



NIKSAR HYDROELECTRIC POWER PLANT

Document Prepared by SEKANS ENERJI LIMITED SİRKETİ

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CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Project	4
1.2	Audit History.....	6
1.3	Sectoral Scope and Project Type.....	7
1.4	Project Eligibility.....	7
1.5	Project Design	7
1.6	Project Proponent	8
1.7	Other Entities Involved in the Project	8
1.8	Ownership.....	8
1.9	Project Start Date	8
1.10	Project Crediting Period	9
1.11	Project Scale and Estimated GHG Emission Reductions or Removals	9
1.12	Description of the Project Activity	10
1.13	Project Location.....	11
1.14	Conditions Prior to Project Initiation	12
1.15	Compliance with Laws, Statutes and Other Regulatory Frameworks	12
1.16	Double Counting and Participation under Other GHG Programs.....	13
1.17	Double Claiming, Other Forms of Credit, and Scope 3 Emissions.....	14
1.18	Sustainable Development Contributions.....	15
1.19	Additional Information Relevant to the Project.....	15
2	SAFEGUARDS AND STAKEHOLDER ENGAGEMENT	16
2.1	Stakeholder Engagement and Consultation.....	16
2.2	Risks to Stakeholders and the Environment.....	19
2.3	Respect for Human Rights and Equity	19
2.4	Ecosystem Health	21
3	APPLICATION OF METHODOLOGY.....	22
3.1	Title and Reference of Methodology	22
3.2	Applicability of Methodology	23
3.3	Project Boundary	32
3.4	Baseline Scenario	33

3.5	Additionality	Error! Bookmark not defined.
3.6	Methodology Deviations	44
4	QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS.....	44
4.1	Baseline Emissions	44
4.2	Project Emissions	45
4.3	Leakage Emissions	46
4.4	Estimated GHG Emission Reductions and Carbon Dioxide Removals	46
5	MONITORING	47
5.1	Data and Parameters Available at Validation.....	47
5.2	Data and Parameters Monitored	47
5.3	Monitoring Plan	50
	APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION.....	55

1 PROJECT DETAILS

1.1 Summary Description of the Project

Niksar Hydroelectric Power Plant which was developed by İÇTAŞ YENİLENEBİLİR ENERJİ ÜRETİM VE TİCARET A.Ş. is located at Niksar town of Tokat province and utilizes the Kelkit stream water to generate electricity from hydropower. The project is a run-of-river and the total installed capacity of the project is 41.560 MWm/40.161 MWe, consisting of 2 turbines with a predicted net power supply to the grid of 215,203 MWh per annum. There is no new reservoir formation as it's just the collection of water. The water is collected as it just enables hourly regulation. The Project Activity is a run-of-river type composed of the Akıncı weir, water intake structures, 12,014 m conveyance channel, a forebay, 2 penstocks, a powerhouse equipped with turbines having a total installed capacity of 40.16 MWe and other related facilities (See Figure 1 for the general layout of the project activity).

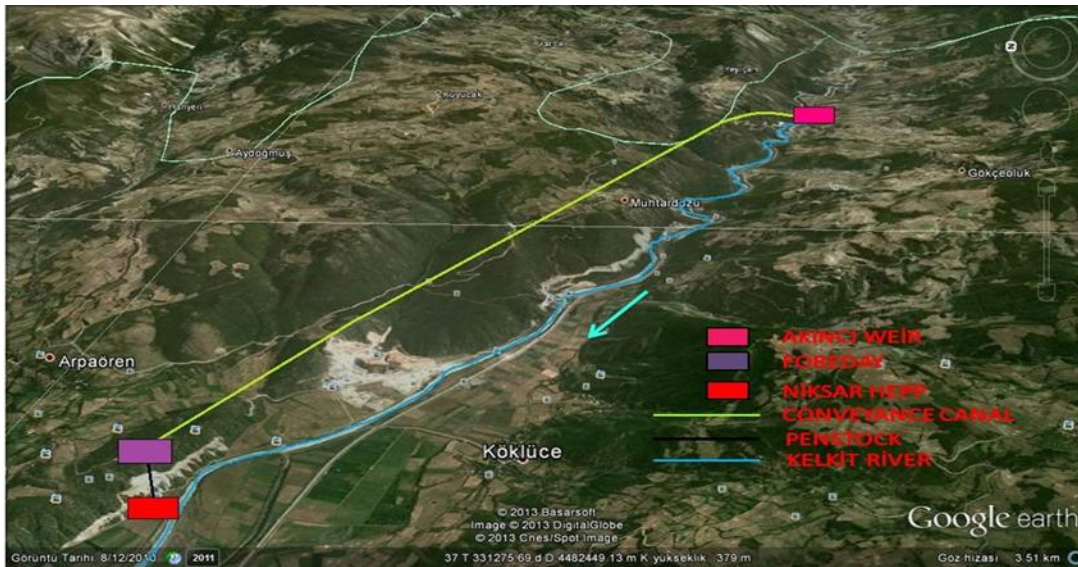


Figure 1. General Layout of Niksar HEPP

The Project Activity utilizes the Kelkit stream water in a diversion-type run-of-river hydro power scheme to generate electricity with zero carbon emissions for the Turkish Power Grid and will generate Verified Emission Reductions (VERs) by displacing electricity that would otherwise be generated by the existing grid of the host country. Annual gross electricity production by the PA was initially estimated in the DSI approved Feasibility report to be 247,650 MWh, and the net electricity production amount was estimated to be 237,025 MWh. However, due to a regulatory change in water usage arrangements made between investors and the DSI, the project owner was obliged to release more amount of water to the riverbed, before taking the water to the water conveyance structures of the project. This

amendment in the water usage agreement leads to the revision of the total amount of electricity that could be produced annually. As a result, it is estimated that the project will be annually producing, 215,203 MWh of electricity. This is the net amount of electricity that the project is going to be exporting to the Turkish national grid. Therefore, the Project Activity is expected to lead to an emission reduction of 99,337 tones CO₂e annually.

The environmental impact of the project is kept to a minimum level and all the regulations that are in act in the host country, Turkey, will be obeyed during the construction and operation stages of the Niksar HPP project. At the planning stage these impacts have been investigated and were presented to the Ministry of Environment and Forestry (MoEF now renamed and structured as Ministry of Environment and Urban Planning), in the form of a Project Introductory File (PIF). The provincial directorate of MoEF in Tokat province examined the report, and the project was granted an EIA not Necessary certification. Considering that the project will be using the water resource that is also essential for the aquatic life in the area, there will be a fish ladder (fish passageway) within the regulator for the downstream and upstream movement of the fish, to facilitate fish migration.

The Major milestones at the project development history can be summarized as shown in the following table (Table 1):

Table 1 - Monitoring timeline of the Project Activity

Date (Period)	Activity
24/03/2006	Main water Usage agreement signed
04/10/2007	Local Stake Holder Consultation (LSC) Meeting held at the project site
15/12/2009	EPC Contract Date - (Construction Start Date)
24/10/2010	The Electro Mechanical Equipment Purchase Contract Signed
24/05/2012	The commissioning of the 1st turbine
08/06/2012	The commissioning of the 2nd turbine
24/05/2012-31/07/2013	1st Monitoring Period
01/08/2013-31/07/2019	2nd Monitoring Period
01/08/2019 - 31/10/2021	3rd Monitoring Period
01/08/2019-23/05/2022	4th Monitoring Period (not completed yet)
24-May-2012 to 23-May-2022	1st Crediting Period
24-May-2022 to 23-May-2032	2 nd Crediting Period

How the project activity will be operating, and the boundary of the project activity (indicated in broken red line) is outlined in the following Figure 2:

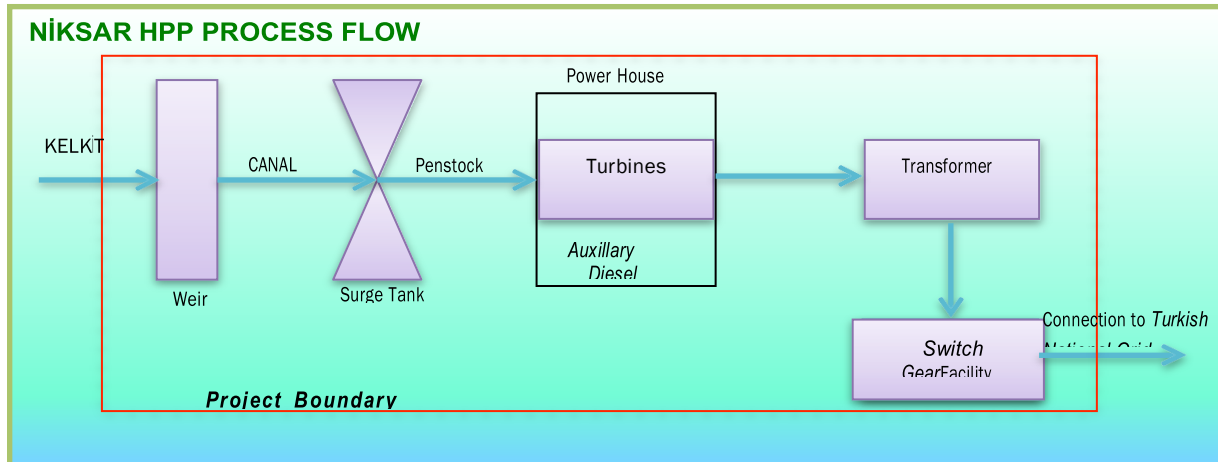


Figure 2. Flow chart showing the basic operational principles of the project activity, and the project boundary.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	24-May-2012–23-May-2022	VCS	TUV Rheinland	10 years
Verification	24-May-2012-31-July-2013	VCS	TUV Rheinland	1.2 years
Verification	01 -August-2013-31- July-2019	VCS	Re Carbon Gözetim Denetim ve Belgelendirme Ltd. Şti.	6 years
Verification	01 - August-2019-31 -October-2021	VCS	RINA Services S.p.A.	1.2 years
Verification	01 November 2021-23 May 2022 ¹	VCS	RINA Services S.p.A.	0.7 months
Re-Validation	24-May-2022-23 May 2032	VCS	RINA Services S.p.A.	10 years

¹ Site visit has been conducted but not certified yet.

1.3 Sectoral Scope and Project Type

Sectoral scope ²	Sectoral Scope 1: Energy industries (renewable-/non - renewable sources).
Project activity type	Grid connected electricity generation from renewable sources

1.4 Project Eligibility

1.4.1 General eligibility

The project is a single green field investment and is not part of a project group or bundle.

Eligibility Criteria

Type of project: Hydro

Location of project: The project is located in Tokat province, Turkey. Therefore, the project is eligible.

Project Area, Boundary and Scale: The registered project activity is 41.560 MWm/40.161 MWe as large scale.

1.4.2 Transfer project eligibility

N/A

1.5 Project Design

☒ Single location or installation

☐ Multiple locations or project activity instances (but not a grouped project)

☐ Grouped project

1.5.1 Grouped project design

N/A

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>

1.6 Project Proponent

Organization name	İÇTAŞ YENİLENEBİLİR ENERJİ ÜRETİM VE TİCARET A.Ş.
Contact person	Zeynep Yarga
Title	Chief Environmental Engineer
Address	Kızılırmak Caddesi No: 31 Çankaya /ANKARA
Telephone	+90-312-285 83 63
Email	zeynep.yarga@ictasenerji.com.tr

1.7 Other Entities Involved in the Project

Organization name	Sekans Danışmanlık
Role in the project	Consultant
Contact person	Sıla Duran
Title	Consultant
Address	4. Levent - Istanbul
Telephone	-
Email	sila@sekansdanismanlik.com

1.8 Ownership

As per the Generation License, İÇTAŞ YENİLENEBİLİR ENERJİ ÜRETİM VE TİCARET A.Ş. has the ownership of the project activity.

1.9 Project Start Date

Project start date	24 MAY 2012
Justification	During the development of the project activity, VCS v.3.3 required project crediting period start date earliest to be 01 JANUARY.2002, besides, the Project had to complete the validation within two years of the Project Start Date, which was 24 May 2012. Both conditions were satisfied for the Project Activity.

1.10 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☐ Ten years, fixed ☒ Other (ten years renewable twice)
Start and end date of first or fixed crediting period	24-May-2012 to 23-May-2022

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

- ☒ < 300,000 tCO₂e/year (project)
☐ ≥ 300,000 tCO₂e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO ₂ e)
24-May-2022 to 31-December-2022	60,418
01-January-2023 to 31-December-2023	99,337
01-January-2024 to 31-December-2024	99,337
01-January-2025 to 31-December-2025	99,337
01-January-2026 to 31-December-2026	99,337
01-January-2027 to 31-December-2027	99,337
01-January-2028 to 31-December-2028	99,337
01-January-2029 to 31-December-2029	99,337
01-January-2030 to 31-December-2030	99,337
01-January-2031 to 31-December-2031	99,337
01-January-2032 to 23-May-2032	38,919
Total estimated ERRs during the first or fixed crediting period	993,370
Total number of years	10
Average annual ERRs	99,337

1.12 Description of the Project Activity

The Project Activity is comprised of the following main parts: a diversion weir (named Akıncı weir) to divert the water, a conveyance channel and the powerhouse where the turbines are housed.

Water is collected in a concrete gravity diversion weir (31 m crest length, 20 m height). The weir also includes three spillway radial gates, a spill water crest and a fish gate on the left bank. Water enters the weir from an intake structure and leave the weir from the outlet gates into a 12 km conveyance channel and two units of 100 m penstocks. A gross head of 59.44 m is formed (net head 58.20 m) and water will be discharged into two Francis turbines, which are contained within a 47.50 x 20 x 36 m powerhouse. The electricity is transmitted via 36 kV transmission lines through Köklüce transformer substations, which are approximately 4 km away from the project site.

To summarize the technical description of the Project Activity, the main technical characteristics obtained from final revised and DSI approved feasibility report and latest information based on the final water usage agreement of the Project Activity and its general properties of the facilities are provided in Table 2:

Table 2 - Technical description of the Project Activity³

Turbine brand	VOITH
Turbine model	S.L. E-20400 Tolosa
Serial numbers	19771 and 19772
Turbine type	Vertical Axis Francis
Number of units	2
Turbine Power	20.78 MWm/20.08MWe
Net-head	58.9
Max. flow	80 m3/s

The net electricity production (delivered to the grid after losses and consumption in the plant) from the plant is estimated to be 215,203 MWh per annum. The amount of electricity generated by the project is not influenced by factors outside the project boundary such as other power plants or demand for electricity.

³ The photographic evidences of turbine name plates are available to the VVB

The baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources. The Baseline Scenario is detailed in section 3.4. In the project scenario, the project generates electricity from hydro power and result in emission reductions in parallel with its electricity generation values. Since Turkey's grid mainly consists of thermal power plants, this would have resulted in GHG emissions. Briefly, in the absence of the project activity, the electrical energy would have been delivered to the grid through a mix of existing power generation resources, as described in more detail in section 3.4.

In addition to displacing the electricity generated by fossil fuel fired power plants by utilising the renewable resources to avoid environmental pollution and GHG emissions, the project activity has increased the income and local standard of living by providing job opportunities for the local people and contributed the economic development of the region by providing sustainable energy resources.

1.13 Project Location

The Project Activity is located on the Kelkit stream in Tokat province. The Project Activity is about 50 km from the city of Tokat, and about 10 km from the town of Niksar. The nearest residential areas include the villages of Arpaören, Yarbaşı, Hacılı, Kumçiftlik, Camidere and Korulu. The project area exists within the coordinates, 40°26'42.29"N and 37°05'25.74"E.

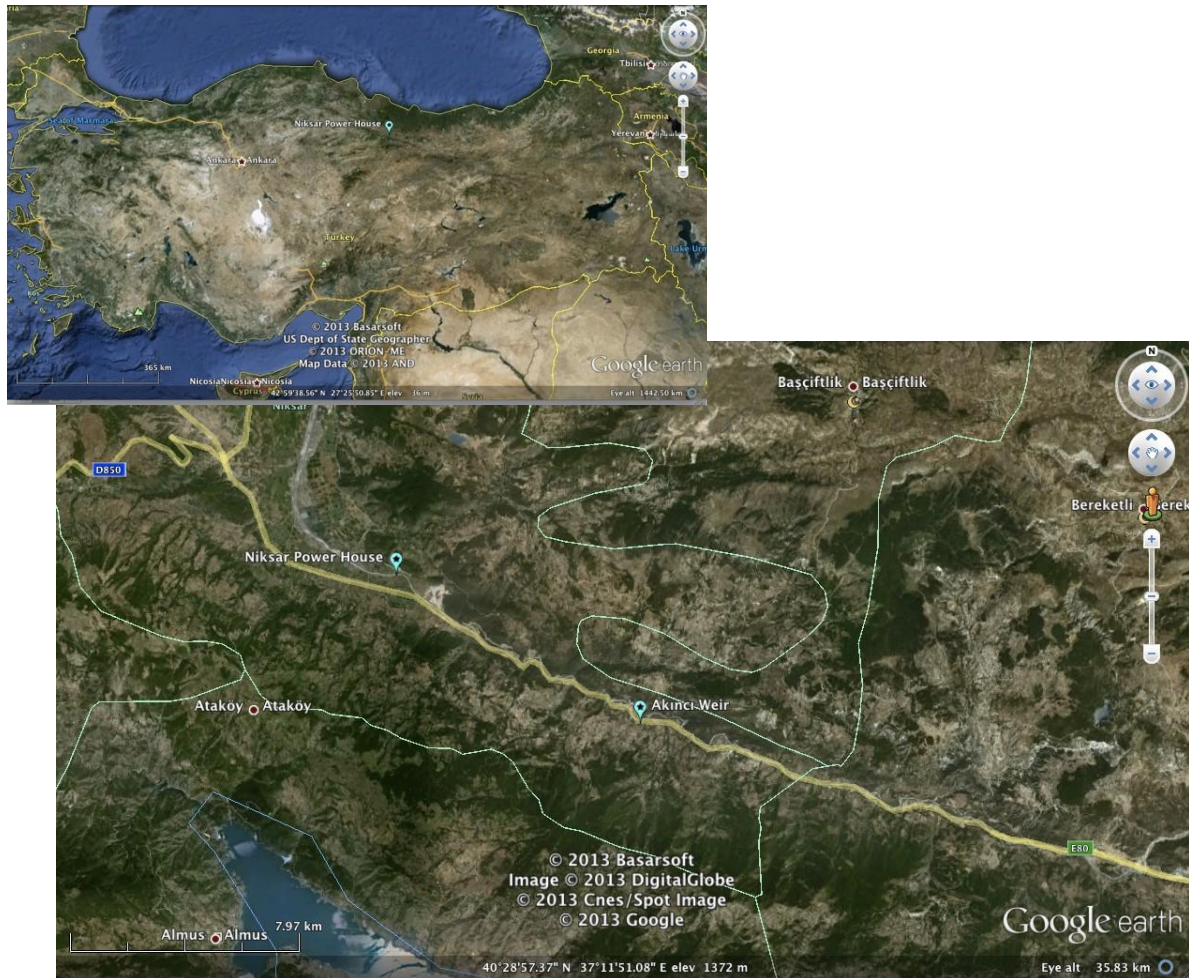


Figure 3. The location of the project

1.14 Conditions Prior to Project Initiation

There was no other hydroelectric power plant installation at the project location. The project activity does not generate greenhouse gas emissions, so it can be excluded that the implementation has been made only in order to generate GHG emissions with their subsequent reduction.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

Identify Addition of a new power generation capacity to the grid is regulated by Energy Market Regulatory Authority (EMRA) who issues the licenses for electricity generation and is responsible for ensuring that new capacity additions are in compliance with its rules and regulations.

Table 3 - Relevant laws and regulations

Relevant Laws	Number/ Enactment Date	Aim and Scope
Environmental Law *Environmental Impact Assessment Regulation	Nr. 2872 / 17/07/2008	The approval is requested for power plants from Ministry of Environment and Forest as Electricity License Regulation requests project to be in line with the environmental law.
Electricity Market Law *Electricity Licence Regulation *Electricity Market Balancing and Conciliation Regulation	Nr. 4628 / 03/03/2001	Regulating procedures of electricity generation, transmission, distribution, wholesale, retail for legal entities. Two regulations issued under the law: one for generation license and the other for market price balancing and conciliation.
Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy	Nr. 5346 / 18/05/2005	Aims to extend the utilization of renewable energy for electricity generation and identifies method and principles for power generation from renewable resources in an economical and conservative manner as well as certification of the electricity generated from renewable resources.
Energy Efficiency Law	Nr. 5627 / 02/05/2007	Identifies method and principles for industry, power plants, residential buildings and transport to imply necessary measures for energy efficiency during electricity generation, transmission, distribution and consumption.
Regulation on procedures and principles of signing the agreement of utilization of water resources for the purpose of electricity production in the electricity market	National Gazette number 25150, 06/06/2003	Identifies procedures and principles of signing the agreement of utilization of water resources for the purpose of electricity production in the electricity market
Regulation on Environmental Impact Assessment	National Gazette number 26939, 17/07/2008	Identifies rules and principles for Environmental Impact Assessment of power plants

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

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

☐ Yes

☒ No

1.16.2 Registration in Other GHG Programs

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

☐ Yes ☒ No

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

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

1.17.1 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

1.17.2 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

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 1.12 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 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

1.18 Sustainable Development Contributions

The project produces electricity from renewable energy sources using hydro as the power source and to contribute to Turkey’s growing electricity demand through a sustainable and low carbon technology. The project displaces the same amount of electricity generated by the grid dominated with fossil fired power plants. The project is expected to generate 215,203 MWh/year as contributing to SGD 7 Affordable and Clean Energy.

The annual emission reduction estimated by the project is 99,337tonnes CO2 as contributing to SDG 13 Climate Action While this number of emissions is mitigated, technology transfer is also realized as benefitting from hydropower.

The project contributes to improve the environmental situation in the region and in the country as avoiding fossil fuel-based electricity will enhance the air quality and help to reduce the negative effects on the climate. Through renewable technologies and hydro-based electricity sustainable and climate friendly development is promoted.

.As contributing to SGD 8 Decent Work and Economic Growth, the project has created employment opportunities for the local community during construction and operational periods,The project contributes the economic development of the region by providing sustainable energy resources. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments. Thus, the project contributes to the Sustainable Development Goal, Decent Work and Economic Growth.

1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

N/A

1.19.2 Commercially Sensitive Information

N/A

1.19.3 Further Information

N/A

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	Local stakeholders have been contacted by the project owners to inform them about the Project and to gather their comments in the meeting hall of Halil Gürel Kiraathanesi Arpaören Village, Niksar, Tokat province, at 11 am on October 4th, 2007. The common outcome of the stakeholder consultation was positive, and stakeholders were in favor of the Project. The contact information of the plant responsible exist at the Mukhtar, the project owner and local community are always in touch. The project owner regularly checks with the Mukhtar if any complaint or a request exists. Any complaint or need from the local community could directly be received by the project owner and appropriate contributions or improvements are made to the local community.
Legal or customary tenure/access rights	The project has all tenure and access rights.
Stakeholder diversity and changes over time	Most of the stakeholders are villagers from Niksar, Tokat province
Expected changes in well-being	The Project has resulted in the creation of new jobs in the project region and improvement in local roads, contributing to living standards in the region. Moreover, the project owner has provided contribution in kind to the local community, although these activities are not required legally. As a result, the community is supporting the project, and they believe that it creates a momentum for local sustainable development.
Location of stakeholders	Niksar, Tokat-Turkey

Location of resources	The project has all tenure and access rights.
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2.1.2 Stakeholder Consultation and Ongoing Communication

Use the table below to describe the process for and the outcomes from the stakeholder consultation conducted prior to project initiation.

Date of stakeholder consultation	04 -October-2007
Stakeholder engagement process	A dialog meeting with stakeholders regarding the planned project was conducted in the meeting hall of Halil Gürel Kiraathanesi Arpaören Köyü, Niksar, Tokat province, at 11 am on October 4th, 2007. The meeting was organized and conducted by Çınar Mühendislik Müşavirlik ve Proje Hizmetleri Ltd. Şti. To prepare for the meeting, important stakeholders were identified and notified about the event. For the participation of officials, phone calls were made to the Tokat Governorship, Provincial Environment and Forestry Directorship, Niksar Municipality and Niksar Kaimakam's Office (the major municipality of the district). For the participation of the local villagers, a fax notification and personal invitations were sent to the Arpaören, Köklüce, Osmaniye and Akıncı villages inviting their residents. In addition, the event was advertised in the regional and national newspapers calling for stakeholders to attend the meeting. The ads were published at the Yeni Tokat Gazette (regional), and the Türkiye Gazette (national). Both ads were published on September 28th, 2007.
Consultation outcome	Over 80 people attended (participants' information are available), and the meeting included a presentation, a dialog session, and a personal questionnaire. An informational brochure (can be provided) summarizing all the information presented was handed to all participants with contact information of a representative for any further questions and clarifications.
Ongoing communication	The contact information of the plant responsible exist at the Mukhtar, the project owner and local community are always in touch. The project owner regularly checks with the Mukhtar if any complaint or a request exists. Any complaint or need from the local community could directly be received by the project owner and appropriate contributions or improvements are made to the local community.

Stakeholder input	After the stakeholder meeting, participants were encouraged to comment on the project, raise any concerns they had, and ask questions or for clarifications. The villagers expressed their overall satisfaction and enthusiasm regarding the implementation of the project. The stakeholders asked more about employment possibilities. Project owner gave priority to local villagers during construction and operation of the project.
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2.1.3 Free Prior and Informed Consent

Obtaining consent	There aren't any ongoing or unresolved conflicts and demonstrate that the project does not exacerbate nor influence the outcomes of unresolved conflicts.
Outcome of FPIC	The project has not encroached on land, relocated people without consent, and forced physical or economic displacement.

2.1.4 Grievance Redress Procedure

Development process	The contact information of the plant responsible exist at the Mukhtar, the project owner and local community are always in touch. The project owner regularly checks with the Mukhtar if any complaint or a request exists. Any complaint or need from the local community could directly be received by the project owner and appropriate contributions or improvements are made to the local community.
Grievance redress procedure	Stakeholders directly reach project owner or the Mukhtar. The project owner regularly checks with the Mukhtar if any complaint or a request exist.

2.1.5 Public Comments

Summarize any public comments submitted during the public comment period and any comments received after the public comment period. Demonstrate how due account was taken of all comments received. Include details on when the comments were received, and any updates to the project design or demonstrate the insignificance or irrelevance of comments.

Comments received	Actions taken
The local villagers asked about employment possibilities.	Project owner gave priority to local villagers during construction and operation of the project for hiring employees.

2.2 Risks to Stakeholders and the Environment

	Risks identified	Mitigation or preventative measure taken
Risks to stakeholder participation	No risk identified	Stakeholder consultation process was conducted.
Working conditions	No risk identified	The Project avoids community exposure to increased health risks and does not adversely affect the health of the workers and the community. Employees take H&S trainings, and the project is operated considering H&S conditions.
Safety of women and girls	No risk identified	Not related to project activity.
Safety of minority and marginalized groups, including children	No risk identified	Not related to project activity.
Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials)	No risk identified	The project activity is operated in line with Environmental Impact Assessment Regulation, Water Pollution Control Regulation, Hazardous Wastes Control Regulation, Industrial Air Pollution Control Regulation.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Discrimination and sexual harassment	The project does not involve in any form discrimination in any kind of 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. The project does not involve and is not complicit in any form of discrimination based on gender, race, religion, sexual orientation or any other basis.
Management experience	There isn't an expert required for the Gender Safeguarding Principles & Requirements. Since this is a renewable energy project no gender expert was required as we executed for the other similar project activities. Additionally, no need was raised by the stakeholders.
Gender equity in labor and work	The project does not involve and is not complicit in any form of discrimination based on gender, race, religion, sexual orientation or any other basis.
Human trafficking, forced labor, and child labor	Turkey signed the convention of International Labour Organization. The related articles are 100 and 111. The project owner respects Article 5/8425 of Labour Law, which states no discrimination based on gender, race, religion, sexual orientation or any other basis is allowed.

2.3.2 Human Rights

Turkey is a party to European Convention on Human Rights since 18 May 1954⁴.

2.3.3 Indigenous Peoples and Cultural Heritage

During the construction and operation of the project, there was not any damage, alteration or removal to the critical cultural heritage. Because the project location does not involve any critical cultural heritage. Cultural and environmental heritage is protected against alteration, damage or removal by the law⁵.

2.3.4 Property Rights

⁴ Please see Official Website of Ministry of Foreign Affairs of Turkey: <http://www.mfa.gov.tr/the-european-convention-on-human-rights.en.mfa>

⁵ "Law on Protection of Cultural and Environmental Assets" <http://mevzuat.basbakanlik.gov.tr/Metin.Aspx?MevzuatKod=1.5.2863&MevzuatIliski=0&sourceXmlSearch=>

Rights to territories and resources	There are no uncertainties with regards land tenure, access rights, usage rights or land ownership.
Respect for property rights	Forestry Permit Letter was issued by Forest Authority on 9 March 2010

2.3.5 Benefit Sharing

Process used to design the benefit sharing plan	N/A
Summary of the benefit sharing plan	N/A
Approval and dissemination of benefit sharing plan	N/A.

2.4 Ecosystem Health

	Risks identified	Mitigation or preventative measure taken
Impacts on biodiversity and ecosystems	No risk identified	The Project does not physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified. Regarding the monitoring of “Water quality and quantity”, “Biodiversity and aquatic life”, streamgage gauging station is built for the

		measurement of flow to assess the environmental flow. General directorate for state hydraulic works executes the monitoring and the Project complies with the regulations
Soil degradation and soil erosion	No risk identified	The project is operated under Soil Pollution Control Regulation.
Water consumption and stress	No risk identified	Wastewater is collected through within the septic tank and is transferred through the sewage truck.
Usage of fertilizers	No risk identified	Not related to the project activity.

2.4.1 Rare, Threatened, and Endangered species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☐ Yes ☒ No

If yes, list such species and habitats in the table below and provide evidence that the project will not adversely impact these areas.

Species and habitat	Demonstrate that the project will not adversely impact habitats for rare, threatened, or endangered species.
...	...

2.4.2 Introduction of species

N/A

2.4.3 Ecosystem conversion

N/A

3 APPLICATION OF METHODOLOGY

3.1 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	21
Tool	TOOL07	Tool to calculate the emission factor for an electricity system	07
Tool	-	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	03.0.1
Tool	TOOL01	Tool for the demonstration and assessment of additionality	07

3.2 Applicability of Methodology

Methodology ID	Applicability condition	Justification of compliance
ACM0002	This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or	The project is installation of a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity.

	(e) Involve a replacement of (an) existing plant(s)/unit(s)	
ACM0002	In case the project activity involves the integration of a BESS, the methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Integrate battery energy storage systems (BESS) with a Greenfield power plant; (b) Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic or wind power plant(s)/unit(s); (c) Integrate a BESS to (an) existing solar photovoltaic or wind power plant(s)/unit(s) without implementing any other changes to the existing plant(s); (d) Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s)	The project does not involve an integration of a BESS.
ACM0002	The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types:	The project is a hydro power plant.

	hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity (c) In case of Greenfield project activities applicable under paragraph 5 (a) above, the project participants shall demonstrate that the BESS was an integral part of the design of the renewable energy project activity (e.g. by referring to feasibility	
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	studies or investment decision documents); (d) The BESS should be charged with electricity generated from the associated renewable energy power plant(s). Only during exigencies 2 may the BESS be charged with electricity from the grid or a fossil fuel electricity generator. In such cases, the corresponding GHG emissions shall be accounted for as project emissions following the requirements under section 5.4.4 below. The charging using the grid or using fossil fuel electricity generator should not amount to more than 2 per cent of the electricity generated by the project renewable energy plant during a monitoring period. During the time periods (e.g. week(s), months(s)) when the BESS consumes more than 2 per cent of the electricity for charging, the project participant shall not be entitled to issuance of the certified emission reductions for the concerned periods of the monitoring period.	
ACM0002	In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing	as per the methodology, the power density calculation is as following: $PD = 40,161,000 - 0 / 160,759 - 0$

	single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (3), is greater than 4 W/m²; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m². (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m², all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m² ; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power	PD = 249.8 W/m² which is greater than 4 W/m²
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	density lower than or equal to 4 W/m ² shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
ACM0002	In the case of integrated hydro power projects, project participants shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units.	The project is not an integrated hydropower plant.

	Therefore, this water balance will take into account.	
ACM0002	The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	The project does not involve switching from fossil fuels to renewable energy sources and is not a biomass fired power plant.
ACM0002	In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.	The project does not involve retrofits, rehabilitations, replacements, and it’s not a capacity addition.
TOOL01: Tool for the demonstration and assessment of additionality, Version 07.0.0	Para 10: Once the additionality tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	Since this tool is included in ACM0002, this tool is used.
TOOL07: Tool to calculate the emission factor for an electricity system, Version 07.0	Para 3: This tool may be applied to estimate the OM, BM and/or CM when	Project activity that substitutes grid electricity is where a project activity

	calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g., demand-side energy efficiency projects). Para 4: Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under step 2 of the tool are available to the project participants, i.e., option IIa and option IIb. If option IIa is chosen, the conditions specified in “Appendix 1: Procedures related to off-grid power generation” should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity	supplies electricity to a grid. There is only one national grid in Türkiye. The emission factor for only grid power plants (off grid power plants are not taken into account) have been used by Turkish Ministry of Energy and Natural Resources to calculate emission factor. Tool restricts use of Tool 07 to non-annex 1 countries but that is for CDM application, thus the Tool 07 can be applied in Türkiye (Annex-1) country. Türkiye especially has special circumstances and did not take any place withing compliance market. In conclusion, Tool 07 is applicable to the project activity.
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	system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity. Para 5: In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country. Para 6: Under this tool, the value applied to the CO2 emission factor of biofuels is zero. The calculation of the emission factor does not involve any biofuels. The calculation of the emission factor does not involve any biofuels.	
TOOL27: Investment analysis, Version 12.0	This methodological tool is applicable to project activities that apply the methodological tool “Tool for the demonstration and assessment of additionality”, the methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality”, the guidelines “Non-binding	Since the project activity has used the tool, Combined tool to identify the baseline scenario and demonstrate additionality”, investment analysis is applicable.

	best practice examples to demonstrate additionality for SSC project activities”, or baseline and monitoring methodologies that use the investment analysis for the demonstration of additionality and/or the identification of the baseline scenario.	
TOOL11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” Version 03.0		Since CP Renewal of the project activity is executed, this tool has been used.

3.3 Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Generation mixes of electricity grid in Turkey	CO ₂	Yes	Main source.
		CH ₄	No	The dominant emissions from power plants are in the form of CO ₂ , therefore CO ₂ emissions from fossil fuel fired power plants connected to the grid will be accounted for in baseline calculations.
		N ₂ O	No	-
Project	Construction and operation of HPP	CO ₂	No	Not applicable

The project boundary encompasses the physical, geographical site of the renewable generation source. The wind power plant with all installation is the project boundary.

As the electricity generated by the project displaces the electricity generated by the national grid, the baseline boundary is defined as the national grid. This includes the project site and all power plants connected physically to the national grid and excludes the off-grid power plants. Please see the diagram below:

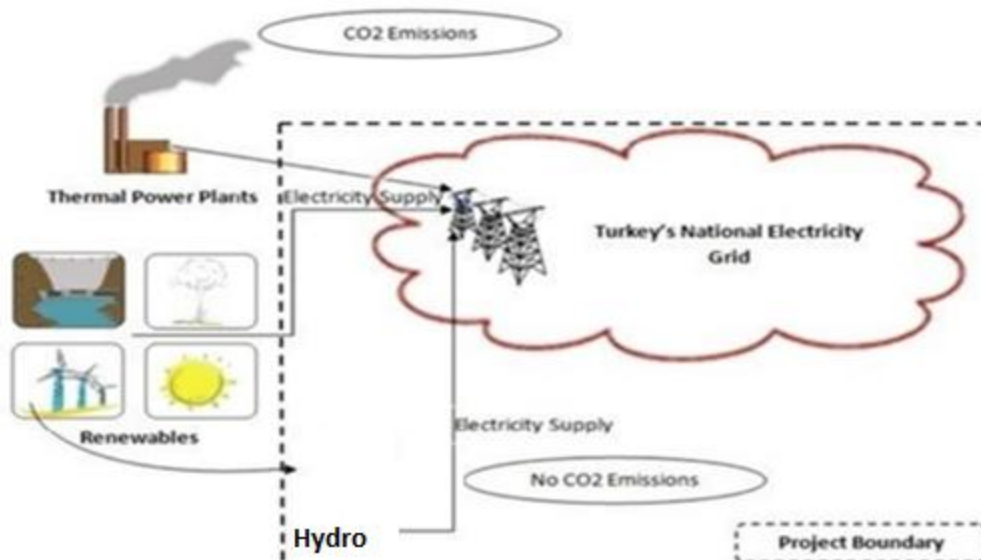


Figure 4. Project Boundary

3.4 Baseline Scenario

According to ACM0002 (Version 21.0)⁶, if the project activity is the installation of a new grid connected renewable power plant, the baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources. In line with the tool, “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” Version 03.0.1⁷, the development of the Turkish energy mix and thus the baseline scenario have been reanalysed as it may be seen below.

Step 1: Assess the validity of the current baseline for the next crediting period

The current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission

⁶ <https://cdm.unfccc.int/methodologies/DB/HF3LP6O41YY0JIP1DK6ZRJO9RSCX3S>

⁷ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>

of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period.

Step 1.2: Assess the impact of circumstances

As it may be seen in Figure 3, the development of Türkiye's installed capacity by primary energy resources between the years, 2011-2021⁸, the electricity generation has mainly been done by fossil fuel fired power plants in Türkiye. Total Installed electricity generation capacity in Türkiye has reached to 99,819.6 megawatts (MW) as of 2021.

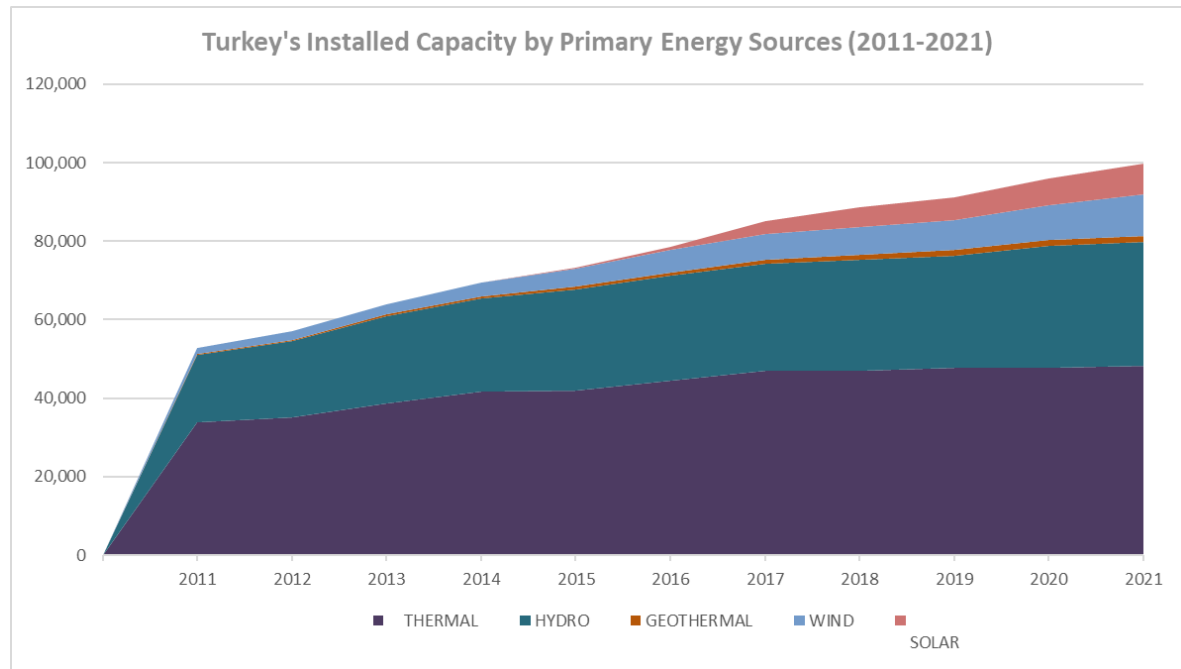


Figure 5. The development of Türkiye's installed capacity by primary energy resources, 2011-2021

Table-4 shows the comparison of renewable electricity generation share in Türkiye total electricity generation and the distribution of the renewable energy resources within this share between the years of 2011 and 2021. It's obvious that renewable electricity generation has increased 90% during this period. Hydro still has the biggest share with 32%, whereas solar and wind have the portions of %7.83 and 10.633%, respectively. Within the total installed capacity, geothermal and biomass have the smallest portions with 1.68% and 1.65%, respectively.

Table 4 - Comparison of Renewable Electricity Generation Share in Türkiye Total Electricity Generation, 2011-2021

⁸ <https://www.teias.gov.tr/tr-TR/turkiye-elektrik-uretim-iletim-istatistikleri>

YEARS	TOTAL HYDRO	GEOTHERMAL	WIND	SOLAR	BIOMASS *	RENEWABLE INSTALLED CAPACITY	TOTAL INSTALLED CAPACITY	RENEWABLE SHARE %
2011	17,137.1	114.2	1,728.7	-	104.2	19,084.2	52,911.1	36.1
2021	31,492.6	1,676.2	10,607.0	7,815.6	1,642.7	53,234.1	99,819.6	53.3

In reference to 5-year capacity projection⁹, it is clear that fossil fuels and non-renewable resources will remain the main sources for electricity generation through until 2025. According to TEİAŞ's most up-to-date projection fossil fuels will continue to dominate the market. In 2025, hydro will account for 18% of the mix whereas all non-hydro renewable combined (geothermal/ biomass/ solar/ wind) will only account for 18% of all electricity generation capacity. This projection is consistent with continuing fossil fuel dependent characteristics of Turkish electricity sector.

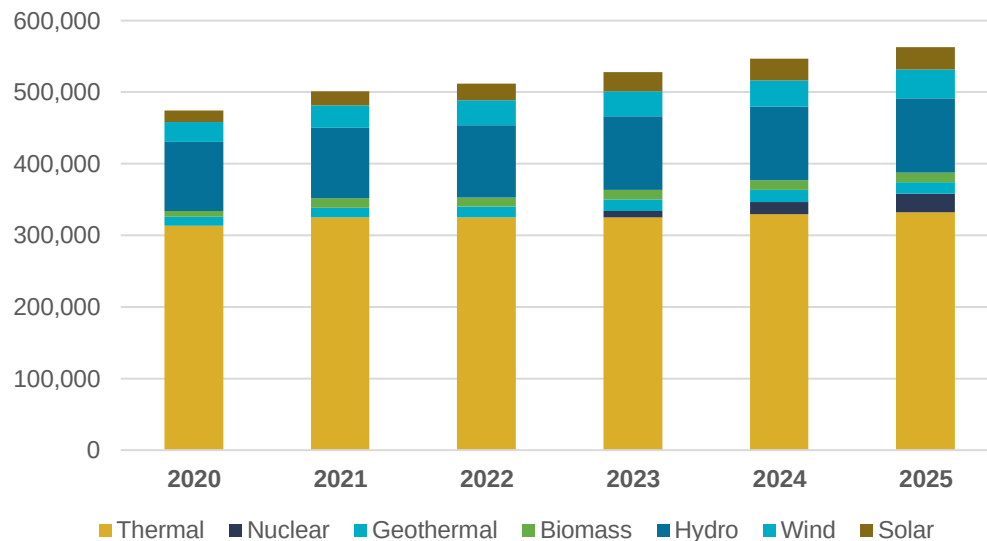


Figure 5. 5-year capacity projection

⁹ <https://webapi.teias.gov.tr/file/b965cb45-e01b-483a-8c91-3f7f5f2fe5d0?download>

The current baseline has been updated with the latest data and projections available by the official bodies. It's clear that the baseline scenario is still valid for the third crediting period in accordance with the tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period".

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

This sub-step is not applicable since the baseline scenario identified at the validation of the project activity was not the continuation of use of the current equipment(s) without any investment.

Step 1.4: Assessment of the validity of the data and parameters

Data and parameters have been updated.

Step 2: Update the current baseline and the data and parameters.

Step 2.1: Update the current baseline.

The current baseline emissions for the subsequent crediting period have been updated.

Step 2.2: Update the data and parameters.

Data and parameters have been updated.

3.4.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☒ Annex 1 country

☐ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes

☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes

☐ No

3.4.2 Additionality Methods

According to the applied methodology (ACM0002) baseline scenario for the project has been defined as “generation of equal amount of electricity by the power plants connected to the grid”. Emission factor for the baseline scenario has been calculated according to the combined margin approach as defined by the selected methodology. Within this framework, project is expected to generate about 215,203 MWh of electricity and reduce about 99,337 tCO₂ annually, through replacing the electricity that would be supplied via the National grid in the absence of the project activity. Additionality of the proposed project has been assessed according to the applied tool for demonstration of additionality as shown in following steps.

Step 1 - Identification of Alternatives to the project activity consistent with current laws and regulations

Sub-step 1a - Define alternatives to the project activity:

Most realistic and reliable alternatives to the project activity are:

1. Proposed project not undertaken as a VER project activity
2. Continuation of the current situation-supply of equal amount of electricity by the grid connected power plants.
3. Construction of a thermal power plant with the same installed capacity or the same annual power output.

The implementation of the project is not financially feasible without the carbon revenues as elaborated further in the investment analysis section below.

The Second alternative (Scenario 2) is the baseline scenario and implementation of the proposed project as a VER activity would be additional to this scenario. In the absence of the project activity, it is assumed that same amount of electricity would be provided by the grid connected power plants. Since the electricity demand is increasing, in order to meet this demand, new power plants must be built which uses fossil fuels or renewable sources. When we review the licenses issued by EMRA, it is seen that weight of thermal power plants will continue to increase in the overall electricity mix of Turkey thus increasing electricity sector emissions¹⁰. Proposed project will provide zero emission electricity and reduce significant amount of GHG compared to baseline scenario.

Last alternative is considered as a significant alternative to the project activity. According to the Directorate General of Electrical Power Resources Survey and Development (EIE), thermal power plants fuelled with natural gas or imported coal could pose an alternative to the hydroelectric

¹⁰ <http://www.epdk.gov.tr/lisans/elektrik/lisansdatabase/verilentesistipi.asp>

power plants due to their economic advantages¹¹. As mentioned above, the policies to increase the share of thermal power plants within the energy mix of Turkey is reflected in terms of license issuance as well.

Outcome of Step 1a

Three realistic alternatives have been identified for the project scenario as defined above. In the absence of proposed VER activity, most likely scenarios will be:

- Supply of electricity by the grid which requires addition of new power plants or;
- Installation of thermal power plants to deliver electricity in order to meet the electricity demand.

Sub-step 1b. Consistency with mandatory laws and regulation

The following applicable mandatory laws and regulations have been identified:

1. Electricity Market Law¹²
2. Natural Gas Market Law¹³
3. Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy¹⁴
4. Energy Efficiency Law¹⁵
5. Forest Law¹⁶
6. Environment Law¹⁷

Both alternatives identified are in compliance with existing laws and regulations. Installation of new thermal power plants are subject to laws numbered 1,2,5 and 6 mentioned above. Moreover,

¹¹ Project criteria for hydroelectric power plants at the stage of planning, EIE, Clause 3.1. Energy Benefits (in Turkish). http://www.eie.gov.tr/turkce/YEK/HES/proje/HESProje03_istik.html (Available on: 01/12/2010)

¹² Law number 4628, enactment date 03/03/2001, <http://www.epdk.gov.tr/english/regulations/electricity.htm> (Available on: 01/12/2010)

¹³ Law number 4646, enactment date 02/05/2001, <http://www.epdk.gov.tr/mevzuat/kanun/dogalgaz/dogalgazkanunu.html> (Available on: 01/12/2010)

¹⁴ Law number 5346, enactment date 18/05/2005 <http://www.eie.gov.tr/duyurular/YEK/LawonRenewableEnergyReources.pdf> (Accessed on: 01/12/2010)

¹⁵ Law number 5627, enactment date 02/05/2007 http://www.eie.gov.tr/english/announcements/EV_kanunu/EnVer_kanunu_tercume_revize2707.doc (Accessed on: 01/12/2010)

¹⁶ Law number 6831, enactment date 31/08/1956 (Accessed on: 01/12/2010) www.tos.org.tr/mevzuat/6831.doc

¹⁷ Law number 2872. Published in official gazette No. 18132 on 11/08/1983 (Accessed on: 01/12/2010) www2.cevreorman.gov.tr/yasa/k/2872.doc

these projects are assessed and delivered licenses by EMRA in line with the relevant laws and regulations.

The renewable energy generation license for Sefakoy HEPP has been issued considering Electricity Law and Law in utilization of Renewable Energy Resources for the purpose of generating electricity energy. The project is also in compliance with Energy Efficiency Law (Article 2 of Part One). Environment Law is also satisfied in terms of sustainable development principles and EIA conducted for the proposed project activity. Finally, Forest Law which specifies that forest areas can be allocated by Ministry of Environment and Forestry to institutions or individuals for energy plants if the project implementation serves common good for public.

Outcome of Step 1b

Based on the above analysis, the proposed project activity is not the only alternative that is in compliance with mandatory regulations. Therefore, the proposed VER project activity is considered as additional.

Step 2 - Investment analysis

At this step it will be demonstrated that “the proposed project activity is not the most economically or financially attractive” option.

Sub-step 2a - Determine appropriate analysis method.

There are three options for investment analysis method:

- Simple Cost Analysis
- Investment Comparison Analysis and
- Benchmark Analysis

“Simple Cost Analysis” is not applicable for this project activity as the project generates economic benefits from sale of electricity to the Turkish national grid”. Investment Comparison Analysis is also eliminated since the baseline for the project is “the generation of electricity by the existing grid” and no similar investment alternatives exist. Therefore, Benchmark Analysis is the most appropriate approach for the evaluation of the project activity.

Sub-step 2b - Option III-Apply benchmark analysis

Internal Rate of Return (IRR) on equity is taken for this project to be the financial indicator for assessing the financial viability of the project activity.

Equity IRR is the cash flow return to equity shareholders after debt repayments. And therefore, also takes into account the debt repayments. Equity IRR takes into consideration that you use debt for the project, so the inflows are the cash flows required minus any debt that was raised for the project. The outflows are cash flows from the project minus any interest and debt repayments.

To be able to assess the financial viability of the project a benchmark to compare the equity IRR is needed.

The Tool for the Demonstration and Assessment of Additionality Version 7.0.0 (EB 70, Annex 8) and the Guidelines issued at EB 62 state that “...Discount rates and benchmarks shall be derived from: Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data”.

At the time of investment decision, Turkey’s Moody’s index (Ba2) was comparable to country’s with the same Moody’s index, and same default benchmark value from this point of view a reasonable and appropriate benchmark to compare the Equity IRR can be taken as 12.50 %.

Sub-step 2c - Calculation and comparison of financial indicators

The following parameters are taken into account for the assessment of the investment (Table 5) and supplementary parameters are provided in the “Niksar Financia lAnalysis” workbook and submitted to the validating VVB.

Table 5: Major parameters taken into account for the financial analysis and determination of the Equity IRR of the Niksar HPP Project:¹⁸

Parameter	Value	Unit	References
Installed Capacity	40.16	MWe	Electricity Generation License of the project activity.
Expected Annual Electricity Generation	215,203		Documents supplied by the project owner that explains final calculations of net electricity production based on final revisions made in the water usage agreement.
Expected Average Annual Emission Reduction (ER)	99,337	tCO2e	Calculated
Total Investment	Confidential	USD	EPC contract
Annual Operation Costs	Confidential	USD	Based on FSR (Table 9.2, maintenance & spare parts) and based on calculations.

¹⁸ Registered PD

Loan	Confidential	USD	Loan Agreement
Loan Period	12	years	Loan Agreement
Electricity Sales Price	0.073	USD/kWh	Price Guaranteed by the renewable energy law number 5346
VAT	18	%	V.A.T. Law No:3065
Income Tax	20	%	Income Tax Law number 5281

The value of the investment has been depreciated on a reducing balance basis over 20 years, 75 % of the long-lasting assets are depreciated over 45 years and the residual book value of 46,789,619.31 USD is added back to the cash flow. The economic lifetime of a hydro power plant investment is assumed to be about 50 years, based on the experts' committee report⁹ on energy under the 8th development plan published by the State planning organization. Even if the facility can last for 50 years the major equipment needs to be replaced in every 20 years. As a result, the project lifetime is estimated to be about 20 years and the investment analysis is therefore done for a time frame of 20 years.

For the assessment of the viability of the project activity the Equity IRR is compared to the benchmark. The equity IRR is worked out as 8.80 %, which is below the benchmark of 12.50%.

Sub-step 2d - Sensitivity Analysis

To be able to conclude if the investment decision is the financially the most attractive alternative or not, a sensitivity analysis is performed. Three parameters that affect the equity IRR are examined for the sensitivity analysis:

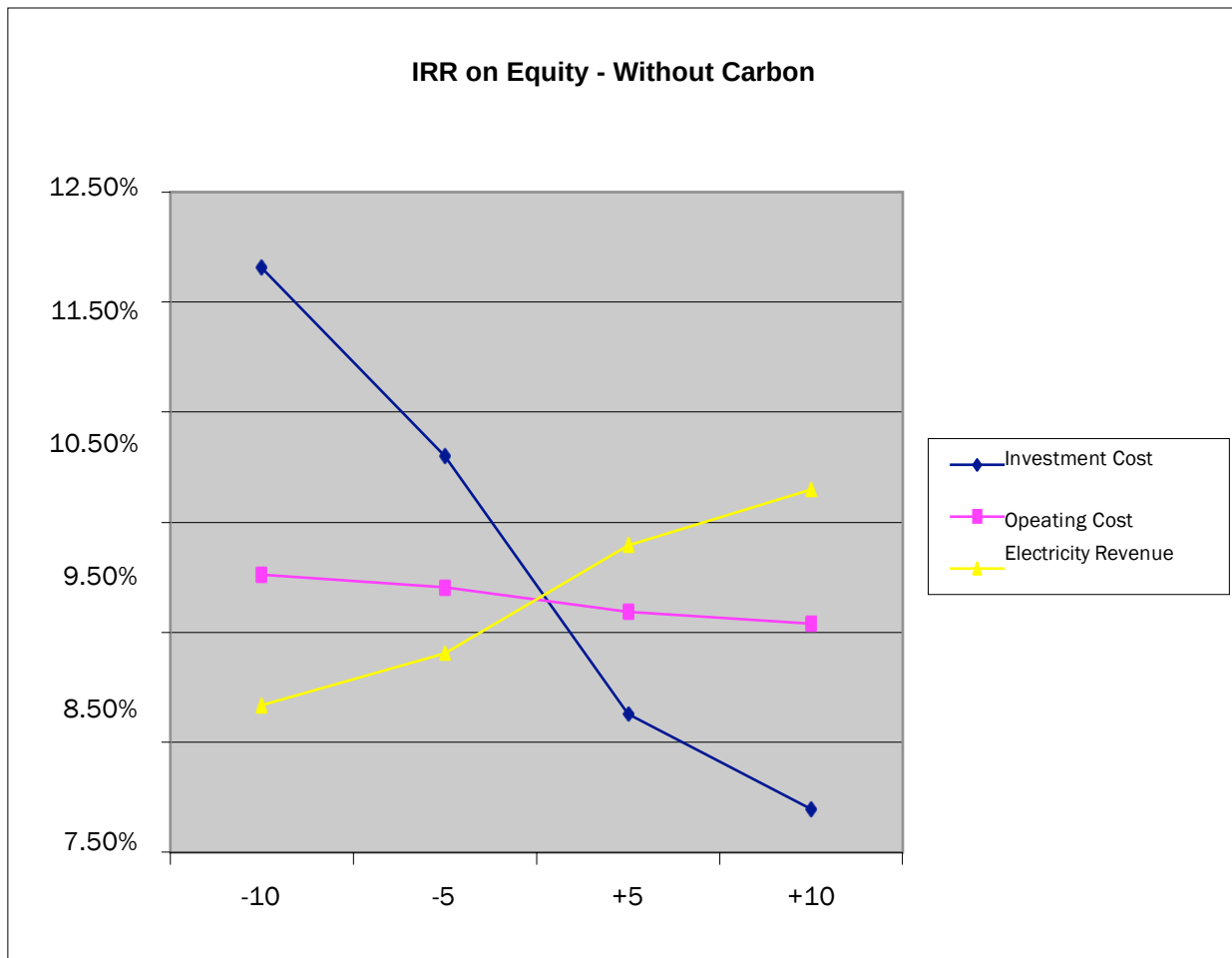
- Investment Cost
- Operating and Maintenance Cost
- Electricity Revenue

The sensitivity analysis is performed for a range of $\pm 10\%$ fluctuations in the above parameters. The figures in the following table (Table 6) are obtained. Following the "Guidelines on the assessment of investment analysis (Version 05)" of EB 62 Annex 5 when any of the key variables are increased or decreased by at least 10%, and the benchmark is not exceeded (also see Figure 5).

Table 6- Sensitivity analysis for the Equity IRR without carbon revenue for the project (Benchmark: 12.50%)

Change	-10%	-5%	5%	10%	Exceed Benchmark?
Investment Cost	11.81%	10.10%	7.76%	6.89%	No
Operating Cost	9.02%	8.91%	8.69%	8.58%	No
Electricity Revenue	7.84%	8.31%	9.29%	9.80%	No

Figure 6. Sensitivity analysis: Fluctuation of the Equity IRR without the carbon revenue, by changing major parameters that effect the Equity IRR by $\pm 10\%$



To exceed the benchmark, the electricity revenue must increase by about 35.80 % over the life of the project, or the investment cost must be reduced by about 11.61 %. The Renewable energy law only guaranties a minimum price of USD 0.073 per kWh for renewable energy and the price.

The investment costs we have considered in our financial analysis was based on the numbers presented to the bank when the project developer was negotiating the terms of the bank loan. In addition to this, the investment cost is fixed by the EPC contract. Therefore, these numbers are reasonable and reflect the average market conditions but are unlikely to go down, as the focus of the project developer is to secure and improve the electricity yield and therefore, they will not be able to cut costs. Therefore, it is very unlikely for the investment cost to finalize below the amounts estimated and shown in the financial analysis.

Outcome of Step 2:

Without the VER revenue the Internal Rate of Return of the project cannot get close to the benchmark of 12.50 %, with an equity internal rate of return of 8.80%. A fluctuation of $\pm 10\%$ in the key parameters also does not make the project exceed the benchmark.

Step 3 - Barrier Analysis

As the investment analysis concludes that the proposed project activity is unlikely to be the most financially attractive option, the sub step 3- Barrier analysis is optional to be applied and barrier analysis is not considered for the Niksar HPP.

Step 4- Common Practice Analysis

The common practice analysis was done first validation, and that the information is not repeated in this PD, and no new common practice analysis has been done.

Previously issued VCUs have given support to the ongoing financial sustainability of the project. Both low demand for VCUs and a sharp decrease in prices caused Project Participant not to benefit from carbon as it was expected. Carbon revenue from the project is mostly used for the operation costs of the project activity. Even, the sales prices were so lower than the expected ones at the investment time, sold VCUs provided contribution to the ongoing financial sustainability of the project.

3.5 Methodology Deviations

There are no methodology deviations applied during this crediting period.

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Since the project is an installation of a new grid-connected renewable power plant, the baseline scenario is formulated in ACM0002, Version 21: “Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the Combined Margin (CM) calculations described below”.

The baseline emission factor is the weighted average of the Operating Margin Emission Factor and Build Margin Emission Factor.

The combined margin (CM) emission factor of Turkish National Transmission System has been published by the Ministry of Energy. The latest values belong to the 2020 statistics¹⁹.

Calculation of the Operating Margin Emission Factor

It's been published as 0.7424 tCO₂/MWh by the Ministry of Energy.

Calculation of the Build Margin Emission Factor

According to TOOL 7, “Option 1 - the build margin emission factor calculated for the second crediting period should be used for the third. Therefore, it’s been taken as 0.3680 tCO₂/MWh.

Calculating of the Combined Margin Emission Factor

According to TOOL 7, “Option 1 - the build margin emission factor calculated for the second crediting period should be used for the third. It’s been calculated as 0.4616 tCO₂/MWh.

Accordingly, the baseline emissions BEy is calculated as following:

$$BE_y = EG_y \times EF_{grid, CM, y}$$

4.3 Leakage Emissions

Also, as suggested in ACM0002 Version 21, the leakage emissions are not considered and assumed as “0”.

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

:

Vintage period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated reduction VCU (tCO ₂ e)	Estimated removal VCU (tCO ₂ e)	Estimated total VCUs (tCO ₂ e)
24.05.2022-31.12.2022	60,418	0	0	60,418	0	60,418
2023	99,337	0	0	99,337	0	99,337
2024	99,337	0	0	99,337	0	99,337
2025	99,337	0	0	99,337	0	99,337
2026	99,337	0	0	99,337	0	99,337
2027	99,337	0	0	99,337	0	99,337
2028	99,337	0	0	99,337	0	99,337
2029	99,337	0	0	99,337	0	99,337
2030	99,337	0	0	99,337	0	99,337
2031	99,337	0	0	99,337	0	99,337

Justification of choice of data or description of measurement methods and procedures applied	Observed via the SCADA system of the Project Activity
Purpose of data	Calculation of the project emissions
Comments	

Data / Parameter	ABL
Data unit	m ²
Description	Area of the single or multiple reservoirs 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.
Source of data	Project site
Value applied	0
Justification of choice of data or description of measurement methods and procedures applied	Checked and compared to satellite imagery available by Google Earth.
Purpose of data	Calculation of the project emissions
Comments	

5.2 Data and Parameters Monitored

Data / Parameter	EGfacility,y
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y

Source of data	The primary source of data is EPIAS web site screenshots. The secondary source of data is two TEIAS meter readings recorded at the monthly reading protocols, the column related to electricity obtained from the grid.																														
Description of measurement methods and procedures to be applied	Two sets of meters measuring continuously then calculate the net electricity generation supplied by the project to grid.																														
Frequency of monitoring/recording	Measuring continuously/ recording monthly																														
Value applied	The annual electricity fed to the grid is estimated as 215,203 MWh.																														
Monitoring equipment	The net electricity is measured continuously by four electricity meters at the grid interface and recorded monthly. The total generated electricity can be reached through summing up the values monitored by two groups. Meters information: Installation date of the Group 1 power and Group 2 power meters is 23/11/2020. Group 1: <table><tr><td></td><td>Main Meter</td><td>Spare Meter</td></tr><tr><td>Name</td><td>Ana Sayaç</td><td>Yedek Sayaç</td></tr><tr><td>Brand</td><td>EMH</td><td>EMH</td></tr><tr><td>Serial Number</td><td>9798684</td><td>9798685</td></tr><tr><td>Accuracy class</td><td>0.2 S</td><td>0.2 S</td></tr></table> Group 2: <table><tr><td></td><td>Main Meter</td><td>Spare Meter</td></tr><tr><td>Name</td><td>Ana Sayaç</td><td>Yedek Sayaç</td></tr><tr><td>Brand</td><td>EMH</td><td>EMH</td></tr><tr><td>Serial Number</td><td>9798686</td><td>9798687</td></tr><tr><td>Accuracy Class</td><td>0.2 S</td><td>0.2 S</td></tr></table>		Main Meter	Spare Meter	Name	Ana Sayaç	Yedek Sayaç	Brand	EMH	EMH	Serial Number	9798684	9798685	Accuracy class	0.2 S	0.2 S		Main Meter	Spare Meter	Name	Ana Sayaç	Yedek Sayaç	Brand	EMH	EMH	Serial Number	9798686	9798687	Accuracy Class	0.2 S	0.2 S
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Serial Number	9798686	9798687																													
Accuracy Class	0.2 S	0.2 S																													

QA/QC procedures to be applied	The OSF forms have been used to cross-check. The periodic calibration or maintenance is under the responsibility of TEİAŞ and has been fixed as once in 10 years: Since TEİAŞ meters are sealed by TEİAŞ, the project proponent cannot intervene with the devices. The periodic tests are conducted every two years, however, TEİAŞ can change this period depending on their timeline. Calibration of all the meters will be undertaken at required intervals and faulty meters will be duly replaced immediately.
Purpose of data	Calculation of emission reductions
Calculation method	$EG_{Facility,y} = EG_{export,y} - EG_{import,y}$
Comments	

Data / Parameter	Cap_{PJ}
Data unit	W
Description	Installed capacity of the hydropower plants after the implementation of the Project Activity.
Source of data	Project site
Description of measurement methods and procedures to be applied	Observed via the SCADA system of the Project Activity
Frequency of monitoring/recording	Once at the beginning of each crediting period
Value applied	40,161,000
Monitoring equipment	SCADA system of the Project Activity
QA/QC procedures to be applied	Can be confirmed also by the parameter readings on the design plates of each turbine and by summing the two units

Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	

Data / Parameter	AP _J
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. Indirectly measured based on the reservoir area map provided in Annex 5 of the registered PD.
Source of data	Surface area determined using the lake surface area map provided.
Description of measurement methods and procedures to be applied	The reservoir area corresponding to maximum operational level has been determined via the topographic map showing the lake area, presented in Annex 5 in the registered PD.
Frequency of monitoring/recording	Once at the beginning of each crediting period
Value applied	160,759
Monitoring equipment	Scada system water level readings
QA/QC procedures to be applied	Can be checked and compared to satellite imagery available by Google Earth.
Purpose of data	Calculation of project emissions
Calculation method	N/A

Comments

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5.3 Monitoring Plan

The objective of the monitoring plan is to ensure the complete, consistent, clear, and accurate monitoring and calculation of the emission reductions during the whole crediting period. The Project proponent is responsible for the implementation of the monitoring plan.

The Project Proponent is responsible for the overall management of the monitoring procedures including recording, data collection, calculating emission reductions and project emissions. Please see below the management structure for the plant operation:

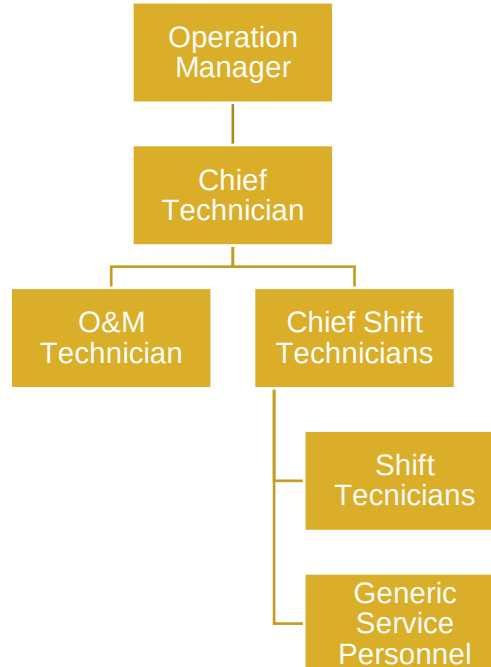


Figure 6. The management structure for the plant operation

In total, eighteen employees are working for the Project Activity. The operation manager is responsible for the whole management of the Project Activity and the 14 technicians are responsible for the implementation of the Project Activity. In addition to the technicians, there are three generic service personnel working for the plant.

Four power meters are installed at the grid interface of the project. There are two metering groups and, in each group, one is the main meter and the other is spare meter of the main meter for cross-checking. Both meters are jointly inspected and sealed in order to be protected from interference by any of the parties. Both the main and secondary meters are owned and installed by the grid operator (TEIAS). The grid operator's is the only one authorized to deal with fixing, calibrating, or changing the meters, which will be done either by the grid operator or by a company authorized by the grid operator. During this monitoring period, there were no records of meter failure. In case of any urgent case TEIAS contacts the Plant Manager. 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 periodic calibration or maintenance is under the responsibility of TEIAS and has been fixed as once in 10 years: Since TEIAS meters are sealed by TEIAS, the project participant cannot intervene with the devices. The periodic tests are conducted every two years, however, TEIAS can change this period depending on their timeline.

TEIAS is performing remote reading of the meters and monthly power meter readings are the basis for monitoring net electricity fed into the grid. A measuring protocol is prepared including day, peak and night hour electricity generation by the project owner and approved by governmental officers at the end of each month.

The primary source is EPIAS records. Net electricity exported is crosschecked with the Meter Reading Forms (OSF). EPIAS is the financial settlement centre of TEIAS. The Meter Reading Forms are filled by the project owner and approved by the governmental officers. Additionally, the remote reading by the governmental body is also available. The website of EPIAS is accessible to Project Proponent with their unique user ID and password. Once accessed, the Project Proponent is able to call electricity generation and consumption reports of their own projects. The same reports are used by the Project Proponent for invoicing TEIAS. The electricity generation data is reported monthly basis.

Quality Control and Assurance (QC/QA)

Both the main and spare (control) meters are owned and installed by the grid company. Both meters are jointly inspected and sealed in order to be protected from interference by any of the parties.

The grid operator's Metering Officer should be notified of any failure of one of the meters. He is the only one authorized to deal with fixing, calibrating, or changing the meters, which will be done either by the grid operator or by a company authorized by the grid operator. During this monitoring period, there were no records of meter failure. The data is hourly recorded by the personnel on

the plant. TEIAS Load Dispatching Centre also executes remote reading during 24-hour period. The data could be remotely accessed by TEIAS.

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

N/A