



**Verified Carbon
Standard**

THE THIRD MONITORING REPORT

KEPEZKAYA HYDROELECTRIC POWER PLANT PROJECT

Document Prepared by SEEM TURKEY

Project Title	<i>Kepezkaya Hydroelectric Power Plant Project</i>
Version	3
Report ID	KPZMONITORING3
Date of Issue	19 January 2022
Project ID	954
Monitoring Period	01 March 2018 to 30 September 2020
Prepared By	SEEM Danışmanlık Ltd Şti
Contact	Buyaka Kule 2, No:8/C Blok Kat:16 34771 Ümraniye İstanbul +90 216 266 5844 info@seemturkey.com

CONTENTS

1	PROJECT DETAILS.....	4
1.1	SUMMARY DESCRIPTION OF THE IMPLEMENTATION STATUS OF THE PROJECT	4
1.2	SECTORAL SCOPE AND PROJECT TYPE	6
1.3	PROJECT PROPONENT.....	6
1.4	OTHER ENTITIES INVOLVED IN THE PROJECT	7
1.5	PROJECT START DATE	7
1.6	PROJECT CREDITING PERIOD.....	7
1.7	PROJECT LOCATION	7
1.8	TITLE AND REFERENCE OF METHODOLOGY	8
1.9	PARTICIPATION UNDER OTHER GHG PROGRAMS	8
1.10	OTHER FORMS OF CREDIT	8
1.11	SUSTAINABLE DEVELOPMENT	8
2	SAFEGUARDS	9
2.3	AFOLU-SPECIFIC SAFEGUARDS	13
3	IMPLEMENTATION STATUS	13
3.1	IMPLEMENTATION STATUS OF THE PROJECT ACTIVITY.....	13
3.2	DEVIATIONS.....	13
3.3	GROUPED PROJECTS.....	13
4	DATA AND PARAMETERS.....	13
4.1	DATA AND PARAMETERS AVAILABLE AT VALIDATION.....	13
4.2	DATA AND PARAMETERS MONITORED	17
4.3	MONITORING PLAN	26
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	28

5.1	BASELINE EMISSIONS.....	28
5.2	PROJECT EMISSIONS	31
5.3	LEAKAGE.....	31
5.4	NET GHG EMISSION REDUCTIONS AND REMOVALS.....	31

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Kepezkaya Hydroelectric Power Plant, Karaman is located on the Göksu River in the Eastern Mediterranean region of Turkey. The Project is being used only for energy generation purposes. It has an Energy Generation License for 48 years and two and half months obtained from Energy Market Regulatory Authority (EMRA) in 2007.

The Project Activity is a run-of-river type composed of a weir, water intake structures, 3 610 m long conveyance tunnel, a head pond, penstocks, and a powerhouse equipped with 28.00 MWe installed capacity turbines other facilities.

As was also explained in the DSI approved project feasibility study report, the Project Activity is a part of the Konya-Çumra 3rd Stage Irrigation Plan of DSI. At the upstream basin of the Kepezkaya HPP, a large-scale irrigation project was conducted by the General Directorate of State Hydraulic Works (DSI). Within the scope of this irrigation project at the upper elevation of 1,000 m of Göksu basin three dams: Namely Bağbaşı, Afşar, and Bozkır dams.

The purpose of the Kepezkaya HPP is to utilize the hydropower potential of the Göksu river to generate electricity based on a renewable resource and thus generate Verified Emission Reductions (VERs), displacing electricity generation from grid-connected fossil fuel-fired power plants.

The expected annual energy generation is 107,587 MWh, and the estimated amount of GHG emission reduction is 61,443 tonnes CO₂e per year in the registered PDD. During this third monitoring period (01/03/2018-30/09/2020), 263,557.79 MWh net electricity was generated. Based on this net electricity generation, at the third monitoring period, 150,518 tCO₂ was reduced.

The Project has produced positive environmental benefits as displacing the electricity generated by fossil fuel-fired power plants by utilizing renewable resources to avoid environmental pollution and GHG emissions.

The Project Activity is a run-of-river type hydropower plant with a total installed capacity of 28 MW (2 x 14.00 MW). A concrete gravity weir diverts water into the conveyance tunnel with 40 m³/s flow rate capacity. A net water head of 81.57 m (gross head 87.88 m) is formed, and water is discharged into two vertical Francis turbines. A 30 km 33 kV transmission line interconnects to the national grid at the Kepezkaya Basin Transformer Substation. Figure 1 summarizes how the project activity will be operating and what needs to be considered within the physical project boundary. The project boundary may be seen in Figure 1.1.

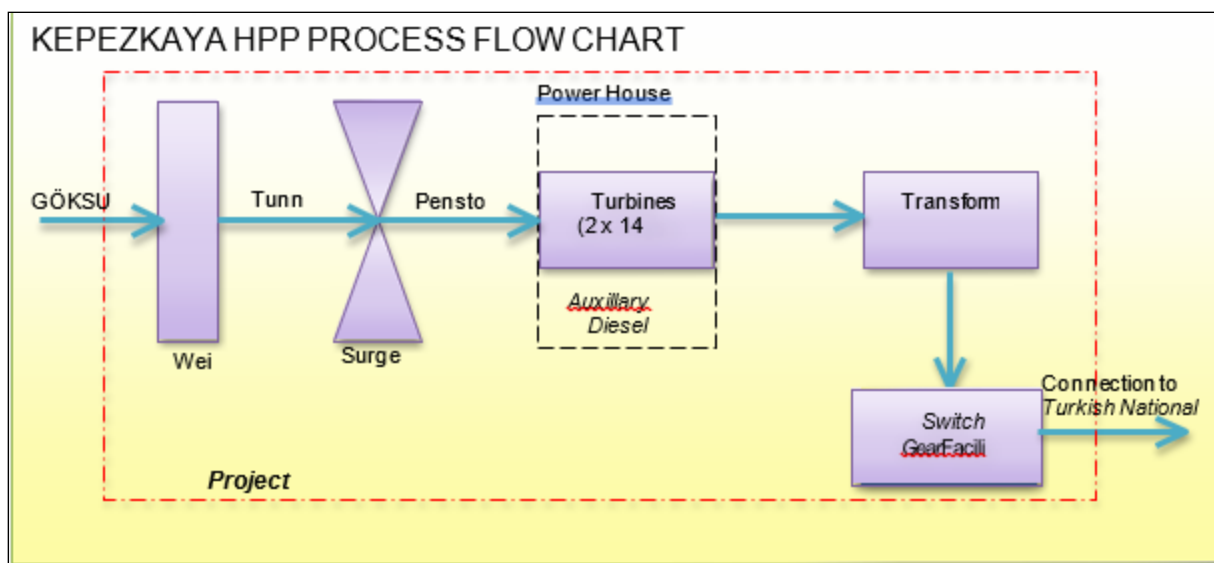


Figure 1.1: The project boundary of Kepezkaya Hydroelectric Power Plant

The project timeline is presented in Table 1.1.

Table 1.1: Project timeline

Date	Milestone
12/09/2006	Correspondences start to seek consultancy to develop Carbon asset of the Project
15/11/2006	A proposal was taken from E&C Services GmbH Germany to develop the projects in the pipeline of the mother company
5/07/2007	EMRA granted Electricity Production License to Selen Elektrik Üretim A.Ş.
13/07/2007	EIA not Needed Certificate Issued by MoEF Karaman Province Representation
28/01/2008	Turnkey Engineering Procurement and Construction Contract Signed between Selen Elektrik Uretim A.S. and IC İçtaş İnşaat
06/02/2008	Loan Agreement Signed
18/03/2008	Construction start Date
02/04/2008	The project Owner was granted the Ultimate Forestry Permit to operate within the jurisdictions of the forestry authorities' lands

15/04/2008	Electromechanical equipment procurement agreement was signed between IC İçtaş (as the Turnkey EPC Contractor) and Harbin electric Co.
01/07/2008	Feasibility study Report Finalized
22/09/2008	DSI Approval for the Feasibility Study
23/01/2009	Water Usage Agreement Signed between Selen and DSI
07/10/2009	TEIAS Connection Agreement Signed
06/09/2010	Government officials approved the Project to be suitable to be connected to the grid
01/10/2010	First Date Electricity is supplied to the grid (crediting period start date)
01/10/2010	Start date of the first monitoring period
31/08/2012	End date of the first monitoring period
01/09/2012	Start date of the second monitoring period
28/02/2018	End date of the second monitoring period
01/03/2018	Start date of the third monitoring period
30/09/2020	End date of the third monitoring period
30/09/2020	End date of the first crediting period

1.2 Sectoral Scope and Project Type

According to UNFCCC sectoral scope definition for CDM projects, the Project Activity is included in the Sectoral Scope 1, category “Energy industries (renewable - / nonrenewable sources).” The Project is a single greenfield investment and is not part of a project group or bundle.

1.3 Project Proponent

Organization name	Entek Elektrik Üretim A.Ş.
Contact person	Serkan Dünder

Title	<i>Trade Manager</i>
Address	<i>Köseköy Mah. Yeni Demiryolu Cad. No:70 41250 Kartepe/Kocaeli</i>
Telephone	<i>+90 216 217 11 90</i>
Email	<i>serkan.dundar@entekelektrik.com.tr</i>

1.4 Other Entities Involved in the Project

Organization name	<i>SEEM Danışmanlık Ltd Şti</i>
Role in the Project	<i>Project Consultant</i>
Contact person	<i>Işıl Timuroğlu</i>
Title	<i>Co-founder</i>
Address	<i>Buyaka Kule 2, No:8/C Blok Kat:16 34771 Ümraniye İstanbul</i>
Telephone	<i>+90 216 266 5844</i>
Email	<i>i.timuroglu@seemturkey.com</i>

1.5 Project Start Date

The project start date is 01/10/2010.

1.6 Project Crediting Period

Project's first crediting period is ten years and renewable twice. The first crediting period starts on 01/10/2010 and ends on 30/09/2020 (both days are included).

1.7 Project Location

The Project is located on the Göksu River in the Eastern Mediterranean region of Turkey, within the Karaman city borders. The power-house is located between the elevations of 682 m and 483 between 36°57'14.99" north and 33°00'28.34" east latitudes. ¹.

¹ Information is taken from the latest monitoring report.



Figure 1.2: Map showing the location of Kepezkaya HEPP on the Göksu River, Karaman, Turkey

1.8 Title and Reference of Methodology

Approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 13.0.0)” is used. This approved methodology refers to the following tools:

- “Tool for the demonstration and assessment of additionality” (Version 06)
- “Tool to calculate the emission factor for an electricity system” (Version 02.2.1)
- “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (Version 02).

1.9 Participation under other GHG Programs

The Project has never been included in an emissions trading program or any other binding limits. It has neither received any kind of environmental credits nor been registered under any other GHG programs.

1.10 Other Forms of Credit

The Project has never been included in an emissions trading program or any other binding limits. It has neither received any kind of environmental credits nor been registered under any other GHG programs.

1.11 Sustainable Development

The Project produces electricity from renewable energy sources using hydro as the power source and contributes to Turkey's growing electricity demand through sustainable and low carbon technology. The Project displaces the same amount of electricity generated by the grid dominated by fossil-fired power plants During this third monitoring period (01/03/2018-

30/09/2020), 263,557.79 MWh net electricity was generated. The Project contributes to SDG7 Affordable and Clean Energy.

Based on this net electricity generation, at the third monitoring period, 150,518 tCO₂ was reduced at this third monitoring period. The Project contributes to improve the environmental situation in the region and the country as avoiding fossil fuel-based electricity will enhance the air quality and help to reduce the adverse effects on the climate. Through renewable technologies and hydro-based electricity, sustainable and climate-friendly development is promoted. The Project contributes to SDG13 Climate Action. While the Project reduces emissions, technology transfer is also realized as benefitting from hydropower.

During the construction and operational period, the Project has created employment opportunities for the local community. The Project contributes to the economic development of the region by providing sustainable energy resources. The Project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments. Thus, the Project contributes to SDG8 Decent Work and Economic Growth.

2 SAFEGUARDS

2.1 No Net Harm

The Project does not cause any negative environmental or socio-economic impact. Under the following sub-sections, each indicator is analyzed².

Noise

The noise levels on Kepezkaya Regulator site, tunneling system and HES site, could have a negative impact on residents. The day and night time modeled noise levels around the nearest residential areas are within the standards of the "Day and night noise limits for Rural Areas and Settlement Areas" in accordance with Article 25 of the Regulations for Evaluation and Management of Environmental Noise announced in the Official Gazette No. 25862 on 01.07.2005.

Waste Management

² The following sub-section is taken from the second monitoring report. It is verified by the DOE at the second monitoring period.

Wastewater produced by employees is collected in an impermeable septic tank and later, they are periodically transferred to the wastewater treatment plant³.

Regarding the hazardous waste, the lubricant oil is transferred and disposed of in line with the regulations.

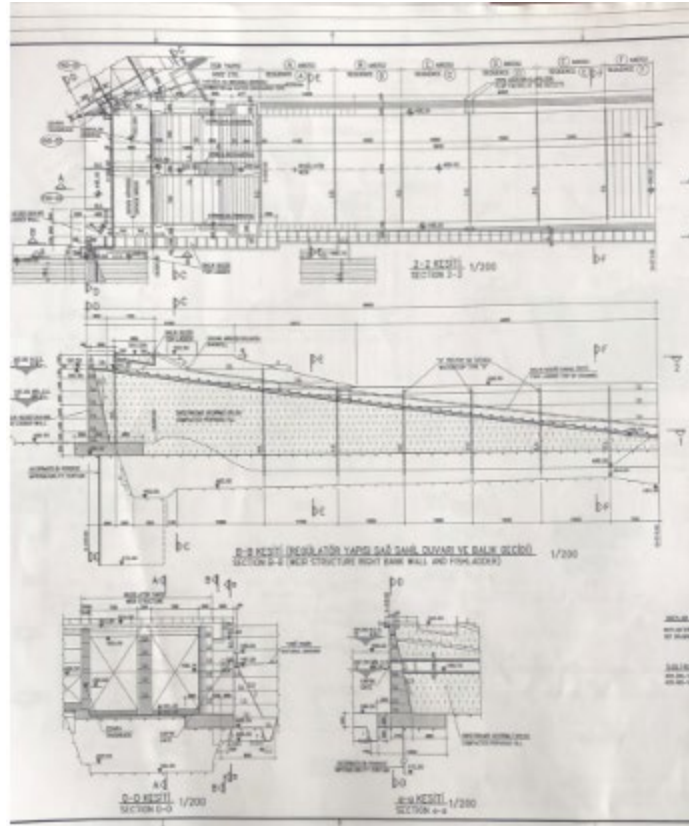
Water flow

The Project does not have a negative impact on water quality. The regulator is a small reservoir that is enough to retain water for only a few hours. In addition, all vegetation was cleared prior to flooding the area. Therefore, anaerobic conditions and decomposition are not expected to form and will not affect water quality and composition or encourage methane production. A fish passage for fish species has been as the project design and the photo of the passage may be seen in Figure 2.1. A specially designed fish ladder allows fish to swim upstream and over the dam. Thus, the Project will not produce any air or water pollution to the surrounding environment.



Figure 2.1: Fish Passage

³ The record belong to this monitoring period is submitted to the DOE.



stakeholders were identified and notified about the event. For the participation of officials, phone calls were made to the Karaman Governorship, Provincial Environment and Forestry Directorship (of which 2 persons attended), and the Karaman Mayoralty (The mayor himself could not attend the meeting. However, a separate meeting with him was conducted after the stakeholders meeting). For the participation of the locals, a fax notification and personal invitations were sent to the Mukhtar's (village mayor) offices of Damlapınar, Güzer, Çukurköy and Buçakkışla villages inviting them and the residents of their villages. In addition, the event was advertised in both a regional and a national newspaper, calling for stakeholders to attend the meeting. The ads were published in the Anadolu Manşet Gazette (regional), and the Türkiye Gazette (national).

42 people attended (participant information is available), and the meeting included a presentation, a dialog session, and a personal questionnaire. An informational brochure (can be provided) summarizing all the information presented was handed to all participants with contact information of a representative for any further questions and clarifications. The presentation included:

1. General principals of run-of-river type hydro plants.
2. The specific technical details of the proposed Project, including information and location of each component, shown on a topographic map.
3. Environmental impact assessment of the Project.

The local villagers asked about employment possibilities. The Owner promised that when hiring unskilled workers during the construction and operation of the project activity, priority was given to the local villagers.

There was no specific environmental problem that concerned the locals more than others, and environmental issues need to be solved by the government. All people considered clear signs of climate change in the region in recent years.

The contact information of the plant responsible exist at the Mukhtar, the project owner and local community are always in touch. The project owner regularly checks with the Mukhtar if any complaint or a request exists. Any complaint or need from the local community could directly be received by the project owner and appropriate contributions or improvements are made to the local community. The signed letter (dated on 13.01.2020) by Mukhtar, which indicates that contact information of the plant responsible is available to them has been provided to the DOE. During the monitoring period, there hasn't been any complaint⁴.

There is no update or any change to the project design after the registration of the Project.

⁴ This letter was validated during the second monitoring period. The letter as well as the contact information of the Muhtar is provided to the DOE during this monitoring period (3rd).

2.3 AFOLU-Specific Safeguards

N/A

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The Project became operational on 01/10/2010 (project start date). So far, there have been no events that may impact the GHG emission reductions or removals and monitoring. The description of the implementation and operational status of the Project and the installed technology(ies), technical process and equipment are detailed in Section 1.1.

The shareholder structure was changed on 10/04/2015 and the Project has been transferred to Entek Elektrik Üretim A.Ş. The sole Project Proponent is Entek Elektrik Üretim A.Ş.

3.2 Deviations

2.3.1 Methodology Deviations

There are no methodology deviations applied during this monitoring period.

2.3.2 Project Description Deviations

There are no project description deviations applied during this monitoring period.

3.3 Grouped Projects

It is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	FCi,y
Data unit	Volume Unit (cubic meter)
Description	Amount of fuel i consumed by relevant power plants in Turkey in years, 2008, 2009, 2010.

Source of data	Official publications at the Turkish Electricity Transmission Company (TEİAŞ) Web Site https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri
Value applied	Detailed in Annex 2 in the PDD
Justification of choice of data or description of measurement methods and procedures applied	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to date and reliable data available for the Turkish grid
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	NCVi,y
Data unit	GJ/Mass or Volume Unit
Description	Net Calorific Values for fossil fuel type i in year, for the years 2008, 2009 and 2010
Source of data	Regional or national average default values that are reliable and documented in national energy statistics of the Turkish Electricity Transmission Company Web Site https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri
Value applied	Detailed in Annex 2 in the PDD
Justification of choice of data or description of measurement methods and procedures applied	<i>Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to date and reliable data available for the Turkish grid.</i>
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	EFCO ₂ ,i,y
Data unit	tCO ₂ /GJ
Description	CO ₂ emission factor of fossil fuel type i in year y
Source of data	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied	Detailed in Annex 2 in the PDD

Justification of choice of data or description of measurement methods and procedures applied	According to the “Tool to calculate the emission factor for an electricity system” version 02.2.1, if values provided by the fuel supplier of the power plants in invoices or regional or national average defaults values are not available the IPCC default values at the lower limit of uncertainty must be used
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	EGy
Data unit	MWh
Description	Net electricity generated in the project electricity system in other words, net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants /units, in year y
Source of data	Turkish Electricity Transmission Company Web Site https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri
Value applied	Detailed in Annex 2 in the PDD
Justification of choice of data or description of measurement methods and procedures applied	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to-date and reliable data available for the Turkish grid.
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	EG _{m,y}
Data unit	MWh
Description	Net electricity generated and delivered to the grid by power unit m in
Source of data	Turkish Electricity Transmission Company Web Site (www.teias.gov.tr). Data is extracted from the relevant annexes of the capacity projection reports for the years 2009 and 2010. The reports are now available through the website of EPDK: https://www.epdk.org.tr/Detay/Icerik/3-0-66/elektrikuretim-kapasite-projeksiyonlari

	The projects that are listed in Gold Standard Registry, VCS project Database, and Blue Registry (VER+ Standard) are deducted
Value applied	Detailed in Annex 2 in the PDD
Justification of choice of data or description of measurement methods and procedures applied	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to-date and reliable data available for the Turkish grid.
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	$n_{m,y}$
Data unit	-
Description	Specific electrical efficiency for all relevant energy sources (natural gas, lignite, coal/anthracite, fuel/motor oil)
Source of data	1. Turkish Electricity Transmission Company (TEİAŞ), http://www.teias.gov.tr 2. European Commission Report (July 2006): Integrated Pollution Prevention and Control (IPPC) - Best Available Techniques for Large Combustion Plants. 3. German Federal Environmental Agency (UBA).
Value applied	Please see Table 14 in the PDD.
Justification of choice of data or description of measurement methods and procedures applied	As no plant specific efficiency data is available, average numbers were calculated with the help of statistical data from TEİAŞ.
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	$NCV_{i,y}$
Data unit	GJ/Mass or Volume Unit
Description	Weighted average net calorific value of fuel type i in year y
Source of data	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied	43.3 GJ/ton

Justification of choice of data or description of measurement methods and procedures applied	Default IPCC value is used. Any future revision of the IPCC Guidelines will be taken into account.
Purpose of Data	Data will be used for potential Project Emission Calculations. The project emissions are those that are related to the burning of the diesel (fossil fuel) in the auxiliary power generators that produce electricity in the absence of the electricity obtained from the grid for self-consumption.
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	EGPP-self consumption, y					
Data unit	MWh					
Description	Quantity of electricity imported by the power plant from the grid for self-consumption, in year y					
Source of data	The primary source is the Meter Reading Forms. The data is crosschecked with EPIAS records. EPIAS is the financial settlement center of TEIAS (the national grid operator). The Meter Reading Forms are filled by the project owner and approved by the governmental officers. Additionally, the remote reading by the governmental body is also available.					
Description of measurement methods and procedures to be applied	Measurements are to be made by electricity meters that belong to the grid operator TEİAŞ. The meters are in compliance with the collected data. Data will be used to calculate the net electricity supplied to the grid.					
Frequency of monitoring/recording	Recorded continuously, reported monthly on TEIAS Meter Reading Protocols, Reported annually on the VCS Monitoring Report.					
Value monitored	01/03/2018 – 31/12/2018 : 213.72 MWh 01/01/2019 – 31/12/2019 : 263.87 MWh 01/01/2020 – 30/09/2020 : 216.02 MWh					
Monitoring equipment	Old Power Meters: Unit 1: <table><tr><td></td><td>Main Meter</td><td>Spare Meter</td></tr></table>				Main Meter	Spare Meter
	Main Meter	Spare Meter				

Description	Bi-directional electricity meter in compliance with TS-620 EN 60044-1 and TS718 IEC60044.2 standards	
Location	TEIAS Meters located at Kepezkaya Basin Transformer Station	
Brand	ELSTER	ELSTER
Serial Number	00401726	00484319

Unit 2

	Main Meter	Spare Meter
Description	Bi-directional electricity meter in compliance with TS-620 EN 60044-1 and TS718 IEC60044.2 standards	
Location	TEIAS Meters located at Kepezkaya Basin Transformer Station	
Brand	ELSTER	ELSTER
Serial Number	00401723	00401724

New Power meters:

Unit 1:

	Main Meter	Back-up Meter
Description	Bi-directional electricity meter in compliance with TS-620 EN 60044-1 and TS718 IEC60044.2 standards	
Location	TEIAS Meters located at Kepezkaya Basin Transformer Station	
Brand	ITRON	ITRON
Serial Number	84260262	84260263

Unit 2:

	Main Meter	Back-up Meter
--	------------	---------------

	Description	Bi-directional electricity meter in compliance with TS-620 EN 60044-1 and TS718 IEC60044.2 standards	
	Location	TEIAS Meters located at Kepezkaya Basin Transformer Station	
	Brand	ITRON	ITRON
	Serial Number	84260264	84260265
QA/QC procedures to be applied	- A back-up meter is used for crosschecking the accuracy and both meters are calibrated if required. - The Meter Reading Forms are considered as the main source for the net electricity and the values are crosschecked with the EPIAS records. - TEIAS is responsible for calibration and maintenance of the devices. The periodic calibration or maintenance is under the responsibility of TEIAS and has been fixed as once in 10 years⁵. Since TEİAŞ meters are sealed by TEİAŞ, the project proponent cannot intervene with the devices. The periodic tests are executed on annual basis. The power meters were changed on 23.07.2019⁶. The meter tests conducted are summarized below: 06/08/2018: Meter tests were conducted to the previous metering devices that has the serial number of: 00401726, 00484319, 00401723, 00401724. 23/07/2019: Meter tests were conducted to the new metering devices that has the serial number of: 84260262, 84260263, 84260264, 84260265 19/08/2020: Meter tests were conducted to the new metering devices that has the serial number of: 84260262, 84260263, 84260264, 84260265		
Purpose of the data	Calculation of net electricity supplied to the grid and thus baseline emissions		
Calculation method	Direct continuous measurement		

⁵ <http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch>

⁶ This information was verified at the second monitoring period.

Comments	-
Data / Parameter	EGPP-gross, y
Data unit	MWh
Description	Quantity of electricity produced by the power plant, in y
Source of data	The primary source is the Meter Reading Forms. Net electricity exported is crosschecked with EPIAS records. EPIAS is the financial settlement center of TEİAŞ (the national grid operator). The Meter Reading Forms are filled by the project owner and approved by the governmental officers. Additionally, the remote reading by the governmental body is also available
Description of measurement methods and procedures to be applied	Measurements are to be made by electricity meters that belong to the grid operator TEİAŞ. The meters are in compliance with the collected data. Data will be used to calculate the net electricity supplied to the grid.
Frequency of monitoring/recording	Recorded continuously, reported monthly on TEİAS Meter Reading Protocols, Reported annually on the VCS Monitoring Report.
Value monitored	01/03/2018 – 31/12/2018 : 58,534.91 MWh 01/01/2019 – 31/12/2019 : 114,924.8 MWh 01/01/2020 – 30/09/2020 : 90,791.69 MWh
Monitoring equipment	Power meters as detailed in EGPP-selfconsumption, y parameter
QA/QC procedures to be applied	- A back-up meter is used for crosschecking the accuracy and both meters are calibrated if required. - EPIAS records are considered as the main source for the net electricity and the values are crosschecked with the data measured by meters. - TEİAS is responsible for calibration and maintenance of the devices. The periodical calibration or maintenance is under the responsibility of TEİAS and has been fixed as once in 10 years. Since TEİAŞ meters are sealed by TEİAŞ, the project proponent cannot intervene with the devices. The periodic tests are executed on annual basis.

Purpose of the data	Calculation of baseline emissions
Calculation method	Direct continuous measurement
Comments	-

Data / Parameter	Cap _{PJ}
Data unit	W
Description	Installed capacity of the hydropower plant after the the implementation of the Project Activity
Source of data	Project site computers with SCADA system and the turbine name plates.
Description of measurement methods and procedures to be applied	Observation via the SCADA system of the Project Activity
Frequency of monitoring/recording	Once for each monitoring period
Value monitored	28,000,000
Monitoring equipment	SCADA system of the Project Activity
QA/QC procedures to be applied	Can be confirmed also by the parameter readings on the design plates of each turbine and by summing up the two units.
Purpose of the data	Calculation of project emissions
Calculation method	N/A
Comments	-

Data / Parameter	APJ
Data unit	m2
Description	Area of the reservoir measured in the surface of the water, after the implementation of the Project Activity, when the reservoir is full.
Source of data	Scada System of the project

Description of measurement methods and procedures to be applied	The reservoir area corresponding to maximum operational level has been determined by field scanning that is conducted by the project engineer. The resulting view showing the area is shared with the DOE.
Frequency of monitoring/recording	Once during each monitoring period
Value monitored	129,438 m2
Monitoring equipment	Scada system water level readings
QA/QC procedures to be applied	Can be checked and compared to satellite imagery available by Google Earth.
Purpose of the data	Calculation of project emissions
Calculation method	Section 4.2
Comments	Since there is no capacity increase, the same installed capacity during the registration is valid. Therefore, no annual electronic spreadsheet has been recorded for the area of the reservoir and the reservoir area corresponding to maximum operational level has been taken into consideration.

Data / Parameter	$PE_{FC,j,y}$
Data unit	tCO ₂ /yr
Description	CO ₂ emissions from fossil fuel combustion in process j during the year y
Source of data	As per the “Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion” (Version 2.00 EB 41 Report Annex 11)
Description of measurement methods and procedures to be applied	As per the “Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion” (Version 2.00 EB 41 Report Annex 11)
Frequency of monitoring/recording	Once at every monitoring period
Value monitored	29.8 ⁹

⁹ ER Calculation Kepezkaya

Monitoring equipment	As per the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (Version 2.00 EB 41 Report Annex 11)
QA/QC procedures to be applied	As per the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (Version 2.00 EB 41 Report Annex 11)
Purpose of the data	Calculation of project emissions
Calculation method	As per the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (Version 2.00 EB 41 Report Annex 11)
Comments	Used to determine Project Emissions related to use of auxiliary diesel generator at the power-house of the project activity.

Data / Parameter	FC,j,y
Data unit	Mass or volume unit per year (tonne/yr)
Description	Quantity of fuel type i combusted in process j during the year y
Source of data	Onsite logs and measurements
Description of measurement methods and procedures to be applied	N/A as option A is chosen
Frequency of monitoring/recording	Once at every monitoring period
Value monitored	9.20 ¹⁰
Monitoring equipment	Site Manager’s logbook
QA/QC procedures to be applied	Continuous
Purpose of the data	Used for the calculation of Project Emissions related to use of auxiliary diesel generator



¹⁰ ER Calculation Kepezkaya

Calculation method	1. The auxiliary diesel generator work hours are recorded precisely and the annual work hours are summed and conservatively round up to the nearest whole hour. 2. The total hours multiplied by the diesel fuel consumption of 69.9 L and 6 L 100% load factor for the powerhouse and the regulator, respectively. The facts sheet of Volvo TAD94 1GE model BCV 360-50 E2 diesel generator and MI-33 ISUZU NK diesel generator are available to the DOE. 3. The Mass is calculated based on the following formula: • $M = d \times V$ where: • M = Mass in kg, • d = the average density of diesel fuel (0.845 kg/L³⁴) and • V is the Volume in litres • The Mass in kg is converted to tonnes by dividing into 1000.
Comments	Used to determine Project Emissions related to use of auxiliary diesel generator at the power-house of the project activity.



Data / Parameter	NCV _{i,y}
Data unit	GJ per mass or volume unit (GJ/ton)
Description	Weighted average net calorific value of fuel type i in year y
Source of data	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Description of measurement methods and procedures to be applied	Not Applicable as default value of the IPCC guidelines is utilized
Frequency of monitoring/recording	Not Applicable as default value of the IPCC guidelines is utilized
Value monitored	43.3 GJ/ton (default value used for calculations-does not change throughout the crediting period)

Monitoring equipment	Default IPCC value is used. Any future revision of the IPCC Guidelines will be taken into account
QA/QC procedures to be applied	Not Applicable as default value of the IPCC guidelines is utilized
Purpose of the data	To calculate project or leakage CO2 emissions from fossil fuel combustion.
Calculation method	Not Applicable as default value of the IPCC guidelines is utilized
Comments	Applicable as option B of the Methodological tool "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (Version 02) is chosen.

Data / Parameter	EFCO _{2,i,y}
Data unit	tCO2/GJ
Description	Weighted average CO2 emission factor of fuel type i in year y
Source of data	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Description of measurement methods and procedures to be applied	Not Applicable as default value of the IPCC guidelines is utilized
Frequency of monitoring/recording	Not Applicable as default value of the IPCC guidelines is utilized
Value monitored	74.80 tCO2/GJ (default value used for calculations-does not change throughout the monitoring period)
Monitoring equipment	Default IPCC value is used. Any future revision of the IPCC Guidelines will be taken into account
QA/QC procedures to be applied	Not Applicable as default value of the IPCC guidelines is utilized
Purpose of the data	To calculate project or leakage CO2 emissions from fossil fuel combustion.
Calculation method	Not Applicable as default value of the IPCC guidelines is utilized

Comments	Applicable as option B of the Methodological tool “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (Version 02) is chosen.
----------	--

4.3 Monitoring Plan

The objective of the monitoring plan is to ensure the complete, consistent, clear, and accurate monitoring and calculation of the emission reductions during the whole crediting period. The Project proponent is responsible for the implementation of the monitoring plan.

According to the methodology applied, ACM0002 version 13.0.0, the electricity supplied to the national grid by the proposed project and the electricity consumed by the project activity are monitored. The net electricity is the difference of the electricity supplied from electricity consumed by the project and are taken into account for emission reduction calculations.

The Project Proponent is responsible for the overall management of the monitoring procedures including recording, data collection, calculating emission reductions and project emissions. Figure 4.1 gives the management structure for the plant operation.

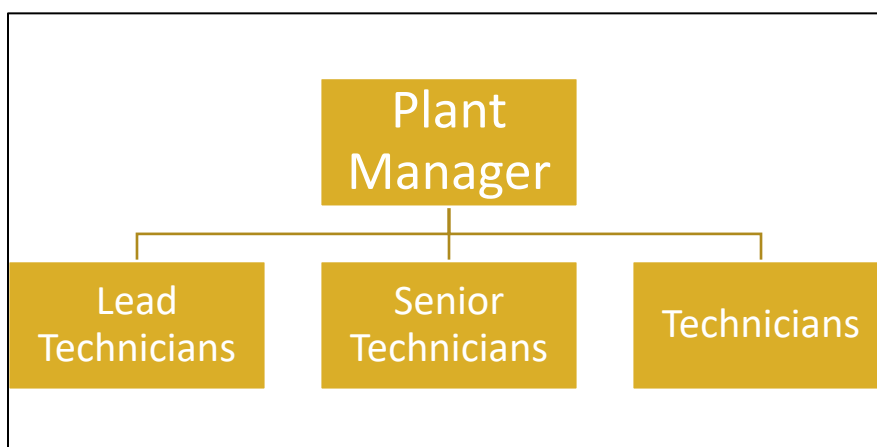


Figure 4.1: The management structure for the plant operation

The plant manager is responsible for the whole management of the Project Activity and the technicians are responsible for the implementation of the Project Activity.

Four power meters are installed at the grid interface of the project. There are two main meters and two back-up meters of the main meters for cross-checking. All meters are jointly inspected and sealed in order to be protected from interference by any of the parties. All metering devices are owned and installed by the grid operator (TEIAS). The grid operator's is the only one authorized to deal with fixing, calibrating, or changing the meters, which will

be done either by the grid operator or by a company authorized by the grid operator. During this monitoring period, there were no records of meter failure. In case of any urgent case TEIAS contacts the Plant Manager. 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.

TEIAS is performing remote reading of the meters and monthly power meter readings are the basis for monitoring net electricity fed into the grid. A measuring protocol is prepared including day, peak and night hour electricity generation by the project owner and approved by governmental officers at the end of each month.

The primary source is the Meter Reading Forms. Net electricity exported is crosschecked with EPIAS records. EPIAS is the financial settlement centre of TEIAS. The Meter Reading Forms are filled by the project owner and approved by the governmental officers. Additionally, the remote reading by the governmental body is also available. The website of EPIAS is accessible to Project Proponent with their unique user ID and password. Once accessed, the Project Proponent is able to call electricity generation and consumption reports of their own projects. The same reports are used by the Project Proponent for invoicing TEIAS. The electricity generation data is reported monthly basis.

The installed capacity is measured through the SCADA system. By means of the SCADA system established in the plant all kinds of technical parameters related with turbines and generators including installed capacity is measured and stored in the system on real time basis.

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 by field scanning.

The fourth data is project emissions related to diesel generator usage. The project activity is forced to use an auxiliary diesel generator in cases when there may be a power outage. The technicians are keeping a track record of the diesel consumed by the diesel generators located at the powerhouse and at the weir and the hours of diesel generator usage is recorded by the generator's computers on a day-to-day basis.

Quality Control and Assurance (QC/QA)

Both the main and back-up (control) meters are owned and installed by the grid company. Both meters are jointly inspected and sealed in order to be protected from interference by any of the parties.

The grid operator's Metering Officer should be notified of any failure of one of the meters. He is the only one authorized to deal with fixing, calibrating, or changing the meters, which will be done either by the grid operator or by a company authorized by the grid operator. During this monitoring period, there were no records of meter failure. The data is hourly recorded by the personnel on the plant. TEIAS Load Dispatching Center also executes

remote reading during 24-hour period. At the end of the month, the readings are taken to the center to be compared and approved. The data could be remotely accessed by TEIAS.

The capacity of the transmission line connected is 33 kV, the accuracy class for main power meter has been defined in the Communiqué for Power Meters as 0.2S class. The back-up meter has the same accuracy class of 0.2S. The calibration will be implemented in accordance with the related standard procedures (TS-620 EN 60044-1 and TS718 IEC60044-2) by either TEIAS or the provider company in the name of TEIAS. When the main meter has a breakdown, the readings of the back-up meter will be used. All power meters are ITRON , 0.2S class.

The electricity produced is sold to TEİAŞ. Therefore, TEİAŞ measures the electricity produced by two main meters and two back-up meters:

Old Meters:

1. The serial number for main power meter is 00401726 and the back-up power meter is 00484319.
2. The serial number for main power meter is 00401723 and the back-up power meter is 00401724.

New Meters:

1. The serial number for main power meter is 84260262 and the back-up power meter is 84260263.
2. The serial number for main power meter is 84260264 and the back-up power meter is 84260265.

All data collected as part of monitoring will be archived electronically by the Project Proponent and be kept at least for 2 years after the end of the last crediting period.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline emission BE_y (tCO₂e) during the monitoring period results from:

$$BE_y = EGP_{J,y} \cdot EF_{grid,CM,y}$$

Where:

BE_y	Baseline emissions in year y (tCO ₂ e/y)
$EG_{PJ,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{grid,CM,y}$	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated by using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO ₂ /MWh)

$EF_{grid,CM,y}$ value is fixed as 0.571103 tCO₂/MWh for during the crediting period. Table 5.1 shows the baseline emissions for the verification period.

Table 5.1: Baseline Emissions

Month	Metering Device 1		Metering Device 2		(C) = (A) - (B) EG Net electricity supplied to the grid [MWh]	EF [tCO ₂ /MWh]	Emission Reduction Achieved: ER = EG * EF [t CO ₂ -eq]
	(A) Electricity supplied to the grid [MWh]	(B) Electricity consumption from the grid [MWh]	(A) Electricity supplied to the grid [MWh]	(B) Electricity consumption from the grid [MWh]			
Mar-18	5,997.295	1.690	7,649.731	3.357	13,641.98	0.571103	7,791.0
Apr-18	7,039.590	9.405	403.661	4.227	7,429.62	0.571103	4,243.1
May-18	3,263.106	16.020	1,691.732	5.510	4,933.31	0.571103	2,817.4
Jun-18	1,360.560	7.900	2,854.386	15.473	4,191.57	0.571103	2,393.8
Jul-18	1,814.755	13.063	1,594.739	12.944	3,383.49	0.571103	1,932.3
Aug-18	719.615	0.019	2,340.077	30.107	3,029.57	0.571103	1,730.2
Sep-18	2,945.224	20.844	218.561	8.620	3,134.32	0.571103	1,790.0
Oct-18	1,254.356	10.152	2,344.338	18.152	3,570.39	0.571103	2,039.1
Nov-18	745.399	1.460	3,040.753	26.650	3,758.04	0.571103	2,146.2
Dec-18	5,039.635	4.866	6,217.396	3.261	11,248.90	0.571103	6,424.3
Jan-19	8,635.623	2.148	7,936.937	1.733	16,568.68	0.571103	9,462.4
Feb-19	8,862.484	-	9,169.953	0.250	18,032.19	0.571103	10,298.2
Mar-19	9,959.954	0.004	10,369.074	0.420	20,328.60	0.571103	11,609.7

Apr-19	9,933.643	-	10,325.592	-	20,259.24	0.571103	11,570.1
May-19	8,256.279	9.714	4,882.605	0.007	13,129.16	0.571103	7,498.1
Jun-19	579.171	1.447	4,594.001	16.374	5,155.35	0.571103	2,944.2
Jul-19	1,267.253	7.025	2,346.979	23.284	3,583.92	0.571103	2,046.8
Aug-19¹¹	3,266.970	26.160	-	14.890	3,225.92	0.571103	1,842.3
Sep-19	3,120.140	25.540	-	15.090	3,079.51	0.571103	1,758.7
Oct-19	3,019.710	24.920	-	14.940	2,979.85	0.571103	1,701.8
Nov-19	2,999.690	26.850	107.530	15.460	3,064.91	0.571103	1,750.4
Dec-19	1,830.630	21.920	3,460.580	15.690	5,253.60	0.571103	3,000.3
Jan-20	2,749.180	10.890	8,661.590	7.520	11,392.36	0.571103	6,506.2
Feb-20	8,474.910	0.960	9,273.850	0.360	17,747.44	0.571103	10,135.6
Mar-20	10,344.700	-	10,486.560	0.090	20,831.17	0.571103	11,896.7
Apr-20	8,734.900	1.370	9,877.060	1.030	18,609.56	0.571103	10,628.0
May-20	3,646.450	9.920	4,469.630	29.320	8,076.84	0.571103	4,612.7
Jun-20	4,120.370	16.100	83.090	22.710	4,164.65	0.571103	2,378.4
Jul-20	3,379.880	23.510	23.210	14.440	3,365.14	0.571103	1,921.8
Aug-20	2,786.900	27.000	478.480	14.360	3,224.02	0.571103	1,841.2
Sep-20	-	17.000	3,200.930	19.440	3,164.49	0.571103	1,807.2
2018 Vintage (01.03.2018-31.12.2018)	30,179.54	85.42	28,355.37	128.30	58,321.14	0.571103	33,307
2019 Vintage (01.01.2013-31.12.2013)	61,731.55	145.73	53,193.25	118.14	114,660.93	0.571103	65,483
2020 Vintage (01.01.2020-31.12.2020)	44,237.29	106.75	46,554.40	109.27	90,575.67	0.571103	51,728

¹¹ In August, September and October 2019, the plant was under maintenance. That is why the electricity supplied to the grid from metering device 2 is 0.

2020-30.09.2020)							
Total	136,148.37	337.90	128,103.03	355.71	263,557.79	0.571103	150,518

5.2 Project Emissions

There is no project emission resulting from the reservoir area of the Project Activity as the power density of the project is greater than 10W/m². The reservoir area is calculated as 129,438 m². The Project Activity's power density was calculated as below:

$$= 28,000,000 \text{ W} / 129,438 \text{ m}^2$$

$$= 216.32 \text{ W/m}^2$$

In addition to this, there are 2 auxiliary diesel generators in the project area: One that produce electricity for the operation of the gate over the weir, and one more is installed in the powerhouse. These generators are logged to work for 138.2 and 204.03 hours between 01/01/2018-31/12/2020¹². During power outages, and this accounts to a diesel consumption of maximum 10,884.38 Liters (assuming that both generators have worked at 100% load). Based on ACM0002 V.13 the fossil fuel consumption from diesel generator can be neglected.

Therefore, PE= 0

5.3 Leakage

No leakage is to be accounted by the Project Activity. This is in line with the registered PDD and applicable methodology ACM0002 version 13.0.0. Therefore, the leakage from the Project Activity is zero.

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2018 (01/03/2018)	33,307	0	0	33,307

¹² Although the monitoring period covers 01 March 2018 to 30 September 2020, the working hours were logged yearly. As a result, to be on the conservative side, the working hours covers three years.

- 31/12/2018)				
2019	65,483	0	0	65,483
2020 (01/01/2020 - 30/09/2020)	51,728	0	0	51,728
Total	<i>150,518</i>	<i>0</i>	<i>0</i>	<i>150,518</i>