

TEMPLATE

MONITORING REPORT

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VERSION **v. 1.1**

RELATED SUPPORT - **TEMPLATE GUIDE Monitoring Report v. 1.1**

This document contains the following Sections

Key Project Information

SECTION A - Description of project

SECTION B - Implementation of project

SECTION C - Description of monitoring system applied by the project

SECTION D - Data and parameters

SECTION E - Calculation of SDG Impacts

SECTION F - Safeguards Reporting

SECTION G - Stakeholder inputs and legal disputes

KEY PROJECT INFORMATION

Key Project Information

GS ID (s) of Project (s)	GS1208
Title of the project (s) covered by monitoring report	Cemel Hydro Bundle
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	10 04/11/2019
Version number of the monitoring report	04
Completion date of the monitoring report	14/12/2021
Date of project design certification	01/10/2013
Date of Last Annual Report	06/10/2021
Monitoring period number	03
Duration of this monitoring period	01/06/2019 – 31/07/2021 (26 months, both dates included)
Project Representative	HGG Enerji Üretim San. Ve Tic. A.Ş. (formerly Zeynep Enerji Üretim San. Ve. Tic. A.Ş.) GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık ve Ticaret A.Ş. (Project Developer)
Host Country	Turkey
Activity Requirements applied	☐ Community Services Activities ☒ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	ACM0002 "Consolidated baseline methodology for grid connected electricity generation from renewable sources", ver 12.3.0
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
7	Production of clean energy	127,842	MWh
9	Infrastructural benefits	Project implemented sustainable infrastructure that reduces environmental footprint and employed clean renewable energy industry technology	-
13	CO ₂ emission reduction	69,162	tCO ₂

Table 2 – Product Vintages

		Amount Achieved
Start Dates	End Dates	VER
01/06/2019	31/12/2019	15,545 tCO ₂
01/01/2020	31/12/2020	37,355 tCO ₂
01/01/2021	31/07/2021	16,262 tCO ₂

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

The CEMEL HYDRO BUNDLE project is a bundled a run-of-river type project located on Kızılırmak River, within the boundaries of Avanos district of Nevşehir province.

The project is licensed in 14/12/2006¹ and in 09/02/2011 all the legal rights of the project is given to HGG Enerji Üretim Sanayi A.Ş. for 44 years 11 months. The project consists of three cascade projects, each having its own turbines and generators which are used to transform the potential energy of water to mechanical energy at a first stage and later into electrical energy. This bundled project is composed of 6.567 MWe Cemel I HEPP, 7.055 MWe Cemel II HEPP and 6.4 MWe Cemel III HEPP² on the mid-section of Kızılırmak River basin.

The purpose of this project is to generate electricity by using the existing water without constructing any reservoir. The project type is run-of-river type project.

The proposed hydroelectric power plant is composed of: - Weir house - Derivation channel - Power House - Tail water channel³.

The presented structural format is the same for all three Cemel. Technical specifications of all three Cemel is tabulated below:

Table 2. Technical characteristics⁴

	Cemel I	Cemel II	Cemel III
Drainage area	19613.0 km ²	19613.0 km ²	19613.0 km ²
Average flow rate	66,63 m ³ /s		
Project flow rate	135 m ³ /s	135 m ³ /s	135 m ³ /s
Crest elevation	922,5 m	916.0 m	909.5 m
Normal water elevation	921.5 m	915.0 m	908.5 m

¹ PIF, page 9

² Equipment Agreement

³ PIF, page 35

⁴ PIF, page 1-2, Equipment Agreements

Minimum water elevation	921.0 m	914.5 m	908.0 m
Thalweg elevation	916.5 m	910.0 m	903.5 m
Tailwater elevation	915.52 m	909.31 m	902.42 m
Gross Head	5,98 m	5.69 m	6.08 m
Net Head	5.941 m	5.681 m	6.079 m (average)
Length of cofferdam and derivation channel crest	85m / 147m	87m / 165m	129m / 109m
Length of tale water channel			
Type of Weir	Draw-door weir	Draw-door weir	Draw-door weir
Turbine type	Pit-type Kaplan turbines	Pit-type Kaplan turbines	Pit-type Kaplan turbines
Number of unite	2	2	2
Type of Generator	Horizontal Asynchronous; 50 Hz	Horizontal Asynchronous; 50 Hz	Horizontal Asynchronous; 50 Hz
Efficiency of Turbines at 135 m ³ /s	0,92	0,92	0,92
Power factor of generator	0,85	0,85	0,85
Efficiency of Generator at Nominal Capacity ⁵	96.78%	96.78%	96.78%

The project has a capacity of 21.6 MWm and 20.4 MWe and an expected production of 73.95 GWh. This corresponds to an average of 40,006 tCO₂e emission reductions when all plants are commissioned.

Electricity generated at project is fed to the national grid via Avanos substation with energy transmission line of 8 km from Cemel I HEPP, 3.6km Cemel II HEPP and 4.4km from Cemel III HEPP.⁶ Project is not located within any protected area as per the international agreements ratified by Turkey.⁷

⁶ PIF, page 42

⁷ PIF, page 168

Project includes an impoundment type weir and will cause limited land use since there exist no conveyance line and penstock is built at the bottom of the weir. There exist several Dams (Hirfanlı, Yamula, Bayramhacılı and Sarıhıdır) on the upstream and downstream of the project.⁸ There exist agricultural areas around the river bed and several old sand quarry sites which will not be affected by the project activity due to the project type.

Main goals of the CEMEL HYDRO BUNDLE Projects include;

- Utilization of the hydroelectric potential of Turkey in order to meet rapidly increasing electricity demand and contribute achieving energy security.
- Increase share of HEPPs in electricity generation mix of Turkey and reduction of GHG emissions.
- Contribute to the national economic development by creating direct and indirect job opportunities during construction and operation phases.
- Reduce import dependency of fossil fuel dominated electricity sector and diversify generation mix through use of local resources.
- Contribution to sustainable development through supporting local community and local economy.

In terms of sustainable development project not only contributes to emission reduction through use of renewable resources and creating job opportunities, it also contributes sustainable development goals in the region as detailed in GS passport. In terms of environmental impact, project is considered to have positive impact on air quality due to avoided NO_x, PM and SO_x emissions whereas no negative impact on water quality other pollutants and biodiversity has been identified. Since the project is a compact type project and there is no diversion, project does not have any impact in terms of minimal flow or decreased water flow rate.

According to the research conducted by State Planning Organization (SPO) on socio-economic levels of districts in Turkey, Avanos district is ranked as 227th among 872 districts and in terms of development level the area is classified as third (out of six) group. About 70.9% of the population works on agriculture and 21.0 % works on service sector (mainly tourism) whereas only 1.28% works on industry. The Avanos district is

⁸ PIF, page 166

ranked as 291st in terms of per capita income. In that respect, direct and indirect contribution of project activities such as employment and supplying of needs from the region will have a significant effect on local economy.⁹

In addition to contribution to local economy, project also contributed to use of local and renewable resources to meet the increasing energy demand of Turkey and reduce dependency on fossil fuels. According to Turkish Electricity Transmission Company (TEIAS) statistics, in 2010 about 73.8%¹⁰ of the electricity has been generated via thermal power plants whereas 46.5% was from natural gas (NG) power plants which is fully imported and 21.8 bn m³ NG has been consumed¹¹. In terms of fuel dependency, corresponding to 42.286 GWh/year estimated generation, proposed project is expected to replace about 16.4 million m³ NG and contribute to balance of payments which, in addition, increased air quality and access to affordable energy services in national level.

Table 3. Milestones for CEMEL HYDRO BUNDLE

Milestone	Date
Connection Agreement	20/03/2007
Preliminary EIA	16/11/2009
EIA Exemption Letter	04/06/2010
Water Right Utilization Agreement	05/11/2010
License Issuance	09/02/2011
Board Decision about carbon revenues	10/06/2011
Construction Subcontractor Agreement*	13/07/2011
Start of Construction	27/07/2011
EM Equipment Purchase Contract	13/09/2011
Carbon Agreement	20/10/2011
Commissioning Date (Cemel I)	27/06/2013
Commissioning Date (Cemel II)	04/10/2013
Commissioning Date (Cemel III)	03/07/2015
First Monitoring Period	01/07/2015 – 28/02/2017
Second Monitoring Period	01/03/2017 – 31/05/2019
Third Monitoring Period	01/06/2019 – 31/07/2021

*Date of investment decision

⁹ <http://www.dpt.gov.tr/DocObjects/Download/3159/ilce.pdf>, page 193

¹⁰ [http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010%C3%A7i%C3%A7ek%20kitap/uretim%20tuketim\(22-45\)/36.xls](http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010%C3%A7i%C3%A7ek%20kitap/uretim%20tuketim(22-45)/36.xls)

¹¹ <http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010%C3%A7i%C3%A7ek%20kitap/yak%C4%B1t46-49/47.xls>

A.2. Location of project

The project is located in Nevşehir Province in Turkey. Nearest location to the project site is Aladdin village of Avanos which is about 2 km away from the project site.

Project site is accessible from main road following a 3 km route to Cemel I, 8.5 km to Cemel II and 5.5 km to Cemel III.

Table 4. Project coordinates

Cemel I HEPP	Coordinates	
	WGS84 (DMS)	ED50
• Latitude	38° 43' 25.93" N	657453.13
• Longitude	34° 48' 40.51" E	4287692.14
Cemel II HEPP	Coordinates	
	WGS84 (DMS)	ED50
• Latitude	38° 45' 15.48" N	651561.65
• Longitude	34° 44' 39.19" E	4290856.96
Cemel III HEPP	Coordinates	
	WGS84 (DMS)	ED50
• Latitude	38° 45' 25.58" N	648523.54
• Longitude	34° 42' 33.57" E	4291210.62

Cemel I HEPP Regulator Axis	Coordinates	
	WGS84 (DMS)	ED50
• Latitude	38.741016	657675
• Longitude	34.814239	4289600
Cemel I HEPP Weir house	38.741471	657650
	34.813963	4289650
Cemel II HEPP Regulator Axis	Coordinates	
	WGS84 (DMS)	ED50
• Latitude	38.763616	652340
• Longitude	34.753411	4292005
Cemel II HEPP Weir house	38.763262	652300
	34.752942	4291965
Cemel III HEPP Regulator Axis	Coordinates	
	WGS84 (DMS)	ED50
• Latitude	38.771499	648100
• Longitude	34.704800	4292800
Cemel III HEPP Weir house	38.771142	648080
	34.704561	4292760

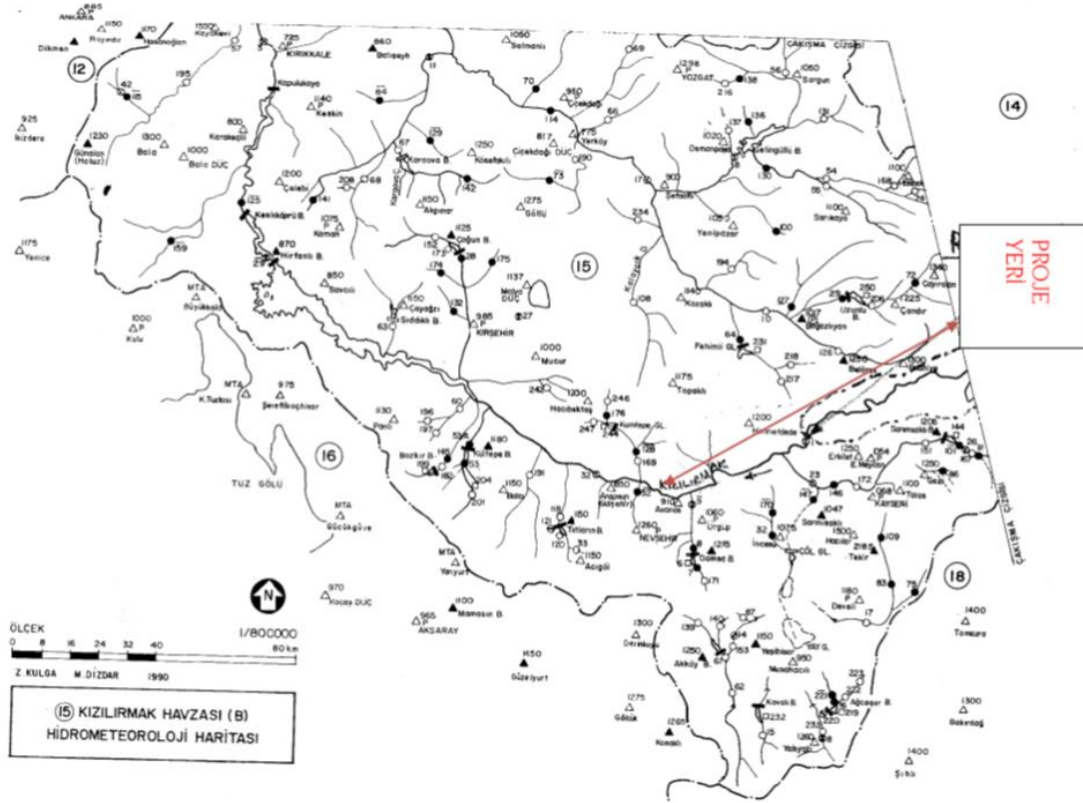


Figure 1. Layout of the project on the site map

A.3. Reference of applied methodology

The UNFCCC approved baseline and monitoring methodology ACM0002, version 12.3.0¹² valid from 17/09/2010 was applied for the project activity.

ACM0002 refers to the following tools:

- “Tool for the demonstration and assessment of additionality”, Version 06.0, and,
- “Tool to calculate the emission factor for an electricity system”, Version 02.2.1.

A.4. Crediting period of project

The first crediting period started in 01/07/2015 in parallel with commissioning date of Cemel III. Total length of crediting period is 7 years.

¹² <http://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L>

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

The Cemel HEPP project is a bundled project located on Kızılırmak River, within the boundaries of Avanos District of Nevşehir Province. It is a run-off-river type project. Start date of project activity is stated as 13/07/2011 in the PDD, which is the date of construction subcontractor agreement. Commissioning date of Cemel I is 27/06/2013, of Cemel II is 04/10/2013; and of Cemel III is 03/07/2015. First and second monitoring period dates are available in Section A.1.

During this (3rd) monitoring period, project has generated less electricity than expected due to low rate of flow. However, there was not any event or situation that may prevent applicability of methodology during this monitoring period.

B.1.1 Forward Action Requests

None.

B.2. Post-Design Certification changes

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B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

Project owner's name was changed from Zeynep Enerji Üretim San. Ve Tic. A.Ş to HGG Enerji Üretim San. Ve Tic. A.Ş. This is also mentioned in pages 11 and 12 of the Generation Licence. When HGG İnşaat A.Ş. became the major shareholder, they changed the company's name (Zeynep Enerji Üretim San. Ve Tic. A.Ş) to HGG Enerji Üretim San. Ve Tic. A.Ş. The GS is already informed about the issue. The name change procedure is still ongoing on GS portal.

There have been no temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline.

B.2.2. Corrections

No correction has been made.

B.2.3. Changes to start date of crediting period

Expected commissioning date of Cemel III HEPP was 01/09/2015, therefore this date had been set for the start of crediting period. However, since the actual commissioning for Cemel III was earlier 03/07/2015 start of crediting period has been changed from 01/09/2015 to 01/07/2015.

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

N/A

B.2.5. Changes to project design of approved project

N/A

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

Monitoring is a key procedure to verify the real and measurable emission reductions from the proposed project. To guarantee the proposed project's real, measurable, and long-term GHG emission reductions, the monitoring plan is established.

Net electricity generation has been measured and recorded by both EPIAS and project owners for billing purposes therefore no new additional protocol was needed for monitoring emission reduction. Power Plant Manager is responsible for the electricity generated, gathering all relevant data, and keeping the records.

Generation data that has been collected during crediting period was submitted to GTE Carbon, who is responsible for calculating the emission reduction subject to verification.

Generation data has been used to prepare monitoring report which was used to determine the vintage from the project activity; and eventually to be submitted to the Designated Operational Entity 'DOE'.

VER Team Members are composed of the following staff:

Plant Manager: Responsibility for running the HEPP plant and compliance with VER monitoring plan

Accounting Manager: Responsible for keeping data about generation and consumption and,

GTE Carbon: Responsible for emission reduction calculations, preparing monitoring report and periodical verification process.

Installation of meter and data monitoring has been carried out according to the regulations by EPIAS. Two metering devices (one of them used as spare) have been used for monitoring the electricity generated by the power plant. Readings have been conducted using main metering devices and spare metering device has been used for comparison only. Data from metering devices are recorded via monthly reading. In addition to the two metering devices, generation of the HEPP has been cross checked from EPIAS web site which is accessible using a password provided to electricity generation companies. ISVM (Electricity fed to the grid) and UECM (Electricity

consumed from the grid) data given in generation records are used for cross checking of emission reduction calculations.

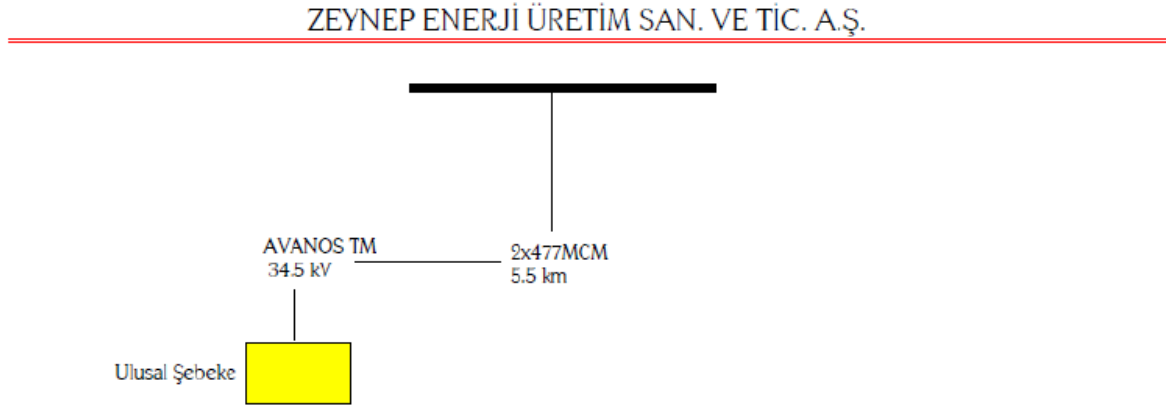


Figure 2. Grid connection diagram for CEMEL HYDRO BUNDLE

Installation of meter and data monitoring has been carried out according to the regulations by TEIAS. Two metering devices (one of them used as spare) have been used for monitoring the electricity generated by the power plant. Readings have been conducted using main metering devices and spare metering device has been used for comparison and in any emergency case. Data from metering devices are recorded by TEIAS monthly (through remote reading). In addition to the two metering devices, generation of the HEPP has been cross checked from TEIAS – PMUM (now EPIAS) (formerly PMUM, the change happened on 01/09/2015 after EPIAŞ received Market Operating License. Market operations transferred from PMUM to EPIAŞ.) web site which is accessible using a password provided to electricity generation companies. ISVM (Electricity fed to the grid) and UECM (Electricity consumed from the grid) data given in generation records are used for cross checking of emission reduction calculations. All data are kept for at least two years after the crediting period for QA/QC purposes. Information on the meters used in this monitoring period are given in the table below.

Table 5. Meter properties

	Main Meter	Spare Meter
Brand	EMH	EMH
Class	0.2S	0.2S
Serial No.	4632454	4632455

SECTION D. DATA AND PARAMETERS

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Relevant SDG Indicator	7.2.1 “Renewable energy share in the total final energy consumption” 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions”
Data/parameter	EGy,
Unit	GWh
Description	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must run power plants in year y
Source of data	For gross generation electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must run power plants in year y : http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010%C3%A7i%C3%A7ek%20kitap/kgucunkullan%C4%B1m(13-21)/13.xls For net generation and imported electricity http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010%C3%A7i%C3%A7ek%20kitap/uretim%20tuketim(22-45)/33(84-10).xls
Value(s) applied	157,706.6 in 2008 151,144.7 in 2009 150,894,2 in 2010 459,745 .428 GWh between 2008-2010
Choice of data or Measurement methods and procedures	Data from Grid Operator has been used.
Purpose of data	Data used for emission reduction calculation (for calculation of OM, Netto-Gross electricity ratio and share of low-cost must-run sources)
Additional comment	-

Relevant SDG Indicator	7.2.1 “Renewable energy share in the total final energy consumption” 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions”
Data/parameter	EFCO ₂ , i, y i
Unit	tCO ₂ /TJ
Description	CO ₂ emission factor of fossil fuel type “i” in year “y”
Source of data	For EF of fossil fuels, IPCC values at the lower limit have been used

Value(s) applied	Fuel Source	EF(tCO ₂ /Tj)
	Coal	89.5
	Lignite	90.9
	Fuel Oil	75.5
	Diesel	72.6
	LPG	61.6
	Naphtha	69.3
	Natural Gas	54.3
Choice of data or Measurement methods and procedures	According to the applied tool, IPCC default values at lower limit of 95% confidence interval can be used. Although, the actual emission reduction is expected to be higher due to high EF of fuels consumed in existing power plants, IPCC values have been used for conservativeness as requested by the methodology.	
Purpose of data	EF calculations	
Additional comment	-	

Relevant Indicator	SDG	7.2.1 “Renewable energy share in the total final energy consumption” 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions”
Data/parameter	$\eta_{m,y}$	
Unit	-	
Description	Average net energy efficiency of power unit m in year y	
Source of data	Default values provided in Annex 1 of the “Tool to calculate the emission factor for an electricity system”.	
Value(s) applied	See Annex 1	
Choice of data or Measurement methods and procedures	Data source is selected as per the applied tool.	
Purpose of data	Data used for BM calculation	
Additional comment	-	

Relevant Indicator	SDG	7.2.1 “Renewable energy share in the total final energy consumption” 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions”
Data/parameter	$FC_{i,y}$	
Unit	Tons or 1000 m ³ for gases	
Description	Amount of fuels consumed by thermal power plants for electricity generation in terms of fossil fuel type i in year y	

Source of data	TEIAS web page (http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/yak%C4%B1t46-49/47.xls)
Value(s) applied	See Annex 1
Choice of data or Measurement methods and procedures	Data from Grid Operator has been used
Purpose of data	Data used for OM calculation
Additional comment	-

Relevant SDG Indicator	7.2.1 “Renewable energy share in the total final energy consumption” 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions”
Data/parameter	$NCV_{i,y}$
Unit	Tj/kt
Description	Net calorific value (energy content) of fossil fuel type i in y
Source of data	TEIAS web page (http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/yak%C4%B1t46-49/49.xls)
Value(s) applied	See Annex 1
Choice of data or Measurement methods and procedures	Data has been calculated from Grid Operator’s (TEIAS) statistics
Purpose of data	Data used for OM and BM calculation
Additional comment	-

Relevant SDG Indicator	7.2.1 “Renewable energy share in the total final energy consumption” 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions”
Data/parameter	Cap_{BL}
Unit	W
Description	Installed capacity of the hydro power plant before the implementation of the project activity.
Source of data	Project Site

Value(s) applied	0
Choice of data or Measurement methods and procedures	The project activity is the new grid-connected renewable power plant at a site where no renewable power plant was operated
Purpose of data	Data used for PE calculation
Additional comment	-

Relevant Indicator	SDG	7.2.1 “Renewable energy share in the total final energy consumption”
Data/parameter		A_{BL}
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
Source of data		Project Site
Value(s) applied		0
Choice of data or Measurement methods and procedures		The project activity is the new grid-connected renewable power plant at a site where no renewable power plant was operated. There was no reservoir.
Purpose of data		Data used for PE calculation
Additional comment		-

D.2 Data and parameters monitored

Relevant Indicator	SDG	SDG 7 - Indicator 7.2.1 – “renewable energy share in the total final energy consumption”
Data / Parameter		$EG_{\text{facility},y}$
Unit		GWh
Description		Net Electricity generated and delivered to the grid by CEMEL HYDRO BUNDLE in year y

Source of data	Records from the metering devices used in the power plant were used to calculate the annual generation of energy. EPIAS (formerly PMUM, the change happened on 01/09/2015 after EPIAŞ received Market Operating License. Market operations transferred from PMUM to EPIAŞ. ¹³) records were used as a cross-check both for generation and internal consumption.								
Value(s) applied	Annual generation forming the basis for emission reduction calculation has been 59,004 MWh in this monitoring period. Net generation is 127,842 MWh in this monitoring period. <table> <tr> <th>Year</th><th>Net Generation</th></tr> <tr> <td>01/06/2019 – 31/12/2019</td><td>28,735</td></tr> <tr> <td>01/01/2020 – 31/12/2020</td><td>69,048</td></tr> <tr> <td>01/01/2021 – 31/07/2021</td><td>30,059</td></tr> </table>	Year	Net Generation	01/06/2019 – 31/12/2019	28,735	01/01/2020 – 31/12/2020	69,048	01/01/2021 – 31/07/2021	30,059
Year	Net Generation								
01/06/2019 – 31/12/2019	28,735								
01/01/2020 – 31/12/2020	69,048								
01/01/2021 – 31/07/2021	30,059								
Measurement methods and procedures	Generation data were recorded by two metering devices continuously. These records provide the data for the monthly invoicing to TEIAS. Generation were recorded via remote reading system. This record forms the basis for monthly invoicing. Internal consumption which indicates the usage in the project site is read from monthly records taken from the meters.								
Monitoring frequency	Continuous measuring and monthly recording								
QA/QC procedures	Two calibrated ammeters will back up each other. Maintenance and calibration of the metering devices were made by TEIAS. If there is a noticeable difference between the readings of two devices, maintenance and tests of the metering devices and the associated equipment were done before waiting for the periodical maintenance. The meters should comply with EPDK regulations which define the accuracy class of the meters as 0.2 or 0.5 depending on the capacity of the circuit as given in document in link (http://www.epdk.gov.tr/web/elektrik-piyasasi-dairesi/44) Invoices are provided to be cross-checked with.								
Purpose of data	Emission Reduction calculations								
Additional comment	-								

Relevant SDG Indicator	7.2.1 “Renewable energy share in the total final energy consumption” 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions”
Data / Parameter	Cap _{PJ}
Unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Project site, equipment agreements
Value(s) applied	20.4 Mwe as per generation licence provided.

¹³ <https://www.epias.com.tr/en/corporate/history/>

Measurement methods and procedures	Checking project documents and equipment labels
Monitoring frequency	Yearly
QA/QC procedures	-
Purpose of data	Ensuring validity of project documentation
Additional comment	-

Relevant SDG Indicator	7.2.1 “Renewable energy share in the total final energy consumption”
Data / Parameter	A_{PJ}
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
Value(s) applied	0 Since no new reservoir is created as the project is impoundment type HEPP.
Measurement methods and procedures	Measured from topographical surveys or maps
Monitoring frequency	Yearly
QA/QC procedures	-
Purpose of data	Calculating Power Density
Additional comment	As per the type of the project, it does not have storage capacity and thus it does not create any new reservoir. This has been confirmed by DOE during 1 st verification and also from satellite pictures submitted to GS during registration of the project.

Relevant SDG Indicator/Safeguarding Principle	13.2.1. Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development
Data / Parameter	Air Quality
Unit	tons
Description	Reduction of SO ₂ and NO _x emissions due to implementation of project activity that would otherwise be emitted by thermal power plants
Source of data	Electricity generated by CEMEL HYDRO BUNDLE and NO _x and SO ₂ emission data from GHG inventory of Turkey was used as reference in calculation of the emission reduction.

Value(s) applied	Total SO₂ emission related to electricity generation is about 167.89 kt for 2012 according to National Inventory of Turkey¹⁴. Considering that electricity generation in 2012 is 239,496.8 GWh¹⁵, SO₂ emission per MWh is calculated as 0.70 kg/MWh. Total NO_x emission related to electricity generation is about 324.30 kt for 2012 according to National Inventory of Turkey. NO_x emission per MWh is calculated as 1.35 kg/MWh. Therefore, total SO₂ and NO_x reduction of the project were calculated as 250.5 tons and 192.1 tons, respectively. Details are provided in the excel sheet.
Measurement methods and procedures	The net electricity supplied by the Project was continuously measured and recorded by EPIAS; and was kept by the Project Owner. NO _x and SO ₂ emission data from GHG inventory of Turkey was used as reference in calculation of the emission reduction.
Monitoring frequency	Yearly
QA/QC procedures	-
Purpose of data	To calculate the baseline emission value; and also to monitor the contribution to SDG 13 (Take urgent action to combat climate change and its impacts)
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	13.2.1. Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development
Data / Parameter	Emissions Reductions in tCO ₂
Unit	tCO ₂
Description	Reduction of CO ₂ emissions due to implementation of project activity
Source of data	Electricity generated by CEMEL HYDRO BUNDLE and calculated combined margin (CM) emission factor was used as reference in calculation of the emission reduction.
Value(s) applied	In this monitoring period, net emission reduction is 69,162 tCO ₂ while annual emission reduction is 31,921 tCO ₂ according to the electricity generation during this monitoring period and the combined margin used for the project. Detailed calculations are given in Excel Spreadsheet.
Measurement methods and procedures	The net electricity supplied by the Project was continuously measured and recorded by EPIAS; and was kept by the Project Owner. In addition to the EPIAS meters which is used for billing purposes, records taken by meters using at project site was used for comparison.
Monitoring frequency	Once every monitoring period
QA/QC procedures	-

¹⁴<https://unfccc.int/sites/default/files/resource/tur-2014-crf-14apr18.zip> ,Worksheet:Table1s1

¹⁵[http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/kgucunkullan%C4%B1m\(14-23\)/14.xls](http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/kgucunkullan%C4%B1m(14-23)/14.xls)

Purpose of data	To calculate the baseline emission value; and also to monitor the contribution to SDG 13 (Take urgent action to combat climate change and its impacts)
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	Principle 4.2.1 Impact on natural water patterns and flow
Data / Parameter	Water Quality and Quantity
Unit	-
Description	Impact of project activity and waste water comes from management activities
Source of data	Site assessment and interviews with locals
Value(s) applied	A sewage truck record on 24/02/2020 is submitted.
Measurement methods and procedures	Since the project is run-off- river type, the water used for the electricity generation is released back to river with in 50m and at least 1m depth of water will always be available in weir area. Waste water due to management activities is stored and transferred to municipal waste water channel.
Monitoring frequency	Once after construction completed for the impact of project activity. Annually for wastewater generated.
QA/QC procedures	-
Purpose of data	To monitor the project contribution to Principle 4.2.1
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	4.2.1 Erosion and/or water body stability
Data / Parameter	Soil condition/land restoration
Unit	-
Description	Land restoration measures implemented
Source of data	Through site assessment and documents for implementation of plan
Value(s) applied	The maintenance of planted areas has been done. The care is provided by project personnel. Relevant pictures are provided to DOE.
Measurement methods and procedures	Restoration have been implemented in 2014 for Cemel I and II and in 2016 for Cemel –III (after construction was completed)
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	To monitor the project contribution to Principle 4.2.1
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	Principle 3.6.1: Labour Rights
Data / Parameter	Quality of Employment
Unit	Number of certificates issued/trainings provided

Description	Contribution to quality of employment by ensuring that the staff is trained and certified for the required positions
Source of data	Training Records (including H&S) & Other Certificates required by certain professions, if necessary
Value(s) applied	The staff were given H&S training; training certificates of the staff are provided by the project owner. (Training dates: 05.12.2019 & 06.12.2019)
Measurement methods and procedures	All employees will attend trainings on first aid and health & safety. For positions that require specific skills (such as high voltage equipment) staff will either be trained, or certified staff were recruited.
Monitoring frequency	Annually
QA/QC procedures	The training programmes help increase the efficiency of the workforce and provides employees skilled at their job. This not only helps the company but to self-improvement of individual employees.
Purpose of data	To monitor the contribution to Principle 3.6.1
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	Principle 3.6.1: Labour Rights
Data / Parameter	Quantitative employment and income generation
Unit	Household income and annual minimum wage rate
Description	Ensuring that the staff receives their full salaries on time
Source of data	Review of payrolls and annual expenditures to be provided by the Project Owner
Value(s) applied	28 people are employed in this monitoring period among which 18 of them are locals. Their social security records (employment documents) are provided by the project owner.
Measurement methods and procedures	The project owner is committed to ensuring that the staff receives their full salaries on time. Number of employees and the evidence for their wages being paid were checked from the social security records, which were provided by the Project Owner.
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	To monitor the contribution to Principle 3.6.1
Additional comment	-

D.3. Comparison of monitored parameters with last monitoring period

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period
Net Electricity generated and delivered to the grid by CEMEL HYDRO BUNDLE in year y	Annual generation: 59,004 MWh Net generation: 127,842 MWh (26 months)	Annual generation: 55,443 MWh Net generation: 124,746 MWh (27 months)

Installed capacity of the hydro power plant after the implementation of the project activity	20.4 Mwe	20.4 Mwe
Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full	0 Since no new reservoir is created as the project is impoundment type HEPP.	0 (No new reservoir formed)
Reduction of SO ₂ and NO _x emissions due to implementation of project activity that would otherwise be emitted by thermal power plants	Total SO ₂ reduction: 250.5 tons Total NO _x reduction: 192.1 tons (26 months)	Total SO ₂ reduction: 244.4 tons Total NO _x reduction: 187.5 tons (27 months)
Reduction of CO ₂ emissions due to implementation of project activity	Annual reduction: 31,921 tCO ₂ Net reduction: 69,162 tCO ₂ (26 months)	Annual reduction: 29,994 tCO ₂ Net reduction: 67,487 tCO ₂ (27 months)
Impact of project activity and waste water comes from management activities	A sewage truck record on 24/02/2020 is submitted.	According to the information obtained from the project site, there is not high amount of wastewater generation. Therefore, transfer of wastewater is done quite rarely. In 2017 and 2019, there were no need for the operation of a sewage truck. A sewage truck record belonging the year 2018 was submitted to DOE.
Land restoration measures implemented	The maintenance of planted areas has been done. The care is provided by project personnel.	The maintenance of planted areas has been done. The care is provided by project personnel.
Contribution to quality of employment by ensuring that the staff is trained and certified for the required positions	The staff were given H&S training; training certificates of the staff are provided by the project owner. (Training dates: 05.12.2019 & 06.12.2019)	The staff were given H&S training; training certificates of the staff are provided by the project owner. (Training dates: 28/07/2017 & 21/11/2018 & 05/12/2019)
Quantitative employment and income generation	28 people are employed in this monitoring period among which 18 of them are locals. Their social security records (employment documents) are provided by the project owner.	27 people are employed in this monitoring period. Their social security records (employment documents) are provided by the project owner.

D.4. Implementation of sampling plan

No sampling plan deemed necessary for the Project.

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

The ex-ante emission reductions (ERy) are calculated as follows:

$$ERy = BEy - PEy - LEy$$

Where:

ERy = Emission reductions in year y (tCO₂)

BEy = Baseline emissions in year y (tCO₂)

PEy = Project Emissions in year y (tCO₂)

LEy = Leakage emissions in year y (tCO₂)

E.2. Calculation of project value or estimation of project situation of each SDG Impact

Baseline emission is calculated according to the formula

$$BEy = EG_{PJ,y} \times EF_{grid,CM,y}$$

Where:

EGy = Net electricity delivered to the grid by the project activity in year y excluding transmission losses of the grid.

EFy = Emission factor calculated according to selected methodology. Emission factor has been calculated ex-ante in PDD which is also used in calculating the baseline emissions. EF value used is 0.541 tCO₂/MWh

As it can be seen detail in excel spread sheet used for calculations;

Realized baseline emissions are calculated as follows:

$$EG_y = 127,842 \text{ MWh}$$

$$EF_{grid,CM,y} = 0.541 \text{ tCO}_2/\text{MWh}$$

$$BE_y = (127,842 \text{ MWh}) \times (0.541 \text{ tCO}_2/\text{MWh}) = 69,162 \text{ tCO}_2e$$

Vintage wise breakdown of emission reduction is:

Net Emission Reduction in 2019 (tCO ₂)	15,545
Net Emission Reduction in 2020 (tCO ₂)	37,355
Net Emission Reduction in 2021 (tCO ₂)	16,262
Total Emission Reduction during Monitoring Period (tCO₂)	69,162

Vintage wise breakdown of electricity generation is:

Net Generation Reduction in 2019 (MWh)	28,735
Net Generation Reduction in 2020 (MWh)	69,048
Net Generation Reduction in 2021 (MWh)	30,059
Total Net Generation during Monitoring Period (MWh)	127,842

E.3. Calculation of leakage

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g., extraction, processing, transport). These emissions sources are neglected. Also, the energy generating equipment is not transferred from or to another activity. Therefore, leakage is considered as "0".

As a result: Total Emission Reduction is;

$$LE_y = 0$$

$$ER_y = BE_y$$

E.4. Calculation of net benefits or direct calculation for each SDG Impact

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
7	Production of clean energy	0 MWh	127,842 MWh	127,842 MWh
9	Infrastructural benefits	0 plants	1 clean energy generation plant	1 clean energy generation plant
13	CO ₂ emission reduction	Generation of 69,162 tCO ₂	0 tCO ₂	Avoided 69,162 tCO ₂

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values ¹⁶ achieved during this monitoring period
7	73,950 MWh/year 160,225 MWh in 26 months	59,004 MWh/year 127,842 MWh in 26 months
9	The project provides quality, reliable, sustainable, and resilient infrastructure to support economic development and human well-being, with a focus on affordable and equitable access for all.	Project implemented sustainable infrastructure that reduces environmental footprint and employed clean renewable energy industry technology
13	Reduction of 86,680 tCO ₂	Reduction of 69,162 tCO ₂

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

Amount estimated ex ante has been based on annual emission reduction figures in PDD. Average monthly emission reduction has been calculated by dividing annual generation to 12 months. Average monthly emission reduction has been multiplied by monitoring period (in months) to calculate estimated emission reduction.

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

Both actual electricity generation and actual emission reduction values are lower than the estimated values. The value in the registered PDD is calculated ex-ante for duration of one complete year and assuming a certain incoming flow rate. Since the project is a HEPP, seasonal effects are significant on the monthly generation rates and deviations from the calculated values are acceptable. On the other hand, the

¹⁶ Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

electricity generation is dependent on water flow estimation, which is a natural phenomenon and cannot be estimated with 100% accuracy, and minor deviations from the calculated values are acceptable.

Total emission reduction achieved in whole monitoring period (01/06/2019 - 31/07/2021): 69,162 tCO₂

Total emission reduction estimated ex-ante for whole monitoring period (01/06/2019 - 31/07/2021): 86,680 tCO₂

$[(69,162 - 86,680) / 86,680] * 100 = -20.2\%$

In this monitoring period, the actual emission reduction was observed 20.2% less than the value determined ex-ante due to the reasons indicated above.

SECTION F. SAFEGUARDS REPORTING

Safeguarding principles	Assessment questions	Assessment of relevance to the project (Yes / Potentially / No)	Justification	Mitigation measure (if required)
3.2 Gender Equality and Women's Rights	Is there a possibility that the project might reduce or put at risk women's access to or control of resources, entitlements, and benefits?	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment ¹⁷ .	No mitigation measure is required for this indicator.
	Is there a possibility that the project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment.	No mitigation measure is required for this indicator.

¹⁷ <http://www.ilo.org/ankara/areas-of-work/equality-discrimination/lang--tr/index.htm>

	Is there a possibility that the project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment.	No mitigation measure is required for this indicator.
	Does the project take into account gender roles and the abilities of women or men to benefit from the project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?	Yes	The project outputs serve everyone without regarding gender. It provides electricity for all.	No mitigation measure is required for this indicator.
	Does the project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment.	No mitigation measure is required for this indicator.

	Would the project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment.	No mitigation measure is required for this indicator.
	Would the project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment.	No mitigation measure is required for this indicator.
	Is there a likelihood that the proposed project would expose women and girls to further risks or hazards?	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment.	No mitigation measure is required for this indicator.

	The project is not directly or indirectly contributed sexual harassment and/or any forms of violence against women – address the multiple risks of gender-based violence, including sexual exploitation or human trafficking.	No	Turkey has ratified European Convention on Human Right on 10/03/1954, which includes the right to life as well as prohibition of torture, slavery, discrimination and forced labor.	No mitigation measure is required for this indicator.
	The project is not directly or indirectly contribute slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls.	No	Turkey has ratified European Convention on Human Right on 10/03/1954, which includes the right to life as well as prohibition of torture, slavery, discrimination and forced labor.	No mitigation measure is required for this indicator.
	The project is not directly or indirectly contribute restriction of women's rights or access to resources (natural or economic).	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment.	No mitigation measure is required for this indicator.

	The project is not directly or indirectly contribute recognise women's ownership rights regardless of marital status – adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources.	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment.	No mitigation measure is required for this indicator.
	Where appropriate for the implementation of the project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities.	Yes	The project promotes equal participation of man and women. Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality.	No mitigation measure is required for this indicator.

	The project introduces conditions that ensure the participation of women or men in project activities and benefits based on pregnancy, maternity/paternity leave, or marital status. The project also ensures that these conditions do not limit the access of women or men, as the case may be, to project participation and benefits.	Yes	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality.	No mitigation measure is required for this indicator.
	The project refers to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.	Yes	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality. It also shows parallelity with national strategies prepared for women employment by creating opportunities for all. However, there is no women working directly in the site. Women in the region mostly take roles in agricultural and husbandary activities.	No mitigation measure is required for this indicator.

3.4.3 Land Tenure and Other Rights	a. Does the Project require any change to land tenure arrangements and/or other rights? b. For Projects involving land-use tenure, are there any uncertainties with regards land tenure, access rights, usage rights or land ownership?	a. No b. Not relevant	The area between regulators will be approximately 10 ha.	This area will be expropriated according to the Turkish Expropriation Law.
3.6.2 Negative Economic Consequences	The Project Developer demonstrates the financial sustainability of the project, also including those that will occur beyond the Project Certification period.	Yes	Investment analysis has been done for the project.	No mitigation needed for this indicator.
	The project considers economic impacts and demonstrate a consideration of potential risks to the local economy and how these have been taken into account in project design, implementation, operation and after the project.	Yes	The project involved electricity generation from local and renewable sources. Since Turkey is dependent on import fuel (mainly natural gas and coal), project will not generate any risk but contribute to local economy.	No mitigation is needed for this indicator.

4.1.1 Emissions	Will the project increase greenhouse gas emissions over the baseline scenario?	No	Since it is a hydro energy power plant, the project is expected to have a positive impact on Climate Change by eliminating fossil fuels. Expected amount of CO2e: 40,006 tonnes.	No mitigation measure is required for this indicator.
4.1.2 Energy Supply	Will the project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	Project does not use any local fuel resource. It is connected to the national grid and supply 73.95 GWh additional energy to the grid. Internal consumption which indicates the usage in the project site is read from monthly records taken from the meters.	No mitigation measure is required for this indicator.

4.2.1 Impact on natural water patterns and flow	Will the project affect the natural or pre-existing pattern of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	Project is run-of-river type, and it uses the existing water on the river and releases back to river within 50 m. Since there is no conveyance line, no minimum flow is determined, or gauging station is required for the project activity. Also, the project is subject to water utilization right agreement dated 05/11/2010. Nearby irrigation facilities or fishing fish migration will not be affected. Design of the fish passage has been done according to the report dated on 12/08/2012 and DSI (State Hydraulic Works) criteria which requires free and continuous flow of water from fish passage. During construction, continuous flow will be achieved to ensure that effect on fish habitat is minimum. The weir will prevent the isolation of fish and organisms by providing a steady minimal flow, even when water level decreases. Project is impoundment type HEPP. Hence, there is no diversion of flow from natural riverbed or storage capacity. Therefore, project can not affect the flow pattern of the river. AS per the water utilization	No mitigation is needed.
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			rights agreement, project owner has to release all water when the minimum flow is below 10% of average flow. In practice, due to technical limitations about operation of turbines, all incoming flow is released without electricity generation when the flow is less than 30% of turbine capacity to prevent damage to the turbines. The functionality of the fish passage design of the project has been reviewed by independent experts at time of construction upon request of GS. Design of the fish passage has been renewed upon recommendation of those experts and renewed design has been implemented by project owner. The report of expert has been submitted to GS during registration and 1st verification.	
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4.2.1 Erosion and/or water body stability	Could the project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion?	No	Project does not have any impact on erosion. The main construction activities are powerhouse, weir and fish passage constructions. Excavation aggregate is formed at all three sites and excavated soil is disposed appropriately and used for landscaping.	Project had excavation work on all three project sites. Since the project sites are near the existing road which is paved already, no significant dust due to vehicles are expected however, to minimize the impact, construction site was irrigated regularly to avoid dust.¹⁸ To avoid dust problem in the village, trucks were covered during the transportation of the excavated soil.¹⁴ Also during the storage of the excavated soil, the top layer of the soil was kept with a %10 humidity ration to avoid the dust problem. Project is subject to a comprehensive dust formation modelling due to cement production. All the necessary procedures were followed, and it has been proved that the project dust emissions are below the regulative limit values for particulate matters. Project will have an impoundment type of weir and no conveyance line is going to be built. Design of the Project ensures that the Project will only use a small area. A part of the
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¹⁸ PIF, page 188

				excavation from the construction activities will be used to support the river side line as a precaution against flooding and some will be used for construction purposes. Remaining excavation will be stored in predesignated areas. Vertical penstocks on the body of regulators will be used as gravel pass in transferring the sediment that may be cumulated in the headwater to the downstream. ¹⁹
4.2.3 Landscape modification and soil	Does the Project involve the use of land and soil for production of crops or other products?	No	The project site is located in the relatively plane area where the slope of Kızılırmak River decreases. Therefore, there is alluvial soil used for agricultural purpose in both side of the river.	Land is limited within the project construction phase and there is no negative effect on use of land and soil for production of crops. Although project aim is to generate electricity, irrigation water allocated from the headwater has been considered during project design. ²⁰
4.3.1 Landscape modification and soil	Does the project involve the use of land and soil for production of crops or other products?	No	Project site is mainly surrounded by agricultural lands which are not affected and will continue to be cultivated after project activity.	No mitigation measure is required for this indicator.

¹⁹ FSR_Revised, page 170

²⁰ PSR_Revised, page 71

4.3.2 Vulnerability to Natural Disaster	Will the project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	Possible	Avanos district is in the 3rd Degree Seismic Zone according to the earthquake zones determined by the General Directorate of Disaster Affairs. ²¹	All the design and construction works will be performed in accordance with relevant regulation (Earthquake Code released by the Ministry of Environment and Urbanization, 18/03/2018). The code classifies the country into earthquake zones and determines the basis of calculations regarding building construction rules, importance & priority of the buildings and ground conditions.
4.3.3 Genetic Resources	Could the project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?	No	The project activity is not relevant to the use of genetically modified organisms or GMOs since it is a renewable energy power plant.	No mitigation is needed.
4.3.4 Release of pollutants	Could the project potentially result in the release of pollutants to the environment?	Potentially	Some pollutants may occur during the construction and operation phase of the project, such as waste oil and domestic waste.	Waste oil and domestic waste generated at the construction site is handled according to the national regulations on handling domestic waste.

²¹ http://ankara.imo.org.tr/resimler/dosya_ekler/ff019c60caaf76b_ek.pdf?tipi=84&turu=X&sube=0

4.3.5 Hazardous and Non- hazardous Waste	Will the project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	Potentially	Project was expected to create solid, liquid and particulate wastes/emissions during its construction. Hazardous wastes were also expected such as waste oils in the construction and operation period.	Handling, storage and disposal of these wastes were done according to the Turkish regulations. Solid wastes generated during construction and operation period are expected to be food, package, plastic bottles, etc.²² These wastes are handled according to the “Regulation on Solid Waste Control”. They are collected separately and disposed, accordingly. Project activities include usage of a mobile concrete production unit. The cement Works were carried out one by one and the mobile concrete production unit was transferred to the construction site after each building is complete. There was no waste due to cement usage within the Project site as the cement was supplied in sealed packages from another company.²³ Cement making unit was operated as per the article 9 of the waste and landscape management regulations numbered 25755, dated 14/03/2005.²⁴ Wastewater generated at the site are handled via cesspool compatible with “Water Pollution Control Regulation”. Collected wastewater is then transferred to the closest sewer line by sewage trucks.²⁵ During site preparation works, some
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²² PIF, page 125

²³ PIF, page 52

²⁴ PIF, page 158

²⁵ PIF, page 130

				amount of waste oil generation is expected. This waste is handled according to the “Waste Oil Control Regulation”.²⁶ In order to reduce dust emission during construction, Street sprinklers were used, and the trucks were covered. “Industrial Air Pollution Control Regulation” precautions were also implemented such as standing wind barriers, walls and planting trees in the site.²⁷
4.3.6 Pesticides and fertilizers	Will the project involve the application of pesticides and/or fertilisers?	No	The project is not relevant since it is a renewable energy project.	No mitigation is needed for this indicator.
4.3.7 Harvesting of forests	Will the project involve the harvesting of forests?	No	There is no forest area in and in the close vicinity of the project area.	No mitigation is needed for this indicator.
4.3.8 Food	Does the project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The project is not relevant since it is a renewable energy project.	No mitigation is needed for this indicator
4.3.9 Animal Husbandry	Will the project involve animal husbandry?	No	The project is not relevant since it is a renewable energy project.	No mitigation is needed for this indicator.

²⁶ PIF, page 148

²⁷ PIF, page 146

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

During this monitoring period, no grievances were received.

On the other hand, meetings with the farmers and villagers around stated that the project activity had multiple positive effects on the river and agricultural activities. Such as, the river water used to look like sewerage water, there used to be floods. After the implementation of the project, river water has been clean due to sedimentation and filtration and no more floods occur like they used to. Also, farmers did not have any problems while taking water from the river.

G.2. Report on any stakeholder mitigations that were agreed to be monitored.

No such demand was made in this monitoring period.

G.3. Provide details of any legal contest that has arisen with the project during the monitoring period

No legal contest had arisen with the project in this monitoring period.

Revision History

Version	Date	Remarks
1.1	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Section for POA monitoring Forward action request section Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on safeguard reporting Clarity on design changes Leakage section added for VER/CER projects Addition of Comparison of monitored parameters with last monitoring period Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.0	10 July 2017	Initial adoption

Appendix 1. Further background information on ex ante calculation of emission reductions

DATA USED IN CALCULATION OF OM FOR TURKISH ELECTRICITY GRID

Table 6. Values used in calculation of OM ²⁸

	NCV (Tj/kt) (1000m ³ for gas)	EF (tCO ₂ /Tj)	COEF (tCO ₂ /kt)
Coal	22.26	89.5	1,992
Lignite	6.78	90.9	617
Fuel Oil	39.84	75.5	3,008
Diesel Oil	42.42	72.6	3,079
LPG	46.47	61.6	2,863
Naphtha	39.78	69.3	2,756

²⁸ 2006 IPCC Guidelines for National Greenhouse Inventories

Natural Gas	37.06	54.3	2,012
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Table 7. Amount of fuel used for electricity generation²⁹

	2008	2009	2010	Total Fuel Consumption 2008-2010	Total Emission 2008-2010
Hard Coal	6,270,008	6,621,177	7,419,703	20,310,888	40,464,455
Lignite	66,374,120	63,620,518	56,689,392	186,684,030	115,098,675
Fuel Oil	2,173,371	1,594,321	891,782	4,659,474	14,014,770
Diesel Oil	131,206	180,857	20,354	332,417	1,023,654
LPG	0	111	0	111	318
Naphtha	10,606	8,077	13,140	31,823	87,719
Natural Gas	21,607,635	20,978,040	21,783,414	64,369,089	129,542,466

DATA USED IN CALCULATION OF BM FOR TURKISH ELECTRICITY GRID

Table 8. Net calorific values, generation efficiency and emission factor data used in calculations

	A NCV	B EF_{CO2}	D η	E (=3.6/D/1000*B)
	(Tj/kt or m ³ for gas)	(tCO ₂ /Tj)	Generation Efficiency	EF ³⁰ tCO ₂ /MWh
Coal	22.26	89.50	39.0%	0.826
Lignite	6.78	90.90	39.0%	0.839
Fuel Oil	39.84	75.50	39.5%	0.688
Diesel	42.42	72.60	39.5%	0.662
LPG	46.47	61.60	39.5%	0.561
Naphtha	0.00	69.30	39.5%	0.632
Natural Gas	0.00	54.30	60.0%	0.326

²⁹

<http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/yak%C4%B1t46-49/47.xls>

³⁰ IPCC Reference Document on Best Available Techniques for Large Combustion Plants

Table 9. Most recent capacity additions corresponding to 20%.^{31,32}

Fuel Source	Electricity Generated (MWh)	EF	Share in Total Generation
Coal	9,080	0.826	18.9%
Lignite	144	0.839	0.3%
Fuel Oil	0	0.688	0.0%
Diesel oil	0	0.662	0.0%
LPG	0	0.561	0.0%
Naphtha	0	0.000	0.0%
Natural Gas	31,557	0.326	65.6%
Renewable and wastes	0	0.000	0.0%
Solid	0	0.000	0.0%
Total Renewable	7,315	0.000	15.2%
TURKEY'S TOTAL	48.096		100%

³¹

[http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/kguc\(1-12\)/8.xls](http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/kguc(1-12)/8.xls)

³²

<http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2009/8.xls>