



ADIGUZEL II HYDROELECTRIC POWER PLANT

Document Prepared by GAIA Climate Consultant

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PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

PEKER ENERJI A.Ş. installed Adiguzel II Hydroelectric Power Plant (hereafter referred to as ADIGUZEL II HEPP) of which the plant is in the Guney county of the city of Denizli, in Turkey. The objective of the project is to generate zero-emission electricity to be fed into the interconnected national grid.

ADIGUZEL II HEPP, which is comprised of the construction of a greenfield 30.09 MWe run- of-river hydroelectric power plant located in the Buyuk Menderes river basin, in Turkey's Aegean Sea Region. The power plant consists of 2 Francis turbines with the vertical axis with 15.05 MWe power each., cofferdam of upstream, penstock, energy transmission line, a head pond, a surge tank, and a power station. Energy is produced by utilizing water flow from the thalweg elevation of 320.50 meters to 267.00 meters of tailwater elevation. The maximum water level is 318.00 m and the tailwater level is 267.00 m. Water transports via penstock which has 270 m in length and 3.30m in diameter. The length of the energy transmission line is about 5 km and the transmission line is connected to Adiguzel Dam which is located at the source side of the Project. The water from the surge tank is transferred to Adiguzel II HEPP, which has 2 vertical shafts of Francis turbines with a total installed capacity of 30.09 MW and vertical axis, three-phased synchronous generators are used. 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 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-October-2020 to 23-January-2025. During this monitoring period, the actualized net electricity generation is 83,385.01 MWh. The total emission reduction of this monitoring period is 52,448 tCO₂e.

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

Table 1: Ex-ante vs achieved emission reductions

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-October-2020 to 31-December-2020	92	11,277	0	17,941.26	0.00	-100.00%
01-January-2021 to 31-December-2021	365	44,741	13,963	71,180.00	22,199.12	-68.79%
01-January-2022 to 31-December-2022	365	44,741	11,998	71,180.00	19,075.28	-73.18%
01-January-2023 to 31-December-2023	365	44,741	12,443	71,180.00	19,782.23	-72.19%
01-January-2024 to 31-December-2024	366	44,864	14,047	71,375.01	22,333.48	-68.69%
01-January-2025 to 23-January-2025	23	2,819	-3	4,485.32	-5.10	100.11%
Total	1,576	193,183	52,448	307,341.59	83,385.01	-72.85%

According to the water usage agreement that all hydroelectric power plants are required to make with the State Hydraulic Works (DSİ), DSİ determines the amount of water reaching the Adıgüzel 2 Hydroelectric Power Plant (HPP) by releasing water from the Adıgüzel Dam in accordance with the annual irrigation programs implemented for irrigation projects. Depending on the water level in the Adıgüzel Dam and the needs of irrigation unions, water is released from the dam each year between April and September. During the remaining months, the incoming water is stored in the Adıgüzel Dam for the following year. Therefore, during these months, electricity production at the HPP is usually very low or zero.

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

Table 2: Technical specifications of the Project

Power Plant Building

Length	M	28.70
Width	M	15.00
Turbines		
Brand/Type		ORIENT/Vertical Francis Turbine
Number of Units		2
Serial No of Units		13ORIENT001-13ORIENT002
Unit Rated Power	MWe	15.048 ¹
Total Installed Capacity	MWe	30.096
Rated Head	m	50.69
Project rated discharge	m ³ /s	66.00
Transformer		
Type		Outdoor Type, oily, three phased
Number of Units		2
Power of a Unit	kVA	16,750
Voltage	kV	10.5 / 34.5 kV
Efficiency	%	99
Penstock		
Inner Diameter	m	3.30
Steel Thickness	mm	12.00
Length	m	270
Generator		
Type		Vertical axis, three phased synchron
Number of Units		2
Max. Voltage Output	kW	10.5
Power Factor		0.90
Efficiency	%	98

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
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¹ Source: Turbine Generator Unit Label has been provided to the DOE. Unit Rated Power = Label Rated capacity (16.72) * Power factor (0.90) = 15.048MWe

Validation	24-January-2015 23-January-2025	VCS	Rina Services S.P.A.	Two times renewable crediting period of ten years
First Verification	24-January-2015 30-September-2020	VCS	Re Carbon Gözetim Denetim ve Belgelendirme Ltd. Şti.	Five years, eight months, eight days
Second Verification	01-October-2020 23-January-2025	VCS	BM Certification	Four years, three months, twenty-three days

1.3 Sectoral Scope and Project Type

Sectoral scope ²	Energy Industry – Renewable/Non-renewable Sources
Project activity type	Single green field investment

Sectoral scope	N/A
AFOLU project category ³	N/A
Project activity type	N/A

1.4 Project Proponent

Organization name	Peker Enerji A.S.
Contact person	Hakan Özyaşar
Title	Electrical Electronics Engineer
Address	UGUR MUMCU CD. UGUR MUMCU'NUN SOK. No: 15/1 GOP/ANKARA
Telephone	0312 466 5658
Email	hakan.ozyasar@hanayelektrik.com

1.5 Other Entities Involved in the Project

Organization name	GAIA Climate Consultant
Role in the project	Project Coordinator
Contact person	Yesim Akpınar
Title	Carbon Consultant
Address	Maslak Meydan Sk. No:1 Beybi Giz Plaza Kat:26 Maslak/Istanbul

² Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

³ See Appendix 1 of the VCS Standard

Telephone	+90212 2240450
Email	yakpinar@gaiacclimate.com

1.6 Project Start Date

Project start date	24-January-2015
Justification	The project start date is the commissioning date of the project.

1.7 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☐ Ten years, fixed ☒ Other One time renewable crediting period of 10 years 0 month
Start and end date of first or fixed crediting period	24-January-2015 to 23-January-2025

1.8 Project Location

The Project site is in the Buyuk Menderes river basin in Turkey, in the Aegean Sea region, approximately 5 km to the south of the Guney county of Denizli. Adiguzel II HEPP is located 38°07'59'' N - 29° 09'12'' E coordinates. The following figures show the project's location.



Figure 1: The project's location



Figure 2: The Project Lay-out

1.9 Title and Reference of Methodology

Type (methodology, tool or module)	Reference ID, if applicable	Title	Version
Methodology	ACM0002	Grid-connected electricity generation from renewable sources	15
Tool	TOOL 07	Tool to calculate the emission factor for an electricity system	04
Tool	TOOL 01	Tool for demonstration and assessment additionality	07

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

If yes, provide required evidence of no double issuance as outlined by the VCS Standard.

1.10.2 Registration in Other GHG Programs

Was the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

If yes, provide the registration number and all relevant details including the date of project inactivity in the other GHG program.⁴

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

If yes, provide all required evidence of no double claiming as outlined by the VCS Standard.

⁴ The requirement to provide the date of project inactivity only applies to projects which request registration or crediting period renewal under the VCS Program on or after 1 January 2025.

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the VCS Program Definitions for definition of GHG-related environmental credit system.

☐ Yes ☒ No

If yes, provide all required evidence of no double claiming as outlined by the VCS Standard.

1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

If yes: Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☐ No

If yes: Has the project proponent(s) or authorized representative posted a public statement on their website saying, "Carbon credits may be issued through the Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities]."

☐ Yes ☐ No

If yes to all: Provide evidence of the public statement. Evidence must be provided in this section or in an appendix.

1.12 Sustainable Development Contributions

The project helps Turkey to stimulate and commercialize the use of grid-connected renewable energy technologies and markets. Furthermore, the project aims to generate clean energy by reducing the dependence on fossil fuels. As a Hydroelectric Power Plant, the project helps to meet the increasing national electricity demand of the country in a cleaner and sustainable way. The project also contributes to promoting inclusive and sustainable economic growth by creating employment opportunities during both the construction and operational phases. It supports full and productive employment with decent working conditions for engineers, technicians, and local workers. By investing in renewable energy infrastructure, the project fosters long-term local economic development and capacity-building in the clean energy sector. Furthermore, the project enhances climate awareness in Turkey by demonstrating the tangible benefits of renewable energy as a climate mitigation strategy. It promotes institutional and public understanding of low-carbon technologies and fosters capacity-building through knowledge sharing and stakeholder engagement. By integrating sustainability into energy planning, the project supports Turkey's efforts to build resilience and adaptive capacity to climate-related impacts.

Table 3: Sustainable Development Contributions

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
1)	7.2	Clean and Affordable Energy	Implemented activities to increase	During this monitoring period, the actualized net electricity generation is 83,385.01 MWh.	The total net electricity generation of the project including this monitoring period is 347,318.36 MWh.
2)	8.5	Decent Work and Economic Growth	Implemented activities to increase	Employment opportunities were provided for nine personnel during this monitoring period.	Employment opportunities were provided for nine personnel during the operation phase of the project.
3)	13.3	Tons of greenhouse gas emissions avoided or removed	Implemented activities to increase	During this monitoring period, the actualized emission reduction is 52,448 tCO ₂ e.	The total emission reduction of the project including this monitoring period is 218,460 tCO ₂ e.

For SDG 7.2, the total electricity generation of the project activity has been calculated by using official EPIAŞ records. For SDG 8.5, the employment opportunities offered by the project have been evidenced by social security records. For SDG 13.3, the total emission reduction of the project activity has been calculated by multiplying the monthly electricity generation amounts taken by EPIAŞ records with the emission factor taken from PDD and summing the calculated amounts for the whole monitoring period.

1.13 Commercially Sensitive Information

N/A

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	The stakeholders are identified as the people from nearest settlement, which is Adiguzel Village and, project owner.
Legal or customary tenure/access rights	N/A as the project owner has the rights of carbon project.
Stakeholder diversity and changes over time	The project has no impact on the social, economic, and cultural diversity within stakeholder groups
Expected changes in well-being	The project is expected to improve local environment, provide work opportunities and supply clean energy.
Location of stakeholders	Nearby settlements, Adigüzel Village and neighborhood.
Location of resources	N/A

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	The contact information of the plant responsible is always available at the Mukhtar's office. The project owner and local community are always in touch. The project owner regularly checks with the Mukhtar whether any complaint or a request exists. Any complaint or need from the local community can directly be received by the project owner and appropriate contributions or improvements can be made to the local community.
Date(s) of stakeholder consultation	The last site visit was on 30-November-2020
Communication of monitored results	Stakeholders can directly reach the plant business manager if they have any complaints/opinions. In cases where stakeholders needed to be informed during the monitoring period, the project owner informed the stakeholders through the headman. There are no complaints on the grievance logbook during this monitoring period.
Consultation records	N/A
Stakeholder input	No negative inputs were received during this monitoring period.

2.1.3 Free, Prior, and Informed Consent

Consent	Relevant permits were obtained during the validation period. No ongoing or unresolved conflicts.
Outcome of FPIC	The project activity did not damage land, did not relocate people without their consent, and did not forcibly physically or economically displace people.

2.1.4 Grievance Redress Procedure

Grievances received	Resolution and outcome
No negative inputs have been received during this monitoring period.	The grievance mechanism is in place, and this was also confirmed by the interviewed local villagers and Mukhtars during the site visit of the last verification. In addition, the contact information of the plant responsible is available in Mukhtars; any complaints or requests can be forwarded to the Project Owner.

2.1.5 Public Comments

Summary of comments received	Actions taken
No comments received during this monitoring period.	

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

No new organization was involved in the project design or implementation during this monitoring period. The current project manager and operation manager have sufficient technical background, expertise and experience in implementing such project activities.

2.2.2 Risk assessment

	Risk identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing	No risk identified	The project does not cause any natural and human-induced risk to stakeholders' wellbeing.
Risks to stakeholder participation	No risk identified	The project owner encourages continuous ongoing feedback from its stakeholders. Stakeholders are involved in every stage of informing about the project activity. The

		complaint mechanism is fully functioning. Therefore, the risk in this content is not identified to this project.
Working conditions	No risk identified	All necessary training regarding the health and safety of employees is provided.
Safety of women and girls	No risk identified	The project does not endanger the safety of girls and women. The women and girls are treated as per the law of land with no discriminations on gender basis.
Safety of minority and marginalized groups, including children	No risk identified	The project does not jeopardize the safety of minorities and isolated groups, including children.
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	No risk identified	The project is not located in a residential area, and it does not cause noise pollution to humans. Since the project is a hydro energy project, it does not cause any air pollution. There is no waste discharge to water and no release of hazardous materials.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified ⁵	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	The project does not involve and is not complicit in any form of discrimination based on gender, race, religion or any other basis.
Sexual harassment	No risk identified	The project does not involve and is not complicit in any form of sexual orientation or any other basis.
Gender equity in labor and work	No risk identified	The project does not reduce access to or control of resources for women. The project does not involve in any discrimination in any kind or form. The project respects the employees' freedom of association and their right to collective bargaining and is not complicit in restrictions of these freedoms and rights.
Forced labor	No risk identified	The Project Developer ensures that there is no forced labor, and that all employment follows national labor and occupational health and safety laws, with obligations under

⁵ The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

		international law, and consistency with the principles and standards embodied in the International Labor Organization (ILO) fundamental conventions.
Child labor	No risk identified	Child labor, as defined by the ILO Minimum Age Convention, is not allowed. No child under eighteen years old is working in the project.
Human trafficking	No risk identified	No human trafficking is allowed by the Project Owner

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	Turkey is a party to European Convention on Human Rights since 18-May-1954. The project owner respects internationally proclaimed human rights including dignity, cultural property, and uniqueness of indigenous people. The project is not complicit in Human Rights abuses.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
No risk identified.	Turkey is a party to European Convention on Human Rights since 18-May-1954. The project owner respects internationally proclaimed human rights including dignity, cultural property, and uniqueness of indigenous people. The project is not complicit in Human Rights abuses and did not cause any harm to cultural heritage during the monitoring period.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified.	All permits for the project site were obtained during the validation period.

2.3.5 Benefit Sharing

There is no benefit sharing in the project activity.

Summary of the benefit sharing plan	N/A
Benefit sharing during the monitoring period	N/A

2.4 Ecosystem Health

	Risk identified	Mitigation or preventative measure(s) taken during the monitoring period
Impacts on biodiversity and ecosystems	No risk identified.	The project has an EIA positive declaration dated 31-January-2012 from Ministry of Environment and Urbanization. It has no negative impact on biodiversity and ecosystems.
Soil degradation and soil erosion	No risk identified.	The project activity has no impact in this regard.
Water consumption and stress	No risk identified.	Under project activity, no direct process consumes freshwater, and wastewater is collected in a large sewage tank. When filled, the tank is emptied via municipality sewage truck.

2.4.1 Rare, Threatened, and Endangered species

Species or habitat	There aren't any endangered species identified as potentially present within the Project boundary (including those that may route through the area).
Areas needed for habitat connectivity	The Project does not potentially impact other areas where endangered species may be present through transboundary effects.

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No risk identified.	The project is not located in, or adjacent to habitats for rare, threatened, or endangered species. Therefore, this section is N/A.
Areas for habitat connectivity	No risk identified.	The project is not located in any are for habitat connectivity. Therefore, this section is N/A.

2.4.2 Introduction of species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
N/A	N/A	N/A	N/A

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
No invasive species	N/A

	Risks identified	Mitigation or preventative measure(s) taken
Invasive species	No risk identified.	Invasive species don't exist in the project area.

2.4.3 Ecosystem conversion

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	No risk identified.	The project is not an ARR, ALM, WRC or ACoGS project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project was started construction on 15/04/2013. The first unit started commissioning on 24/01/2015. During the monitoring period, there was no event or situation that occurred, which may impact the applicability of the methodology.

Table 4: Project Timeline

Milestone	Date
Water Usage Agreement	30-September-2009
Revised Feasibility Report	March 2011
Board Decision for Early Consideration Investment and Carbon Finance Support	11-July-2011
Electromechanical Equipment Contract	30-December-2011
EIA-Not-Required Certificate	31-January-2012
Generation License	18-April-2012
Construction Contract	May 2012
Loan Agreement	09-July-2012
Revised Transmission System Contract	30-September-2013
The date for start of construction (Site delivery record)	15-April-2013
Project Start Date (Commissioning of Power Plant)	24-January-2015
1 st Monitoring Period	24-January-2015 to 30-September-2020
2 nd Monitoring Period	01-October-2020 to 23-January-2025

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

The registration of Adiguzel II Hydroelectric Power Plant was carried out by GAIA Carbon Finance. However, during first monitoring period, the name of the Carbon Consultant has changed to GAIA Climate Consultant. In addition, there has been no change in the shareholder structure.

3.3 Grouped Projects

This is not a grouped project.

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes

☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EG _{gross, y}
Data unit	GWh
Description	Turkey's Gross Electricity Generated by primary energy source for the five most recent years (2008 - 2012).
Source of data	Turkish Electricity Transmission Company (TEIAS) http://www.teias.gov.tr/TürkiyeElektrikIstatistikleri/istatistik2012/uretim%20tuketim(23-47)/30(06-2012).xls
Value applied	1,073,331 Validated VCS Project Description (Version 7) of the Project.
Justification of choice of data or description of measurement methods and procedures applied	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available.
Purpose of data	Used for baseline emission calculation.
Comments	

Data / Parameter	Cap _{BL}
Data unit	W
Description	Installed capacity of the hydro power plant before the implementation of the project activity.
Source of data	Project site
Value applied	0 (this is a new hydro power plant)
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of project emissions.
Comments	

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/TürkiyeElektrikIstatistikleri/istatistik2

	012/yakit48-53/49.xls
Value applied	Validated VCS Project Description (Version 7) of the Project. (Please see Section 3.1 and Annex 3)
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	

Data / Parameter	$NCV_{i,y}$
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" 2008-2012: http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2012/yakit48-53/51.xls
Value applied	Validated VCS Project Description (Version 7) of the Project. Please see Annex 3
Justification of choice of data or description of measurement methods and procedures applied	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to date and reliable data available for the Turkish grid.
Purpose of data	To calculate the Operating Margin (OM) emission factor
Comments	

Data / Parameter	$EF_{CO_2,i,y}$
Data unit	tCO ₂ /GJ
Description	Default CO ₂ emission factor of fossil fuel type i used in power in year y
Source of data	IPCC default values (as provided in Table 1.4, Chapter 1, Volume 2 (Energy), 2006 IPCC) Guidelines for National Greenhouse Gas Inventory) are used. Link: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Value applied	Validated VCS Project Description (Version 7) of the Project. Please see Section 3.1. and Annex 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 04.0)".

Purpose of data	To calculate the Operating Margin (OM) emission factor
Comments	

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

Data / Parameter	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 2009-2010 http://www.teias.gov.tr/YayinRapor/APK/projeksiyon/KAPASITEPROJEKSIYONU2013.pdf
Value applied	Validated VCS Project Description (Version 7) of the Project. Please refer to Section 2.4 for Capacity Additions
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	-

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 7) of the Project. Please refer to ANNEX 3
Justification of choice of data or description of measurement methods and procedures applied	-
Purpose of data	Used for baseline emission calculation.
Comments	No official efficiency values based on each power plant, or each fuel type is available in Turkey. Most natural gas power plants in Turkey are combined cycle, most coal power plants operate sub-critical and most liquid fuel power plants adopt an open cycle technology.

Data / Parameter	$EG_{m,y}$
Data unit	MWh
Description	Net electricity generated by power plant/unit m in year y
Source of data	Annex I of Turkish Electricity Transmission Company (TEIAS) Capacity Projection Report for 2012. http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2012.pdf
Value applied	Validated VCS Project Description (Version 7) of the Project Please refer to Section 3.1., Table 12
Justification of choice of data or description of measurement methods and procedures applied	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to-date and accurate information available.
Purpose of data	-
Comments	-

Data / Parameter	$EF_{L,m,y}$
Data unit	kgCO ₂ /GJ
Description	The CO ₂ emission factor of the grid power unit m (Default CO ₂ emission factor of fossil fuel types is used)
Source of data	IPCC default values (as provided in Table 1.4, Chapter 1, Volume 2 (Energy), 2006 IPCC Guidelines for National Greenhouse Gas Inventory) are used. Link: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

Value applied	Validated VCS Project Description (Version 7) of the Project. Please refer to ANNEX 3
Justification of choice of data or description of measurement methods and procedures applied	There is no information on the power unit specific emission factor in Turkey. Hence, IPCC values have been used as per the “Tool to calculate the emission factor for an electricity system (version 04.0)”.
Purpose of data	-
Comments	-

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

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

Data / Parameter	EF_{grid,CM,y}
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor for the project electricity system in year y
Source of data	Tool to calculate the emission factor for an electricity system
Value applied	0.629

Justification of choice of data or description of measurement methods and procedures applied	The baseline emission factor is the weighted average of the Operating Margin Emission Factor and Build Margin Emission Factor. The “Tool to calculate the emission factor for an electricity system” (version 04.0) guideline procedures have been applied.
Purpose of data	To calculate baseline emissions and emission reductions.
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	Cap _{PJ}
Data unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Project site
Description of measurement methods and procedures to be applied	Supplier information on the equipment and the number of turbines will be checked on site visits
Frequency of monitoring/recording	Yearly
Value monitored	30,096,000 (15,048,000Wx2).
Monitoring equipment	N/A
QA/QC procedures to be applied	Supplier information on the related equipment and the existence of the equipment will be checked. Also, this information may be checked from the EMRA website.
Purpose of the data	According to the Turbine Generator Unit Label which has been provide to the DOE, Unit Rated Power has been calculated as Label Rated Capacity (16.72) x Pover Factor (0.90) = 15,048 Mwe.
Calculation method	-
Comments	-

Data / Parameter	APJ
Data unit	m ²
Description	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
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	875,264.111 m ²
Monitoring equipment	Topographical surveys, maps, satellite pictures
QA/QC procedures to be applied	The readings will be done during the period when the water flow is made to have the largest reservoir area
Purpose of the data	-
Calculation method	-
Comments	-

Data / Parameter	EG _{facility,y}																											
Data unit	MWh/yr																											
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	<table><tr><td>Vintage</td><td>Electricity supplied to the grid (MWh)</td><td>Electricity consumed from the grid (MWh)</td><td>Net electricity supplied to the grid (MWh)</td></tr><tr><td>01-October-2020 to 31-December-2020</td><td>0.00</td><td>0.00</td><td>0.00</td></tr><tr><td>01-January-2021 to 31-December-2021</td><td>22,199.41</td><td>0.29</td><td>22,199.12</td></tr><tr><td>01-January-2022 to 31-December-2022</td><td>19,081.84</td><td>6.56</td><td>19,075.28</td></tr><tr><td>01-January-2023 to 31-December-2023</td><td>19,814.07</td><td>31.84</td><td>19,782.23</td></tr><tr><td>01-January-2024 to 31-December-2024</td><td>22,377.72</td><td>44.24</td><td>22,333.48</td></tr></table>				Vintage	Electricity supplied to the grid (MWh)	Electricity consumed from the grid (MWh)	Net electricity supplied to the grid (MWh)	01-October-2020 to 31-December-2020	0.00	0.00	0.00	01-January-2021 to 31-December-2021	22,199.41	0.29	22,199.12	01-January-2022 to 31-December-2022	19,081.84	6.56	19,075.28	01-January-2023 to 31-December-2023	19,814.07	31.84	19,782.23	01-January-2024 to 31-December-2024	22,377.72	44.24	22,333.48
Vintage	Electricity supplied to the grid (MWh)	Electricity consumed from the grid (MWh)	Net electricity supplied to the grid (MWh)																									
01-October-2020 to 31-December-2020	0.00	0.00	0.00																									
01-January-2021 to 31-December-2021	22,199.41	0.29	22,199.12																									
01-January-2022 to 31-December-2022	19,081.84	6.56	19,075.28																									
01-January-2023 to 31-December-2023	19,814.07	31.84	19,782.23																									
01-January-2024 to 31-December-2024	22,377.72	44.24	22,333.48																									

	01-January-2025 to 23-January-2025	0.00	5.10	-5.10
Monitoring equipment	Meters are in compliance with the communiqué for Metering Devices to be used in Electricity Market.			
	The specification of electricity meters is provided below:			
	Name	Serial Number	Brand –Model	Date of Last Test
	Main Meter	9202719	EMH-LZQJ-XC	30/03/2022
	Backup meter	65006598	ITRON- SL7000	30/03/2022
	Accuracy class: Active CL:C – Reactive 1S			
	During the monitoring period one metering test was performed on 30/03/2022. The calibration test result is provided to the DOE.			
	The first index protocol of the main meter with Serial No: 9202719 dated back to 16-September-2020 within previous monitoring period and, was provided to the DOE.			
	The backup meter with Serial No:65006598 had been tested on 16/09/2020 in the previous monitoring period and the calibration test result were provided to the DOE.			
	The main meter (9202719) and backup meter (65006598) were changed on 23.02.2023 ⁹ . The features of the new electricity meters are provided below:			
Name	Serial Number	Brand –Model	Accuracy class	
Main Meter	540421	ELSTER-A-500	Active: CL:C-1S	
Backup meter	540422	ELSTER-A-500	Active: CL:C-1S	
QA/QC procedures to be applied	Measurements are undertaken using energy meters.			
	• According to the Article 2 of the Communiqué of Meters in Electricity Sector ¹⁰ : ‘The meters to be used in the electricity market shall be compliant with the standards of Turkish Standards Institute or IEC and have obtained “Type and System Approval” certificate from the Ministry of Trade and Industry.’ Therefore, Ministry of Trade and Industry (Ministry) is responsible from control and calibration of the meters.			
	• Paragraph b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems' (Regulation) of Ministry states that: ‘b) Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done every 10 years.’ Therefore; periodic calibration of the meters will be done every 10 years.			
	• As above mentioned, the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures must 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 emission reductions
Calculation method	The net electricity is calculated by: - 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	-

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 Peker Enerji 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 had been 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 was defined in the agreement as two groups: main meter and spare meter. The design of the metering system was 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 both parties. This prevents any intervention and assures the accuracy and quality of the measurements. Concerning metering system accuracy, project participants must 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 were within TEIAS' province, TEIAS executed all the procedures for handling non-conformities. Therefore, the Project Participant did not have any internal auditing for this purpose. Data would be stored electronically, during the crediting period and at least two years after the last issuance of credits for the project activity in the concerning crediting period. The Project Proponent is responsible for storage of data received from the measuring devices. However, the monitoring data collection responsibility was transferred to ADM Elektrik Dağıtım A.Ş. in this monitoring period, in February 2023 by a new agreement between ADM and Peker Enerji.

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 net electricity generation (EG_{facility,y}) per year. Since project emission is zero no additional monitoring is required. The generation data are subject to the strict internal quality control systems of both parties.

The monthly meter reading documents are stored by Peker Enerji A.S. and ADM. The settlement notification, which is issued by ADM and includes the meter reading data, is stored on an ADM file server and accessible for Peker Enerji 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 must 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 technicians 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 technicians 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 nine employees within the scope of the project. Roles and responsibilities have been summarized in the following chart.

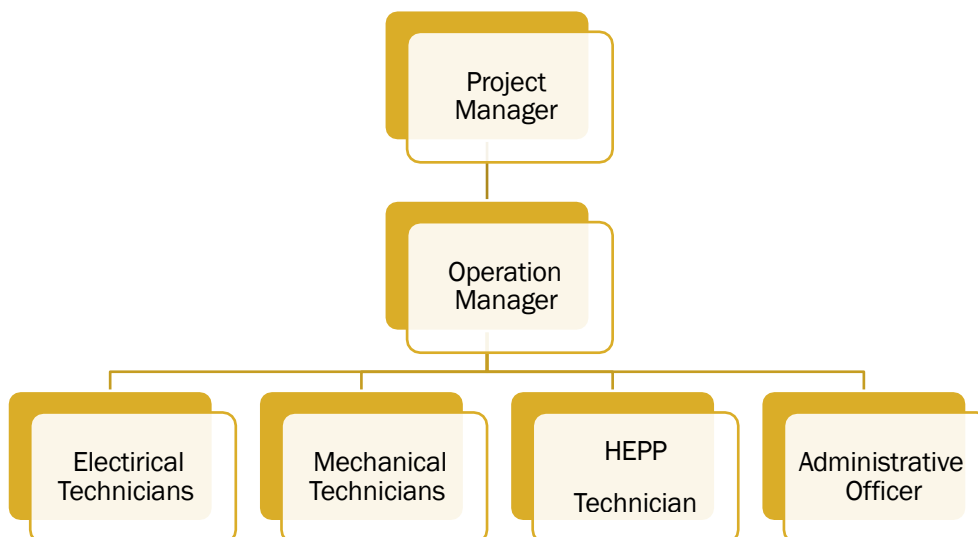


Figure 3: Operation and management diagram

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

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

BE_y :Baseline emissions in year y (tCO₂)

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

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

$EF_{grid,CM,y}$ value is fixed as 0.629 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).

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y} = 83,385.01 * 0.629 = 52,448 \text{ tCO}_2\text{e}$$

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:

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} = 30,096,000 W

Cap_{BL} = 0 (Justification: The project is a new hydro power plant) A_{PJ} = 875,264.111 m²

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

Therefore; PD = (30,096,000 – 0)/(875,264.111 – 0) = 34.385 W/m²

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

5.3 Leakage Emissions

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 GHG Emission Reductions and Carbon Dioxide Removals

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

$$ER_y = BE_y - PE_y - LE_y$$

Where:

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

BE_y = Baseline emissions in year y (tCO₂/yr).

PE_y = Project emissions in year y (tCO₂/yr).

LE_y = Leakage emissions in year y (tCO₂/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.

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Reduction VCUs (tCO ₂ e)	Removal VCUs (tCO ₂ e)	Total VCUs (tCO ₂ e)
01-October-2020 to 31-December-2020	0	0	0	0	0	0
01-January-2021 to 31-December-2021	13,963	0	0	13,963	0	13,963
01-January-2022 to 31-December-2022	11,998	0	0	11,998	0	11,998
01-January-2023 to 31-December-2023	12,443	0	0	12,443	0	12,443
01-January-2024 to 31-December-2024	14,047	0	0	14,047	0	14,047

01-January-2025 to 23-January-2025	-3	0	0	-3	0	-3
Total	52,448	0	0	52,448	0	52,448

Vintage period	Ex-ante estimated reductions/removals	Achieved reductions/removals	Percent difference	Explanation for the difference
01-October-2020 to 31-December-2020	11,277	0	-100.00%	Limited active period of the dam in line with the water usage agreement with DSI
01-January-2021 to 31-December-2021	44,741	13,963	-68.79%	Limited active period of the dam in line with the water usage agreement with DSI
01-January-2022 to 31-December-2022	44,741	11,998	-73.18%	Limited active period of the dam in line with the water usage agreement with DSI
01-January-2023 to 31-December-2023	44,741	12,443	-72.19%	Limited active period of the dam in line with the water usage agreement with DSI
01-January-2024 to 31-December-2024	44,864	14,047	-68.69%	Limited active period of the dam in line with the water usage agreement with DSI
01-January-2025 to 23-January-2025	2,819	-3	-100.11%	Limited active period of the dam in line with the water usage agreement with DSI
Total	193,183	52,448	-72.85%	Limited active period of the dam in line with the water usage agreement with DSI

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

N/A

Section	Information	Justification