment (a.c) – Particular requirements - Part 22: Static meters for active energy (Classes 0.2 S and 0.5 S)" The calibration of the meters is done every ten years and the test of electricity meters are performed every two years. If the meters exhibit any error or fault during the test, the electricity meters would be calibrated or replaced with the new ones. The meters are checked continuously if there is a difference of 0.2 % in the readings of the main and the auxiliary meters, the calibration is repeated. For Cirakdami HEPP, the next calibration date of electricity meters is recorded as 19/11/2030.

The net electricity produced is calculated by subtracting the total electricity consumed by the hydroelectric power plant, from the gross electricity generation and a certain percentage is lost during the transmission. After obtaining the net electricity production value, the emission reductions are calculated by multiplying the net electricity with the Combined Margin calculated above.

The monitoring is conducted by the Verified Emission Reduction (VER) Monitoring Team. The VER Team Members, and their position and duties for the monitoring is outlined in the following table.

Table 5. Positions and responsibilities of the VER monitoring team members

Position	Responsibility
Çırakdamı HEPP Manager	Day to day operation of the Cirakdami HEPP, Compliance of the project activity with the host country rules and regulations Coordination of the data collection and recording for the VCS monitoring report.
Chief Electrical Engineer	Day to day follow up of electrical equipment Recording and monitoring of the electricity generation data
Accounts Manager	Data keeping for power sales Data entry to EPİAŞ system
Chief Mechanical Engineer	Day to day operation of the power plant Keeping records of malfunctions and repairs
Carbon Consultant	Emission reduction calculations Scripting of the periodic monitoring report Follow up of the verification process

The power generation meter readings were performed by using the main metering devices and the auxiliary metering devices for accuracy checks only. Data from metering devices is recorded by TEİAŞ on monthly agreed protocols and form the basis for invoicing. In addition to the readings of the two metering devices, generation data of the Cirakdami HEPP can be cross checked, via the TEİAŞ – EPİAŞ web site (https://seffaflik.epias.com.tr/transparency/) which is accessible by a password available to the electricity generation companies. The electricity generation data at the Market Financial Reconciliation Centre (MFRC/EPİAŞ) web page exhibits the net electricity generated less transmission loss, to be able to produce comparable numbers, the figures taken from EPİAŞ web site needs to be multiplied by the transmission loss factor of the grid.

The two electricity metering devices were replaced with new ones on 19/11/2020 as the previous ones reached their end of validity period of 10 years.

Meter	Serial Number	Brand	Calibration Year	Valid Until	Accuracy Class
Main Meter (old)	53077777	ACTARIS	2010	2020	0.5S (+-%1)
Control Meter (old)	53077778	ACTARIS	2010	2020	0.5S (+-%1)

Main Meter (current)	9798711	EMH	2020	2030	0.5S (+-%1)
Control Meter (current)	9798712	EMH	2020	2030	0.5S (+-%1)

The project boundary can be seen in the figure below.

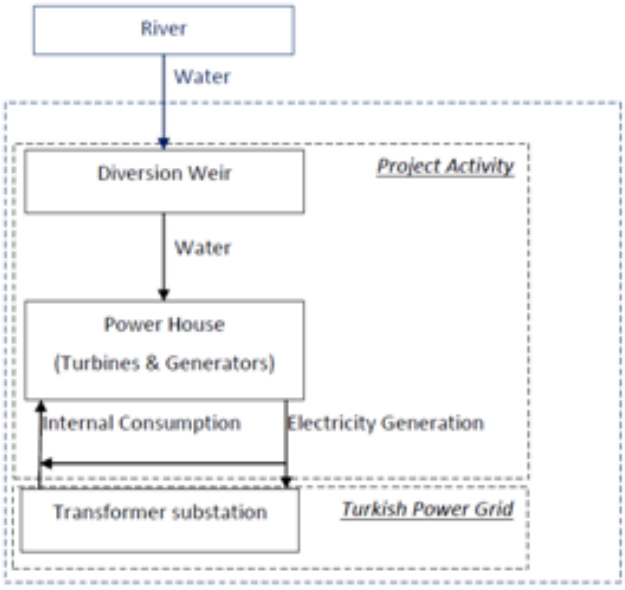

Figure 9. Project boundary

The single line diagram of the project activity has been given in the figure below.

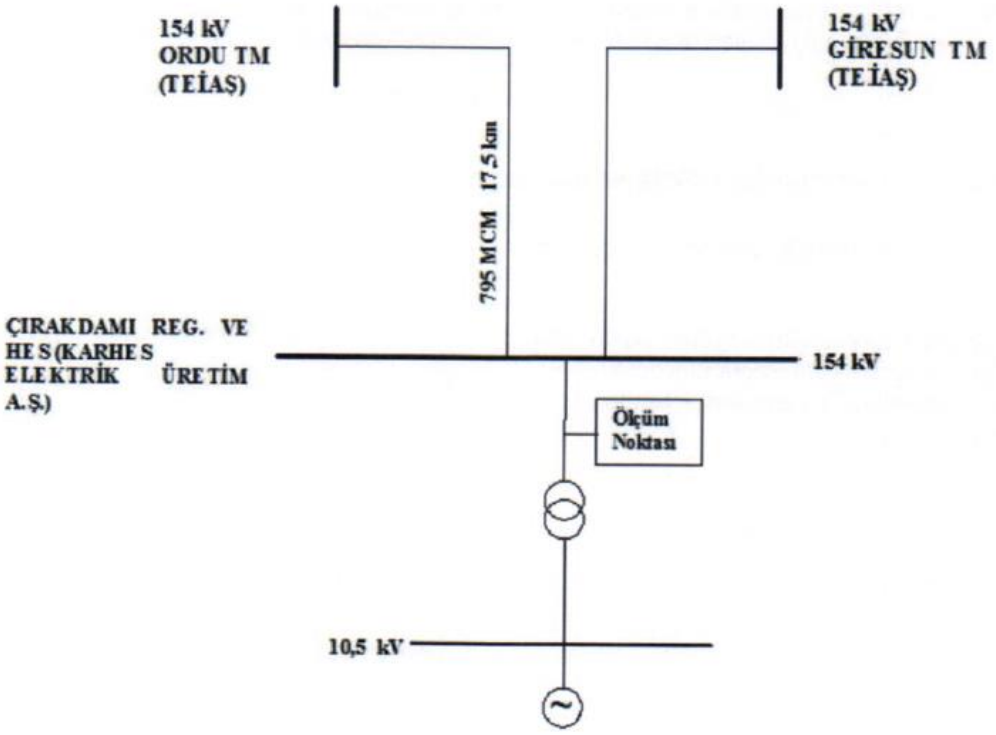

Figure 10. Single line diagram of the project activity

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

There is no commercially sensitive information about the project activity. Hence, this section is not applicable.

Section	Information	Justification

APPENDIX 2: THE LEGAL FRAMEWORK OF THE HOST COUNTRY THAT BINDS THE PROJECT

The Environmental Law (No. 2872), which was published in Turkish Official Gazette No. 18132 dated August 11, 1983 and revised in Turkish Official Gazette No. 26167 dated May 13, 2006 (Law No.

5491) provides the legislative framework for the regulation of industries and their potential impact on the environment. Industrial projects are subject to varying levels of review that begin while projects are in the development and pre-operation phases. Additional regulations apply to facilities once they are in operation.

The Environmental Law authorized the promulgation of a number of regulations. Those that pertain to development and operation of renewable energy projects are the following:

- Environmental Impact Assessment Regulation, Official Gazette No. 26939 dated July 17, 2008.
- Water Pollution Control Regulation, Official Gazette No. 25687 dated December 31, 2004 and revised in Official Gazette No. 26786 dated February 13, 2008;
- Regulation on Construction of Cesspits where there is no Wastewater Collection System, Official Gazette No. 13783 dated March 13, 1971;
- Hazardous Chemicals Regulation, Official Gazette No.21634 dated July 11, 1993 and revised in Official Gazette No. 27092 dated December 26, 2008;
- Regulation on General Principles of Waste Management, Official Gazette No. 26927 dated July 5, 2008;
- Hazardous Wastes Control Regulation, Official Gazette No. 25755 dated March 14, 2005;
- Waste Oil Control Regulation, Official Gazette No. 26952 dated July 30, 2008 and revised Official Gazette No. 27304 dated July 31, 2009;

- Vegetative Waste Oil Control Regulation, Official Gazette No. 25791 dated April 19, 2005; and revised Official Gazette No. 27305 dated July 31, 2009
- Solid Waste Control Regulation, Official Gazette No. 20814 dated March 14, 1991 and revised in Official Gazette No. 25777 dated April 5, 2005;
- Medical Waste Control Regulation, Official Gazette No. 25883 dated July 22, 2005;
- Environmental Audit Regulation, Official Gazette No. 27061 dated November 21, 2008;
- Packaging Waste Control Regulation, Official Gazette No. 26562 dated June 24, 2007 and revised in Official Gazette No. 27046 dated November 6, 2008; and
- Waste Batteries and Accumulators Control Regulation, Official Gazette No. 25569 dated August 31, 2004 and revised in Official Gazette No. 25744 dated March 03, 2005;
- The Excavation, Construction and Demolition Waste Control Regulation, Official Gazette No. 25406 dated March 18, 2004;
- Soil Pollution Control Regulation, Official Gazette No. 25831 dated May 31, 2005;
- Regulation Related to Workplace Opening and Operation Permits, Official Gazette No. 25902 dated August 10, 2005 and revised in Official Gazette No. 26492 dated April 13, 2007;
- Industrial Air Pollution Control Regulation, Official Gazette No.27277 dated July 3, 2009
- Air Quality Assessment and Management Regulation, Official Gazette No. 26898 dated June 6, 2008 and revised in Official Gazette No. 27219 and dated May 5, 2009;
- Air Pollution Control Regulation For Heating Sources, Official Gazette No. 25699 dated January 13, 2005 and revised in Official Gazette No. 27134 dated February 07, 2009;
- Exhaust Gases Emission Control Regulation, Official Gazette No. 27190 dated April 04, 2009; and
- Regulation on Protection of Wetlands, Official Gazette No. 25818 dated May 17, 2005.

In addition to the Environmental Law and its associated regulations, there are several other laws that directly or indirectly include environmental review, and thus, are applicable to the proposed project. The project complies with the 4857 numbered Labour Law and its regulations stated below:

- Health and Safety Regulation for Construction Works, Official Gazette No. 25325 dated December 23, 2003;
- Regulation on Health and Safety Regarding Temporary Works, Official Gazette No. 25463 dated May 15, 2004.

Other regulations that the project complies with can be listed as follows:

- 5346 numbered Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy;
- Regulation on Protection and Usage of Agricultural Lands, Official Gazette No. 25766 dated March 25, 2005;
- 2863 numbered Law on Protection of Cultural and Natural Heritage (revised by 5226 numbered Law);
- 4342 numbered Pasture Law;
- 6831 numbered Forestry Law (amended by 5192 numbered Revision in Forestry Law); Regulation on Buildings located on the Disaster Areas, Official Gazette No. 26582 dated July 14, 2007.

APPENDIX 3: RESERVOIR AREA

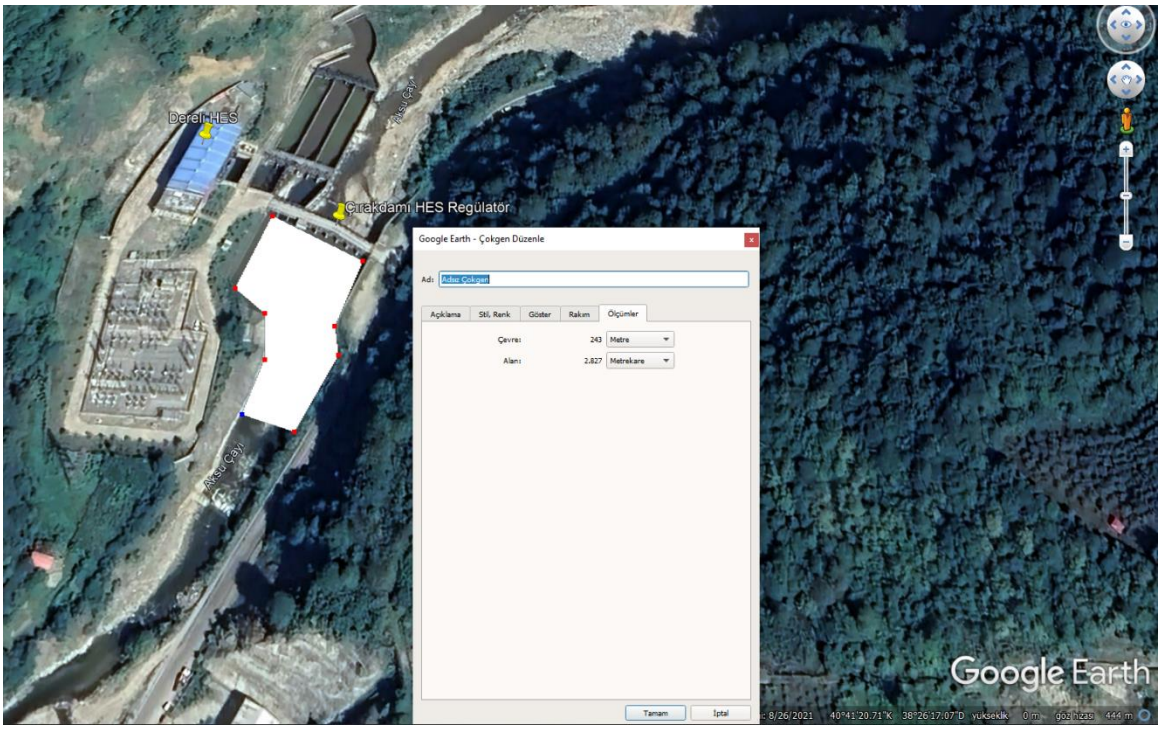

Figure 11. The reservoir area of Çırakdamı HEPP