MONITORING REPORT TITLE

Document Prepared by GAIA Climate Consultant

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project is located in the Middle Blacksea Region of Turkey, within the province of Tokat province. The Project Activity is a hydropower plant with a total installed capacity of 69,627 MWe (2 x 32,99 MWe and 3,641 MWe). The main purpose of the project is to generate approximately 241,098[1] MWh/year of electricity to supply the national grid using a renewable resource and tapping the significant hydropower potential in the region. Tepekisla Dam & Hydropower Plant Project is located in the village of Erbaa in the central county of Tokat on the Kelkit River (the longest tributary of the Yesilirmak river basin).

The plant comprises Tepekisla Dam, cofferdam of upstream and downstream, penstock, a headpond, a spillway, and a powerhouse and having 2 SAM turbines of the horizontal axis and one Francis turbines of the horizontal axis. The clean energy is produced by utilizing water flow from the thalweg elevation of 216 meters to 255,50 meters of tailwater elevation. Water is transmitted through 214.00 meters tailwater elevation in the Tepekisla HEPP via two penstocks which have 130 m in length and 5.00 meters in diameter, after turbined here the water is given again Kelkit River. In this case, 37 meters between 252.50 meters and 215.0 of elevation of Kelkit River is evaluated therefore productive lands of Niksar plain are preserved. The length of the energy transmission line is about 15 km. The water is transferred which has 3 (2 horizontal axis SAM and one horizontal axis Francis) turbines with a total installed capacity of 69.627 MWe and a three-phased synchronous generator is used. The turbine and generator manufacturer are Alstom. The manufacturer is a French company, acclaimed for its integrated power plants, power production services and air quality control systems. Alstom has been selected as the equipment provider because of its reliable quality products and technology, which is a grid friendly technology with low maintenance needs as well as low noise and low environmental impacts. There has been no new reservoir formation within the context of the project activity.

The project contributes positive environmental benefits as displacing the electricity generated by fossil fuel-fired power plants by utilizing renewable resources so as to avoid environmental pollution and GHG emissions. Thus, the project has a significant contribution to climate protection and to sustainable development in the region.

[1] The Generation Licence has been provided to the DOE.

This monitoring period is from 13 July 2015 to 31 August 2020. During this monitoring period, the actualized net electricity generation is 880,495.95 MWh. The total emission reduction of this monitoring period is 417,351 tCO2e.

Please see the vintage-based comparison of expected and achieved emission reduction for this monitoring period:

Vintage	Total Days	Expected amount of net GHG removals (t CO_2e)	Amount achieved during this monitoring period (tCO2e)	Expected net electricity generation (MWh)	Amount achieved during this monitoring period (MWh)	Difference (%)
13/08/2015-31/12/2015	141	44,169	23,064	93,136.49	48,659.27	-48%
01/01/2016-31/12/2016	365	114,337	113,244	241,098.00	238,912.79	-1%
01/01/2017-31/12/2017	365	114,337	63,722	241,098.00	134,436.38	-44%
01/01/2018-31/12/2018	365	114,337	67,282	241,098.00	141,946.19	-41%
01/01/2019-31/12/2019	365	114,337	97,581	241,098.00	205,869.06	-15%
01/01/2020-31/08/2020	244	76,434	52,458	161,172.36	110,672.26	-31%
Total	**1,845**	**577,950**	**417,351**	**1,218,700.85**	**880,495.95**	**-28%**

Table 1: Ex-ante vs achieved emission reduction

Considering the difference between the amount achieved in this monitoring period and the ex-ante amount, lower than expected precipitation resulted in lower production. According to the official records published by the General Directorate of Meteorology, annual areal precipitation in the Black Sea Region, where the project is located, is higher in 2016.[2] Therefore, emission reductions for 2016 are higher than for other years.

The following table shows a full detail of the project's technical specifications:

Power Plant Building		
Length	M	58.3
Width	M	38.5
Turbines		

[2] https://mgm.gov.tr/veridegerlendirme/yillik-toplam-yagis-verileri.aspx

Brand/Model		Alstom-Kaplan and Francis
Type		Horizantal axis SAM and Francis
Number of Units		2+1
Unit Rated Power	MWe	2 * 32.993 + 1*3.641
Total Installed Capacity	MWe	69.627
Project rated discharge	m^3/s	213.00
Transformer		
Type		Outdoor Type, oily, three phased
Number of Units		3
Power of a Unit	kVA	85,000
Voltage	kV	11/154 kV (+/- 2 x 2.5 %)
Efficiency	%	99
Type		Internal Type, dry or slicone oil, three phased
Number of Units		3
Power of a Unit	kVA	400
Voltage	kV	11 (+/- 2 x 2.5 %) / 0.4 kV
Penstock		
Number of Units		2
Inner Diameter	m	5
Steel Thickness	mm	14,09
Length	m	130
Generator		
Type		Horizantal axis, three phased synchron
Number of Units		3
Power Factor		0,90

Efficiency	%	98.5

Table 2: TEPEKISLA HEPP's Technical properties

1.2 Sectoral Scope and Project Type

The respective sectoral scope is scope 1: "Energy Industry – Renewable/Non-renewable Sources". Installed capacity of the project is 69.627 MWe, thus it falls into a large-scale project activity.

The project is not a grouped project.

1.3 Project Proponent

Organization name	SANKO ENERJI SANAYI VE TICARET. A.S.
Contact person	Ferudun İtergen
Title	Deputy General Manager
Address	15 Temmuz Mah, Gülbahar Cad, No:43, 34212 Istanbul / Turkey
Telephone	+90 212 410 45 00
Email	ferudun.itergen@sankoenerji.com.tr

1.4 Other Entities Involved in the Project

Organization name	GAIA Climate Consultant
Role in the Project	Project Coordinator
Contact person	Gamze Karaca
Title	Carbon Consultant

Address	Maslak Meydan Sk. No:1 Beybi Giz Plaza Kat:26 Maslak/Istanbul
Telephone	+90212 2240450
Email	gkaraca@gaiaclimate.com

1.5 Project Start Date

The project start date is 13/08/2015 which is the commissioning date of the project.

1.6 Project Crediting Period

The crediting period of the project begins with the commissioning of the plant. The Project's total crediting period is ten years renewable twice. The project started to generate electricity on 13/08/2015. Thus, the first crediting period shall last from the 13th of August 2015 until 12th of August 2025.

1.7 Project Location

The Project site is located Kelkit river which one is the longest tributary of the Yesilirmak river basin in Turkey's Middle Black Sea Region, approximately 3.5 km to the south of the Doganyurt Nahiye center and 5.5 km upstream of Tepekisla village of Tokat. The project area is located 40º 39' 34'' N -36º 42' 13'' E coordinates. The following figures show the project's location.

Figure 1: Project Location[3]

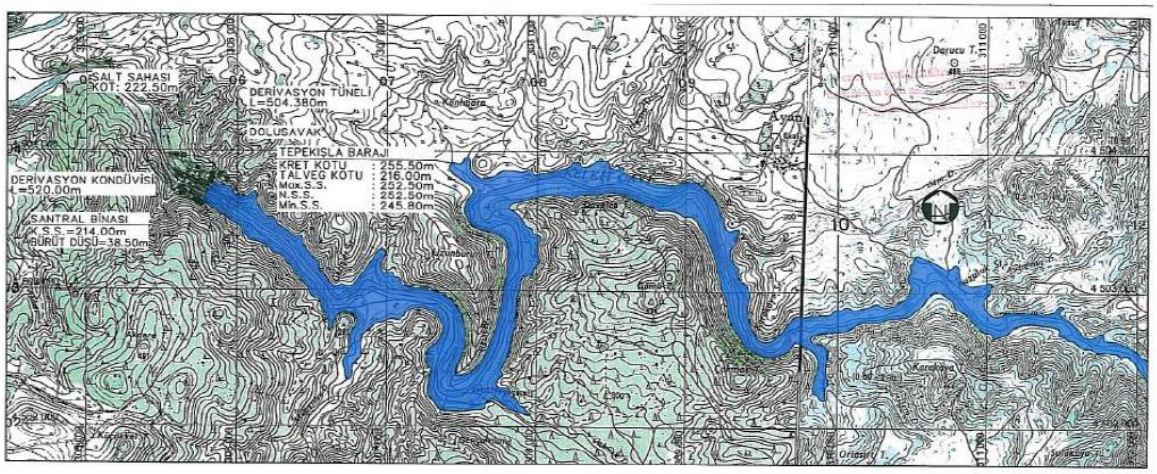

Figure 2: Plant Layout

1.8 Title and Reference of Methodology

Approved consolidated baseline and monitoring methodology ACM0002/version 15.0: "Large Scale Consolidated Methodology: Grid-connected electricity generation from renewable sources" was applied.[4] For the purpose of calculating the emission factor of the Turkish electricity grid," Tool to calculate emission factor for an electricity system", Version 04.0[5] was applied. The project's additionality has been demonstrated using the version of "Tool for the demonstration and assessment of additionality, Version 07.0"[6]

1.9 Participation under other GHG Programs

The project has not been registered or seeking registration under other GHG programs.[7]

1.10 Other Forms of Credit

The project has not created another form of Credit.[8]

[3] Google Earth screenshot of the coordinates has been provided to the DOE.

[4] https://cdm.unfccc.int/filestorage/5/2/F/52FDLM8C49Q3TBSOIJYPVH16ER0UAW/EB79_repan11_ACM0002_ver15.0.pdf?t=YnB8cWdqd2V3fDBxx6wY_m8n1LIH_A3UWU25

[5] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf

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

[7] The relevant declaration letter has been submitted to the DOE.

[8] The relevant declaration letter has been submitted to the DOE.

1.11 Sustainable Development

The project helps Turkey to stimulate and commercialise the use of grid-connected renewable energy technologies and markets. Furthermore, the project demonstrates the viability of grid-connected hydro plants which can support improved energy security, improved air quality, alternative sustainable energy futures, improved local livelihoods and sustainable renewable energy industry development. The specific goals of the project are to:

The specific goals of the project are to:

SDG-7 Clean and Affordable Energy

The project contributes to the Sustainable Development Goal, Affordable and Clean Energy. During this monitoring period, the actualized net electricity generation is 880,495.95 MWh.

SDG-8 Decent Work and Economic Growth

The project contributes to the Sustainable Development Goal, Decent Work and Economic Growth. Employment opportunities were provided for 21 personnel during the operation phase of the project.

SDG-13 Climate Action

The project contributes to the Sustainable Development Goal, Climate Action. During this monitoring period, the actualized emission reduction is 417,351 tCO2e.

2 SAFEGUARDS

2.1 No Net Harm

There isn't any negative environmental or socio-economic impact. Also, in line with Turkish environmental regulations, an "Environmental Impact Assessment (EIA) Report" had been carried out and EIA Positive Decision was approved by the Ministry of Environment and Forestry in 08/06/2011.[9]

2.2 Local Stakeholder Consultation

According to the regulation declared by the Ministry of Environment and Forestry and published on the Official Gazette (dated 17th July 2008, numbered 26939), projects in

[9] Positive EIA Letter has been submitted to the DOE.

which an EIA is not required from are not subject to an obligation to hold Stakeholder Meetings. Therefore, during the registration of the project, a stakeholder meeting was not been planned. Nevertheless, mukhtars of local villages have been interviewed and continuously informed about the Project for understanding the general perspective about the HEPP. For the time being, it has been experienced that mukhtars and villagers of the region are the most cooperative about the exchange of information and opinions. Besides that, the contact details of the relevant plant responsible exist at the Mukhtar, the project owner and local community are always in touch. The project owner regularly checks with the Mukhtar if any complaint or a request exists. Any complaint or need from the local community could directly be received by the project owner and appropriate contributions or improvements are made to the local community.

During this monitoring period, an online site visit including the stakeholder engagement procedure was conducted on 06/11/2020.[10] Four people including the mukhtars of Ayan and Tepekışla villages and two local stakeholders were interviewed. All of these people are from local villages around the plant. There were not any negative feedbacks on socio-economic and environmental issues by the locals. Since there were no negative feedbacks from the locals, there is no need to take any further action.

Also, mukhtars of Ayan and Tepekışla villages had already taken the contact information of the Plant Manager of the company so that the local stakeholders are able to reach Plant Manager whenever they have any complaints, suggestions, or ideas about the project. Since mukhtar is the head of the village, he is the main contact person between the project owner and the local stakeholders. Mukhtar makes sure that there's continuous communication between the two parties.

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 project was started construction on 04.06.2013.[11] The first unit started commissioning on 13/08/2015. During the registration of the project, the project proponent was the Ark

[10] The online site visit was carried out through the MS Teams program.

[11] The site delivery protocol has been provided to the DOE.

Enerji Üretimi Sanayi Ve Ticaret A.S (as project developer). Ark Enerji was taken with all its liabilities by SANKO Rüzgar Enerjisi Sanayi ve Ticaret A.Ş on 04/11/2015. Finally, SANKO Rüzgar Enerjisi Sanayi ve Ticaret A.Ş has been transferred to SANKO ENERJI SANAYI VE TICARET A.S. on 04/09/2019. Similarly, the shareholder structure was changed on 04/09/2019 and the Project has been transferred to SANKO ENERJI SANAYI VE TICARET A.S. The sole Project Proponent is SANKO ENERJI SANAYI VE TICARET. A.S.

Milestone	Date
Final Project Description Report for EIA Process	April 2011
EIA approval (by the Ministry of Environment and Forestry)	08 June 2011
Water Usage Agreement	01 October 2012
Generation Licence	15 November 2012
Revised Feasibility Report	January 2013
Construction Contract	08 May 2013
Permission letter for the use of forestry lands	12 June 2013
Electromechanical Equipment Contract	28 June 2013 - 17 July 2013
The letter related to credit condition from the financier	12 March 2013
The date for start of construction (Site delivery record)	04 June 2013
Partial Provisional Acceptance Date (3.755MWm/3.641MWe)	13 August 2015
Partial Provisional Acceptance Date (33.431MWm/32.993MWe)	04 September 2015
Partial Provisional Acceptance Date (33.431MWm/32.993MWe)	05 November 2015
1st Monitoring Period	13/08/2015-31/08/2020

Table 3: Project Timeline

The registration of the project was carried out by GAIA Carbon Finance. However, during this monitoring period, the name of the Carbon Consultant has changed to the GAIA Climate Consultant.

3.2 Deviations

3.2.1 Methodology Deviations

No deviation in the methodology has been applied to the project activity during the monitoring period.

3.2.2 Project Description Deviations

As the commissioning of the power plant has been realized on 13/08/2015, the start date of the first crediting period was revised as 13/08/2015. Thus, the first crediting period shall last from the 13th of August 2015 until the 12th of August 2025.

Clarifications about the project owner and other organizations involved in the project are included in Section 3.1.

3.3 Grouped Projects

This is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EG_{gross,y}$
Data unit	GWh
Description	Turkey's Gross Electricity Generated by primary energy source for the five most recent years (2008 - 2012).
Source of data	Turkish Electricity Transmission Company (TEIAS) http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik 2012/uretim%20tuketim(23-47)/30(06-2012).xls
Value applied	Validated VCS Project Description (Version 3, dated 13/01/2015) of the Project, Section 3.1
Justification of choice of data or description of measurement methods and procedures applied	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available.
Purpose of Data	Used for baseline emission calculation.
Comments	

Data / Parameter	Cap_{BL}
Data unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Project site
Value applied	0 (this is a new hydro power plant)
Justification of choice of data or description	The installed capacity will be determined based on recognized standards.

of measurement methods and procedures applied	
Purpose of Data	Calculation of project emissions
Comments	

Data / Parameter	**$FC_{i,y}$**
Data unit	Ton (m3 for Natural Gas)
Description	Amount of fossil fuel type i consumed in the project electricity system in year y
Source of data	Turkish Electricity Transmission Company (TEIAS) http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2012/yakıt48-53/49.xls
Value applied	Validated VCS Project Description (Version 3) of the Project, Section 3.1 (Step 4)
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, the national average default value shall be used if values are reliable and documented in regional or national energy statistics / energy balances. TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available. Therefore, the uncertainty for the data is low.
Purpose of Data	To calculate the Operating Margin (OM) emission factor
Comments	-

Data / Parameter	**$NCV_{i,y}$**
Data unit	TJ/Ton (TJ/m3 for Natural Gas)
Description	Net calorific value of fossil fuel type
Source of data	TEIAS website: “Heating Values of Fuels Consumed in Thermal Power Plants in Turkey by the Electric Utilities” 2008-2012: http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2012/yakıt48-53/51.xls

Value applied	Validated VCS Project Description (Version 3) of the Project, Section 3.1
Justification of choice of data or description of measurement methods and procedures applied	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available.
Purpose of Data	To calculate the Operating Margin (OM) emission factor
Comments	The conversion factor of 4.187 Joules/Cal is used

Data / Parameter	**$EF_{CO2,I,y}$**
Data unit	tCO2/GJ
Description	Default CO2 emission factor of fossil fuel type i
Source of data	IPCC default values (as provided in Table 1.4, Chapter 1, Volume 2 (Energy), 2006 IPCC) Guidelines for National Greenhouse Gas Inventory) are used.
Value applied	Validated VCS Project Description (Version 3) of the Project, Section 3.1
Justification of choice of data or description of measurement methods and procedures applied	There is no information on the fuel specific default emission factor in Turkey. Hence, IPCC values haves been used as per the “Tool to calculate the emission factor for an electricity system (version 04.0)”.
Purpose of Data	Used for baseline emission calculation.
Comments	

Data / Parameter	**Electricity Imports**
Data unit	GWh
Description	Electricity imported to the Grid from other countries
Source of data	Turkish Electricity Transmission Company (TEIAS)
Value applied	http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2012/uretim%20tuketim(23-47)/30(06-2012).xls
Justification of choice of data or description of measurement	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to-date and accurate information available.

methods and procedures applied	
Purpose of Data	To calculate the Operating Margin (OM) emission factor
Comments	

Data / Parameter	**Electricity capacity additions**
Data unit	Name of the plant; Installed capacity (MW); Fuel type; Commissioning date.
Description	Set of power capacity additions in the electricity system that comprise 20% of the system generation (in GWh) and that have been built most recently.
Source of data	Turkish Electricity Transmission Company (TEIAS) Generation units put into operation in 2012, 2011 and 2010. http://www.teias.gov.tr/YayinRapor/APK/projeksiyon/KAPASITEPROJEKSIYONU2013.pdf http://www.teias.gov.tr/KapasiteProjeksiyonuARALIK2012.pdf http://www.teias.gov.tr/KAPASITEPROJEKSIYONU2011.pdf
Value applied	Validated VCS Project Description (Version 3) of the Project, Section 2.4
Justification of choice of data or description of measurement methods and procedures applied	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to-date and accurate information available.
Purpose of Data	To calculate the Operating Margin (OM) factor
Comments	

Data / Parameter	$\eta_{m,y}$
Data unit	%
Description	Average net energy conversion efficiency of power unit m in year y
Source of data	UNFCC web site: “Tool to calculate the emission factor for an electricity system”.
Value applied	Validated VCS Project Description (Version 3) of the Project, Annex 3

Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Used for baseline emission calculation.
Comments	No official efficiency values based on each power plant or each fuel type is available in Turkey Most natural gas power plants in Turkey are combined cycle, most coal power plants operate sub-critical and most liquid fuel power plants adopt an open cycle technology.

Data / Parameter	**EGm,y**
Data unit	MWh
Description	Net electricity generated by power plant/unit m in year y
Source of data	Annex I of Turkish Electricity Transmission Company (TEIAS) Capacity Projection Report for 2011. http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2012.pdf
Value applied	Validated VCS Project Description (Version 3) of the Project, Section 3.1 (Step 5)
Justification of choice of data or description of measurement methods and procedures applied	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to-date and accurate information available.
Purpose of Data	-
Comments	-

Data / Parameter	**$EF_{L,m,y}$**
Data unit	kgCO2/GJ
Description	The CO2 emission factor of the grid power unit m (Default CO2 emission factor of fossil fuel types are used)
Source of data	IPCC default values (as provided in Table 1.4, Chapter 1,

	Volume 2 (Energy), 2006 IPCC) Guidelines for National Greenhouse Gas Inventory) are used. Link: http://www.ipccnggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Value applied	Validated VCS Project Description (Version 3) of the Project, ANNEX 3 and Section 3 (Step 5)
Justification of choice of data or description of measurement methods and procedures applied	There is no information on the power unit specific emission factor in Turkey. Hence, IPCC values have been used as per the "Tool to calculate the emission factor for an electricity system (version 04.0)".
Purpose of Data	-
Comments	-

Data / Parameter	w_{OM}
Data unit	rate
Description	Weight of operating margin emissions factor
Source of data	Tool to calculate the emission factor for an electricity system
Value applied	0.5
Justification of choice of data or description of measurement methods and procedures applied	"Tool to calculate the emission factor for an electricity system (Version 04.0)", suggests wOM = 0.5 and wBM = 0.5 for the first crediting period, except wind and solar power plants. In the second and third crediting periods wOM=0.25 and wBM=0.75
Purpose of Data	-
Comments	N/A

Data / Parameter	w_{BM}
Data unit	rate
Description	Weight of built margin emissions factor
Source of data	Tool to calculate the emission factor for an electricity system
Value applied	0.5
Justification of choice of data or description of measurement methods and	"Tool to calculate the emission factor for an electricity system (Version 04.0)", suggests wOM = 0.5 and wBM = 0.5 for the first crediting period, except wind and solar power plants. In the second and third crediting periods wOM=0.25 and

procedures applied	wBM=0.75
Purpose of Data	-
Comments	N/A

4.2 Data and Parameters Monitored

Data / Parameter	**$EG_{facility,y}$**
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Main source is the monthly meter readings records (EPİAŞ data, also known as PMUM). Invoicing of the electricity production is carried out according to EPİAŞ data; thus, rendering the EPİAŞ data official source of electricity generation
Description of measurement methods and procedures to be applied	The net electricity generation supplied to the grid is measured continuously by meters (both main and spare) and recorded monthly.
Frequency of monitoring/recording	Continuous measurement and at least monthly recording

Value monitored

Vintage	Electricity supplied to the grid (MWh)	Electricity consumption from the grid (MWh)	Net electricity supplied to the grid [MWh]
13/08/2015-31/12/2015	48,752.00	92.73	48,659.27
01/01/2016-31/12/2016	239,224.05	311.26	238,912.79
01/01/2017-31/12/2017	134,568.03	131.65	134,436.38
01/01/2018-31/12/2018	142,158.05	211.86	141,946.19
01/01/2019-31/12/2019	206,347.34	478.28	205,869.06
01/01/2020-31/08/2020	111,143.57	471.31	110,672.26

Monitoring equipment

Meters are in compliance with the communiqué for Metering Devices to be used in Electricity Market.

The specification of electricity meters is provided below:

Name	Serial Number	Brand/Model	Date of Last Calibration	Transformer Information
Main Meter	68010502	ITRON-SL761W071	24/08/2020	TM1
Backup meter	68010503	ITRON-SL761W071	24/08/2020	TM1
Main Meter	68010504	ITRON-SL761W071	24/08/2020	TM2
Backup meter	68010505	ITRON-SL761W071	24/08/2020	TM2

Accuracy class: Active 0.2S – Reactive 2

	During this monitoring period three metering tests were performed on 23/06/2015 (initial test) 27/07/2017 and 24/08/2020.[12] The project's electricity production is fed into the grid through the Erbaa TM-Almus TM EİH 154, kV.
QA/QC procedures to be applied	Measurements are undertaken using energy meters. • According to the Article 2 of the Communiqué of Meters in Electricity Sector[13]: 'The meters to be used in the electricity market shall be compliant with the standards of Turkish Standards Institute or IEC and have obtained "Type and System Approval" certificate from the Ministry of Trade and Industry.' Therefore, Ministry of Trade and Industry (Ministry) is responsible from control and calibration of the meters. • Paragraph b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems' (Regulation) of Ministry states that: 'b) Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done every 10 years.' Therefore, periodic calibration of the meters will be done every 10 years. • As above mentioned, the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan. In addition to that the quantity of net electricity delivered to the grid will be cross checked with the meter reading records (OSF forms) provided to the company by TEIAS and internal reports provided to the head of the company by the plant manager. • The net electricity export/supplied to a grid is the difference between the measured quantities of the grid electricity export and the import. Main source is the monthly meter readings records (EPİAŞ data, also known as PMUM). Data from remote automatic meter reading system (OSOS) is used for crosschecking. Invoicing of the electricity production is carried out according to EPİAŞ data; thus, rendering the EPİAŞ data official source of

[12] The calibration test results are provided to the DOE.

[13] http://www.epdk.gov.tr/documents/elektrik/mevzuat/teblig/elektrik/sayaclar_hakkinda/Elk_Tblg_Sayaclar.doc

	electricity generation.
Purpose of the data	Calculation of net electricity supplied to the grid and thus baseline emissions
Calculation method	The net electricity is calculated by: a) Subtracting self-consumption value from gross generation value for each month to find the net electricity supplied to the grid. b) Adding up all monthly net electricity values to calculate the total net electricity supplied to the grid during the monitoring period. c) Multiplying the total net electricity value with the CM emission factor.
Comments	N/A

Data / Parameter	**Cap_{PJ}**
Data unit	MWe
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Project site
Description of measurement methods and procedures to be applied	SCADA system of the Project Activity
Frequency of monitoring/recording	Yearly
Value monitored	69.627
Monitoring equipment	The data is monitored from the electricity generation license which was granted by Energy Market Regulatory Authority. The company has not made any change on the project design up to know and therefore, there is no increase or decrease in the installed capacity of the power plant.
QA/QC procedures to be applied	-

Purpose of the data	Calculation of project emissions
Calculation method	-
Comments	

Data / Parameter	**A_{PJ}**
Data unit	m^2
Description	Area of the regulation pond measured in the surface of the water, after the implementation of the project activity when is full
Source of data	Project site
Description of measurement methods and procedures to be applied	Measured from topographical surveys, maps, satellite pictures, etc.
Frequency of monitoring/recording	Yearly
Value monitored	2,319,000 m2
Monitoring equipment	
QA/QC procedures to be applied	
Purpose of the data	Calculation of project emissions
Calculation method	The Generation Licence
Comments	Since there is no capacity increase, the same installed capacity during the registration is valid..

4.3 Monitoring Plan

The purpose of the monitoring plan is to ensure that the monitoring and calculation of emission reductions of the proposed Project within the crediting period are complete, consistent, clear and accurate. The project is operated by Sanko Enerji Sanayi Ve Ticaret. A.S. which ensures the overall site management in accordance with Turkish Laws and technology providers' guidelines.

The Project Proponent is responsible to implement the monitoring report according to the UNFCCC rules and procedures. According to the Turkish Law and Regulations, the methods of monitoring the net electricity fed to the grid and quality control and assures are explained below:

Monitoring data is collected in accordance with the agreement done between the project owner and Turkish Electricity Transmission Company (TEIAS) which provides the infrastructure for the connection to the national grid. The metering system is defined in the agreement as two groups: main meter and spare meter. The design of the metering system is checked and approved by TEIAS before commissioning of the plant. The technical specifications of the power meters should be in line with Measure and Metering Devices Regulation by Ministry of Industry and Trade. In addition, the Communiqué for Power Meters announced by Energy Market Regulations Authority (EMRA) requires all meters to be in line with either Turkish Standards Institution or International Electro technical Commissions Standards. The meters are placed at the point the electricity is fed to the grid and sealed on behalf of the both parties. This prevents any intervention and assures the accuracy and quality of the measurements. Concerning metering system accuracy, project participants have to comply with relevant national legislation According to b) paragraph of the 9th Article of the Regulation of Metering and Testing of Metering Systems "periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformer are done every 10 years.

Data is stored electronically, during the crediting period and at least two years after the last issuance of credits for the wind farm project activity in the concerning crediting period. The Project Proponent is responsible for the storage of data received from the measuring devices.

The main and spare meter readings are recorded monthly-remote automatic meter reading system and cross-checked whether calibration is required. The capacity of the transmission line connected is medium voltage of 154 kVA, the accuracy class for power meters have been defined in the Communiqué for Power Meters as 0.2S class. The calibration will be implemented in accordance with the related standard procedures. The periodical maintenance is under the responsibility of TEIAS and has been fixed as once in 10 years as mentioned above. Since the meters are within TEIAS' province, TEIAS executes all the procedures for handling non-conformities. Therefore, the Project Participant does not have any internal auditing for this purpose.

Operational and Management Structure

As described before, there are two main factors important for the calculation of emission reductions. The only relevant data that have to be monitored is only net electricity generation ($EG_{facility,y}$) per year. Since project emission is zero no additional monitoring is required. The generation data are subject to the strict internal quality control systems of both parties.

The monthly meter reading documents are stored by Sanko Enerji Sanayi Ve Ticaret. A.S. and TEİAŞ. The settlement notification, which is issued by TEİAŞ and includes the meter reading data, is stored on a TEİAŞ file server and accessible for Sanko Enerji Sanayi Ve Ticaret. A.S. via a secured website. The meters themselves can always be read as plausibility check for verification. The other important parameter is the emission factor. It is approved according to strict quality control parameters from an independent external party. With this, no additional structures or processes have to be implemented to insure the availability and high quality of the necessary data for monitoring.

The Project Manager is responsible for all issues related to the project and operation of the plant. On the other hand, plant manager is responsible for daily operational processes of the plant, management of the plant personnel, and other technical and management issues for the plant. Electrical Engineers undertake the specific actions required by the monitoring plan, i.e. they measure the electricity generation, the electricity supplied to the Turkish grid by the power plant, the electricity imports and the amount of fuel consumed, if fuel is consumed. Mechanical Engineers ensure that all the instrumentations and devices to perform the monitoring work properly. Management Representative is the key coordinator for the development of the quality system. Administrative Officer act as the point of contact for all employees, providing administrative support and managing their queries. In total, there are twenty one employees within the scope of the project. Roles and responsibilities have been summarized in the following chart.

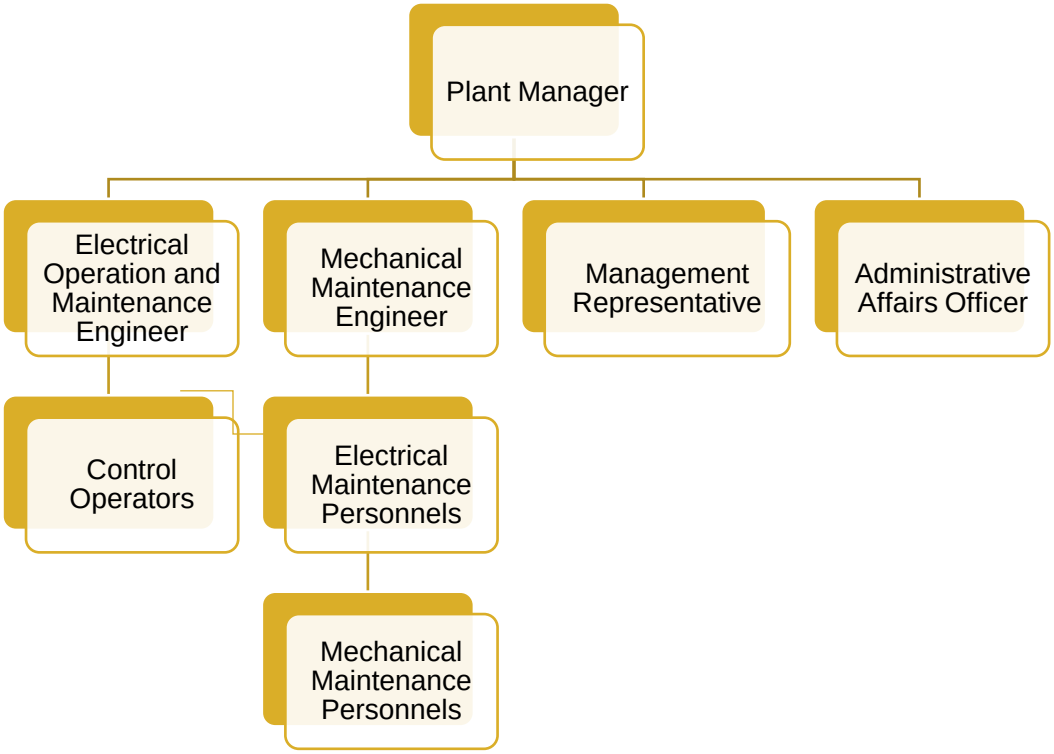

Figure 3: Operation and Management diagram

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

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

BE_y :Baseline emissions in year y (tCO2)

$EG_{PJ,y}$:

Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y (MWh/yr)

$EF_{grid,CM,y}$:Combined margin CO2 emission factor for grid connected power generation in year y

$EF_{grid,CM,y}$ value is fixed as 0.474 tCO2/MWh for during the crediting period.

Calculation of $EG_{PJ,y}$

Since the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity:

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

Where:

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

$EG_{facility,y}$:Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr).

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/m^2.

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

$PD = (Cap_{PJ} - Cap_{BL})/(A_{PJ} - A_{BL})$

Where:

PD = Power density of the project activity, in W/m^2

Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W)

Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project

activity (W). For new hydro power plants, this value is zero

A_{PJ} = Area of the reservoir measured in the surface of the water, after the implementation of

the project activity, when the reservoir is full (m^2)

A_{BL} = Area of the reservoir measured in the surface of the water, before the implementation

of the project activity, when the reservoir is full (m^2) For new reservoirs, this value is zero

Cap_{PJ} = 69,627,000 W

Cap_{BL} = 0 (Justification: The project is a new hydro power plant)

A_{PJ} = 2,319,000 m^2

A_{BL} = 0 (Justification: The project is a new hydro power plant)

Therefore; PD = (69,627,000 – 0)/(2,319,000 – 0) = 30.025 W/m^2

Since the Power Density of the Project is greater than 10 W/m^2 PE_y =0

5.3 Leakage

No leakage emissions are considered. This is in line with the registered PDD and applicable methodology ACM0002 version 15.0.0.. Therefore, the leakage from the Project Activity is zero.

5.4 Net GHG Emission Reductions and Removals

Also, according to ACM0002/Version 15 the emission reductions in year "y" should be calculated as the following formula:

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y = Emission reductions in year y (t CO2/yr).

BE_y = Baseline emissions in year y (t CO2/yr).

PE_y = Project emissions in year y (t CO2/yr).

LE_y = Leakage emissions in year y (t CO2/yr).

y = Refers to a given period

Since PE_y and LE_y are assumed to be 0, emission reductions are equal to baseline emissions.

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)
13/08/ **2015**	431	0	0	431
September 2015	5,460	0	0	5,460
October 2015	6,703	0	0	6,703

November 2015	3,978	0	0	3,978
December 2015	6,493	0	0	6,493
Total 2015 Vintage (13.08.2015-31.12.2015)	**23,064**	**0**	**0**	**23,064**
January 2016	5,782	0	0	5,782
February 2016	8,916	0	0	8,916
March 2016	10,196	0	0	10,196
April 2016	10,262	0	0	10,262
May 2016	15,990	0	0	15,990
June 2016	13,725	0	0	13,725
July 2016	8,875	0	0	8,875
August 2016	8,229	0	0	8,229
September 2016	7,992	0	0	7,992
October 2016	7,779	0	0	7,779
November 2016	3,988	0	0	3,988
December 2016	11,511	0	0	11,511
Total 2016 Vintage (01.01.2016-31.12.2016)	**113,244**	**0**	**0**	**113,244**
January 2017	7,677	0	0	7,677
February 2017	6,962	0	0	6,962
March 2017	3,463	0	0	3,463
April 2017	2,707	0	0	2,707

May 2017	2,712	0	0	2,712
June 2017	4,965	0	0	4,965
July 2017	5,323	0	0	5,323
August 2017	5,844	0	0	5,844
September 2017	6,212	0	0	6,212
October 2017	5,704	0	0	5,704
November 2017	5,262	0	0	5,262
December 2017	6,893	0	0	6,893
Total 2017 Vintage (01.01.2017-31.12.2017)	**63,722**	**0**	**0**	**63,722**
January 2018	7,899	0	0	7,899
February 2018	5,424	0	0	5,424
March 2018	7,005	0	0	7,005
April 2018	6,806	0	0	6,806
May 2018	3,309	0	0	3,309
June 2018	3,103	0	0	3,103
July 2018	7,078	0	0	7,078
August 2018	6,959	0	0	6,959
September 2018	6,994	0	0	6,994
October 2018	3,328	0	0	3,328
November 2018	2,978	0	0	2,978

December 2018	6,398	0	0	6,398
Total 2018 Vintage (01.01.2018-31.12.2018)	**67,282**	**0**	**0**	**67,282**
January 2019	9,471	0	0	9,471
February 2019	8,541	0	0	8,541
March 2019	8,816	0	0	8,816
April 2019	8,291	0	0	8,291
May 2019	8,321	0	0	8,321
June 2019	6,193	0	0	6,193
July 2019	8,047	0	0	8,047
August 2019	8,824	0	0	8,824
September 2019	8,382	0	0	8,382
October 2019	7,939	0	0	7,939
November 2019	8,009	0	0	8,009
December 2019	6,748	0	0	6,748
Total 2019 Vintage (01.01.2019-31.12.2019)	97,581	0	0	97,581
January 2020	5,552	0	0	5,552
February 2020	6,734	0	0	6,734
March 2020	8,138	0	0	8,138
April 2020	4,523	0	0	4,523
May 2020	6,592	0	0	6,592

June 2020	7,461	0	0	7,461
July 2020	6,687	0	0	6,687
August 2020	6,772	0	0	6,772
Total 2020 (01.01.2020-31.08.2020)	**52,458**	**0**	**0**	**52,458**
Total Sum (13.08.2015-31.12.2020)	**417,351**	**0**	**0**	**417,351**

Table 4: Summary of Emission Reductions