



**Verified Carbon
Standard**

AKINCI HYDROELECTRIC POWER PLANT



EKOBIL Environmental Services and Consultancy Ltd.

info@ekobil.com

Project Title	Akinci Hydroelectric Power Plant
Version	1.04
Report ID	AkinciVCSMR-1
Date of Issue	09-December-2020
Project ID	VCS 1380
Monitoring Period	24-October-2018 to 30-September-2020
Prepared By	Ekobil Environmental Services and Consultancy Ltd.
Contact	Ahlatlibel Mahallesi 1839 Sokak No 56 Çankaya 06805 ANKARA-Turkey Tel:+90.312 4891338 e-mail: info@ekobil.com, www.ekobil.com

CONTENTS

1	PROJECT DETAILS	3
1.1	Summary Description of the Implementation Status of the Project	3
1.2	Sectoral Scope and Project Type	5
1.3	Project Proponent	5
1.4	Other Entities Involved in the Project	6
1.5	Project Start Date	6
1.6	Project Crediting Period	6
1.7	Project Location	6
1.8	Title and Reference of Methodology	7
1.9	Participation under other GHG Programs	8
1.10	Other Forms of Credit	8
1.11	Sustainable Development	8
2	SAFEGUARDS	10
2.1	No Net Harm	10
2.2	Local Stakeholder Consultation	11
2.3	AFOLU-Specific Safeguards	13
3	IMPLEMENTATION STATUS	14
3.1	Implementation Status of the Project Activity	14
3.2	Deviations	15
3.2.1	Methodology Deviations	15
3.2.2	Project Description Deviations	16
3.3	Grouped Projects	16
4	DATA AND PARAMETERS	17
4.1	Data and Parameters Available at Validation	17
4.2	Data and Parameters Monitored	20
4.3	Monitoring Plan	22
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	27
5.1	Baseline Emissions	27
5.2	Project Emissions	28
5.3	Leakage	29
5.4	Net GHG Emission Reductions and Removals	29
	APPENDIX 1: PROJECT'S SINGLE LINE DIAGRAM	30

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Firat Elektrik Üretim ve Ticaret A.S. which is owned by Aydem Yenilenebilir A.Ş.. has constructed a 99 MWe capacity Hydroelectric Power plant. Akıncı Hydroelectric Power Plant (Akıncı HPP in short) is a project that is designed and constructed on Kelkit river , Reşadiye-Tokat, Turkey. Kelkit River is a tributary of Yeşilırmak River, which is one of the biggest rivers in Turkey, and gives its name to the Yeşilırmak basin that makes up one of the 26 big river catchments of Turkey. The purpose of the project is to supply electricity to the Turkish power grid, from a renewable source.

The Project Activity (PA) utilizes the Kelkit river water in a diversion-type run-of-river hydro power scheme to generate electricity with zero carbon emissions for the Turkish Power Grid. The PA is displacing electricity that would otherwise be generated by the existing grid of the host country. Annual gross electricity production by the PA is estimated to be 439,360 MWh Therefore the Project Activity is expected to lead to an emission reduction of 225,831 tonnes CO_{2e} annually.

The environmental impacts of the project is kept to a minimum level and all the regulations that are in act in the host country, Turkey, are targeted to be complied with the Akıncı HPP project. At the planning stage these impacts have been investigated and were presented to the Ministry of Environment and Urban Planning (MoEUP), in the form of an Environmental Impact Assessment Report. The report was assessed and the MoEUP and the project was granted an EIA Affirmative certification, indicating that the project is good to be implemented only if the mitigation measures reported are implemented and all the undertakings stated in the report are complied with. Please also note that, 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 passage way) within the regulator for the downstream and upstream movement of the fish, to facilitate fish migration.

The project start date is 24.10.2018. Unit 1 and 2 of the Akıncı Hydroelectric Power Plant was commissioned in 24.10.2018. After that, Unit 3 of the Akıncı Hydroelectric Power Plant was commissioned in 24.01.2019. Construction has started in 29.07.2013.

During this monitoring period the project has produced a net total of 734,652.19 MWh electricity and a total amount of 377,610 tCO_{2e} of emission reduction.

Table 1: The Major Milestones of the Project Activity

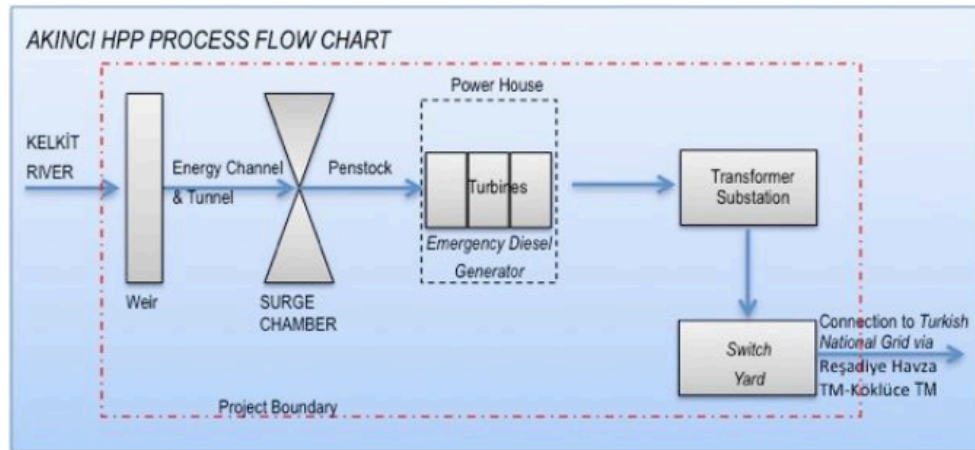
Date	Milestone	Reference
22/11/07	Stake Holder Consultation Meeting is held in Reşadiye -Tokat	Meeting Minutes (See Annex 4 in the validated PDD version 2.00)
18/03/08	EIA Affirmative certification issued	Certificate
18/09/08	The EMRA decision for expropriation issued	Expropriation decision letter
15/12/11	Water usage agreement signed with DSI ¹	Water usage agreement
28/03/12	The Electricity Production Licence is granted	Licence number EÜ/3749-1/2297
09/07/12	The EIA Title Change Approved	Correspondence with the Ministry of Environment and Urban Planning (MoEUP)
14/09/12	Amendment to the Water Usage Agreement Signed	Water Usage Agreement Amendment
08/03/13 ²	BRK Group acquired the project	Stock purchase agreement
29/07/13	The Special Provincial Authority is informed about the construction start up	Correspondence to SPA dated 26/07/2013 and registered as letter number 7091
18/03/14	DOE Contracted for Validation	Contract
24/09/14	First segment of Loan is utilized	Official Payback term sheet
27/10/14	Site visit with the DOE	DOE testimonial
24/07/18	System Usage Agreement	Agreement
24/10/18	Provisional acceptance certificate	Certification

How the project activity will be operating, and the boundary of the project activity (indicated in broken red line) is outlined in the following figures (Figure 1).

¹ DSI-Devlet Su İşleri –General Directorate of State Hydraulic Works is the institution responsible for all the ground and surface water resources of the host country.

² Date identified as the investment decision date.

Figure 1: Flow chart showing the basic operational principles of the project activity, and the project boundary.



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	Aydem Yenilenebilir Enerji A.Ş. ³
Contact person	Özgün Gül Koparan
Title	Environmental Affairs Manager
Address	Adalet Mah. Hasan Gönüllü Bulvarı No:15-1 Merkezefendi Denizli- Turkey
Telephone	+90 258 242 27 76
Email	ozgun.gulkoparan@aydemenerji.com.tr

³ Bereket Energy was the major shareholder of Fırat Elektrik Üretim and as the Bereket Changed title as a company policy they have dissolved all the individual sister companies that hold licences of facilities (like the Akinci HPP) and changed the ownership as Aydem Yenilenebilir A.Ş.

1.4 Other Entities Involved in the Project

Organization name	Ekobil Environmental Services and Consultancy Ltd. ⁴
Role in the Project	Preparation of the Project Description Document and the monitoring report ⁵
Contact person	Dr. Aslı Sezer Özçelik
Title	Partner
Address	Güneykent Sitesi 1839. Sk. No.56 Ahlatlıbel Mah. Çankaya-Ankara-Turkey
Telephone	+903124891338
Email	asli.ozcelik@ekobil.com

1.5 Project Start Date

Project start date is 24.10.2018.

1.6 Project Crediting Period

The project crediting period is 10 years: 24/10/2018-23/10/2028 (both days inclusive). The crediting period is renewable twice.

1.7 Project Location

The host party is the Republic of Turkey.

The Project is located at the Black Sea Geographical Region/ Tokat Province

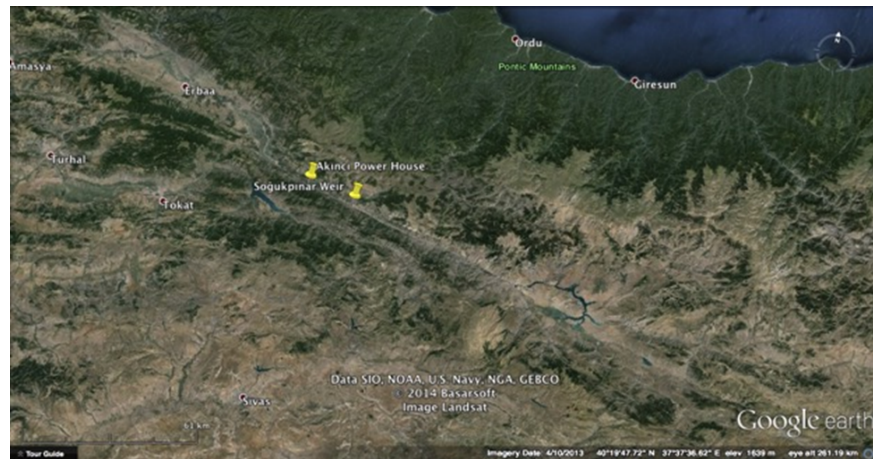
The following are the exact coordinates of the main project structures, as shown in the following figure (Figure 2).

	Weir Point 1	Weir Point 2	Power House
Latitude:	40°23'44.16"N	40°23'48.01"N	40°26'23.86"N
Longitude:	37°18'55.93"E	37°18'54.10"E	37°06'53.28"E

⁴ Ekobil is a limited liability company registered to the Ankara Chamber of Commerce with the registration number of 145009 and with the full title of Ekobil Çevre Hizmetleri Danışmanlık Eğitim Tarım Hayvancılık Madencilik İnşaat İthalat İhracat Turizm ve Ticaret Limited Şirketi

⁵ Turkuaz Karbon Varlık Yönetimi Enerji Proje ve Dan. San. İth. İhr. Ltd. Şti. subcontracted Ekobil for PDD writing and the project owner contracted Ekobil directly for the monitoring stage.

Figure 2: Google Earth image showing the exact project location within Turkey, and with respect to Tokat Province.



1.8 Title and Reference of Methodology

Approved consolidated baseline and monitoring methodology ACM0002 “Large-scale Consolidated Methodology; Grid-connected electricity generation from renewable sources.” Version 15.0.0.

The Approved Methodology refers to the following tools:

- “Tool for the demonstration and assessment of additionality” (Version 07.0.0; EB 70 - Annex 8)
- “Tool to calculate the emission factor for an electricity system”. (Version 04.0.0;EB 75- Annex 15)

- "Guidelines on the assessment of investment analysis" (Version 5; EB62-Annex 5)

1.9 Participation under other GHG Programs

The project is a voluntary project and the host country, Turkey cannot host CDM or JI projects. The project has not been registered under any other voluntary GHG program.

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 project does not generate other form of environmental credits such as Green Power Certificates. 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.

1.11 Sustainable Development

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

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

SDG-7 on access to affordable, reliable, and sustainable energy, as the project is not relying on imported fossil fuels.

SDG-8 is to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. In this project, occupational trainings and occupational health trainings were given regularly. The project providing decent and secure work environment.

SDG-12 is to ensure sustainable consumption and production patterns. As sustainable consumption and production aims the transition towards low-carbon and green economies, this project directly adapt it since hydroelectric power plants significantly contribute to the reduction of GHGs.

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.

SDG 14-Supporting life below water as the project activity is not effected on water quality. No pollution from any source will be emitted into the river from the operation of the plant. All activities related to fuels and oils is done in a drained area to prevent leakage, and the drained excess fuels and oils will be transferred to waste treatment facilities.

SDG 15- Supporting life on land: Any Natural Parks, Wetlands, Natural Monuments, Nature Protected Areas, Wildlife Protected Areas, Biogenetic Reserve Areas, Biosphere Reserves, Natural Sites, Special Environmental Protection Areas have not been destroyed or effected from the project.

SDG-17-Strengten the means of implementation and revitalize the global partnership for sustainable development. The project contributes to sustainable development in two major ways in Turkey:

Akıncı HPP presents environmental benefits:

- As a renewable energy source hydropower can be used without jeopardizing the supply of primary energy sources in the future
- The proposed project will significantly contribute to the reduction of GHGs.
- 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.

Akıncı HPP presents significant socio-economic benefits:

- In the construction phase of Akıncı HPP and operation of the plant resulted in the need of extra employment in the local area. Priority is given to local labor force and necessary trainings is organized to improve vocational capacity of the workers.
- Construction materials are, if possible, supplied through local resources.

2 SAFEGUARDS

2.1 No Net Harm

In accordance with “Environmental Law” No. 2872 (Issued in 1983), Annex 2 of Environmental Impact Assessment (EIA) Regulation (issued in 1993 and revised in 2001), run-of-river type HPPs with an installed capacity of more than 50 MW are subject to a full EIA investigation or report preparation. The project undergone the process and was granted an EIA affirmative certification on 18 March 2008. Since the certification was issued to the earlier production license owner, the new license owner re-applied for the title change and on 9 July 2012 The Ministry of Environment and Urban planning, answered that the certification was valid for the new title owner and all the undertakings stated in the final EIA report was valid for the project owner.

Some possible environmental impacts during construction and operating phases stated in the EIA report are summarized in the following:

Air quality

Models of dust flow and emissions from the project activity in relation to the nearest residential areas revealed no significant effects and values were well within the regulation standards. The provisions of “Regulations for Control of Air Pollution Caused by Industrial Facilities”, announced in the Official Gazette No. 26236, dated 22/07/2006, is observed during construction.

Noise

Modelling the noise level of the site predicted that both day and night time 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 the Article 25 of the Regulations for Evaluation and Management of Environmental Noise announced in the Official Gazette No. 25862 on 01.07.2005.

Water quality

The project activity is not expected to have any effect on water quality. No pollution from any source is emitted into the river from the operation of the plant. Hazardous Material and Waste Obtaining, handling and transportation of the benzene and oil that is used during construction is done in accordance with the “Control of Hazardous Waste Directives” which were published in the Official Gazette number 25755 on March 14th 2005 and the “Control of Oil Wastes Directives” which were published in the Official Gazette number 25353 on January 21st 2004. All activities related to fuels and oils are done in a drained area to prevent leakage, and the drained excess fuels and oils are transferred to waste treatment facilities.

Other hazardous waste materials such as used tires, used batteries, cables, paint, barrels, oil contaminated soil, oil preserving filters, etc., is be piled in a designated area on site temporarily in accordance with Control of Hazardous Waste Directive which was published in the Official Gazette dated March 14th, 2005 and numbered 25755 and is ultimately be transported to the nearest hazardous waste recycling or discharge plants.

As there was no settlement in the reservoir area, resettlement is not needed for the Project Activity.

2.2 Local Stakeholder Consultation

In accordance with “Environmental Law” No. 2872 (Issued in 1983), Annex 2 of Environmental Impact Assessment (EIA) Regulation (issued in 1993 and revised in 2001), within the framework of the Environmental Impact Assessment Process, a stake holders consultation meeting was held on 22/11/2007, at 15:00 , at the restaurant nearby the Avşarlar Gas Station along the Reşadiye –Niksar Highway, at the 5th km. As inline with the regulation the meeting was announced on 17/11/2007 on Tokat Newspaper, and on 17-18/11/2007 on Referans Newspaper (Nation Wide) and on 19/11/2007 at Danişment Newspaper. A translation of the meeting minutes is provided below, and the original meeting minutes and the announcements are given at Annex-4 in the validated PDD. The documents presented in Annex 4 are provided by the Provincial directorate of the Ministry of Environment and Urban Planning (please note that at the time of stakeholder meeting the Ministry was named as Ministry of Environment and Forestry).

The meeting minutes can be summarized as follows:

- Mr. Cemalettin Şirinoğlu, the deputy division manager of Environmental Management , EIA and Planning from the Provincial directorate of the Ministry of Environment and Forestry, made an opening speech and explained the purpose of the meeting.
- Mr. Fazıl Baştürk (Civil Engineer) from the Derya Engineering and Consultancy company (The company that prepared the EIA report) made a presentation and explained the project features showing the pictures of the locations where main elements of the project is placed, and emphasized the importance of energy production.
- Mr. Dursun Gül (citizen of Çayırpınar village) requested the canal to pass as a tunnel indicating the danger an open canal may pose over the life of children and animals. HE indicated that children may fall into the canal or animals could be lost.
- Mr. Fazıl Baştürk (EIA Report Consultant) replied that the canal would be secured by security wires and fencing and the design of the project involves a canal. (Please note that in the final design the conveyance system involves a smaller open canal, but majority of the system is made up of a tunnel and a conduit).

- Mr. Ergun Kılıçarslan (president of the Reşadiye Chamber of Agriculture) asked the land that would be utilized by the canal and the extend of the areas that would be expropriated.
- Mr. Adem Baştürk (EIA Report Consultant) explained that the canal is be passing more from state owned land to keep the expropriation issues to a minimum level.
- Mr. Sami Altıntaş (Citizen of Çayırpınar Köyü), explained that there are existing irrigation canals, and asked if these canals would be affected from the project.
- Mr. Adem Baştürk (EIA Report Consultant) replied that the project would not cause any problem for the existing canals.
- Mr. Salih Oruç (Citizen of Saraykışla village) asked if it would be possible to supply irrigation water from the project to the nearby fruit yards and fields?
- Mr. Adem Baştürk (EIA Report Consultant), explained that the purpose of the project was electricity production and it was not intended to provide irrigation water to the nearby fields and fruit yards.
- Mr. Abdullah Yıldız (Deputy Mayor of Niksar) requested the employment of people from the project vicinity for construction works.
- Mr. Cemal Demiryürek (Citizen of Saraykışla village) explained that there is a brook that brings water to their village, from the Zmen Lake. He asked if this would effect the canal of the project.
- Mr. Adem Baştürk (EIA Report Consultant), explained that the project has no interaction with the mentioned brook.
- Mr. Murat Saraç (DSI 7th District representor) Asked what would be the source of the drinking and utility water at the project site. Would they utilize the ground water? What are the precautions they were planning incase of a flood? And asked if the nearby soda ash factory would be effected?
- Mr. Adem Baştürk (EIA Report Consultant) explained that these issues would be dealt with in detail in the EIA report.
- As there were no further questions, Mr. Cemalettin Şirinoğlu, the deputy division manager of Environmental Management , EIA and Planning from the Provincial directorate of the Ministry of Environment and Forestry, closed the meeting at 15:40, and these minutes are written in two pages and signed below:

List of Signatures:

Name Surname	Affiliation
Murat Saraç	General Directorate of State Hydraulic Affairs 7th District representor
Abdullah Yıldız	Deputy Mayor of Niksar
Cemal Demiryürek	Citizen of Saraykışla Village
Ergün Kılıçarslan	President of the Reşadiye Chamber of Agriculture
Dursun Gül	Citizen of Çayırpınar Village
Sami Altındaş	Village head (Muhtar) of Çayırpınar village
Cemalettin Şirinoğlu	the deputy division manager of Environmental Management , EIA and Planning from the Provincial directorate of the Ministry of Environment and Forestry
Salih Oruç	Citizen of Saraykışla Village
Ünal Ertürk	Provincial directorate of the Ministry of Environment and Forestry, Manager
A. Runa Orhon	Representor of General Directorate of Mineral Research and Exploration
Prof. Dr. Adem Baştürk	Representor of the EIA Consultant Company
Fazıl Baştürk	Representor of the EIA Consultant Company
Samet Birgören	Representor of the Eti Elektrik (Project tittle owner back then)

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 24.10.2018. Unit 1 and Unit 2 was commissioned in 24.10.2018. Unit 3 was commissioned in 24.01.2019 which is also connected to Akinci Hydroelectric Power Plant . 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:

Table 1 : Chronological history of the project development and the Significant dates for the project monitoring period:

Date	Milestone
22/11/07	Stake Holder Consultation Meeting is held in Reşadiye -Tokat
18/03/08	EIA Affirmative certification issued
18/09/08	The EMRA decision for expropriation issued
15/12/11	Water usage agreement signed with DSI ⁶
28/03/12	The Electricity Production Licence is granted
09/07/12	The EIA Title Change Approved
14/09/12	Amendment to the Water Usage Agreement Signed
08/03/13⁷	BRK Group acquired the project
29/07/13	The Special Provincial Authority is informed about the construction start up
18/03/14	DOE Contracted for Validation
24/09/14	First segment of Loan is utilized
27/10/14	Site visit with the DOE
24/07/18	System Usage Agreement
24/10/18	Provisional acceptance certificate
27/12/19	Bereket Enerji Üretim A.Ş. ⁸ Title Changed to Aydem Yenilenebilir Enerji A.Ş.

⁶ DSI-Devlet Su İşleri –General Directorate of State Hydraulic Works is the institution responsible for all the ground and surface water resources of the host country.

⁷ Date identified as the investment decision date.

⁸ Bereket Energy was the major shareholder of Fırat Elektrik Üretim they changed title as Aydem Yenilenebilir Enerji A.S

3.2 Deviations

3.2.1 Methodology Deviations

The UNFCCC methodology of ACM0002/ Version 15.0.0 and its related tools have been applied without any deviations.

There is no deviation except which is mentioned in the below Monitoring parameter :

Data / Parameter:	APJ
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.
Measured /Calculated /Default:	Indirectly measured based on the reservoir area map provided in Annex 6 of VCS-PD.
Source of data:	Surface area determined using the lake surface area map provided in Annex-6 of VCS-PD.
Description of measurement methods and procedures to be applied:	The reservoir area corresponding to maximum operational level has been determined via the topographic map showing the lake area, presented in Annex-6 of VCS-PD.
Frequency of monitoring/recording:	Is not monitored as it is fixed and cannot alter.
Value applied:	314.517
Monitoring equipment:	-
QA/QC procedures to be applied:	N/A
Calculation method:	N/A
Any comment:	-

The rational for this can be explained as follows:

Although the methodology (ACM002, v.15.0.0) requires reservoir area to be monitored, since the power density of the project activity is very large, and the area flooded due to the project activity cannot exceed the above given amount (314.517 m²; See also Annex-6 in the validated PDD: The Map Showing the Reservoir Area of the Project Activity on page 81), the parameter related to the reservoir area is not going to be monitored during the crediting period for Akinci HPP Project. The deviation was accepted during validation and can confirmed from the validated PDD (version 2.0)

3.2.2 Project Description Deviations

Bereket Energy was the major shareholder of Fırat Elektrik Üretim and as the Bereket Changed title as a company policy they have dissolved all the individual sister companies that hold licences of facilities (like the Akıncı HPP) .Then, title of the company changed from Bereket Enerji Üretim San. ve Tic. A. Ş. to Aydem Yenilenebilir Enerji A.Ş which is the current project proponent.

Other than that,the project activity is in compliance with the scenario described at the Project Design Document, and validated by the validation report dated 08/12/2014.

3.3 Grouped Projects

The project category is Sectoral Scope 1: Energy industries (renewable--non -renewable sources). The project is a non-grouped, standalone 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>i</i> consumed by relevant power plants in Turkey in years, 2010, 2011, 2012.
Source of data	Official publications at the Turkish Electricity Transmission Company (TEİAŞ) Web Site (http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2012/yakit48-53/49.xls)
Value applied:	Please see Annex 2-Table-1 in the validated PDD.
Justification of choice of data or description of measurement methods and procedures applied	Once for each crediting period using the most recent three historical years for which data is available at the time of submission of the CDM-PDD to the DOE for validation
Purpose of Data	Data used for the calculation of EF _{grid,OM,Simple,y}
Comments	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.

Data / Parameter	NCV _{i,y}
Data unit	GJ/Mass or Volume Unit
Description	Net Calorific Values for fossil fuel type <i>i</i> in year, for the years 2010, 2011 and 2012
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 (http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2012/yakit48-53/49.xls) http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2012/yakit48-53/51.xls)
Value applied	Please see Annex-2-Table-5 in the validated PDD (version 2.0)
Justification of choice of data or description of measurement methods and	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.

procedures applied	
Purpose of data	Data used for the calculation of $EF_{grid,OM,Simple,y}$
Comments	As data on the NCV is not published directly on the TEİAŞ website, this data is calculated using the heating values of fuels and the volume or mass of fuels consumed for each year.

Data / Parameter	$EFCO2,i,y$
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	Please see Annex-2,Table-2 in the 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 04.0.0 , 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 http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2014/uretim%20tuketim(24-48)/35(1984-2014).xls
Value applied	Please see Appendix-2-Table 3 and Table 4 in validated PDD version 2.00.
Justification of choice of data or description of measurement methods and	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.

procedures applied	
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 2010 ⁹ , 2011 ¹⁰ and 2012 ¹¹ .
Value applied	Please see Appendix-2-Table 8 in validated PDD version 2.00.
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	-
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 04.0.0)” are used
Value applied	Please see Annex 1 of the “Tool to calculate emission factor for an electricity

⁹ <http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202010.pdf>

¹⁰ <http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2011.pdf>

¹¹ <http://www.teias.gov.tr/KAPASITEPROJEKSIYONU2012.pdf>

	sector (Version 04.0.0)”
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 $EF_{grid,BM,y}$
Comments	-

4.2 Data and Parameters Monitored

The following are the data and parameters monitored:

Data / Parameter:	EGPP-Gross Generation, y
Data unit:	MWh
Description:	Quantity of electricity exported by the power plant to the Grid in year y
Source of data:	The Primary source of data is the TEIAS meter readings recorded remotely and accessible via the PMUM/MFRC web site . It is planned to install one bidirectional meter.
Description of measurement methods and procedures to be applied:	Measurements are to be made by an electricity meter that belongs to the grid operator, TEİAŞ. There is one main meter that record the electricity import and export. The meter is in compliance with the collected data. Data is used to calculate the net electricity supplied to the grid. The meter readings are accessible via an Automatic Meter Reading Software remotely by the project owner. The data is also automatically recorded to the PMUM/MFRC servers to be obtained as monthly screen outputs. As a general practice, only the main meter readings are accessible but there is going to be one back up meter to ensure that data recording in case of main meter failure, are not interrupted.
Frequency of monitoring/recording	Recorded continuously, read remotely by TEİAŞ, and accessible monthly via the PMUM/MFRC web site , Reported annually on the Monitoring Report.
Value monitored	Total 734,752.98 MWh
Monitoring equipment:	Both the main meter and the back up meter is in compliance with the communiqué for Metering Devices to be used in the Electricity Market .
QA/QC procedures to be applied:	Measurements is carried out in compliance with the communiqué for Metering Devices to be used in the Electricity Market. The monthly reported meter

	reading by the main meter, is cross-checked against the Main back up meter by a technician that visits and record the back up meter readings on a monthly basis.
Purpose of the data	Data is used to calculate net electricity supplied to the grid.
Calculation method:	Direct continuous measurement
Comments	-

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 of data is the TEIAS meter readings recorded remotely and accessible via the PMUM/MFRC web site .
Description of measurement methods and procedures to be applied:	Measurements are to be made by an electricity meter that belong to the grid operator, TEIAS. It is planned to install one bidirectional meter that record the electricity imported from the grid. The meter is in compliance with the collected data. Data is used to calculate the net electricity supplied to the grid. The meter reading is accessible via an Automatic Meter Reading Software remotely by the project owner. The data is automatically recorded to the PMUM/MFRC servers to be obtained as monthly screen outputs. As a general practice, only the main meter readings are accessible but there is going to be one back up meter to ensure that data recording in case of main meter failure, is not interrupted.
Frequency of monitoring/recording	Recorded continuously, read remotely by TEIAS, and accessible monthly via the PMUM/MFRC web site , Reported annually on the Monitoring Report.
Value monitored	Total 100.8 MWh
Monitoring equipment:	Both the main meter and the back up meter is in compliance with the communiqué for Metering Devices to be used in the Electricity Market .
QA/QC procedures to be applied	Measurements is carried out in compliance with the communiqué for Metering Devices to be used in the Electricity Market. The monthly reported meter reading by the main meter, is cross-checked against the Main back up meter by a technician that visits and record the back up meter readings on a monthly basis.

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 hydro power plant after 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	Observed via the SCADA system of the project activity.
Frequency of monitoring/recording	Once for each monitoring period
Value monitored	99,000,000 W
Monitoring equipment	SCADA System of the Project activity
QA/QC procedures	Turbine labels checked with SCADA System reading.
Purpose of the data	To monitor capacity of the project
Calculation method	N/A
Comments	-

4.3 Monitoring Plan

Objectives of the monitoring program

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

Data to be monitored

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

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

Monitoring procedures

The monitoring is conducted by the Verified Emission Reduction (VER) Monitoring Team. The VER Team Members, and their position and duties for the monitoring is outlined in the following table (Table 3):

Table 3: Positions and responsibilities of the VER monitoring team members.

Position	Responsibility
Akıncı HPP Manager	- Day to day operation of the Akıncı HPP, - Compliance of the project activity with the host country rules and regulations - Coordination of the data collection and recording for the monitoring report.
Chief Electrical Technician	- Day to day follow up of electrical equipment - Recording and monitoring of the electricity generation data via the meters located at the Akıncı Powerhouse. - Making regular checks of the consistency of the back up meters to ensure the operation of the main meters.

Accounts Manager	• Data keeping for power sales • Extracting the main meter readings from the PMUM/MFRC website with the help of the account credentials assigned to the project owner.
Chief Mechanical Technician	• 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 imported from the grid and exported to the grid is planned to be recorded continuously via one bidirectional meter that belongs to the Grid operator TEİAŞ.

The data is measured continuously and recorded on an hourly basis to the PMUM/MFRC servers.

Data can be accessed remotely via the Automated Meter Reading Software installed to the project owners computers, but is also continuously recorded to the PMUM/MFRC servers.

Each month the internal and external consumption recorded hourly by the meters are extracted

The PMUM/MFRC servers automatically calculate the overall grid loss of the country and reflect it in the monthly meter reading outputs of each meter, along side with the direct meter readings. The amount indicated with loss are not used in the emission reduction calculations as the loss calculated by the grid operator is beyond the project boundary.

Monitoring equipment

Data will be monitored continuously by redundant metering devices, which will provide the data for the monthly invoicing to TEİAŞ. All meters will be in compliance with the communiqué for Metering Devices to be used in the Electricity Market¹². Meters location can be seen in single line diagram (Appendix 1). Information about the meters is given in the table below (Table 4).

¹² The latest version of the communiqué (in Turkish) can be found in the following link: <http://www.epdk.gov.tr/web/elektrik-piyasasi-dairesi/44>

Table 4:Information about the meters

Meter number	Manufacturer	Calibration Date	Valid Until	Accuracy Class
Main Meter:7019918	EMH	14.11.2017	14.11.2027	0.2S
Spare Meter :7019919	EMH	14.11.2017	14.11.2027	0.2S

Electricity meters

The main and back-up electricity meter is bi-directional for quantifying the electricity delivered by the Project Activity to the grid.

The meters are in compliance with the standards of the Turkish Standards Institute and have obtained a “Type and System Approval” certificate from the Ministry of Trade and Industry. In case there are modifications to the standards, the modified standard shall be valid; and in case a valid standard is cancelled or abolished, the new standard shall be valid. The standards that are used are TS-620 EN 60044-1 and TS718 IEC60044.2 for main and back-up meter, respectively. The meters shall be factory calibrated by the manufacturer before installation. Records of the meter (type, made, model and calibration documentation) are retained in the quality control system.

Data collecting and recording

I. The net electricity generation by the project activity. Based on the baseline scenario presented above, this amount of electricity would have been produced by the Turkish National Grid.

The electricity produced is exported to TEİAŞ. Therefore, TEİAŞ measures the electricity produced.

TEİAŞ also conducts the calibration and maintenance of the 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 are done and the meters are checked continuously if there is a difference of ± 0.5 % in the readings of the main and the back-up meters, the calibration is repeated.

At the end of each month, the monthly generation is accessed remotely via the PMUM/MFRC web site by the Project owners account manager to determine the invoiced generation amount. In case of failure of any of the main meters, their relevant control meters are used to determine the invoiced generation amount.

The net electricity produced (EGPP-net, y) in year y is calculated by subtracting the total electricity consumed by the hydroelectric power plant (EGPP-self consumption, y) , from the gross electricity generation (EGPP-gross, y) . After obtaining the net electricity production value,

the emission reductions are calculated by multiplying the net electricity with the Ex-ante Combined Margin Emission Factor calculated above.

Measuring Installed Capacity

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 installed capacity of the plant is measured from SCADA once a year while the plant is operated with full load and the related data is stored as per the monitoring program.

Data management

At the end of each month, electricity supplied to the grid is transferred into an electronic spread sheet titled raw data, so that it can be processed for verified emission reduction calculations. The data to be measured for installed capacity is entered into an electronic spread sheet at the end of each year. The electronic files is backed up on both hard drives and on a Compact Discs (CD).

Quality Control and Assurance (QC/QA)

All of the main and back-up meters are owned and installed by the grid operator, TEIAS. The Project Owner has signed an agreement with the grid operator to specify the QA procedure for measurement and calibration to ensure the measurement accuracy of the main and back-up meters are in compliance with national regulations. The Calibrations of the electricity meters are valid for the next 10 years after calibration,

The grid operator's Metering Officer should be notified of any failure of one of the meters. TEIAS is the only one entity, authorized to deal with fixing, calibrating, or changing the meters, which are done either by the grid operator or by a company authorized by the grid operator.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

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

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

Where:

BE_y = 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

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

Table 5: Summary of the GHG removals by the project activity (Combined margin emission factor: 0.5140016 tCO_{2e}/MWh)

		A-Gross Electricity Production	B-Self Electricity Consump tion	C-Net electricity productio n C=A- B	Baseline Emissions = EG_{PP-net,y} * EF_{CM}
	Symbol	EG _{PP-gross, y}	EG _{PP-self consumption, y}	EG _{PP-net, y}	BE1
YEAR	Units	MWh	MWh	MWh	tCO _{2e}
2018(from 24.10.2018 to 31.12.2018)	October	0.00	45.84	-45.84	-23.56
	November	9,220.68	18.33	9,202.35	4,730.02
	December	22,768.58	17.04	22,751.54	11,694.33
Total in 2018		31,989.26	81.21	31,908.05	16,400
2019(from 01.01.2019 to 31.12.2019)	January	45,628.74	0.35	45,628.39	23,453.07
	February	39,170.42	0.00	39,170.42	20,133.66
	March	35,744.55	0.00	35,744.55	18,372.76
	April	38,773.26	0.21	38,773.05	19,929.41
	May	46,079.03	0.22	46,078.81	23,684.58

	June	33,299.65	2.31	33,297.34	17,114.89
	July	35,891.21	0.00	35,891.21	18,448.14
	August	37,042.82	0.48	37,042.34	19,039.82
	September	37,274.57	0.00	37,274.57	19,159.19
	October	38,613.78	0.00	38,613.78	19,847.54
	November	35,765.53	0.20	35,765.33	18,383.44
	December	26,158.45	10.25	26,148.20	13,440.22
Total in 2019		449,442.01	14.02	449,427.99	231,006
2020(from 01.01.2020 to 31.08.2020)	January	22,619.73	1.86	22,617.87	11,625.62
	February	29,858.91	0.00	29,858.91	15,347.53
	March	36,189.87	0.36	36,189.51	18,601.47
	April	20,738.40	3.20	20,735.20	10,657.93
	May	34,438.61	0.12	34,438.49	17,701.44
	June	36,566.21	0.00	36,566.21	18,795.09
	July	36,842.39	0.03	36,842.36	18,937.03
	August	36,067.60	0.00	36,067.60	18,538.80
	September	34,923.98	0.00	34,923.98	17,950.98
Total in 2020		253,321.71	5.57	253,316.15	130,204
Grand Total		734,752.98	100.80	734,652.19	377,610

5.2 Project Emissions

As the methodology states the PE_y 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 CH₄ and CO₂ emissions from the reservoir, estimated as follows:”

“...the power density of the project activity (PD) is greater than 4 W/m² and less than or equal to 10 W/m²:”

Capacity (W)	/	Reservoir Area (m ²)	=	Power density (W/m ²)	> 10 (W/m ²)
99'000'000	/	314'579	=	314.71	> 10 (W/m ²)

The project has a power density of 314.71 W/m² therefore:

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

Where:

PE_{HPP,y} Project emissions from water reservoirs (tCO₂e/yr)

Although there will be an emergency/back up diesel generator installed within the project boundary, the emissions from these have been deemed negligible as per the ACM0002 (version 15.0.0) methodology, since it will be solely utilized in case of an emergency, such as a power outage.

In addition to this Although the methodology (ACM002, v.15.0.0) requires reservoir area to be monitored, since the power density of the project activity is very large, and the area flooded due to the project activity cannot exceed the above given amount (314,579 m²; See also Annex-5 in the validated PDD (version 2.0): The Map Showing the Reservoir Area of the Project Activity on page 75), the parameter related to the reservoir area is not going to be monitored during the crediting period for Akıncı HPP Project.

5.3 Leakage

There are no leakage emissions related to project activity.

5.4 Net GHG Emission Reductions and Removals

The following table gives a summary of the project activity related emission reductions with respect to vintage years.

Table 6: Project activity related emission reductions with respect to vintage years

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 (24/10/2018 to 31/12/2018)	16,400	0	0	16,400
2019 (01/01/2019 to 31/12/2019)	231,006	0	0	231,006
2020 (01/01/2020 to 30/09/2020)	130,204	0	0	130,204
Total	377,610	0	0	377,610

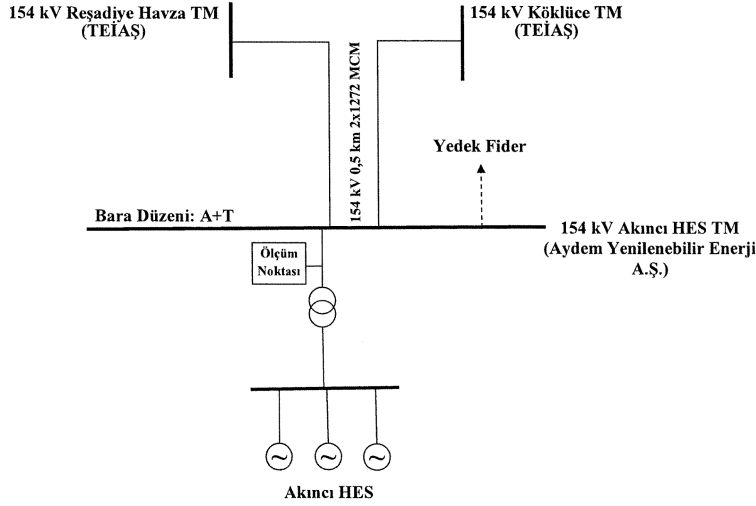
APPENDIX 1: PROJECT'S SINGLE LINE DIAGRAM

BAĞLANTI ANLAŞMASI

İKİNCİ BÖLÜM

EK-1a ÜRETİCİLER İÇİN BAĞLANTI BİLGİLERİ

Tesisin Adresi	: Reşadiye / TOKAT
Lisans Tarihi ve No'su	: 24/10/2019 EÜ/8909-3/04347
Transformatör Merkezi/EİH	: 154 kV Reşadiye Havza TM, 154 kV Köklüce TM
Gerilim Seviyesi	: 154 kV
Ölçüm Noktası	: Tek hat şemasında belirtildiği gibi
Maksimum Alış Kapasitesi	: 0,25 MW
Maksimum Veriş Kapasitesi ¹⁾	: 99 MW
Prensip Tek Hat Şeması ²⁾	:



¹⁾ Üretim lisansındaki kurulu güç değerinden az olmamalıdır.

²⁾ Prensip Tek Hat Şeması, söz konusu tesisin Ölçüm Noktası ve İletim Sistemine Bağlantılarıyla ilgili bilgileri içermelidir.

³⁾ Kullanıcıya özgü bağlantı koşulları varsa EK-1d'de yer verilecektir.

AYDEM YENİLENERGİLER
ENERJİ A.Ş.
Adılet Mah. Hasan Gönüllü Bina Kat: 5/1
Marmaraz / Çankırı / 06072
Pamukkale V.D. - 161 0037 404

9

