



**Verified Carbon  
Standard**

# THE CEVIZLIK RUN-OF-RIVER- HYDROELECTRIC POWER PLANT

Document Prepared by GAIA Climate Consultant

<b>Project Title</b>	The Cevizlik Run-of-River-Hydroelectric Power Plant
<b>Version</b>	05
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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 is comprised of the construction of a greenfield 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 to the public grid. The main purpose of the project is to generate approximately 330,000 MWh/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 a vertical axis with 51.21 MWm power each, a cofferdam of the upstream, penstock, energy transmission line, ahead pond, a surge tank, and a power station. 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. The project has started construction on 2 January 2008, the project started to generate electricity on 29 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 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 April 2018 to 28 May 2020. During this monitoring period, the actualized net electricity generation is 599,313.39 MWh. The total emission reduction of this monitoring period is 335,015 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 (%)
01/04/2018-31/12/2018	275	141,246	133,967	252,419.86	239,656.05	-5%
01/01/2019-31/12/2019	365	187,472	135,446	335,030.00	242,301.00	-28%
01/01/2020-28/05/2020	149	76,529	65,602	136,765.67	117,356.34	-14%
<b>Total (01/04/2018-28/05/2020)</b>	<b>789</b>	<b>405,247</b>	<b>335,015</b>	<b>724,215.53</b>	<b>599,313.39</b>	<b>-17%</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”<sup>1</sup>. The installed capacity of the project is 91,40 MWe, thus it is 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.
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<sup>1</sup> <https://cdm.unfccc.int/DOE/scopes.html>

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## 1.4 Other Entities Involved in the Project

<b>Organization name</b>	GAIA Climate Consultant
<b>Role in the Project</b>	Project Coordinator
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## 1.5 Project Start Date

The project start date is 29/05/2010 which is the first electricity generation 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 29/05/2010. Thus, the first crediting period shall last from the 29th of May 2010 until the 28th 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 nearest settlements to the project site is Gürdere village.

The project area is located at 40° 50' 37"N -40° 28' 32" E coordinates. The following figures show the project's location.



Figure 1: Project Location<sup>3</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>4</sup> In addition, as referred in the methodology, "Tool to calculate the emission factor for an electricity system, Version 01.1."<sup>5</sup> was applied. The project's additionality has been demonstrated using the version of "Tool for demonstration and assessment additionality" Version 05.2<sup>6</sup>

## 1.9 Participation under other GHG Programs

The project has not been registered or seeking registration under other GHG programs.<sup>10</sup>

<sup>3</sup> Google Earth screenshot of the coordinates has been provided to the DOE.

<sup>4</sup> <https://cdm.unfccc.int/UserManagement/FileStorage/NF9EDA0V5K382HW0JR14GS7XYQUMCP>

<sup>5</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.pdf>

<sup>6</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf>

<sup>10</sup> The relevant declaration letter has been submitted to the DOE.

## 1.10 Other Forms of Credit

The project has not created another form of Credit.<sup>11</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 599,313.39 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 335,015 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>12</sup>

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

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<sup>11</sup> The relevant declaration letter has been submitted to the DOE.

<sup>12</sup> Positive EIA Letter has been submitted to the DOE.

the treatment of domestic wastewater generated within the context of the project activity.<sup>13</sup> 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 this project, a Local Stakeholder Consultation meeting was held on 16/03/2006 in the conference room of the culture-building in İlkidere district of Rize 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. The 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 announcements done in village coffeehouse and in the 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 17/11/2021. Six people including the mukhtar of Gürdere village and power plant employees were interviewed. There was not any negative feedback on socio-economic and environmental issues by the locals. Since there was no negative feedback from the locals, there is no need to take any further action.

Also, the 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>16</sup> All applications are recorded via the

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<sup>13</sup> The wastewater package treatment plant photographic evidences have been provided to the DOE.

<sup>16</sup> The Complaint and Request forms have been submitted to the DOE.

form. Project manager checks the comments in the book on a regular basis, and records responses.

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 generate electricity on 29 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>18</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)	February 20 2009
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

<sup>18</sup> The Turkish Trade Registry Gazette has been provided to the DOE.

The commissioning of the power plant <sup>19</sup>	28/05/2010
1 <sup>st</sup> Monitoring Period	29/05/2010-30/06/2011
2 <sup>nd</sup> Monitoring Period	01/07/2011-30/06/2012
3 <sup>rd</sup> Monitoring Period	01/07/2012-31/03/2018
4 <sup>th</sup> Monitoring Period	01/04/2018-28/05/2020

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.

In 2015, EPIAŞ obtained Market Operation License. Market Operation activities were transferred from PMUM to EPIAŞ.<sup>20</sup> 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.

# 4 DATA AND PARAMETERS

## 4.1 Data and Parameters Available at Validation

Data / Parameter	EG <sub>PJ,y</sub>
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<sup>19</sup> The commissioning of the power plant is 28/05/2010. However, the project start date is 29/05/2010 which is the first electricity generation date of the project.

<sup>20</sup> <https://www.epias.com.tr/epias-kurumsal/tarihce/>

<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>	N/A

<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>	N/A

<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</b>	Measured from topographical surveys, maps, satellite pictures, etc.

<b>of measurement methods and procedures applied</b>	
<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%20PROJEKSIYONU%202005.pdf">http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202005.pdf</a> <a href="http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202006.pdf">http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202006.pdf</a> <a href="http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf">http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf</a> <a href="http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf">http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf</a> <a href="http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf">http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf</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>	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>	

## 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																							
<b>Value monitored</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Vintage</th> <th>Electricity supplied to the grid (MWh)</th> <th>Electricity consumption from the grid (MWh)</th> <th>Net electricity supplied to the grid [MWh]</th> </tr> </thead> <tbody> <tr> <td>01/04/2018-31/12/2018</td> <td>240,042.59</td> <td>386.54</td> <td>239,656.05</td> </tr> <tr> <td>01/01/2019-31/12/2019</td> <td>242,886.87</td> <td>585.87</td> <td>242,301.00</td> </tr> <tr> <td>01/01/2020-28/05/2020</td> <td>117,597.79</td> <td>241.45</td> <td>117,356.34</td> </tr> <tr> <td><b>Total (01/04/2018-28/05/2020)</b></td> <td><b>600,527.25</b></td> <td><b>1,213.86</b></td> <td><b>599,313.39</b></td> </tr> </tbody> </table>				Vintage	Electricity supplied to the grid (MWh)	Electricity consumption from the grid (MWh)	Net electricity supplied to the grid [MWh]	01/04/2018-31/12/2018	240,042.59	386.54	239,656.05	01/01/2019-31/12/2019	242,886.87	585.87	242,301.00	01/01/2020-28/05/2020	117,597.79	241.45	117,356.34	<b>Total (01/04/2018-28/05/2020)</b>	<b>600,527.25</b>	<b>1,213.86</b>	<b>599,313.39</b>
Vintage	Electricity supplied to the grid (MWh)	Electricity consumption from the grid (MWh)	Net electricity supplied to the grid [MWh]																					
01/04/2018-31/12/2018	240,042.59	386.54	239,656.05																					
01/01/2019-31/12/2019	242,886.87	585.87	242,301.00																					
01/01/2020-28/05/2020	117,597.79	241.45	117,356.34																					
<b>Total (01/04/2018-28/05/2020)</b>	<b>600,527.25</b>	<b>1,213.86</b>	<b>599,313.39</b>																					
<b>Monitoring equipment</b>	<p>Meters are in compliance with the communiqué for Metering Devices to be used in Electricity Market.</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" style="width: 100%; border-collapse: collapse; text-align: center;"> <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>				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																					
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Backup meter	84260534	ITRON-SL761X071	TM2																					

	<p>Accuracy class: Active 2019/C-2</p> <p>The project's electricity production is fed into the grid through the Kalkandere TM 154, kV.</p> <p>During this monitoring period two metering tests were performed on 28/09/2018 and 24/09/2019 respectively.<sup>21</sup> The date of the last meter calibration test is 19 March 2021.</p> <p>The specification of electricity meters which are changed is provided below:</p> <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>28/09/2018</td> <td>TM1</td> </tr> <tr> <td>Backup meter</td> <td>53035224</td> <td>ACTARIS-SL761A071</td> <td>28/09/2018</td> <td>TM1</td> </tr> <tr> <td>Main Meter</td> <td>53035223</td> <td>ACTARIS-SL761A071</td> <td>28/09/2018</td> <td>TM2</td> </tr> <tr> <td>Backup meter</td> <td>53035225</td> <td>ACTARIS-SL761A071</td> <td>28/09/2018</td> <td>TM2</td> </tr> </tbody> </table>	Name	Serial Number	Brand Model	Date of Last Calibration	Transformer Information	Main Meter	53035222	ACTARIS-SL761A071	28/09/2018	TM1	Backup meter	53035224	ACTARIS-SL761A071	28/09/2018	TM1	Main Meter	53035223	ACTARIS-SL761A071	28/09/2018	TM2	Backup meter	53035225	ACTARIS-SL761A071	28/09/2018	TM2
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Backup meter	53035225	ACTARIS-SL761A071	28/09/2018	TM2																						
<p>Accuracy class: Active 0.2S – Reactive 2</p>																										
<p><b>QA/QC procedures to be applied</b></p>	<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>22</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> </ul>																									

<sup>21</sup> The metering test results have been submitted to the DOE.

<sup>22</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)

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

<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>	Generation License and existence equipment information has been checked.
<b>Purpose of the data</b>	Calculation of project emissions
<b>Calculation method</b>	Please refer to the Generation License
<b>Comments</b>	N/A

<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>	Please see Appendix-I

<b>QA/QC procedures to be applied</b>	The reservoir area corresponding to maximum operational level has been taken into consideration
<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.

### 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. ensures the overall site management by 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 the 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 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.

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 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. 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.

The main source is the EPIAS (also known as PMUM) data which is used for the quantity of net electricity delivered to the grid. 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 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.

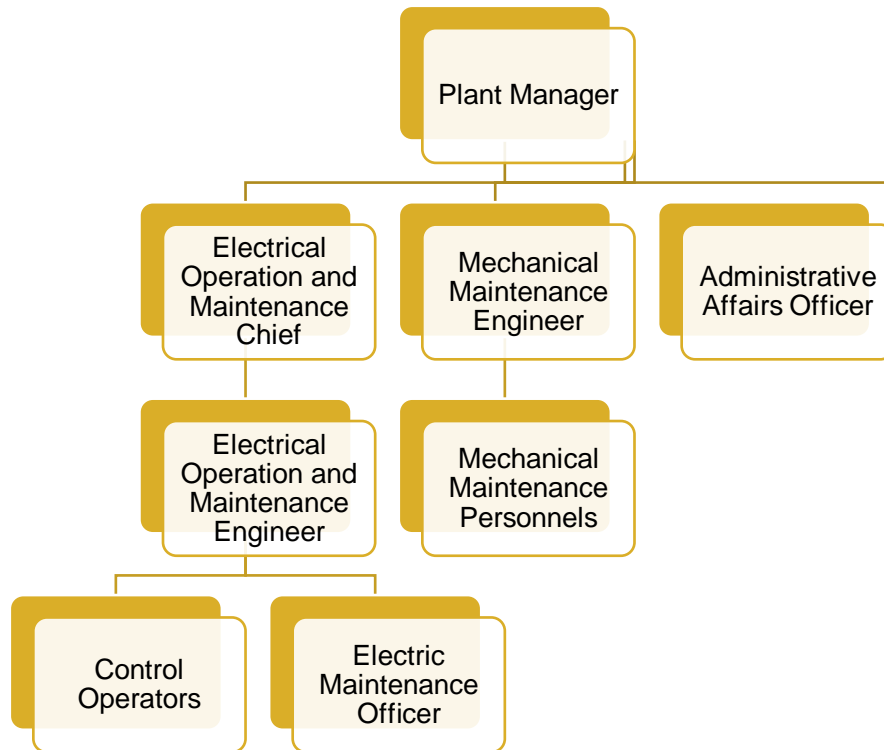


Figure 2: Operation and Management diagram

## 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  $10W/m^2$ . The power density of the project activity is calculated as follows:

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

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

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

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

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

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

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).

According to the ACM0002-Version 10, these emissions sources are neglected.<sup>23</sup> 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<sub>y</sub> = Emission reductions in year y (t CO<sub>2</sub>/yr).

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

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

LE<sub>y</sub> = Leakage emissions in year y (t CO<sub>2</sub>/yr).

y = Refers to a given period

Since PE<sub>y</sub> and LE<sub>y</sub> 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>01/04/2018-31/12/2018</b>	<b>133,967</b>	<b>0</b>	<b>0</b>	<b>133,967</b>
<b>01/01/2019-31/12/2019</b>	<b>135,446</b>	<b>0</b>	<b>0</b>	<b>135,446</b>

<sup>23</sup> <https://cdm.unfccc.int/UserManagement/FileStorage/NF9EDA0V5K382HW0JR14GS7XYQUMCP>

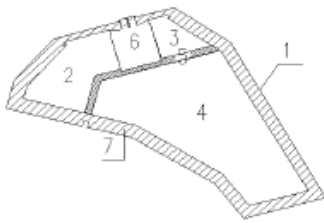
<b>01/01/2020- 28/05/2020</b>	<b>65,602</b>	<b>0</b>	<b>0</b>	<b>65,602</b>
<b>Total Sum 01/04/2018- 28/05/2020</b>	<b>335,015</b>	<b>0</b>	<b>0</b>	<b>335,015</b>

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

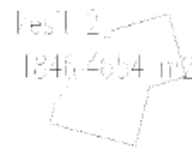
14090,49



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

7

1846,465



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

7

601,4026


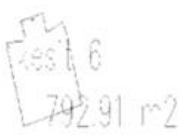



**Section 4** (447.50-440.50~441.70)  
Water Level  
Area:

6,4

6722,871



<b>Section 5</b>	(447.50-440.50 )			
Water Level Area		7	412,3924	412,3924 m <sup>2</sup>
<b>Section 6</b>	(between 447.50-440.50-435.50 level cal.			
Water Level Area:		9,5	792,91	792,91 m <sup>2</sup>
<b>Section 7</b>	(between 447.50-447.50-440.50 level calculation			
Water Level Area		3,5	3714,446	792,91 m <sup>2</sup>
<b>Total Area(m2)</b>	<b>Cross Section 2+3+4+5+6+7</b>		14090,49m <sup>2</sup>	

 	
<b>CEVIZLIK</b>	
<small>CEVIZLIK İNŞAAT VE MÜHÜR</small> <small>İNŞAAT VE MÜHÜR</small> <small>İNŞAAT VE MÜHÜR</small>	
<small>NOVA</small> <small>NOVA</small> <small>NOVA</small>	<small>NOVA</small> <small>NOVA</small> <small>NOVA</small>