



# Verified Carbon Standard

## MONITORING REPORT TITLE

Document Prepared by GAIA Climate Consultant

<b>Project Title</b>	The Cevizlik Run-of-River-Hydroelectric Power Plant
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# 1 PROJECT DETAILS

## 1.1 Summary Description of the Implementation Status of the Project

The Cevizlik Run-of-River-Hydroelectric Power Plant is located in the Eastern Blacksea Region of Turkey, within the province of Rize province. The project, which is comprised of the construction of a green field 92,96 MWm / 91,40 MWe run of river hydropower electricity plant (HEPP) located on the İyidere river.

The objective of the project is to generate electricity and supply it into the public grid. The main purpose of the project is to generate approximately 335 GWh/year of electricity to supply the national grid using a renewable resource and tapping the significant hydropower potential in the region. The power plant consists of 2 Francis turbines with the vertical axis with 51.21 MWm power each, cofferdam of upstream, penstock, energy transmission line, a head pond, a surge tank, and a power station. 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. The project was started the construction on 2 January 2008, the turbine started the commissioning 28 May 2010. There is no dam or any new reservoir formation that will have an impact on the project emissions within the monitoring period.

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.

This monitoring period is from 1 July 2012 to 31 March 2018. During this monitoring period, the actualized net electricity generation is 1,520,652.74 MWh. The total emission reduction of this monitoring period is 850,041 tCO<sub>2</sub>e.

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 <sub>2</sub> e)	Amount achieved during this monitoring period (tCO <sub>2</sub> e)	Expected net electricity generation (MWh)	Amount achieved during this monitoring period (MWh)	Difference (%)
01/07/2012-31/12/2012	184	94,506	49,714	168,891.84	88,935.47	-47%
01/01/2013-31/12/2013	365	187,472	147,779	335,030,00	264,364.35	-21%
01/01/2014-31/12/2014	365	187,472	140,709	335,030,00	251,716.12	-25%
01/01/2015-31/12/2015	365	187,472	154,487	335,030,00	276,363.51	-18%
01/01/2016-31/12/2016	365	187,472	168,635	335,030,00	301,673.77	-10%
01/01/2017-31/12/2017	365	187,472	159,774	335,030,00	285,822.75	-15%
01/01/2018-31/03/2018	90	46,226	28,943	82,610.14	51,776.77	-37%
<b>Total</b>	<b>2,099</b>	<b>1,078,090</b>	<b>850,041</b>	<b>1,926,651.97</b>	<b>1,520,652.74</b>	<b>-21%</b>

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.

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

Property	Unit	Amount
Catchment Area	km <sup>2</sup>	790
Annual Average Precipitation	mm	1100
Average Discharge	m <sup>3</sup> /s	26,46
Design Discharge	m <sup>3</sup> /s	50
Type	-	Ogee shaped concrete Gravity
Crest Length	m	60
Crest Elevation	m	456
Thalweg Elevation	m	450
Foundation Elevation	m	444

Height above Thalweg	m	6
Height above Foundation	m	12
Flood Water Level	m	457.95
Q100	m <sup>3</sup> /s	557
Q500	m <sup>3</sup> /s	719.52
<b>Flushing Gate</b>		
Crest Elevation	m	450
Foundation Elevation	m	444
Crest Length	m	17
Number of Gates		3
Gate Size	m x m x m	3 x 2.50 x 4.00
Intake Structure Total Width	m	14
<b>Settling Basin</b>		
Length	m	64
Width	m	4 X 7
Settled Particular Size	mm	0.60
Regulation Pond Surface Area	m <sup>2</sup>	14091
Regulating Pond Capacity Active Volume	m <sup>3</sup>	200000
	m <sup>3</sup>	173000
<b>Headrace Tunnel</b>		
Type		Horseshoe, concrete lined
Inner Diameter	m	4.00
Thickness of Concrete	m	0,40
Tunnel Capacity	m <sup>3</sup> /s	50,00
Headrace Tunnel Length	m	7981,485
Access Tunnel 1 Length	m	410

Access Tunnel 2 Length	m	545
Access Tunnel 3 Length	m	960
Access Tunnel 4 Length	m	250
Access Tunnel 5 Length	m	113,50
<b>Surge Tank</b>		
Type		Varying Cross Section
Top Elevation	m	476
Bottom Elevation	m	412,40
Max. Water Level	m	470.10
Minimum Water Level	m	420.39
Inner Diameter	m	12.00 (412,40~430.00 between elevation) 16.00 (430.00~476.00 between elevation)
<b>Penstock</b>		
Inner Diameter	m	3.40
Excavation Diameter	m	4.60
Average Steel Thickness	m	20
Length	m	348,63
<b>Powerhouse</b>		
Type		Underground
Height	m	30,70
Length	m	43,80
Width	m	16
Project Discharge	m <sup>3</sup> /s	50,00
Tailrace Elevation	m	226,90
<b>Turbine</b>		

Brand/Model		ALSTOM POWER- Vertical Francis Turbine
Serial No of Units		2060/2061
Turbine Axis Level	m	221,00
Turbine Type		Vertical Axis Francis
Gross Head	m	230,00
Net Head	m	200,60
Installed Capacity	MW	92,96
Unit Capacity	MW	51,21
Number of Units		2
<b>Underground Powerhouse Access</b>		
Type		Modified Horseshoe
Tunnel Size	m	5 x 6
Concrete Thickness	m	0,50
Tunnel Length	m	98,225
<b>Energy Transmission Line</b>		
Type	kV	154
Characteristics		2 x 954MCM
Power Transmission Line Length	km	21

Table 2: Technical specifications of the Project

## 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 91,40 MWe, thus it falls into a large-scale project activity.

The project is not a grouped project.

### 1.3 Project Proponent

<b>Organization name</b>	SANKO ENERJI SANAYI VE TICARET. A.S.
<b>Contact person</b>	Volkan Aktürk
<b>Title</b>	Strategy & Business Development Manager
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<b>Email</b>	<a href="mailto:VAkturk@sankoenerji.com.tr">VAkturk@sankoenerji.com.tr</a>

### 1.4 Other Entities Involved in the Project

<b>Organization name</b>	GAIA Climate Consultant
<b>Role in the Project</b>	Project Coordinator
<b>Contact person</b>	Gamze Karaca
<b>Title</b>	Carbon Consultant
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### 1.5 Project Start Date

The project start date is 28/05/2010 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 28/05/2010. Thus, the first crediting period shall last from the 28th of May 2010 until 27th of May 2020.

## 1.7 Project Location

The project is located in the Eastern Blacksea Region of Turkey, within the province of Rize province. The project is on the İyidere river. The project area is located 40° 50' 37"N -40° 28' 32" E coordinates. The following figures show the project's location.



Figure 1: Project Location<sup>1</sup>

## 1.8 Title and Reference of Methodology

Approved consolidated baseline and monitoring methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources, Version 10." was applied.<sup>2</sup> In addition, as referred in the methodology, "Tool to calculate the emission factor for an electricity system, Version 01.1."<sup>3</sup> was applied. The project's additionality has been demonstrated using the version of "Tool for demonstration and assessment additionality" Version 05.2<sup>4</sup>

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<sup>1</sup> Google Earth screenshot of the coordinates has been provided to the DOE.

<sup>2</sup>[https://cdm.unfccc.int/filestorage/N/F/9/NF9EDA0V5K382HW0JR14GS7XYQUMCP/EB47\\_repan07\\_ACM0002\\_ver10.pdf?t=YWR8cWZneThOfDDpc-QvteK06tLtkWE5Q9z4](https://cdm.unfccc.int/filestorage/N/F/9/NF9EDA0V5K382HW0JR14GS7XYQUMCP/EB47_repan07_ACM0002_ver10.pdf?t=YWR8cWZneThOfDDpc-QvteK06tLtkWE5Q9z4)

<sup>3</sup> <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v1.pdf>

<sup>4</sup> <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v5.2.pdf>

## 1.9 Participation under other GHG Programs

The project has not been registered or seeking registration under other GHG programs.<sup>5</sup>

## 1.10 Other Forms of Credit

The project has not created another form of Credit.<sup>6</sup>

## 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 wind farms 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 1,520,652.74 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 850,041 tCO<sub>2</sub>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 20/02/2009.<sup>7</sup>

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<sup>5</sup> The relevant declaration letter has been submitted to the DOE.

<sup>6</sup> The relevant declaration letter has been submitted to the DOE.

<sup>7</sup> Positive EIA Letter has been submitted to the DOE.

There is a packaged wastewater treatment plant for the treatment of domestic wastewater generated within the context of the project activity.<sup>8</sup> The wastewater is discharged in accordance with Water Pollution Control Regulations.

## 2.2 Local Stakeholder Consultation

During the registration of this project, Local Stakeholder Consultation meeting was held on 16/03/2006 in the conference room of the culture building in İkizdere district of Rize province. The purpose of the meeting was to inform public and stakeholders about the plan and present and discuss social and environmental impacts of the project. Invitation process for local stakeholder meeting was followed and associations/governmental offices were invited by invitation letters or calling. Apart from this kind of invitation other stakeholders were invited by local announcements such as announcement done on village coffeehouse and in newspaper. In order to satisfy this requirement, announcements were published in two newspapers (Karadeniz Haber ve Vatan Gazetesi) -one national and one local- declaring the date, time, venue and topic of the meeting. 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 encouraging and positive.

During this monitoring period, a site visit including the stakeholder engagement procedure was conducted on 03/12/2020. Nine people including the mukhtars of Güneyce and Gürdere villages, three local stakeholders, and power plant employees 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 Güneyce and Gürdere 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 mukhtars are the head of the village, they are the main contact person between the project owner and the local stakeholders. Mukhtars make sure that there's continuous communication between the two parties. In addition, a Complaint and Request form is available on the Project site. Stakeholders convey their requests and objections to the project owner by phone or individual application.<sup>9</sup> All applications are recorded via the form. Project manager checks the comments in the book on a regular basis, and records responses.

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<sup>8</sup> The wastewater package treatment plant photographic evidences have been provided to the DOE.

<sup>9</sup> The Complaint and Request forms have been submitted to the DOE.

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 02.01.2008. The first unit started to commissioning on 28 May 2010. During the registration of the project, the project proponent was the AKIM ENERJI URETIMI SANAYI VE TICARET A.S (as project developer). Akim Enerji was taken with all its liabilities by SANKO ENERJI SANAYI VE TICARET. A.S. on 28/09/2012.<sup>10</sup> Similarly, the shareholder structure was changed on 28/09/2012 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. In addition, the registration of the project was carried out by GAIA Carbon Finance. However, during the monitoring period, the name of the Carbon Consultant has changed to the GAIA Climate Consultant.

There was no event or situation that occurred, which may impact the applicability of the methodology within the monitoring period.

Milestone	Date
First VER consideration	July 23 <sup>rd</sup> 2004
Feasibility report	May 2005
Stakeholder consultation	March 16 <sup>th</sup> 2006
EIA approval (by the Ministry of Environment and Forestry)	July 24 2006
Contract signature for the electrical works	December 4 <sup>th</sup> 2006
Contract signature for the equipments	December 5 <sup>th</sup> 2006
First discussions with financial institutions	February 2006
First contacts with PDD consultants	October 2007
Loan signature	January 2008
Contract signature for the construction works	January 2 <sup>nd</sup> 2008
Contact with a PDD consultant	April 25 <sup>th</sup> 2008
Contact with a DOE	June 12 <sup>th</sup> 2008
Start of PDD elaboration	July 2008
Start of VER validation	November 2009
The commissioning of the power plant (Project start date)	29/05/2010
1 <sup>st</sup> Monitoring Period	01/07/2011-30/06/2012
2 <sup>nd</sup> Monitoring Period	01/07/2012-31/03/2018

<sup>10</sup> The Turkish Trade Registry Gazette has been provided to the DOE.

Table 3: Project Timeline

## 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. 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

<b>Data / Parameter</b>	<b>EG<sub>PJ,y</sub></b>
<b>Data unit</b>	MWh/yr
<b>Description</b>	Quantity of net electricity generation supplied by the project to the grid in year y.
<b>Source of data</b>	Validated VCS Project Description (Version 6) of the Project.
<b>Value applied</b>	335,030 MWh/yr
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	Electricity meters.
<b>Purpose of Data</b>	Used for baseline emission calculation.
<b>Comments</b>	

<b>Data / Parameter</b>	<b>Cap<sub>PJ</sub></b>
<b>Data unit</b>	MW
<b>Description</b>	Installed capacity of the hydro power plant after the implementation of the project activity
<b>Source of data</b>	Validated VCS Project Description (Version 6) of the Project.
<b>Value applied</b>	92.96
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	The installed capacity will be determined based on recognized standards.
<b>Purpose of Data</b>	Calculation of project emissions
<b>Comments</b>	

<b>Data / Parameter</b>	<b>A<sub>PJ</sub></b>
<b>Data unit</b>	m <sup>2</sup>
<b>Description</b>	Area of the regulation pond measured in the surface of the water, after the implementation of the project activity. when is full
<b>Source of data</b>	Validated VCS Project Description (Version 6) of the Project.
<b>Value applied</b>	14,091
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	Measured from topographical surveys, maps, satellite pictures, etc.
<b>Purpose of Data</b>	Calculation of project emissions
<b>Comments</b>	-

<b>Data / Parameter</b>	<b>NCV<sub>i,y</sub></b>
<b>Data unit</b>	TJ
<b>Description</b>	Heating values of fuels consumed in thermal power plants in Turkey by the electric utilities.
<b>Source of data</b>	TEIAS website "Heating Values of Fuels Consumed in Thermal Power Plants in Turkey by the Electric Utilities" 2006-2008: <a href="http://www.teias.gov.tr/istatistik2008/46.xls">http://www.teias.gov.tr/istatistik2008/46.xls</a>

<b>Value applied</b>	Detailed in Annex 4 in the Validated VCS Project Description (Version 6) of the Project.
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	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.
<b>Purpose of Data</b>	Used for baseline emission calculation.
<b>Comments</b>	

<b>Data / Parameter</b>	<b>EF<sub>CO2,i,y</sub></b>
<b>Data unit</b>	tCO2/GJ
<b>Description</b>	CO2 emission factor of fossil fuel type i in year y
<b>Source of data</b>	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.
<b>Value applied</b>	Detailed in Annex 4 in the Validated VCS Project Description (Version 6) of the Project.
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	According to the “Tool to calculate the emission factor for an electricity system”, 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.
<b>Purpose of Data</b>	Used for baseline emission calculation.
<b>Comments</b>	

<b>Data / Parameter</b>	<b>Electricity capacity additions</b>
<b>Data unit</b>	-
<b>Description</b>	Power plants which are most recently taken into operation
<b>Source of data</b>	TEIAS website: <a href="http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJ EKSIYONU%202005.pdf">http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJ EKSIYONU%202005.pdf</a> <a href="http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJ EKSIYONU%202006.pdf">http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJ EKSIYONU%202006.pdf</a> <a href="http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJ EKSIYONU%202007.pdf">http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJ EKSIYONU%202007.pdf</a> <a href="http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKS">http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKS</a>

	IYONU2008.pdf <a href="http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKS">http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKS</a> IYONU2009.pdf
<b>Value applied</b>	Detailed in Annex 4 in the Validated VCS Project Description (Version 6) of the Project.
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to date and accurate information available.
<b>Purpose of Data</b>	Used for baseline emission calculation.
<b>Comments</b>	

<b>Data / Parameter</b>	$\eta_{m,y}$
<b>Data unit</b>	%
<b>Description</b>	Average net energy conversion efficiency of power unit m in year y
<b>Source of data</b>	
<b>Value applied</b>	Detailed in Annex 4 in the Validated VCS Project Description (Version 6) of the Project.
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	-
<b>Purpose of Data</b>	Used for baseline emission calculation.
<b>Comments</b>	-

<b>Data / Parameter</b>	$EF_{grid,Cmy}$
<b>Data unit</b>	tCO <sub>2</sub> e/MWh
<b>Description</b>	Baseline emission factor: the combined emission factor of the project grid system." Tool to calculate the emission factor for an electricity system"
<b>Source of data</b>	Validated VCS Project Description (Version 6) of the Project.
<b>Value applied</b>	0.559

<b>Justification of choice of data or description of measurement methods and procedures applied</b>	Calculated as per ACM0002 with 3 years vintage data and option of ex ante calculation based on ‘50% of OM and 50% of BM values approach for the first crediting period’
<b>Purpose of Data</b>	Used for baseline emission calculation.
<b>Comments</b>	EFgrid,CMy value (0.559 tCO <sub>2</sub> /MWh) is valid for the duration of the crediting period.

## 4.2 Data and Parameters Monitored

<b>Data / Parameter</b>	<b>EG<sub>P,J,y</sub></b>
<b>Data unit</b>	MWh
<b>Description</b>	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
<b>Source of data</b>	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
<b>Description of measurement methods and procedures to be applied</b>	The net electricity generation supplied to the grid is measured continuously by meters (both main and spare) and recorded monthly.
<b>Frequency of monitoring/recording</b>	Annually

Value monitored	Vintage	Electricity supplied to the grid (MWh)	Electricity consumption from the grid (MWh)	Net electricity supplied to the grid [MWh]																									
	01/07/2012-31/12/2012	89,251.05	315.58	88,935.47																									
	01/01/2013-31/12/2013	264,919.82	555.47	264,364.35																									
	01/01/2014-31/12/2014	252,329.12	613.00	251,716.12																									
	01/01/2015-31/12/2015	276,977.15	613.64	276,363.51																									
	01/01/2016-31/12/2016	302,289.66	615.89	301,673.77																									
	01/01/2017-31/12/2017	286,388.86	566.11	285,822.75																									
	01/01/2018-31/03/2018	51,933.95	157.18	51,776.77																									
Monitoring equipment	Meters are in compliance with the communiqué for Metering Devices to be used in Electricity Market. The specification of electricity meters are provided below:																												
	<table border="1"> <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>53035222</td> <td>ACTARIS-SL761A071</td> <td>19/12/2017</td> <td>TM1</td> </tr> <tr> <td>Backup meter</td> <td>53035224</td> <td>ACTARIS-SL761A071</td> <td>19/12/2017</td> <td>TM1</td> </tr> <tr> <td>Main Meter</td> <td>53035223</td> <td>ACTARIS-SL761A071</td> <td>19/12/2017</td> <td>TM2</td> </tr> <tr> <td>Backup meter</td> <td>53035225</td> <td>ACTARIS-SL761A071</td> <td>19/12/2017</td> <td>TM2</td> </tr> </tbody> </table>				Name	Serial Number	Brand –Model	Date of Last Calibration	Transformer Information	Main Meter	53035222	ACTARIS-SL761A071	19/12/2017	TM1	Backup meter	53035224	ACTARIS-SL761A071	19/12/2017	TM1	Main Meter	53035223	ACTARIS-SL761A071	19/12/2017	TM2	Backup meter	53035225	ACTARIS-SL761A071	19/12/2017	TM2
Name	Serial Number	Brand –Model	Date of Last Calibration	Transformer Information																									
Main Meter	53035222	ACTARIS-SL761A071	19/12/2017	TM1																									
Backup meter	53035224	ACTARIS-SL761A071	19/12/2017	TM1																									
Main Meter	53035223	ACTARIS-SL761A071	19/12/2017	TM2																									
Backup meter	53035225	ACTARIS-SL761A071	19/12/2017	TM2																									

<b>QA/QC procedures to be applied</b>	<p>Accuracy class: Active 0.2S – Reactive 2</p> <p>During this monitoring period five metering tests were performed on 09/09/2013, 29/09/2014, 29/09/2015, 26/09/2016 and 19/12/2017 respectively.<sup>11</sup></p> <p>The main and back meters was changed on 24/09/2019. The features of the new electricity meters are provided below:</p> <table border="1" data-bbox="613 466 1500 667"> <thead> <tr> <th>Name</th> <th>Serial Number</th> <th>Brand –Model</th> <th>Transformer Information</th> </tr> </thead> <tbody> <tr> <td>Main Meter</td> <td>84260531</td> <td>ITRON-SL761X071</td> <td>TM1</td> </tr> <tr> <td>Backup meter</td> <td>84260532</td> <td>ITRON-SL761X071</td> <td>TM1</td> </tr> <tr> <td>Main Meter</td> <td>84260533</td> <td>ITRON-SL761X071</td> <td>TM2</td> </tr> <tr> <td>Backup meter</td> <td>84260534</td> <td>ITRON-SL761X071</td> <td>TM2</td> </tr> </tbody> </table> <p>Accuracy class: Active 2019/C-2– Reactive:2009/0.2S-2</p> <p>The project’s electricity production is fed into the grid through the Kalkandere TM 154, kV.</p>	Name	Serial Number	Brand –Model	Transformer Information	Main Meter	84260531	ITRON-SL761X071	TM1	Backup meter	84260532	ITRON-SL761X071	TM1	Main Meter	84260533	ITRON-SL761X071	TM2	Backup meter	84260534	ITRON-SL761X071	TM2
	Name	Serial Number	Brand –Model	Transformer Information																	
Main Meter	84260531	ITRON-SL761X071	TM1																		
Backup meter	84260532	ITRON-SL761X071	TM1																		
Main Meter	84260533	ITRON-SL761X071	TM2																		
Backup meter	84260534	ITRON-SL761X071	TM2																		
<p>Measurements are undertaken using energy meters.</p> <ul style="list-style-type: none"> <li>• According to the Article 2 of the Communiqué of Meters in Electricity Sector<sup>12</sup>: ‘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.</li> <li>• 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.</li> <li>• 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.</li> <li>• The net electricity export/supplied to a grid is the difference between the measured quantities of the grid electricity export</li> </ul>																					

<sup>11</sup> The metering test results have been submitted to the DOE.

<sup>12</sup> [http://www.epdk.gov.tr/documents/elektrik/mevzuat/teblig/elektrik/sayaclar\\_hakkinda/Elk\\_Tblg\\_Sayaclar.doc](http://www.epdk.gov.tr/documents/elektrik/mevzuat/teblig/elektrik/sayaclar_hakkinda/Elk_Tblg_Sayaclar.doc)

	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.
<b>Purpose of the data</b>	Calculation of emission reductions
<b>Calculation method</b>	<p>The net electricity is calculated by:</p> <ul style="list-style-type: none"> <li>a) Subtracting self-consumption value from gross generation value for each month to find the net electricity supplied to the grid.</li> <li>b) Adding up all monthly net electricity values to calculate the total net electricity supplied to the grid during the monitoring period.</li> <li>c) Multiplying the total net electricity value with the CM emission factor.</li> </ul>
<b>Comments</b>	

<b>Data / Parameter</b>	<b>Cap<sub>PJ</sub></b>
<b>Data unit</b>	MW
<b>Description</b>	Installed capacity of the hydro power plant after the implementation of the project activity
<b>Source of data</b>	Project site
<b>Description of measurement methods and procedures to be applied</b>	The installed capacity will be determined based on recognized standards.
<b>Frequency of monitoring/recording</b>	Yearly
<b>Value monitored</b>	92.96 MWm/ 91,40 MWe (2 x 45,70MWe)
<b>Monitoring equipment</b>	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.
<b>QA/QC procedures to be applied</b>	-

<b>Purpose of the data</b>	Calculation of project emissions
<b>Calculation method</b>	-
<b>Comments</b>	

<b>Data / Parameter</b>	<b>A<sub>PJ</sub></b>
<b>Data unit</b>	m <sup>2</sup>
<b>Description</b>	Area of the regulation pond measured in the surface of the water, after the implementation of the project activity. when is full
<b>Source of data</b>	Project site
<b>Description of measurement methods and procedures to be applied</b>	Measured from topographical surveys, maps, satellite pictures, etc.
<b>Frequency of monitoring/recording</b>	Yearly
<b>Value monitored</b>	14,091 m <sup>2</sup>
<b>Monitoring equipment</b>	
<b>QA/QC procedures to be applied</b>	
<b>Purpose of the data</b>	Calculation of project emissions
<b>Calculation method</b>	Please see Appendix-I for the reservoir area calculation details. The reservoir area mentioned above (14,091 m <sup>2</sup> ) is the maximum reservoir area. This water level only occurs at the Q500 flood discharge.
<b>Comments</b>	Since there is no capacity increase, the same installed capacity during the registration is valid. Therefore, no annual electronic spreadsheet has been recorded for the area of the reservoir and the reservoir area corresponding to maximum operational level has been taken into consideration.

### 4.3 Monitoring Plan

The 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 ( $EG_{\text{facility},y}$ ) 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 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. 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.

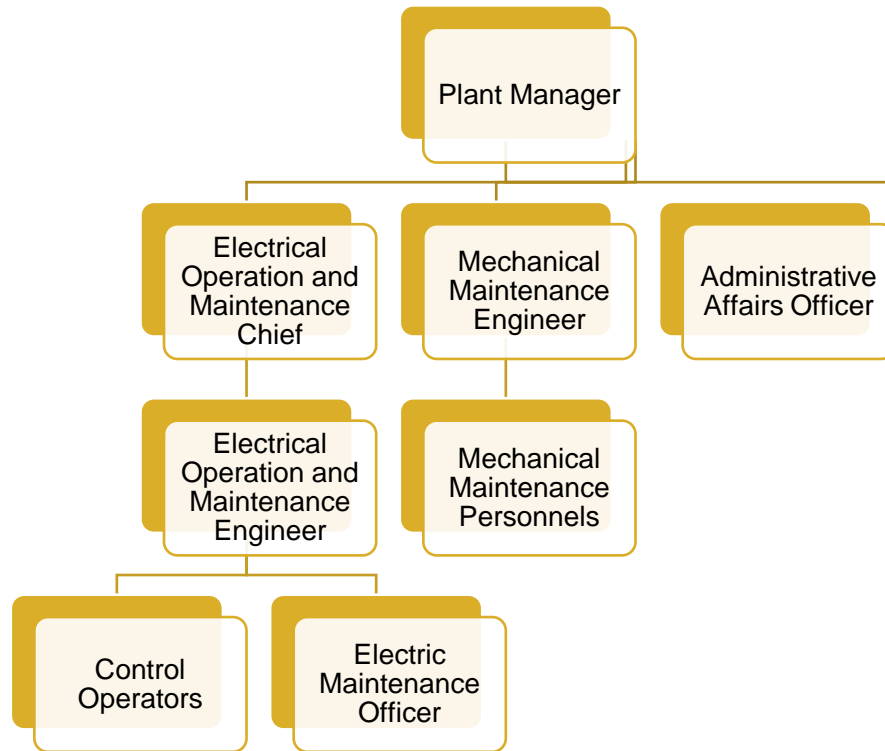


Figure 2: Operation and Management diagram

## 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 (tCO<sub>2</sub>)

$EG_{PJ,y}$ : 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 CO<sub>2</sub> emission factor for grid connected power generation in year y

$EF_{grid,CM,y}$  value is fixed as 0.559 tCO<sub>2</sub>/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:

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

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)

$EG_{\text{facility},y}$  :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<sup>2</sup>. The power density of the project activity is calculated as follows:

Where:

PD = Power density of the project activity, in W/m<sup>2</sup>

Cap<sub>PJ</sub> = Installed capacity of the hydro power plant after the implementation of the project activity (W)

Cap<sub>BL</sub> = 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<sub>PJ</sub> = Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m<sup>2</sup>)

A<sub>BL</sub> = Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m<sup>2</sup>) For new reservoirs, this value is zero

$$Cap_{PJ} = 92,960,000 \text{ W}$$

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

$$A_{PJ} = 14,090.49 \text{ m}^2$$

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

$$\text{Therefore; } PD = (92,960,000 - 0)/(14,090.49 - 0) = 6,597.4 \text{ W/m}^2$$

Since the Power Density of the Project is greater than 10 W/m<sup>2</sup> PE<sub>y</sub> =0

### 5.3 Leakage

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing and transport).

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 10 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 CO<sub>2</sub>/yr).

$BE_y$  = Baseline emissions in year y (t CO<sub>2</sub>/yr).

$PE_y$  = Project emissions in year y (t CO<sub>2</sub>/yr).

$LE_y$  = Leakage emissions in year y (t CO<sub>2</sub>/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 <sub>2</sub> e)	Project emissions or removals (tCO <sub>2</sub> e)	Leakage emissions (tCO <sub>2</sub> e)	Net GHG emission reductions or removals (tCO <sub>2</sub> e)
<b>July 2012</b>	14,701	0	0	14,701
<b>August 2012</b>	9,675	0	0	9,675
<b>September 2012</b>	6,551	0	0	6,551
<b>October 2012</b>	6,253	0	0	6,253

<b>November 2012</b>	7,721	0	0	7,721
<b>December 2012</b>	4,814	0	0	4,814
<b>01/07/2012-31/12/2012</b>	<b>49,714</b>	<b>0</b>	<b>0</b>	<b>49,714</b>
<b>January 2013</b>	4,404	0	0	4,404
<b>February 2013</b>	2,648	0	0	2,648
<b>March 2013</b>	11,898	0	0	11,898
<b>April 2013</b>	19,687	0	0	19,687
<b>May 2013</b>	34,471	0	0	34,471
<b>June 2013</b>	25,153	0	0	25,153
<b>July 2013</b>	12,355	0	0	12,355
<b>August 2013</b>	5,703	0	0	5,703
<b>September 2013</b>	7,990	0	0	7,990
<b>October 2013</b>	11,839	0	0	11,839
<b>November 2013</b>	5,762	0	0	5,762
<b>December 2013</b>	5,870	0	0	5,870
<b>01/01/2013-31/12/2013</b>	<b>147,779</b>	<b>0</b>	<b>0</b>	<b>147,779</b>
<b>January 2014</b>	4,801	0	0	4,801
<b>February 2014</b>	5,034	0	0	5,034
<b>March 2014</b>	9,069	0	0	9,069
<b>April 2014</b>	21,202	0	0	21,202

<b>May 2014</b>	32,077	0	0	32,077
<b>June 2014</b>	20,268	0	0	20,268
<b>July 2014</b>	7,632	0	0	7,632
<b>August 2014</b>	4,898	0	0	4,898
<b>September 2014</b>	5,446	0	0	5,446
<b>October 2014</b>	9,339	0	0	9,339
<b>November 2014</b>	11,382	0	0	11,382
<b>December 2014</b>	9,562	0	0	9,562
<b>01/01/2014-31/12/2014</b>	<b>140,709</b>	<b>0</b>	<b>0</b>	<b>140,709</b>
<b>January 2015</b>	6,502	0	0	6,502
<b>February 2015</b>	4,374	0	0	4,374
<b>March 2015</b>	6,763	0	0	6,763
<b>April 2015</b>	16,678	0	0	16,678
<b>May 2015</b>	35,014	0	0	35,014
<b>June 2015</b>	35,071	0	0	35,071
<b>July 2015</b>	15,123	0	0	15,123
<b>August 2015</b>	6,548	0	0	6,548
<b>September 2015</b>	3,662	0	0	3,662
<b>October 2015</b>	8,334	0	0	8,334
<b>November 2015</b>	8,707	0	0	8,707
<b>December 2015</b>	7,710	0	0	7,710

<b>01/01/2015-31/12/2015</b>	<b>154,487</b>	<b>0</b>	<b>0</b>	<b>154,487</b>
<b>January 2016</b>	7,116	0	0	7,116
<b>February 2016</b>	6,971	0	0	6,971
<b>March 2016</b>	12,551	0	0	12,551
<b>April 2016</b>	24,903	0	0	24,903
<b>May 2016</b>	19,501	0	0	19,501
<b>June 2016</b>	22,484	0	0	22,484
<b>July 2016</b>	24,410	0	0	24,410
<b>August 2016</b>	9,494	0	0	9,494
<b>September 2016</b>	11,415	0	0	11,415
<b>October 2016</b>	12,733	0	0	12,733
<b>November 2016</b>	9,891	0	0	9,891
<b>December 2016</b>	7,167	0	0	7,167
<b>01/01/2016-31/12/2016</b>	<b>168,635</b>	<b>0</b>	<b>0</b>	<b>168,635</b>
<b>January 2017</b>	5,332	0	0	5,332
<b>February 2017</b>	4,550	0	0	4,550
<b>March 2017</b>	10,328	0	0	10,328
<b>April 2017</b>	21,007	0	0	21,007
<b>May 2017</b>	36,409	0	0	36,409
<b>June 2017</b>	33,326	0	0	33,326
<b>July 2017</b>	13,768	0	0	13,768

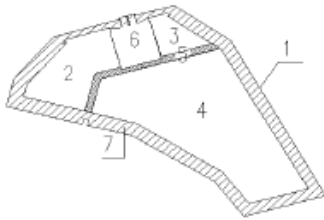
<b>August 2017</b>	6,215	0	0	6,215
<b>September 2017</b>	4,886	0	0	4,886
<b>October 2017</b>	9,641	0	0	9,641
<b>November 2017</b>	6,249	0	0	6,249
<b>December 2017</b>	8,065	0	0	8,065
<b>01/01/2017-31/12/2017</b>	<b>159,774</b>	<b>0</b>	<b>0</b>	<b>159,774</b>
<b>January 2018</b>	6,147	0	0	6,147
<b>February 2018</b>	6,741	0	0	6,741
<b>March 2018</b>	16,056	0	0	16,056
<b>01/01/2018-31/03/2018</b>	28,943	0	0	28,943
<b>Total Sum 01/07/2012-31/03/2018</b>	<b>850,041</b>	<b>0</b>	<b>0</b>	<b>850,041</b>

Table 4: Summary of Emission Reductions

# APPENDIX 1:

## Reservoir Area Calculation

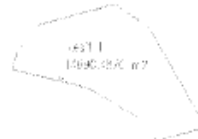
Water Level  
456.00 m



**Section 1** (456.00-447.50)  
Water Level  
Area

8,5

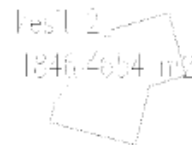
14090,49



**Section 2** (447.50-440.50 )  
Water Level  
Area:

7

1846,465



**Section 3** (447.50-440.50 )  
Water Level  
Area:

7

601,4026



**Section 4** (447.50-440.50~441.70)  
Water Level  
Area

6,4

6722,871



