TATAR HYDRO ELECTRICITY POWER PLANT

EKOBIL ENVIRONMENTAL SERVICES AND CONSULTANCY

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Project Title	Tatar Hydro Electricity Power Plant
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CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Darenhes Elektrik Üretimi A.Ş. constructed Tatar Hydro Electric Power Plant (HPP) on the Peri Stream, within the jurisdiction of Tunceli and Elazığ Provinces. The purpose of the project is electricity production using the potential energy of Peri Stream as a renewable resource. Therefore, the electricity is produced without causing airborne pollutants or Green House Gas (GHG)emissions. The construction and operation of the Tatar Hydro Electric Power Plant (HPP) is delaying the addition of conventional thermal power plants to the Turkish National Electricity Grid.

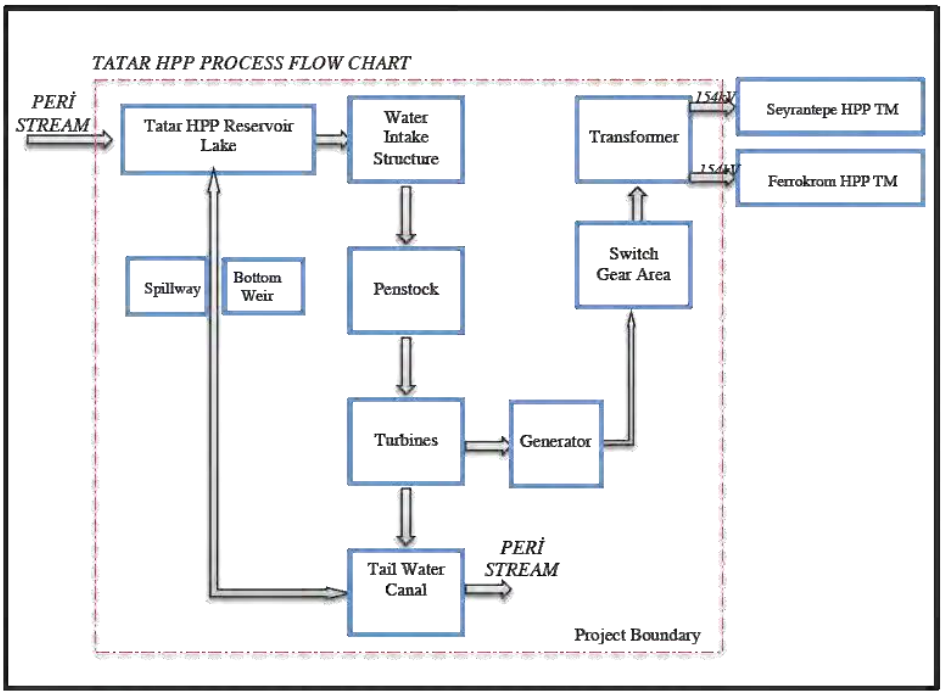
The set capacity of Tatar HEPP is 128.22 MWe, with 2 turbines of 64.11 MWe each. Based on the available water and of the total capacity of the project, the project is indicated to produce 421'270 MWh of electricity per year, based on revised feasibility studies, and as indicated on the Energy Market Regulatory Authority (EMRA) issued official electricity production license of the project activity.

Construction of the project started on 11.11.2011. The project start date and the first unit was commissioned in 14.11.2013. Later the second unit was commissioned in 12.12.2013. From this date, the project continues to operate with full capacity. Based on Turkey's Combined Margin Emission Factor of 0.53985 tCO_{2e}/MWh, the project is expected toproduce 231'898 tonnes of CO_{2e} GHG reductions each year in the validated PDD. During this monitoring period (01/08/2021 to 31/07/2022) the project has produced a net total of 252'251.94 electricity and a total amount of 136'178.21 tCO2e of emission reduction.

The environmental impact of the project is kept at a minimum level and the project complies with all the regulations required by the host country, Turkey. At the planning stage these impacts have been investigated and were presented to the Ministry of Environment and Forestry (MoEF now renamed and structured as Ministry of Environment and Urban Planning -MoEUP), in the form of a EIA report. The report was examined by an EIA evaluation committee coordinated by MoEUP and it was decided that the project could proceed, so they have granted an EIA Affirmative certificate (See Appendix-1). Considering that the project is using the water resource that is also essential for the aquatic life in the area, there is a fish ladder (fish passageway) within the regulator for the downstream and upstream movement of the

fish, to facilitate fish migration. In addition to this, the minimum water (considered as 10 % of the average flow according to the water usage agreement

Figure 1:Basic Operational Principles of the Project Activity



1.2 Sectoral Scope and Project Type

The project category is Sectoral Scope 1: Energy industries (renewable-/non -renewable sources). The project type is grid connected electricity generation from renewable sources. The project is a non-grouped, stand-alone project

1.3 Project Proponent

Organization name	Darenhes Elektrik Üretimi A.Ş.
Contact person	Kadir Cosar/Fatih Baydar
Title	Project Owner – Implementationof the Project
Address	Kuleli Sk. No:87/3 06700 G.O.P./ANKARA
Telephone	+90 216 460 00 55 ext: 85 08/ +90 312 436 06 40
Email	kadir.cosar@bilgin.com.tr /fbaydar@limak.com.tr

1.4 Other Entities Involved in the Project

Organization name	Ekobil Environmental Services and Consulting Ltd[1]
Role in the Project	Preparation of the Project Description Document
Contact person	Dr. Aslı Sezer Özçelik
Title	Dr.
Address	Ahlatlıbel Mahallesi 1839 sokak no.56 Çankaya 06805 Ankara-Turkey
Telephone	+903124891338
Email	asli.ozcelik@ekobil.com

1.5 Project Start Date

Project start date is 14.11.2013.

1.6 Project Crediting Period

The project crediting period is 10 years: 14.11.2013-13.11.2023 (both days inclusive). The crediting period is renewable twice.

1.7 Project Location

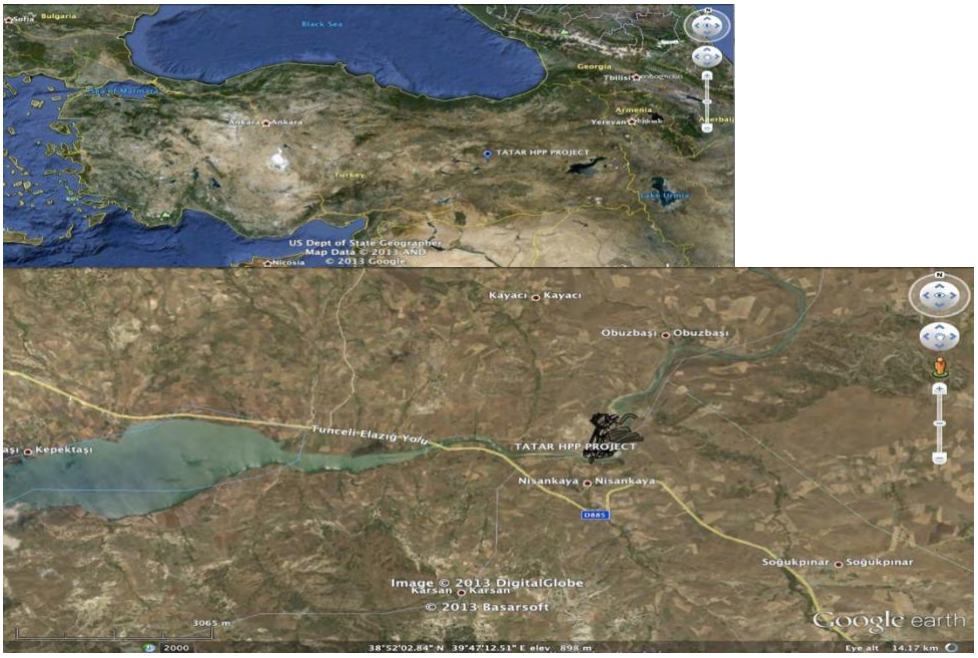
The project is located at the East Anatolian geographical region of Turkey within the jurisdictions of Elazığ and Tunceli Provinces. The project is located at the Northern Euphrates Catchment over thePeri Stream, between 38°91' Northern Latitudes and 39°87' Eastern Longitudes, as can be seen in the following location Map (Figure 2). The coordinates of the Dam Body and the Powerhouse are given below (see Table 1):

Table 1:Coordinates of the dam body and the powerhouse

	Dam Body		Power House	
	Latitude	Longitude	Latitude	Longitude
Point 1	38°51'57.78"N	39°49'14.58"E	38°52'0.28"N	39°49'1.37"E
Point 2	38°51'55.77"N	39°49'4.80"E	38°51'58.11"N	39°48'58.24"E

[1] Registered to the Ankara Chamber of Trade, with the full name of "Ekobil Çevre Hizmetleri Danışmanlık Eğt.Tar. Hayv. Mad. İnş. İth. İhr.Tur. ve Tic. Ltd. Şti."

Figure 2:Satellite image showing the location of the project area



1.8 Title and Reference of Methodology

The following UNFCCC methodology and its related tools are utilised:

Approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources.” Version 13.0.0.

The 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)

"Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (Version 02)

“Combined tool to identify the baseline scenario and demonstrate additionality” (Version 5.0.0).

Only the following tools are utilized:

“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)

1.9 Participation under other GHG Programs

Not applicable. The project is a voluntary project and the host country, Turkey cannot host CDM or JI projects. Hence, the project has not participated in any other GHG Programs.

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits: There is no other form of environmental credit generated by the project because there is no such system within the host country. The projects originate from Turkey do not comply for renewable energy certificates of EU because there is no energy trade between EU and Turkey because of different grid structures.

Other Forms of Environmental Credit: There is no other form of environmental credit generated by the project because there is no such system within the host country. The projects that originate from Turkey do not comply for the renewable energy certificates of EU because there is no energy trade between EU and Turkey because of different grid structures.

1.11 Sustainable Development Contributions

The project aims to generate electricity by using hydroelectric power to supply the increasing national electricity demand in a cleaner and sustainable manner. It reduces the air pollution caused by the grid connected power plants which are mostly fossil fuel fired.

The set capacity of Tatar HPP is 128.22 MWe, with 2 turbines of 64.11 MWe each. Based on the available water and of the total capacity of the project, the project is indicated to produce 421'270 MWh of electricity per year. During this monitoring period (01/08/2021 to 31/07/2022) the project has produced a net total of 252'251.94 MWh electricity and a total amount of 136'178.21 tCO2e of emission reduction. 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-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.

Also hydropower presents significant environmental and economic benefits as:

- 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 is significantly contribute to the reduction of GHGs.
- The local workers are given priority during the hiring for plant operation. The project created employment in the region.

Table 2: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.2	increase substantially the share of renewable energy in the global energy mix	Implemented activities to increase	No further changes this monitoring period	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.
2)	8.5	Achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Implemented activities to increase	Employment opportunities for local people and and equal pay for work of equal value	The local workers are given priority during the hiring for plant operation. The project created employment in the region.

3)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to decrease	Regular emissions from conventional electricity generation such as sulphur dioxide, nitrogen oxide and particulates does not occur in this case.	The project has produced total amount of 129'980.52 tCO2e of emission reduction.

2 SAFEGUARDS

2.1 No Net Harm

As also stated in the Environmental Impact Assessment report of the Tatar HEPP, According to the items numbered 14 and 33 of the Annex-I of the "Environmental Impact Assessment (EIA) regulation" published in the official Gazette dated 16.12.2003 and numbered 25318 Tatar HEPP is listed amongstthe project where an EIA needs to be implemented. Accordingly the project has undergone an environmental impact assessment study and received EIA Affirmative Certificate on 15 November 2006. This Certificate is attached as Appendix 1.

The following is the summary of the impacts and the mitigation actions outlined in the EIA Reportapproved by the EIA Report Evaluation Committee members:

Air Quality: Necessary precautions, such as watering roads, careful loading and unloading and covering the top of loaded trucks by tarpaulin; is taken in order to minimize the dust formedduring excavation.

Water & Wastewater Management: Water for domestic use is supplied by tankers to the site andwastewater is collected in septic tanks which is emptied regularly. The wastewater is discharged in accordance with Water Pollution Control Regulations.

The waste oil: Any kind of waste oil that may result during construction or operation stages, are collected in impermeable containers and transferred to recycling centres in accordance with Hazardous Waste Control Regulations and Waste Oil Control Regulations.

Solid Waste: Solid waste is collected and recyclables are separated to be sent to recycling centres. The rest are disposed to the nearest landfill site in coordination with Kovancılar Municipality.

Biodiversity: The field surveys and studies performed in the region has shown no species under conservation by international conventions. Necessary precautions is taken if any such flora or fauna elements are seen on the site. Also a fish passage/ladder is constructed to ease up anddown stream movements of the fish living in Peri Stream.

Expropriation: At the Euphrates catchment area in general villages are preferred to be established atthe close proximity of the rivers. As a result, whenever there is a hydroelectric power project developed there are some settlements that are effected. These can be listed as follows:

- Tatarköy village: 13 houses and 1 school
- Obuzbaşı village 38 houses

- Alayağmur village 37 houses
- Uçankuş district 9 houses
- Kilizkumu district (Zil region); 8 houses

The project does not have any potential negative social or economic impacts. The project provided job opportunities to the region, improved roads and increased irrigation water. These were also stated by the stakeholders.

2.2 Local Stakeholder Consultation

The project owner has organized two stakeholders meetings within the framework of the EIA process. The first meeting was held on 15 February, 2006 at 10:00 o'clock in the town hall of the Karakoçan Municipality, Elazığ, and the second meeting was held the next day on 16th February 2006, at 14:00 o'clock, next to the Elmalık village Gendarme station, in Munzur Kebap Restaurant (the Place of Hüseyin Usta) in Elmalık village – Mazgirt / TUNCELİ.

Both meetings were declared in National and Local news papers, were announced on the local boards of the Municipalities and District governors house, at the Muhtar's (village head's) announcement boards and were announced from the general announcement loudspeakers of relevant settlements.

On the meeting days the project owner have organized transportation to bring local stakeholders fromtheir villages. In the meetings the issues related to the project and its environmental aspects have been explained and questions that have raised by the local stakeholders have been answered by the qualified staff of Selin Inşaat Ltd. Şti that have conducted the EIA process.

Here is a summary of those questions and answers:

Question From Public: The transit shed place for the deposition of the excavated earth and rock determined by the project owner was a place where they were grazing their animals. If that particularsite would have been used for temporary dumping they would be forced to move their animals to a distant meadow and this was not convenient for the Nişankaya village people. Therefore they asked the project owner to re-consider their plan and find a place that would not effect their case.

Answer by SELİN: The site determined for this purpose would be re-considered at the final design stage and the view of the Nişankaya village people are considered seriously.

Question From Public: Public asked information about the expropriation process. They asked aboutwhen their land is expropriated and when which parts of the land and settlements would be staying under water.

Answer by SELİN: It is explained that the construction would start around December 2006, and the expropriation process cannot start before the EIA Affirmative certificate

is granted to the Project Owner. It is also explained that the expropriation process would be realized according to the regulations by EMRA, but the project owner would pay the amount determined. As the landowners explained their worries about he moneys they would get for their properties, they have been explained that a committee of experts would do the entire process, and would determine the fair land or property values.

In this monitoring period, no negative comments about the project have been received. Stakeholders tend to focus on the positive sides of the project such as creation of employment, increase in irrigation water etc. According to the answers of the stakeholders, since the local people have a close relationship with the project owners and the power plant manager, communication is established by directly visiting the power plant or by calling the power plant manager in case of any problem.

2.3 AFOLU-Specific Safeguards

The project is a non-AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project start date is 14.11.2013. First unit was commissioned in 14.11.2013.Later the second unit was commissioned in 12.12.2013. Since that date, there is no special event that may have impact on monitoring of GHG emission reductions. The following table summarizes the project milestones: The Major milestones at the project development history can be summarized as shown in the following table (Table 2):

Table 3:Significant Dates for the Project

Date	Milestone	Reference
February-04	First Feasibility Study Report Was prepared	FS Report
06-Feb-05	Electricity Production License issued by Energy Market Regulatory Authority (EMRA) (Updated on 17-Nov-2011)	EMRA License
10-Feb-06	Stakeholders Meeting Announced in Local news papers	EIA Report p. 117
15-Feb-06	Stake Holder Consultation Meeting Held at Karakoçan Town of Elazığ	EIA Report p. 116
16-Feb-06	Stake Holder Consultation Meeting Held at Elmalı Village	EIA Report p. 116

	of Mazgirt -Tunceli	
October-2006	EIA Final Report submitted to the MoEF for Approval	EIA Report
15-Nov-06	EIA Affirmative Certificate issued	See Annex-3
10-Jan-2008	Expropriation Approval issued by EMRA	Approval Letter
01-Apr-10	Carbon Finance considered	Board Decision
11-11-2011	Construction (re)-Started	Construction Contract Amendment
27-Jun-11	Ekobil Contracted for Carbon Finance	Contract
Sept-2011	Revised Feasibility Study Report Submitted to DSI	Revised FSR
10-Nov-2011	The Revised Feasibility Study Report Approved by DSI	Approval letter of DSI
18-Nov-2011	Water Usage Agreement amended by DSI to fit the capacity improvement	Water Usage Agreement
14-Dec-11	Validating DOE Contracted	Mail Order
16-Feb-12	PDD submitted to DOE	E-mail
24-Feb-12	Site Visit for Validation	DOE Testimonial

3.2 Deviations

2.1.1 Methodology Deviations

The UNFCCC methodology of ACM0002/ Version 13.0.0 and its related tools have been applied without any deviations.

2.1.2 Project Description Deviations

In the validated PDD it is stated that the project start date is 01.11.2013 or the commercial operation date. First unit of the project was commissioned in 14.11.2013. Other than that no deviation is observed.

3.3 Grouped Projects

Project is not a grouped project activity.

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 (TEIAŞ) Web Site
Value applied	(http://www.teias.gov.tr/istatistik2010/front%20page%202010-çiçek%20kitap/yakıt46-49/47.xls)
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	Data used for the calculation of $EF_{grid,OM,Simple,y}$
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	(http://www.teias.gov.tr/istatistik2010/front%20page%202010-çiçek%20kitap/yakıt46-49/49.xls http://www.teias.gov.tr/istatistik2010/front%20page%202010-çiçek%20kitap/yakıt46-49/47.xls)
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	Data used for the calculation of $EF_{grid,OM,Simple,y}$.
Comments	-

Data / Parameter	$EF_{CO2,i,y}$
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	Indicated in the Annex 2-Table-2 of validated 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	Data used both for the calculation of $EF_{grid,OM,Simple,y}$ and $EF_{EL,m,y}$
Comments	-

Data / Parameter	EG_y
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
Value applied	Indicated in the Annex 2-Table 3 and Table 4 of validated 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	Data used for the calculation of $EF_{grid,OM,Simple,y}$
Comments	-

Data / Parameter	$EG_{m,y}$
Data unit	MWh
Description	Net electricity generated and delivered to the grid by power unit m in year y
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 2008, 2009 and 2010.
Value applied	Indicated in the Annex 2-Table 8 of validated 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	Data used for the calculation of $EF_{grid,BM,y}$
Comments	-

Data / Parameter	$\eta m,y$
Data unit	*x*
Description	Average net energy conversion efficiency of power unit m in year y
Source of data	The default values provided at the Annex 1 of the "Tool to calculate emission factor for an electricity sector (Version 02.2.1) are used
Value applied	Please see Annex 1 of the "Tool to calculate emission factor for an electricity sector (Version 3.0.0)"
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 centre 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	Data used for the calculation of EFgrid,BM,y
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{PP\text{-}self\ consumption,\ y}$
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 of data is the main TEIAS meter recorded at the monthly reading protocols, the column related to electricity obtained from the Grid.The secondary source of data is the PMUM/MFRC web site screen shots, the column with the heading UECM.
Description of measurement methods and procedures to be applied	Measurements are to be made by electricity meters. That belong to the grid operator TEIAŞ. The meters are in compliance with the collected data. Data is 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	892.686 MWh
Monitoring equipment	All meters are in compliance with the communiqué[2] for Metering Devices to be used in the Electricity Market. They have an accuracy class of Class002 indicating an accuracy range of 0.2%.
QA/QC procedures to be applied	Measurements are carried out in compliance with the communiqué for Metering Devices to be used in the Electricity Market. The minimum accuracy of the meters are Class02, that is to say should be within the ±0.2% (±0.002) range. The monthly reported meter readings by the main meter, is cross-checked against the back up meter, if the reading difference is less than ±0.002 (±0.2%) than the meter readings are considered to be OK, if not than the meters are checked. The monthly reported readings are also cross checked against the monthly PMUM/MFRC screen shots. The PMUM/MFRC data of electricity sales are the proof for quality and reliability of data.

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

Purpose of the data	Data is used to calculate net electricity supplied to the grid.
Calculation method	Direct continuous measurement
Comments	-

Data / Parameter	$EG_{PP\text{-}gross, y}$
Data unit	MWh
Description	Quantity of electricity produced by the power plant , in y
Source of data	The Primary source of data is the Main TEIAS meter recorded at the monthly reading protocols, the column related to gross electricity supplied to the Grid. The secondary source of data is the PMUM/MFRC web site screen shots, the column with the heading ISVM
Description of measurement methods and procedures to be applied	Measurements made by electricity meters that belong to the grid operator , TEIAŞ. The meters are in compliance with the collected data. Data is 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	253’144.622 MWh
Monitoring equipment	All meters are in compliance with the communiqué for Metering Devices to be used in the Electricity Market. They have an accuracy class of Class 002 indicating an accuracy range of 0.2%.

QA/QC procedures to be applied	Measurements are carried out in compliance with the communiqué for Metering Devices to be used in the Electricity Market. The minimum accuracy of the meters are Class02, that is to say should be within the ±0.2% (±0.002) range. The monthly reported meter readings by the main meter, are cross-checked against the back up meter. If the reading difference is less than ±0.002 (±0.2%) than the meter readings are considered to be OK, if not than the meters are checked. The monthly reported readings are also be cross checked against the monthly PMUM/MFRC screen shots. The PMUM/MFRC data of electricity sales are also the proof for quality and reliability of data.Current meters details are as: Main Meter / Control Meter 9420077 / 9420078 9420079 / 9420080 These meters were calibrated in 2020 and they are valid until 2030.
Purpose of the data	Data is used to calculate net electricity supplied to the grid.
Calculation method	Direct continuous measurement
Comments	-

Data / Parameter	Cap_{PJ}
Data unit	*W*
Description	Installed capacity of the hydropower plants after the implementation of the Project Activity.
Source of data	Project site
Description of measurement methods and procedures to be applied	Turbine Supplier information on the equipment
Frequency of monitoring/recording	Once for each monitoring period
Value monitored	128.22 MWe
Monitoring equipment	N/A

QA/QC procedures to be applied	Supplier information on the related equipment and existence of the equipment is checked
Purpose of the data	Data is used to calculate power density.
Calculation method	*N/A*
Comments	-

Data / Parameter	A_{PJ}
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 full.
Source of data	Project Site
Description of measurement methods and procedures to be applied	The reservoir area corresponding to maximum operational level has been determined as a certain value according to the topographical maps. And a correlation graphic that exhibits therelationship between the water depth, reservoir area and the volume of the reservoir is plotted against a graphic. In order to make verification of the reservoir area, the monthly maximum water depth recordings is taken and the corresponding reservoir area is determined using the same graphic.
Frequency of monitoring/recording	Once during each monitoring period
Value monitored	10'830'000
Monitoring equipment	N/A
QA/QC procedures to be applied	The depth readings done on daily basis.
Purpose of the data	Data is used for the calculation of Project Emissions.
Calculation method	*N/A*
Comments	*N/A*

4.3 Monitoring Plan

The Monitoring Plan for the project consists mainly of the net electricity generation by the projectactivity. Based on the baseline scenario presented above, this amount of electricity would have been produced by the Turkish National Grid.

The electricity produced is sold to TEIAS. Therefore, TEIAS measures the electricity produced by 4 meters(Please see table 3). First meters were calibrated in 2012 and they were valid until 2022. However those meters were changed by TEIAS on 12.04.2020. New sets of meters are valid until year 2030.

Table 4:Information about Meters

Meter	**Main Meters**		**Back-Up Meters**	
Function	Group 1	Group 2	Group 1	Group 2
Located	At the plant	At the plant	At the plant	At the plant
Serial No	471008	471010	471009	471011
Calibration	2012	2012	2012	2012
Validity[3]	2022	2022	2022	2022
Meter	**Main Meters**		**Back-Up Meters**	
Function	Group 1	Group 2	Group 1	Group 2
Located	At the plant	At the plant	At the plant	At the plant
Serial No	9420077	9420079	9420078	9420080
Calibration	2020	2020	2020	2020

[3] Within the scope of the regulation in Turkey (https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5), the stamp year is taken as basis year and the year it is stamped(2012) is counted as the first year,regardless of the date and the remaining period is calculated from the year it was stamped(2012+10 years).

Validity	2030	2030	2030	2030

These meters are placed on the switchgear station where the power plant gets connected to theTurkish national grid. Those meters provides official data which read and recorded monthly by TEİAŞ officers, either remotely or onsite, for the purpose of recording amount of electricity sold to the grid. 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 and 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.The net electricity produced ($EG_{PP\text{-}net,\ y}$) in year y is calculated by subtracting the total electricity consumed by the hydroelectric power plant ($EG_{PP\text{-}self\ consumption,\ y}$), from the gross electricity generation ($EG_{PP\text{-}gross,\ y}$) . 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 are 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 4):

Table 5:Positions and responsibility of the VER Monitoring Team Members

Position	Responsibility
Tatar HEPP Manager	• Day to day operation of the Tatar HEPP, • Compliance of the project activity with the host countryrules and regulations • Coordination of the data collection and recording for theVCS 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 • Keeping the track record of PMUM/MFRC data
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 are performed by using the main metering devices and the back up/control metering devices for accuracy checks only. Data from metering devices are recorded by TEİAŞ on monthly agreed protocols and form the basis for electricity sales. In addition to the readings of the two metering devices,

generation data of the Tatar HEPP can be crosschecked, via the TEİAŞ – PMUM web site (http://pmum.teias.gov.tr) which is accessible by a password available to the electricity generation companies. The electricity generation data at the Market Financial Reconciliation Centre (MFRC/PMUM) web page is exhibit the net electricity generated less transmission loss, to be able to produce comparable numbers , the figures taken fromPMUM web site needs to be multiplied by the transmission loss factor of the grid.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline emissions (BEy) are calculated based on the following formula:

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ Where:

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

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

$EF_{grid,CM,y}$ = Combined margin CO2 emissions factor in year y (tCO2/MWh)And

And

$EG_{PJ,y} = EG_{Facility,y}$

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

The Combined margin CO_2 emissions factor in year y (tCO_2/MWh), $EF_{grid,CM,y}$, is fixed ex-ante for the duration of the crediting period, and is 0.53985 tCO_{2e}/MWh.

The following table is the Baseline emissions of the project calculated for the monitoring period.

Table 6: Baseline emissions of the project calculated for the monitoring period (National Grid Emission Factor EF_{CM} is 0.53985 tCO2e/MWh).

		A-Gross Electricity Production	B-Self Electricity Consumption	C-Net electricity production C=A-B	Baseline Emissions = $EG_{PP\text{-}net,y}$ * EF_{CM}
	Symbol	$EG_{PP\text{-}gross,\ y}$	$EG_{PP\text{-}self\ consumption,\ y}$	$EG_{PP\text{-}net,\ y}$	BE1
YEAR	Units	MWh	MWh	MWh	tCO_2e
2021	August	12'161.448	90.676	12'070.772	6'516.406
	September	4'659.818	95.120	4'564.698	2'464.252
	October	16'528.466	86.322	16'442.144	8'876.291
	November	13'304.948	49.596	13'255.352	7'155.902
	December	15'090.551	89.067	15'001.484	8'098.551
Total		61'745.231	410.781	61'334.450	33'111.40
2022	January	25'709.531	78.377	25'631.154	13'836.98
	February	20'817.664	75.691	20'741.973	11'197.55
	March	38'255.843	57.230	38'198.613	20'621.52
	April	20'073.375	73.630	19'999.745	10'796.86
	May	46'474.310	41.468	46'432.842	25'066.77
	June	28'498.546	65.770	28'432.776	15'349.43
	July	11'570.122	89.739	11'480.383	6'197.68
Total		**191'399.391**	**481.905**	**190'917.486**	**103'066.805**
Grand Total		**253'144.622**	**892.686**	**252'251.94**	**136'178.21**

5.2 Project Emissions

As the methodology states the PEy in case of a hydro power project is

calculated:"Emissions from water reservoirs of hydro power plants ($PE_{HP,y}$)

For hydro power project activities that result in new reservoirs and hydro power project activities that result in the increase of existing reservoirs, project proponents shall account for CH_4 and CO_2emissions from the reservoir, estimated as follows:"

''…the power density of the project activity (PD) is greater than 4 W/m^2 and less than or equal to 10 W/m^2:''

As shown by the following calculation, the project activity has a power density of 11.84 W/m^2, this is greater than 10 W/m^2,

Project Activity	Installed Capacity	/	Reservoir Area	=	Power Density
Tatar HEPP	128'220'000 W	/	10'830'000 m^2	=	11.84 W/m^2

Hence,

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

Where:

PEHP,y = Project emissions from water reservoirs (tCO2e/yr)

There are two diesel generators installed within the project boundary (one at the power house oneat the dam body). These are only utilized as back-up or emergency generators, therefore,the emissions from these back up generators have been deemed negligible as per the ACM0002 (version 13.0.0) methodology.

5.3 Leakage

There are no leakage emissions related to the project activity

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
Year 2021	33’111	0	0	33’111
Year 2022	103’066	0	0	103’066
Total	136’178	0	0	136’178

APPENDIX 1: EIA AFFIRMATION

T.C.
ÇEVRE ve ORMAN BAKANLIĞI
ÇEVRESEL ETKİ DEĞERLENDİRMESİ VE PLANLAMA
GENEL MÜDÜRLÜĞÜ

Karar Tarihi: 15./11/2006
Karar No : 1176

ÇED OLUMLU BELGESİ

16.12.2003 tarih ve 25318 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin 14. maddesi gereğince; *"Tatar Barajı, HES ve Malzeme Ocakları"* projesi hakkında *"Çevresel Etki Değerlendirmesi Olumlu Kararı"* verilmiştir.

Osman TÜZÜN
Bakan a.
Genel Müdür

Proje Sahibi : Darenhes Elektrik Üretimi A.Ş.
Projenin Yeri : Tunceli ve Elazığ İlleri