



**Verified Carbon
Standard**

THE THIRD MONITORING REPORT

KUMKÖY HYDROELECTRIC POWER PLANT, SAMSUN

Document Prepared by SEEM TURKEY

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Kumköy Hydroelectric Power Plant, Samsun is located on the Yeşilırmak River in the Black Sea region of Turkey. The Project is being used only for energy generation purposes and has an Energy Generation License for 49 years obtained from Energy Market Regulatory Authority (EMRA) in 2011.

The Kumköy Hydroelectric Power Plant, Samsun includes a weir and a reservoir that has been constructed by the General Directorate of State Hydraulic Works (DSİ). The weir will serve two purposes: one is to provide water for irrigation and the other is energy generation.

The project activity was initially designed by the State Hydraulic Works (DSİ), as having an installed capacity of 10 MW, later on the Project Owner improved the design and increased the installed capacity of the Project to 17.5 MW.

Two water intake structures have been constructed on the right and left sides of the Kumköy weir. The overall amount of water for irrigation purposes is released through these structures. The hydroelectric powerhouse and the energy facilities are located next to the weir, as the Project Activity is a river type (run-of-river without a water conveyance system composed of a canal or tunnel) hydropower project. Water released from the weir is used for power generation exclusively until the irrigation project infrastructure is created in the Çarşamba Plain. After the implementation of the irrigation project, the Kumköy weir and reservoir will be utilized for both electricity production and irrigation purposes. The irrigation project will have a priority for the water and only the remaining amount of water will be utilized to generate electricity. The construction phase of the Project is going on.

The expected annual energy generation is 91,964 MWh, and the estimated amount of GHG emission reduction is 49,037 tonnes CO₂e per year in the registered PDD. During this third monitoring period (01/04/2019-02/03/2021), 156,566.68 MWh net electricity was generated. Based on this net electricity generation, at the third monitoring period, 83,484 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 producing electricity using bulb-type turbines. The Project Activity's main technical characteristics obtained from the Project's final feasibility report are provided below:

Table 1.1: Main characteristics of the project activity¹

Component	Property
Thalweg elevation of the weir	18m
Crest elevation of the weir	32m
Weir height	14m
Max. operation level	30m
Min. operation level	28m
Gross head	9.76m
Net-head	9.41m
Turbine type	Bulb
Installed capacity of each turbine	5.75 MWe
Installed capacity	17.50 MWe
Number of units	3
Capacity of each unit	70 m ³ /s
Max. power capacity of each unit	6.073 MWm
Total max. turbine capacity	18.22 MWm

The project boundary may be seen in Figure 1.1.

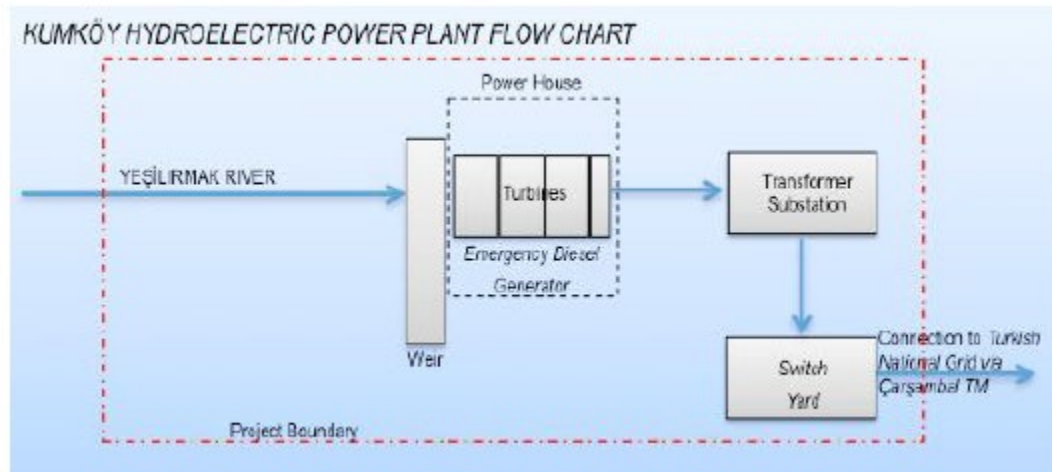


Figure 1.1: The project boundary of Kumköy Hydroelectric Power Plant, Samsun

The project timeline is presented in Table 1.2.

Table 1.2: Project timeline

¹ The related information was validated at the registration.

Date	Milestone
18/10/2006	Early consideration of Carbon Finance
12/12/2006	Water Usage Agreement Signed between Kumköy Enerji Üretim A.Ş. and DSI
5/07/2007	License acquisition fee paid to the government
30/07/2007	EIA not Needed Certificate Issued by MoEF Samsun Province Representation
28/09/2007	Local Stakeholder Consultation Meeting announced in Local (Halk) and National (Türkiye) Newspapers
03/10/2007	Local Stakeholder Consultation Meeting held in Çarşamba
25/01/2008	Turn-Key EPC Contract Signed
06/02/2008	Loan agreement signed
15/04/2008	Electromechanical Equipment contract signed
01/06/2008	Revised Feasibility Report submitted to DSI for Approval
03/11/2008	DSI Approval for the revised feasibility study report
09/10/2009	Contract with DSI to use weir construction facilities
24/12/2009	TEIAS Connection Agreement Signed
11/02/2011	System Usage Agreement Signed with Grid Operator
23/02/2011	Government officials approved the Project to be suitable to be connected to the grid
03/03/2011	First Date Electricity is supplied to the grid
03/03/2011	Start date of the first monitoring period
04/03/2011	Notice letter for readiness to Substantial Completion sent to Kumköy Enerji Üretim A.Ş. by IC İnşaat (EPC Contractor)
04/03/2011	Kumköy Enerji Üretim A.Ş. Accepted and issued official Substantial Acceptance Certificate
01/12/2011	Project License renewed and issued by EMRA
31/03/2013	End date of the first monitoring period

01/04/2013	Start date of the second monitoring period
10/07/2014	Shareholder structure change (the project activity has been transferred to Entek Elektrik Üretim A.Ş.)
31/03/2019	End date of the second monitoring period
01/04/2019	Start date of the third monitoring period
02/03/2021	End date of the third monitoring period
02/03/2021	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	<i>Entek Elektrik Üretim A.Ş.</i>
Contact person	<i>Serkan Dündar</i>
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 03/03/2011.

1.6 Project Crediting Period

Project's first crediting period is ten years and renewable twice. The first crediting period starts on 03/03/2011 and ends on 02/03/2021 (both days are included).

1.7 Project Location

The project activity is located between 41° 05' 40" – 41° 05' 50" north and between 36° 41' 10" – 36° 41' 25" east on the Yeşilırmak river in Samsun Province at the Black Sea Region northern part of Turkey. The project activity is approximately 50 km from the city of Samsun and about 10 km from the town of Çarşamba. The coordinates of the major project components are given in Table 1.3 and the location is illustrated in Figure 1.2².

Table 1.3: The location of the major project components

Structure	Latitude	Longitude
Weir	41°7'12.77"N	36°43'9.34"E
Powerhouse	41°7'15.34"N	36°43'4.76"E

² Information is taken from the registered Project Description.



Figure 1.2: The location of the Project at the Google Earth satellite image

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 07.0.0)
- “Tool to calculate the emission factor for an electricity system” (Version 03.0.0)

Regarding the investment analysis, “Guidelines on the assessment of investment analysis”, version 5 (EB 62-Annex 5) was considered.

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. The Project is expected to generate 91,964 MWh annually. The Project contributes to the Sustainable Development Goal, Affordable and Clean Energy.

The annual emission reduction estimated by the Project is 49,037 tonnes CO₂eq, approximately. While this amount of emissions is mitigated, technology transfer is also realized as benefitting from hydropower.

Based on this net electricity generation, at the third monitoring period, 83,484 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

There isn't any negative environmental or socio-economic impact

2.2 Local Stakeholder Consultation

A public meeting with stakeholders regarding the planned project activity was conducted in the meeting hall of Ömer Akyıldız Kiraathanesi Kumköy Köyü, Çarşamba, Samsun province, on 3rd October 2007.

For the participation of officials, phone calls were made to the Samsun Governorship and the Provincial Environment and Forestry Directorship Çarşamba District Governor's Office. For the participation of the local villagers, a fax notification and personal invitations were sent to the Çarşamba municipality and to Kumköy and Orduköy villages inviting their residents. In addition, the event was announced in the regional and national newspapers, calling for stakeholders to attend the meeting. The ads were published at the Samsun Halk Gazetesi (regional), and the Türkiye Gazetesi (national).

The meeting included a presentation, a dialog session, and a personal questionnaire. Informational brochures (can be provided) summarizing all the information presented were handed to all participants with the contact information of a representative for any further questions and clarifications.

The villagers expressed their overall satisfaction with the implementation of such a Project in their region and expressed their hope that after many years of delays, the Kumköy Hydroelectric Power Plant, Samsun would finally be completed.

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 exists 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 08.07.2019) by Mukhtar, which indicates that the contact information of the plant responsible is available to them, has been provided to the DOE³.

³ 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).

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

2.3 AFOLU-Specific Safeguards

N/A

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The construction of the weir was started by DSI already in 1997, but construction has taken longer to complete than planned due to DSI budgetary problems. The Project became operational on 03.03.2011. 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 10.07.2014 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	FC _{i,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	NCV _{i,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
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	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 2011 and 2012 The reports are now available through the website of EPDK: https://www.epdk.org.tr/Detay/Icerik/3-0-66/elektrikuretim-kapasite-projeksiyonlari
Value applied	Detailed in Annex 2 in the PDD
Justification of choice of data or description of	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data

measurement methods and procedures applied	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	$\eta_{m,y}$
Data unit	-
Description	Average net energy conversion efficiency of power unit m in year y
Source of data	Default values provided at the Annex 1 of the “Tool to calculate emission factor for an electricity sector (Version 03.0.0)” are used.
Value applied	Please see Annex 1 of the “Tool to calculate emission factor for an electricity sector (Version 03.0.0)”
Justification of choice of data or description of measurement methods and procedures applied	According to the “tool to calculate emission factor for an electricity system if documented manufacturer’s specifications or data from the utility, the dispatch center or official records are not available then the default values given in Annex 1 of the tool shall be used. The first two options are not available for the power plants supplying the Turkish grid, therefore the default values are used.
Purpose of Data	Calculation of baseline emissions
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 cross-checked 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	Monthly Readings																														
Value monitored	01/04/2019 – 31/12/2019 : 97.58 MWh 01/01/2020 – 31/12/2020 : 225.67 MWh 01/01/2021 – 02/03/2021 : 76.03 MWh																														
Monitoring equipment	Power meters: The meters are changed on 20/10/2019. The new meters are : <table><tr><td></td><td>Main Meter</td><td>Back-up Meter</td></tr><tr><td>Description</td><td colspan="2">Bi-directional electricity meter in compliance with TS-620 EN 60044-1 and TS718 IEC60044.2 standards</td></tr><tr><td>Location</td><td colspan="2">TEİAŞ Switch Yard Facility Telecommunications Hall</td></tr><tr><td>Brand</td><td>ITRON</td><td>ITRON</td></tr><tr><td>Serial Number</td><td>84260361</td><td>84260362</td></tr></table> The previous meters are: <table><tr><td></td><td>Main Meter</td><td>Back-up Meter</td></tr><tr><td>Description</td><td colspan="2">Bi-directional electricity meter in compliance with TS-620 EN 60044-1 and TS718 IEC60044.2 standards</td></tr><tr><td>Location</td><td colspan="2">TEİAŞ Switch Yard Facility Telecommunications Hall</td></tr><tr><td>Brand</td><td>ACTARIS</td><td>ACTARIS</td></tr><tr><td>Serial Number</td><td>53042294</td><td>53042295</td></tr></table>		Main Meter	Back-up Meter	Description	Bi-directional electricity meter in compliance with TS-620 EN 60044-1 and TS718 IEC60044.2 standards		Location	TEİAŞ Switch Yard Facility Telecommunications Hall		Brand	ITRON	ITRON	Serial Number	84260361	84260362		Main Meter	Back-up Meter	Description	Bi-directional electricity meter in compliance with TS-620 EN 60044-1 and TS718 IEC60044.2 standards		Location	TEİAŞ Switch Yard Facility Telecommunications Hall		Brand	ACTARIS	ACTARIS	Serial Number	53042294	53042295
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Brand	ACTARIS	ACTARIS																													
Serial Number	53042294	53042295																													
QA/QC procedures to be applied	- A back-up meter is used for cross-checking 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 cross-checked 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 years⁴. 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 20/10/2019 ⁵ .
Purpose of the data	Calculation of net electricity supplied to the grid and thus baseline emissions
Calculation method	Direct continuous measurement
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 cross-checked 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 TEİAŞ Meter Reading Protocols, Reported annually on the VCS Monitoring Report.
Value monitored	01/04/2019 – 31/12/2019 : 71,708.29 MWh 01/01/2020 – 31/12/2020 : 79,095.87 MWh

⁴ <http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch>

⁵ The reference document is submitted to the DOE at the third monitoring period.

	01/01/2021 – 02/03/2021 : 6,161.8 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 cross-checking 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 cross-checked with the data measured by meters. - TEIAS is responsible for calibration and maintenance of the devices. The periodical calibration or maintenance is under the responsibility of TEIAS and has been fixed as once in 10 years. Since TEIAS meters are sealed by TEIAS, 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	17,500,000
Monitoring equipment	SCADA system of the Project Activity

QA/QC procedures to be applied	<i>Can be confirmed also by the parameter readings on the design plates of each turbine and by summing up the three units</i>
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	524,023.35
Monitoring equipment	-
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.

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 is 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.

Please see below the management structure for the plant operation:

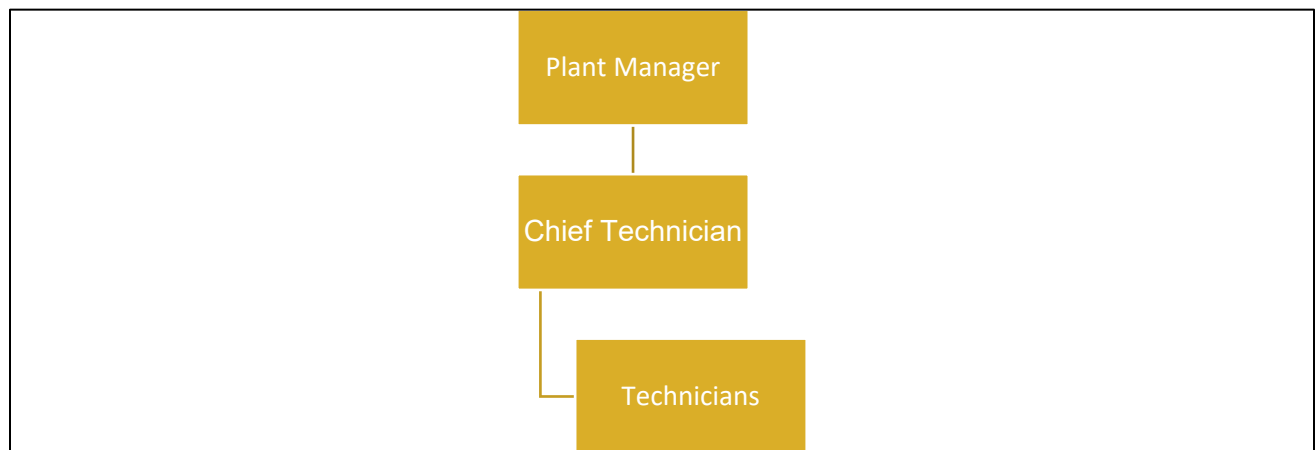


Figure 4.1: The management structure for the plant operation

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.

Two power meters are installed at the grid interface of the Project. One is the main meter and the other is the back-up meter of the main meter for cross-checking. Both meters are jointly inspected and sealed in order to be protected from interference by any of the parties. Both the main and secondary meters 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.

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 cross-checked 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 to turbines and generators, including installed capacity, is measured and stored in the system on a real time basis.

The third data to be monitored is the reservoir area of the Project Activity. The reservoir area corresponding to the 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 coordinates may be measured by GPS around the border of the reservoir area.

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 31.5 kV, the accuracy class for main power meter has been defined in the Communiqué for Power Meters as 0.5S class. 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. Both power meters are ITRON SL7000, 0.5S class. The serial numbers for old and new power meters are defined in section 4.2 of this report.

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:

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

Where:

BE _y	Baseline emissions in year y (tCO ₂ e/y)
EGP _{J,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 0.53323 tCO₂/MWh for during the crediting period. Table 5.1 shows the baseline emissions for the verification period.

Table 5.1: Baseline Emissions

Month	(A) Electricity supplied to the grid [MWh]	(B) Electricity consumption from the grid [MWh]	(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]
Apr-19	7,867.74	12.99	7,854.75	0.53323	4,188

May-19	9,668.78	3.81	9,664.97	0.53323	5,154
Jun-19	6,011.14	15.75	5,995.39	0.53323	3,197
Jul-19	8,728.04	9.38	8,718.66	0.53323	4,649
Aug-19	7,365.06	12.87	7,352.19	0.53323	3,920
Sep-19	8,015.41	10.82	8,004.59	0.53323	4,268
Oct-19	8,7762.80	9.65	8,753.15	0.53323	4,667
Nov-19	7,230.35	13.27	7,217.08	0.53323	3,848
Dec-19	8,058.97	9.04	8,049.93	0.53323	4,292
Jan-20	7,496.12	18.42	7,477.70	0.53323	3,987
Feb-20	7,207.32	19.34	7,187.98	0.53323	3,833
Mar-20	8,534.15	12.80	8,521.35	0.53323	4,544
Apr-20	7,382.77	17.41	7,365.36	0.53323	3,927
May-20	5,528.73	26.16	5,502.57	0.53323	2,934
Jun-20	5,493.36	23.00	5,470.36	0.53323	2,917

Jul-20	7,120.79	15.37	7,105.42	0.53323	3,789
Aug-20	8,063.96	10.60	8,053.36	0.53323	4,294
Sep-20	6,199.18	14.12	6,185.06	0.53323	3,298
Oct-20	7,547.80	10.92	7,536.88	0.53323	4,019
Nov-20	3,557.15	32.58	3,524.57	0.53323	1,879
Dec-20	4,964.54	24.95	4,939.59	0.53323	2,634
Jan-21	3,569.20	35.64	3,533.56	0.53323	1,884
Feb-21	2,375.88	38.02	2,337.86	0.53323	1,247
Mar-21	216.72	2.37	214.35	0.53323	114
2019 Vintage (01.03.2019- 31.12.2019)	71,708.29	97.58	71,610.71	0.53323	38,184
2020 Vintage (01.01.2020- 31.12.2020)	79,095.87	225.67	78,870.20	0.53323	42,055
2021 Vintage (01.01.2021- 02.03.2021)	6,161.80	76.03	6,085.77	0.53323	3,245
Total	156,965.9 6	399,28	156,566.6 8	0.53323	83,484

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 calculated as 524,023.35 m².



The Project Activity's power density was calculated as below:

$$= 17,600,000 \text{ W} / 524,023.35 \text{ m}^2$$

$$= 33.59 \text{ W/m}^2$$

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)
2019 Vintage (01.03.2019-31.12.2019)	38,184	0	0	38,184
2020 Vintage (01.01.2020-31.12.2020)	42,055	0	0	42,055
2021 Vintage (01.01.2021-02.03.2021)	3,245	0	0	3,245
Total	83,484	0	0	83,484

