



**Verified Carbon
Standard**

SANİBEY DAM AND HYDROELECTRIC POWER PLANT

Document Prepared by GAIA Finansal Danışmanlık Hizmetleri Tic. Ltd. Şti

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Sanibey Dam & HEPP is comprised of the construction of a dam and a greenfield 310.66 MWe hydroelectric power plant located in the Seyhan river basin, in Turkey's Eastern Mediterranean Region. The objective of the Sanibey Dam and Hydroelectric Power Plant (Sanibey Dam & HEPP) is to generate electricity and supply it into the public grid. Due to its significant contribution to climate change mitigation and sustainable development in the region, this project fulfills the requirements of VCS rigorously.

The project activity was originally developed under the name of "Yedigoze Dam&HEPP" by Yedigoze Elektrik Üretim ve Ticaret A.S. In parallel with the demand of executive board members, both the company name and consequently the name of the project have recently been changed to "Sanibey Baraji Elektrik Üretim ve Ticaret A.S." and Sanibey Dam&HEPP"¹ respectively. The board decision was taken on 08/06/2011 with decision number 13. The Board decision was later published in the Turkish Trade Registry Gazette on 16/08/2011 (No:7881). Finally, Sanibey Baraji Elektrik Uretim ve Ticaret A.S. has been transferred to SANKO ENERJİ SANAYİ VE TİCARET A.S. on 28/09/2012.²

The construction of the power plant started on 01/07/2007. The project was commissioned in two phases; the first phase started on 2nd December 2010 while the second phase started on 26th January 2011. To generate energy, a dam, having a body of concrete faced rockfill and a HEPP have been constructed. Generally describing; a spillway is located on the left bank of the riverbed; also, energy structures consisting of two penstocks and a power plant building including two units having outputs of 155.33 MWe each are located on the downstream of the dam body. Besides, diversion structures containing two tunnels one of which is used as a sluiceway outlet and the second one is containing valve house are located on the left bank. The turbine and generator manufacturer is 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. Within the scope of the project activity, there has been no dam or any new reservoir formation that will have an impact on the project emissions during the monitoring period. The project contributes

¹ The project activity was originally developed under the name of "Yedigoze Dam & HEPP" and in the current license, it is still referred to as Yedigoze HEPP. According to the Turkish Trade Registry Gazette dated October 3rd, 2012 (No:8166), registered PDD and initial verification report the name of the project has been changed to "Sanibey Dam & HEPP". The relevant documents have been provided to the DOE separately.

² The Turkish Trade Registry Gazette has been provided to the DOE.

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

This monitoring period is from 01 March 2018 to 01 December 2020. During this monitoring period, the actualized net electricity generation is 2,689,849.41 MWh. The total emission reduction of this monitoring period is 1,460,318 tCO₂e. Please see the vintage-based comparison of expected and achieved emission reductions for this monitoring period:

Vintage	Total Days	Expected amount of net GHG removals (tCO ₂ e)	Amount achieved during this monitoring period (tCO ₂ e)	Expected net electricity generation (MWh)	Amount achieved during this monitoring period (MWh)	Difference (%)
01/03/2018-31/12/2018	306	439,910	348,490	810,296.38	641,905.40	-%21
01/01/2019-31/12/2019	365	524,729	609,312	966,530.00	1,122,328.36	%16
01/01/2020-01/12/2020	336	524,729	502,516	966,530.00	925,615.65	%4
Total	1,007	1,447,677	1,460,318	2,666,563.59	2,689,849.41	%1

Table 1: Ex-ante vs achieved emission reductions

Considering the difference between the amount achieved in this monitoring period and the ex-ante amount, lower than expected precipitation resulted in lower production.

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

Dam and Cofferdams		
Type		Concrete Faced Rock Fill
Height above Thalweg	M	105
Height above Foundation	M	130
Crest Width	M	8
Crest Length	M	400
Crest Elevation	M	240
Diversion and Bottom Outlet		

Type of Cross Section		Circular
Diameter	M	8
Length	M	891; 850
Number of Units		2
Spillway		
Type		Radial
Sill Elevation		221.5
Maximum Capacity of Spillway	m ³ /s	9,000
Penstock		
Type		Above ground
Number of Units		2
Diameter	M	6.3
Length	M	393;382
Power Plant Building		
Type		On the ground
Height	M	58.5
Length	M	65.3
Width	M	48.65
Turbines		
Brand		Alstom Power Systems
Type		Vertical Francis Turbine
Number of Units		2
Serial No of Units		AHT YED 01/AHT YED 02
Unit Rated Power	kW	158,500
Total Installed Capacity	kW	310,660
Transformer		

Type		Outdoor Type, oily, three phased
Number of Units		3
Power of a Unit	MVA	175
Voltage	kV	14.4/380

Table 2: Sanibey HEPP's Technical properties

1.2 Sectoral Scope and Project Type

The respective sectoral scope is scope 1: "Energy industries (renewable - / non-renewable sources)"³

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 Finansal Danışmanlık Hizmetleri Tic. Ltd. Şti
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

³ <https://cdm.unfccc.int/DOE/scopes.html>

Telephone	+90212 2240450
Email	gkaraca@gaiacclimate.com

1.5 Project Start Date

The project start date is 02/12/2010 which the project commenced electricity production.

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 02/12/2010. Thus, the first crediting period shall last from the 2nd of December 2010 until 1th of December 2020.

1.7 Project Location

The Project site is located in the Seyhan river basin in Turkey, in Eastern Mediterranean Region, in the boundaries of Imamoglu and Aladag district, Adana province; the project is located 37° 23' 52" N-35° 26' 17" E coordinates.⁴ The closest settlements are Boztahta, Eğner and Uluçınar villages.

The following figures show the project's location.



Figure 1: Satellite image of the Project

⁴ Google Earth screenshot of the coordinates has been provided to the DOE.

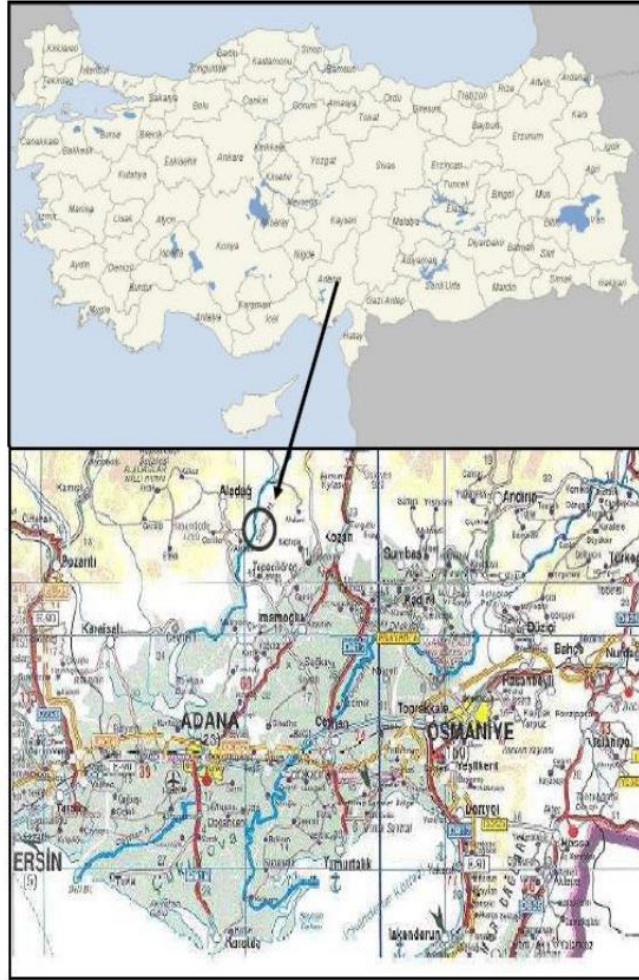


Figure 2: Project Location



Figure 3: Plant Layout

1.8 Title and Reference of Methodology

Approved consolidated baseline and monitoring methodology ACM0002/Version 12.1.0: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” was applied.⁵ For the purpose of calculating the emission factor of the Turkish electricity grid, “Tool to calculate emission factor for an electricity system”, Version 02⁶ was applied. The project’s additionality has been demonstrated using the version of “Tool for the demonstration and assessment of additionality, Version 05.2”⁷

1.9 Participation under other GHG Programs

The project has not been registered or seeking registration under other GHG programs.⁸

1.10 Other Forms of Credit

The project has not created another form of Credit.⁹

1.11 Sustainable Development Contributions

The project helps Turkey to stimulate and commercialize 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:

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 2,689,849.41 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 30 personnel during the operation phase of the project.¹⁰

⁵ <https://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNV3LTK1BP3OR24Y5L/view.html>

⁶ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v2.pdf>

⁷ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v5.2.pdf>

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

⁹ The relevant declaration letter has been submitted to the DOE.

¹⁰ The social security records of employees have been submitted to the DOE.

SDG-13 Climate Action

The project contributes to the Sustainable Development Goal, Climate Action. During this monitoring period, the actualized emission reduction is 1,460,318 tCO₂e.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1	7.2	By 2030, increase substantially the share of renewable energy in the global energy mix	Increase of renewable energy generated	During this monitoring period, the actualized net electricity generation is 2,689,849.41 MWh.	The amount of electricity produced during the life of the project is 8,466,039.68 MWh.

2	8.5	By 2030, 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	Increase of quality and quantitative employment in the region	Currently, 30 people are employed.	30 employees
3	13.2	Integrate climate change measures into national policies, strategies, and planning	Reduction of the greenhouse gas emissions	During this monitoring period, the actualized emission reduction is 1,460,318 tCO ₂ e.	The emission reduction amount over the life of the project is 4,596,206 tCO ₂ e.

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 06/06/2007.¹¹

All generated waste is handled according to the national legislations. Waste oil from equipment is collected properly in line with the relevant regulation and disposed via accredited abatement companies. Domestic solid wastes are kept in tanks and collected by Rize Special Provincial Administration. There is a packaged wastewater treatment plant for the treatment of domestic wastewater generated within the context of the project activity.¹² The wastewater is discharged in accordance with the Water Pollution Control Regulations. On the other hand, the impact on aquatic life is managed by the fish passage to provide an upstream and downstream movement. Life water control is carried out regularly by DSI 22. Regional Directorate. In addition, noise measurements are conducted during regular periods to determine possible turbine and generator noise levels.

2.2 Local Stakeholder Consultation

During the registration of the project, the Local Stakeholder Consultation meeting was held on 12/12/2006 in the conference room of the Akoren Municipality building in the Aladag district of Adana province. The purpose of the meeting was to inform the public and stakeholders about the plan and present and discuss the social and environmental impacts of the project. Announcements were published in two newspapers (Zirve Newspaper on 06.12.2006 and Vatan Newspaper on 04.12.2006) –one national and one local- declaring the date, time, venue, and topic of the meeting. Apart from this kind of invitation other stakeholders were invited by local announcements such as announcements done on village coffeeshouse and in newspapers. All possible stakeholders were tried to be contacted via different kinds of communication ways such as sending letters to the invitees and local announcements. The meeting which started at 14:00 under the chairmanship of the Adana Provincial Directorate of Environment and Forestry received broad participation. All the aspects of the project including the socio-economic and environmental aspects were presented to the participants by a project developer representative and were discussed by the stakeholders. Clarifications were requested and the overall response to the project was

¹¹ Positive EIA Letter has been submitted to the DOE.

¹² The wastewater package treatment plant photographic evidences have been provided to the DOE.

encouraging and positive. All the hearings were held in Turkish. The participants are comprised of representatives from the community, relevant municipalities, public institutions and organizations, scientists, and inhabitants of the surrounding villages. It was observed that public and local authorities gave support for the implementation of the Sanibey Dam and HEPP Project.

During the last monitoring period, an online site visit including the stakeholder engagement procedure was conducted on 12/11/2020. Ten people including mukhtars of Eđner, Ulucinar and Boztahta villages and six local stakeholders were interviewed. All these people are from local villages around the plant. There were not any negative feedbacks on socio-economic and environmental issues by the locals. Locals stated that they are happy with the project since Sanibey HEPP provided employment opportunities for local people.

Also, mukhtars (head of the village) of Eđner, Ulucinar and Boztahta villages had already taken the contact information of the Plant Manager of the company so that the local stakeholders can reach Plant Manager whenever they have any complaints, suggestions, or ideas about the project. Stakeholders convey their requests and objections to the project owner by phone or individual application or local public meetings with a form.¹³ The complaint and request forms within this monitoring period have been checked by DOE. There were no negative feedbacks from the locals and there is no need to take any further action.

Since mukhtars are the head of the villages, they are the main contact persons between the project owner and the local stakeholders. Mukhtars make 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

This is not an AFOLU project.

¹³ The complaint and request form for the monitoring period have been submitted as proof documents to the DOE.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The construction of the project started on 01.07.2007. The first unit started operation on 2 December 2010. The second unit was commissioned on 26 January 2011. The project activity was initially developed under the name of “Yedigöze Dam & HEPP” by Yedigöze Elektrik Üretim ve Ticaret A.S. In parallel with the demand of executive board members, both the company name and consequently the name of the project had been changed to “Sanibey Barajı Elektrik Üretim ve Ticaret A.S.” and “Sanibey Dam & HEPP” respectively. The board decision was taken on 08/06/2011 with decision number 13. The Board decision was later published in the Turkish Trade Registry Gazette on 16/08/2011 (No: 7881). Finally, Sanibey Barajı Elektrik Üretim ve Ticaret A.S. has been transferred to SANKO ENERJİ SANAYİ VE TİCARET A.S. on 28/09/2012.¹⁴ Similarly, the shareholder structure was changed on 28/09/2012 and the Project has been transferred to SANKO ENERJİ SANAYİ VE TİCARET A.S. The sole Project Proponent is SANKO ENERJİ SANAYİ VE TİCARET. A.S. The registration of the project was carried out by GAIA Carbon Finance. The name of the Carbon Consultant has changed to the Gaia Finansal Danışmanlık Hizmetleri Tic. Ltd. Şti within the second monitoring period. There is no other change with respect to the registered project.

Please see the table below for the important dates for the implementation of the project activity:

Milestone	Date
Stakeholder consultation	12/12/2006
Financial analysis of the project	05/12/2006
First VER consideration	05/12/2006
Investment Decision	25/12/2006
Feasibility report	November 2007
Contract signature for the construction-point of no return	01/07/2007
Start of construction	01/07/2007
EIA approval (by the Ministry of Environment and Forestry)	06/06/2007
Contract signature for the equipments	20/03/2008

¹⁴ The Turkish Trade Registry Gazette has been provided to the DOE.

Loan signature	03/09/2008
Contract with a PDD consultant	01/02/2011
Contact with a DOE	August 2011
Commissioning date of the first unit	02/12/2010
Commissioning date of the second unit	26/01/2011
1 st Monitoring Period	02/12/2010-31/05/2012
2 nd Monitoring Period	01/06/2012-28/02/2018
3 rd Monitoring Period	01/03/2018-01/12/2020

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

There are no project description deviations applied during this monitoring period. The current situation regarding the project owner and other organizations involved in the project has been included in Section 3.1.

In 2015, EPIAŞ obtained Market Operation License. Market Operation activities were transferred from PMUM to EPIAŞ.¹⁵ Due to this change, the main source is the EPIAS (also known as PMUM) data which is used for the quantity of net electricity delivered to the grid. The EPIAŞ records have been cross-checked with the meter reading records (OSF forms) provided to the company by TEIAS. Invoicing of the electricity production is carried out according to EPIAŞ therefore the official source of electricity generation is EPIAŞ data.

3.3 Grouped Projects

This is not a grouped project.

¹⁵ <https://www.epias.com.tr/epias-kurumsal/tarihce/>

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	FC_{i,y}
Data unit	Ton (m ³ 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/istatistik2009/43.xls http://www.teias.gov.tr/istatistik2009/44.xls
Value applied	Validated VCS Project Description (Version 08) 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, 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	N/A

Data / Parameter	NCV
Data unit	TJ/Ton (TJ/m ³ 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" 2007-2009: http://www.teias.gov.tr/istatistik2009/46.xls
Value applied	Validated VCS Project Description (Version 3) of the Project, Annex 7
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/MWh
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) http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Value applied	Validated VCS Project Description (Version 08) of the Project, Section 2.3
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 have been used as per the “Tool to calculate the emission factor for an electricity system (version 02)”.
Purpose of Data	Used for baseline emission calculation.
Comments	N/A

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/istatistik2008/23.xls http://www.teias.gov.tr/istatistik2009/23.xls
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) emission factor
Comments	N/A

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 2007, 2008, 2009, 2010.
Value applied	Validated VCS Project Description (Version 08) 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	N/A

Data / Parameter	$\eta_{m,y}$
Data unit	%
Description	Average net energy conversion efficiency of power unit m in year y
Source of data	UNFCCC web site: "Tool to calculate the emission factor for an electricity system".
Value applied	Validated VCS Project Description (Version 08) of the Project, Annex 7
Justification of choice of data or description of measurement methods and procedures applied	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.
Purpose of Data	Used for baseline emission calculation.
Comments	N/A

4.2 Data and Parameters Monitored

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	Measured from topographical surveys, maps, satellite pictures, etc.
Frequency of monitoring/recording	Yearly
Value monitored	14,299,000 m ²
Monitoring equipment	Topographical surveys, maps, satellite pictures
QA/QC procedures to be applied	
Purpose of the data	Calculation of project emissions
Calculation method	The reservoir area is calculated by a topographical engineer based on the map showing the reservoir area at the maximum altitude. (Please see the Appendix 1)
Comments	Since there is no capacity increase, the same installed capacity during the registration is valid. Therefore, no annual electronic spreadsheet has been recorded for the area of the reservoir and the reservoir area corresponding to maximum operational level has been taken into consideration.

Data / Parameter	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 (EPIAŞ data, also known as PMUM). Invoicing of the electricity production is carried out according to EPIAŞ data; thus, rendering the EPIAŞ 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	<p>Electricity supplied to the grid (MWh):</p> <p>01/03/2018-31/12/2018: 643,553.93</p> <p>01/01/2019-31/12/2019: 1,123,861.87</p> <p>01/01/2020-01/12/2020: 927,290.12</p> <p>Total (01/03/2018-01/12/2020): 2,694,705.93</p> <p>Electricity consumption from the grid (MWh):</p> <p>01/03/2018-31/12/2018: 1,648.53</p> <p>01/01/2019-31/12/2019: 1,533.52</p> <p>01/01/2020-01/12/2020: 1,674.47</p> <p>Total (01/03/2018-01/12/2020): 4,856.52</p> <p>Net electricity supplied to the grid (MWh):</p> <p>01/03/2018-31/12/2018: 641,905.40</p> <p>01/01/2019-31/12/2019: 1,122,328.36</p> <p>01/01/2020-01/12/2020: 925,615.65</p> <p>Total (01/03/2018-01/12/2020): 2,689,849.41</p>															
Monitoring equipment	<p>Meters are in compliance with the communiqué for Metering Devices to be used in Electricity Market.</p> <p>The specification of electricity meters is provided below:</p> <table border="1" data-bbox="634 1579 1421 1837"> <thead> <tr> <th>Name</th> <th>Serial Number</th> <th>Brand – Model</th> <th>Date of Last Calibration</th> <th>Transformer Information</th> </tr> </thead> <tbody> <tr> <td>Main Meter</td> <td>8923679</td> <td>EMH-LZQJ-XC</td> <td>19/12/2020</td> <td>TM1</td> </tr> <tr> <td>Backup meter</td> <td>8923680</td> <td>EMH-LZQJ-XC</td> <td>19/12/2020</td> <td>TM1</td> </tr> </tbody> </table>	Name	Serial Number	Brand – Model	Date of Last Calibration	Transformer Information	Main Meter	8923679	EMH-LZQJ-XC	19/12/2020	TM1	Backup meter	8923680	EMH-LZQJ-XC	19/12/2020	TM1
Name	Serial Number	Brand – Model	Date of Last Calibration	Transformer Information												
Main Meter	8923679	EMH-LZQJ-XC	19/12/2020	TM1												
Backup meter	8923680	EMH-LZQJ-XC	19/12/2020	TM1												

Main Meter	8923681	EMH-LZQJ-XC	19/12/2020	TM2
Backup meter	8923682	EMH-LZQJ-XC	19/12/2020	TM2

Accuracy class: Active 0.2S – Reactive 0.5S

During the monitoring period two metering tests were performed on 07/09/2018 and 19/12/2020 respectively. The calibration test results are provided to the DOE.

The main and back meters was changed on 26/10/2019¹⁶. The features of the changed electricity meters are provided below:

Name	Serial Number	Brand –Model	Transformer Information
Main Meter	53042206	ACTARIS-SL761A	TM1
Backup meter	53042208	ACTARIS-SL761A	TM1
Main Meter	53042209	ACTARIS-SL761A	TM2
Backup meter	53042207	ACTARIS-SL761A	TM2

Accuracy class: Active 0.2S – Reactive 2

The project's electricity production is fed into the grid through the transformer stations. (TM1 and TM2)

QA/QC procedures to be applied

Measurements are undertaken using energy meters.

- According to the Article 2 of the Communiqué of Meters in Electricity Sector¹⁷: '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

¹⁶ The initial meter test protocol has been submitted to the DOE.

¹⁷ http://www.epdk.gov.tr/documents/elektrik/mevzuat/teblig/elektrik/sayaclar_hakkinda/Elk_Tblg_Sayaclar.doc

	<p>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.</p> <ul style="list-style-type: none"> • 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 (EPIAŞ 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 EPIAŞ data; thus, rendering the EPIAŞ data official source of 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: <ol style="list-style-type: none"> Subtracting self-consumption value from gross generation value for each month to find the net electricity supplied to the grid. Adding up all monthly net electricity values to calculate the total net electricity supplied to the grid during the monitoring period. Multiplying the total net electricity value with the CM emission factor.
Comments	N/A

Data / Parameter	CapPJ
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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	310.66 (2 x 155.33 MWe)
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	Generation license and supplier information on the regarding equipment has been cross-checked.
Purpose of the data	Calculation of project emissions
Calculation method	Please refer to the Generation License
Comments	N/A

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 into two groups: main meter and spare meter. The design of the metering system is checked and approved by TEIAS before the commissioning of the plant. The technical specifications of the power meters should be in line with the Measure and Metering Devices Regulation by the 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 Electrotechnical Commissions Standards. The meters are placed at the point the electricity is fed to the grid and sealed on behalf of 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. 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.

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 the medium voltage of 154 kVA, the accuracy class for power meters has been defined in the Communiqué for Power Meters as 0.2S class. The calibration is 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.

The main source is the EPIAS (also known as PMUM) data which is used for the quantity of net electricity delivered to the grid monthly meter readings records. it has been cross-checked with the meter reading records (OSF forms) provided to the company by TEIAS. Invoicing of the electricity production is carried out according to EPIAS therefore the official source of electricity generation is EPIAS data.

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 ($EG_{\text{facility},y}$) 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 a 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 ensure 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, the 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 instruments and devices to perform the monitoring work properly. Administrative Officer act as the point of contact for all employees, providing administrative support and managing their queries. In total, thirty employees are working for the Project Activity. Roles and responsibilities have been summarized in the following chart.

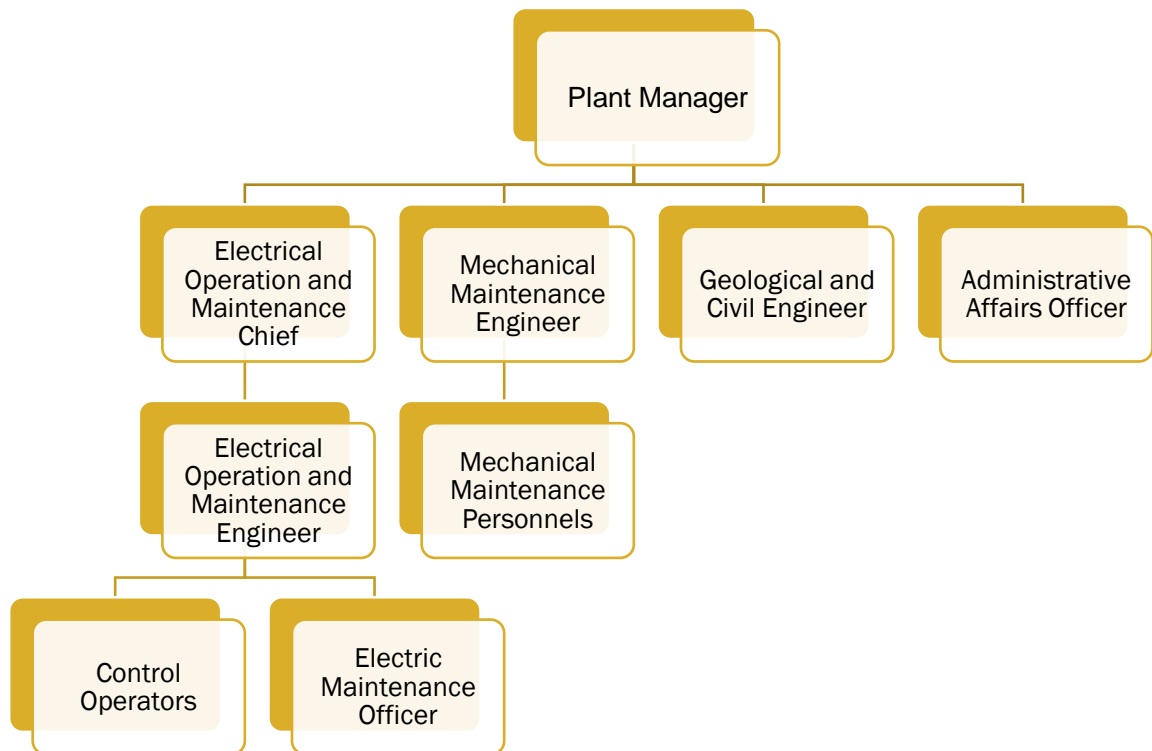


Figure 4: Operation and Management diagram

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 0.5429 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/m².

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/m²

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 (m²)

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 (m²) For new reservoirs, this value is zero

$$Cap_{PJ} = 310,660,000 \text{ W}$$

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

$$A_{PJ} = 14,299,000 \text{ m}^2$$

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

$$\text{Therefore; } PD = (310,660,000 - 0) / (14,299 - 0) = 21.73 \text{ W/m}^2$$

Since the Power Density of the Project is greater than 10 W/m² PE_y = 0

5.3 Leakage

No leakage emissions are considered. This is in line with the registered PDD and applicable methodology ACM0002 version 12.1.0. Therefore, the leakage from the Project Activity is zero.

According to the ACM0002-Version 12, these emissions sources are neglected. Therefore, the leakage from the Project Activity is zero.

5.4 Net GHG Emission Reductions and Removals

Also, according to ACM0002/Version 12.1.0. 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 ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01/03/2018-31/12/2018	348,490	0	0	348,490
01/01/2019-31/12/2019	609,312	0	0	609,312
01/01/2020-01/12/2020	502,516	0	0	502,516
Total (01/03/2018 01/12/2020)	1,460,318	0	0	1,460,318

Table 4: Summary of Emission Reductions

APPENDIX 1: RESERVOIR AREA MAP

