MONITORING REPORT: 1ST VERIFICATION

Document Prepared by

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PROJECT DETAILS

Summary Description of the Implementation Status of the Project

Aslancık Elektrik Üretim A.Ş. (referred to as **Aslancık.** from here on) has developed Aslancık Hydro Power Plant Project (in short: **Aslancık HPP**), a run-of-river hydro power plant (HPP) project with an installed capacity of 98 MWe, which annually feeds an amount of around 428,624 MWh of emission free electricity into the Turkish national grid. Aslancık HPP displaces electricity from the current generation mix which is based to a large amount on thermal power plants and affects the planned capacity extension of the electricity system.

Aslancık HPP thus leads to Greenhouse Gas (GHG) emission reductions which are to be accounted for by verifying and issuing carbon credits under the **Verified Carbon Standard (VCS) Version 4**, (in short **VCS version 4**).

Aslancık HPP generates electricity and feeds it into the national Turkish grid by using the renewable energy source of the current of Harşit Creek, which arises from Cimli, Karakaban and Kostan mountains in the surrounding of the town of Gümüşhane in the district and province of the same name. The watercourse passes the town of Torul in the district of the same name in Gümüşhane province, and then flows through Kürtün district. Here, the major regional HPP project complex Akköy I+II is located, with its first 101.94 MWe component implemented in 2009 and another 187.27 MWe under construction.[1] The watercourse then crosses the border to Giresun province entering Doğankent district where Aslancık HPP is located. Further upstream, in Gümüşhane province, there are Akköy I and Akköy II HPP projects. It flows into the the Black Sea East of the the town of Tirebolu, located in the district of the same name. Detailed information on the project location is compiled in Section 1.7 below.

Aslancık HPP comprises a barrage and reservoir, a diversion structure, an energy tunnel and penstock and the power house with the electro-mechanic equipment. The power generation is achieved by installing and operating a run-of-river HPP comprising 2 Vertical Francis turbines with a rated capacity of 60 MW each. The installed capacity totals 93 MWe only, because this is the maximum use of the turbine combination. The estimated annual electricity production is 428,624 MWh/yr. Further details on project technology are given in table below.

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1 See e.g. http://www.oekb.at/de/exportservice/transparenz-compliance/Bundesgarantierte-Projekte-ab-10-Mio- Euro/2009/Seiten/tuerkei-wkw-akkoey.aspx or http://www.hesiad.org.tr/AKKOYENERJIBILGI.htm.

Aslancık HPP produces GHG emission free, clean electricity, which is fed into the national Turkish grid. All Turkish power plants are connected to this grid[2] and are dispatched centrally by the Turkish grid operator Türkiye Elektrik İletim A.Ş (**TEİAŞ**) and its Market Financial Settlement Centre (Turkish: Piyasa Mali Uzlastirma Merkezi; **PMUM**). The electricity supplied to the national grid is dominated by thermal power plants. As Aslancık HPP is a run-of-river HPP, the electricity amount supplied to the grid depends on external physical conditions, i.e. the flow rate at Harşit Creek, though it is regulated to a certain extent by an appropriate management of the planned reservoir. In contrast, the thermal power plants connected to the national grid can fully be regulated. Concluding, the electricity produced by Aslancık HPP displaces power generation by thermal power plants, which leads to savings in fuel combustion and thus to the reduction of GHG emissions, as specified and explained in detail in Section 5 below.

On the other hand, for this first monitoring period, net electricity generation was achieved as 1,553,154.50 MWh for the period in between 08/03/2014 and 31/12/2019. Moreover, according to this generation amount, actual emission reduction was realized as 827,828 tCO2e for the same period. A comparison table which indicates the difference between estimated and achieved amounts is provided below.

Vintage		actual ERy (tCO2e)	estimated ERy (tCO2e)	% by year
8.03.2014	31.12.2014	90,100	182,582	-51%
1.01.2015	31.12.2015	104,871	222,884	-53%
1.01.2016	31.12.2016	165,200	223,495	-26%
1.01.2017	31.12.2017	156,103	222,884	-30%
1.01.2018	31.12.2018	163,264	222,884	-27%
1.01.2019	31.12.2019	148,290	222,884	-33%
Total		**827,828**	1,297,612	-36%

As aforementioned above, Aslancık HPP is a run-of-river HPP, the electricity amount supplied to the grid depends on external physical conditions, i.e. the flow rate. That is why, actual emission reduction amounts are lower than estimated amount since electricity generated is also lower than the estimated amount of electricity. Within the scope of this project reservoir area whose detailed data are given in Table 1 was formed for the installation of the plant.

Aslancık A.Ş. operates the HPP as **Independent Power Producer (IPP)** and has obtained the respective production licence from the Turkish Energy Market Regulatory Authority (Turkish: Enerji Piyasası Düzenleme Kurumu, **EPDK**) on 20/03/2008. The commissioning date is 08/03/2014.

2 The only exemption are the isolated autoproducer plants, where the plant operators use the generated electricity directly for their own demand..

Table 1 Technical Data[3]

HYDROLOGY			
Precipitation area: 3,109 km^2	**Long term average flow at the dam/barrage:** 45.11 m^3/s -1,420.57 hm^3/a		
RESERVOIR			
Maximum (minimum) operating water altitude/level: 183m (180m)			
Total storage volume: 1.636 hm^3	**Lake area:** 0.175 km^2		
BULKHEAD/COFFERDAM AND DIVERSION			
Altitude of the upstream (downstream) cofferdam: 176m (166m)			
Dimensions of the diversion channel: 12m · 7m	**Length:** 330m		
DAM/BARRAGE			
Type: Concrete weight	**Crest elevation:** 185m	**Thalweg elevation:** 165m	
Height from thalweg/Dam height: 20m	**Height from foundation:** 29m		
WATER INTAKE STRUCTURE			
Control: Rolling cofferdam cover	**Invert elevation:** 171m		
Dimension of the clear aperture: 2 · 5.5m · 12m	**Limit of submergence:** 3.5m – 6.5m		
GRAVEL PASS			
Type: Orifice radial cover	**Invert elevation:** 165m	**Dimensions of the radial covers:** 6m · 2.95m	
SPILLWAY/OVERFALL			
Location and type: on the stem, radial cover, frontal acceptance			
Number of radial covers: 3	**Dimensions of the radial covers:** 13.3m · 15.12m		
ENERGY TUNNEL			
Type: Reverse-U Cross section (modified horseshoe), concrete coated			
Tunnel inside diameter: 5.5m	**Tunnel length (up to steel coating):** 12,907m		
Length and diameter of the Steel coated tunnel: 160m / 4.5m circular			
VALVE CHAMBER			
Type: On the place	**Dimensions:** 18.5m · 8m	**Equipment:** 1 · 4,500mm butterfly valve	
SURGE CHAMBER			
Type: Vertical cylindrical shaft	**Shaft diameter:** 22m	**Top of shaft elevation:** 205m	
Shaft altitude: 50m	**Maximum water level:** 200m	**Minimum water level:** 155.5m	
PENSTOCK			
Diameter: 4,500mm	**Length:** 238m	**Bifurcation area:** 3,200mm (diameter) / 2 · 18=36m (length)	
POWER HOUSE			
Type: Half submerged	**Number of units:** 2	**Nominal/Rated installed capacity:** 2 · 60 MW	
Turbine: Vertical Francis	**Maximum gross head:** 134.5m	**Unit discharge/flow rate:** 51.1m^3/s	

[3] Project Feasibility Report

Dimensions: 36.8m · 17m	**Altitude (max.):** 39.8m	**Elevation of Environment:** 58m
SWITCHYARD		
Type: Open-air switchyard	**Operating voltage:** 13.8/154 kV	**Dimensions :** 42m · 81m
Energy transmission line: 1272 MCM / Length 11.4km / End at TEİAŞ' Tirebolu Substation		

Aslancık HPP comprises a barrage and reservoir, a diversion structure, an energy tunnel and penstock and the power house with the electro-mechanic equipment. The power generation is achieved by installing and operating a run-of-river HPP comprising 2 Vertical Francis turbines with a rated capacity of 60 MW each. The installed capacity totals 98 MWe only, because this is the maximum use of the turbine combination. Further Technical description of installed technology and equipment is given in the table below.

Table 2 Technical Description of Installed Technology and the Equipment[4]

Technical Description of Installed Technology and Equipment	
Equipment	Specifications
Hydraulic Turbine- 1 & Hydraulic Turbine-2	-Vertical Axis Francis Turbine(RAINBOW) Output Power: 60 MW Head:127 m Flow Rate: 51.1 m^3/s Velocity: 333,3r/min Serial Numbers of Turbine 1 and Turbine 2: 3977
Generator-1 & Generator 2	Producer Firm: KONCAR Type: S 5186-18 Phase No/Frequency: 3/50 Hz Serial Number Generator 1: 24406 Serial Number Generator 1: 24407 Nominal Power: 66,66 MVA Velocity: Velocity: 333,3r/min Power Factor:0.9 Excitation Voltage:187 V Excitation Current:786 A

[4] Provisional acceptance certificate for Power-up.

1.2 Sectoral Scope and Project Type

According to guidance from VCS, Aslancık HPP falls under sectoral scope no. 1 "Energy Industries (renewable/non-renewable)".1 The project type is Renewable Energy (REN). More specifically, it is a run-of-river HPP project. Aslancık HPP is not a grouped project if referring to the relevant VCS rules. Referring to CDM rules it is also neither a project bundle nor a debundled component of a large scale project activity.

1.3 Project Proponent

Organization name	Aslancık Elektrik Üretim A. Ş.
Contact person	Suat Odaman
Title	Project Representative
Address	Burhaniye, Kısıklı Cd. No:65/1, 34676 Üsküdar/İstanbul TURKEY
Telephone	+90 (0216) 537 81 41
Email	info@aslancikelektrik.com.tr

1.4 Other Entities Involved in the Project

Organization name	Life İklim ve Enerji Ltd. Şti.
Role in the Project	Project Developer
Contact person	Oğulcan Demirtaş
Title	Carbon Consultant
Address	Oğuzlar Mahallesi, 1377. Sk. No:19, 06520 Çankaya/Ankara/ TURKEY
Telephone	+90 312 481 2142
Email	ogulcan.demirtas@lifeenerji.com

1.5 Project Start Date

The Project was commissioned and started to feed energy to the grid on 08 March 2014.[5] This is the date on which the project started to produce emission reductions.

5 Provisional Acceptance Protocol

1.6 Project Crediting Period

The start date of the crediting period is 08/03/2014. The expected technical and economic lifetime is 30 years.[6] In registered PDD, crediting period was estimated as 01/10/2013, however the plant could not start operating on planned date. Project started operating on 08/03/2014, therefore starting date of first crediting and monitoring period were taken as 08/03/2014

In accordance with VCS rules , The project crediting period is 10 years; 08/03/2014-07/03/2024 (both days included).
As in accordance with VCS version, the intention is to renew the crediting period.[7] For this reason, the crediting period is renewable twice. (Total crediting period will be 30 years)

1.7 Project Location

Aslancık HPP is located in Doğankent and Tirebolu districts, Giresun province in Turkey.

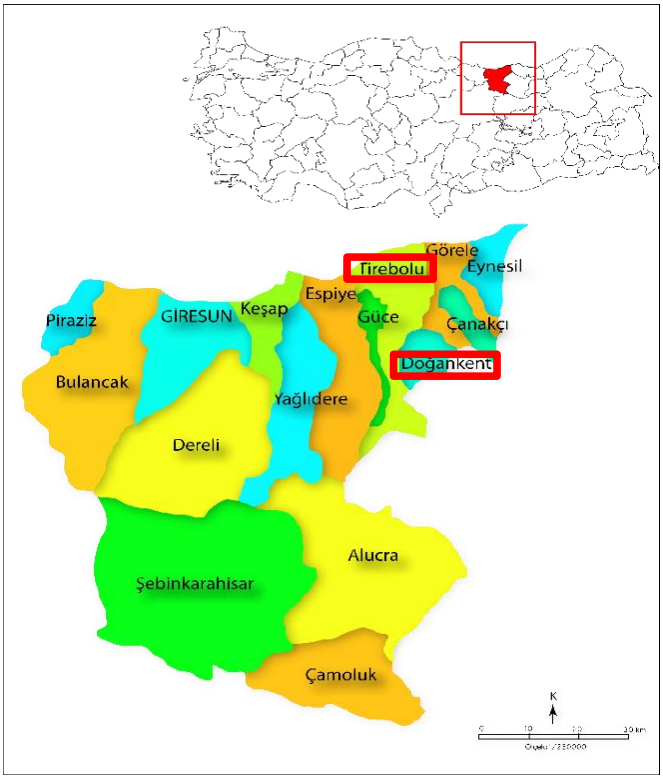


Figure 1 Location of Doğankent and Tirebolu districts in Giresun province in Turkey

6 See VCS Program Definitions Version 4.2 [VCS Definitions], p. 9.

http://www.v-c-s.org/sites/v-c-s.org/files/Program%20Definitions%2C%20v3.2.pdf

7 See [VCS Standard v4.2], Section 3.9.

Figure 2 Aslancık HPP location in Doğankent and Tirebolu districts

The dam axis is located some 1.5km North of the town of Doğankent. The energy tunnel stretches over a distance of some 13km alongside the Harşit Creek watercourse, ending in the power plant which is located some 1.5km East of the village of Soğukpınar.

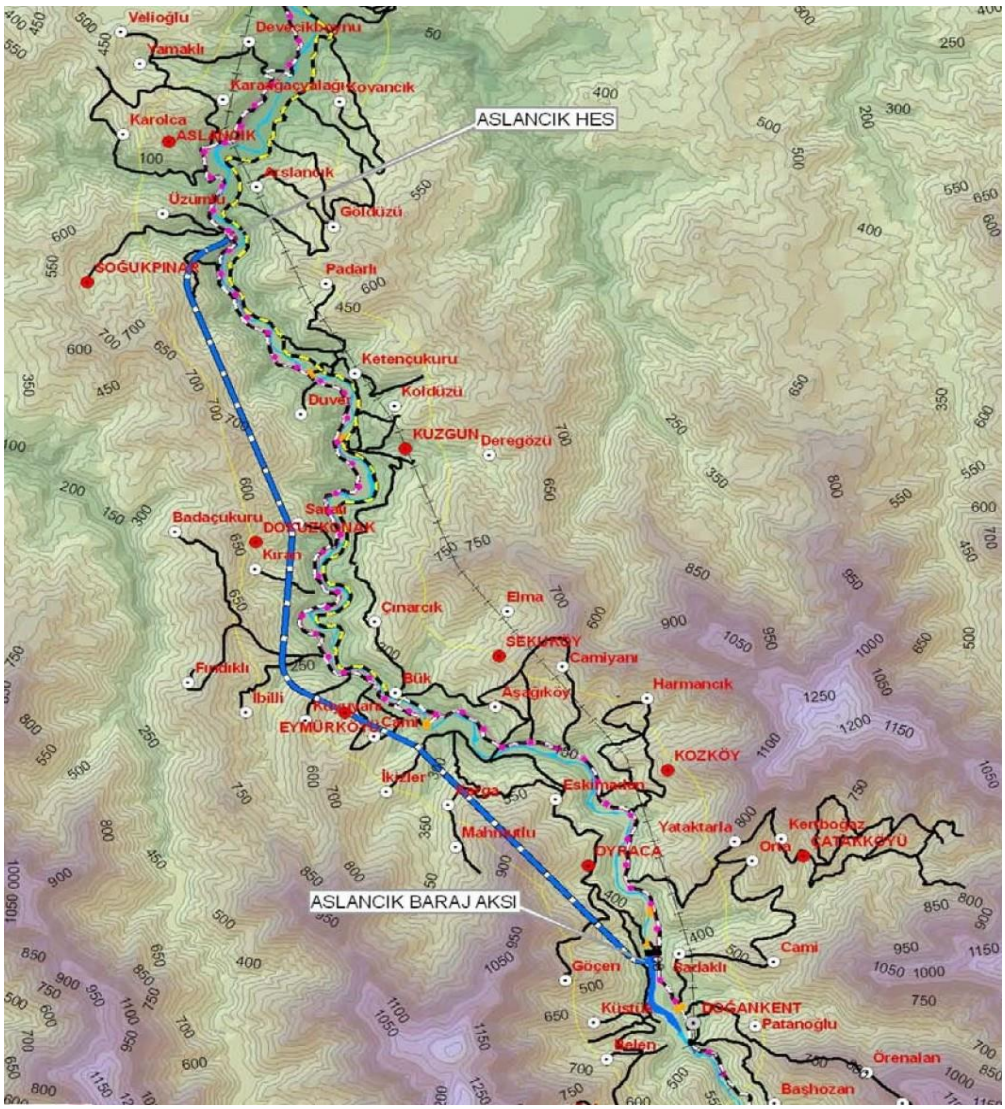


Figure 3 Location of Aslancık HPP project components

Table 3 Coordinates of Aslancık HPP Project Components

Unit	Longitude (N)	Latitude I
Power House	40’54'27”09"N	38’50'45”33"E
Dam Axis	40’49'7”32"N	38’54'47”90"E
	40’49'6”70"N	38’54'38”38"E
Energy Tunnel	40’49'4”20"N	38’54'38”26"E
	40’54'41”26"N	38’50'45”56"E

1.8 Title and Reference of Methodology

The UNFCCC Clean Development Mechanism (CDM) is a VCS approved GHG program. Concluding, methodologies and methodology elements approved under the CDM may be used for VCS projects.[8]

In this VCS PD, the following CDM methodology elements and methodologies are applied:

1. The Approved Consolidated Baseline and Monitoring Methodology "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" Version 12.3.0 valid as of 02/03/2012 (referred to as **ACM0002** from here on) is used in combination with the
2. "Tool to calculate the emission factor for an electricity system" Version 2.2.1 valid as of 29/09/2011 (referred to as "**EF Tool**" from here on) as well as with the
3. "Tool for the demonstration and assessment of additionality" Version 06.0.0, valid as of 25/11/2011 (referred to as the "**Additionality Tool**" from here on).

1.9 Participation under other GHG Programs

Aslancık HPP does not participate in any GHG program other than the VCS.

1.10 Other Forms of Credit

No GHG related environmental credits are applied to the Turkish power sector.

1.11 Sustainable Development

Building a HPP contributes to a sustainable expansion path of the Turkish energy system, as it serves the steadily growing electricity demand in an environmentally suitable way. The project also contributes to dissemination of state-of-the-art new renewable energy (REN) technology. This helps strengthening those pillars of Turkish energy supply that are based on ecologically sound and domestically sourced technology.

No significant negative ecological impacts can be expected from the proposed project activity. Aslancık HPP has undergone a full environmental impact assessment **(EIA)** according to Turkish law. The EIA Report has been submitted on 01/02/2008, leading to environmental approval of the project by the Turkish Ministry of Environment and Urbanization (Turkish: Türkiye Cumhuriyeti Çevre ve Şehircilik Bakanlığı, **TÇŞB** abrogated: **TÇOB**) on 02/04/2008. A summary of the EIA Report is given in Section 5 of the registered PDD.

In fact, there are essential positive environmental effects, as highly polluting electricity generation technologies is displaced by the project. Pollution not only comprises greenhouse gases but other local air pollutants such as SO2, NOx, or Particulate Matter, as well.

8 See http://www.v-c-s.org/how-it-works/linked-programs and http://www.v-c-s.org/methodologies/find.

As for social impacts, significant positive employment effects will occur especially during the construction and installation period. Management, operation and maintenance of the HPP creates permanent jobs which require high qualification, contributing to capacity building and know-how dissemination in Turkey. Moreover, since it is a renewable energy project, it contributes to achieve nationally stated sustainable development priorities which were indicated like in the law on use of renewable energy resources for electricity generation[9]. Introduction purpose of this Law; the use of renewable energy resources for electrical energy generation to spread these resources to the economy in a reliable, economical and quality manner, decreasing greenhouse gas emissions, utilizing wastes, protecting the environment and developing the manufacturing sector needed to achieve these objectives. Moreover, sustainable development goals outcomes and the actual results of the contributed sustainable development indicators by the project during the monitoring period is given in the table given below.

Table 4. Sustainable Development Goals Outcomes

Sustainable Development Goals Targeted	Most relevant SDG Target	SDG Impact
		Indicator (Proposed or SDG Indicator)
SDG 13: Climate Action (mandatory)	**13.3 by emission reduction**	13.3.1 Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula
SDG 7: Affordable and clean energy	**7.2 by using renewable energy systems**	7.2.1 Renewable energy share in the total final energy consumption
SDG 8: Decent work and economic growth	**8.8 by employment and decent work**	8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status

[9] https://www.mevzuat.gov.tr/MevzuatMetin/1.5.5346.pdf

Sustainable Development Goals Targeted	SDG Impact	Actual Results	Units or Products
Climate action	**SDG 13**	CO2: 827,828 tCO2/MP	
Affordable and clean energy	**SDG 7**	1,553,154.50 MWh/MP renewable energy.	
Decent work and economic growth	**SDG 8**	During this monitoring period, 7 HSE training have been provided to employees and also 21 people are employed thanks to this project.[10]	

SAFEGUARDS

2.1 No Net Harm

No negative environmental and socio-economic impacts have been observed/recorded for this project. Detailed information of Aslancık Hydro Power Plant Project's social and environmental performance can be gained via Sustainable Development chapter.

2.2 Local Stakeholder Consultation

In the course of the EIA process, a stakeholder consultation was conducted in compliance with Turkish EIA regulation as an integral part of the scoping phase. The main element of the stakeholder consultation was a physical meeting, conducted on 13/12/2007 in the assembly room of the Imam Hatip School in Doğankent, Giresun, with 80 participants. Invitations had been published in local, regional and national newspapers one week earlier. Also, the heads of the affected villages, as well as community, district and governor administrations had been invited directly to the meeting, and they had disseminated information on the meeting to the affected local public by public announcements and public notices.

[10] HSE trainings and social security records

In addition to the meeting, a two-day opinion survey was conducted beforehand with the heads of the villages affected by the dam construction works, i.e. Aslancık, Ataköy, Eymür, and Dokuzkonak. The purpose was to gather information on the socio-economic situation in the region and about the public opinion on the project.

Concerns about the project have been raised by the local population mainly with regard to

- location and size of expropriation areas
- impacts of the penstock pipe on groundwater quality
- locations of the access tunnels
- storage location of excavation material
- stability of the dam against the flow of the Harşit Creek
- silting up of the reservoir area
- sourcing of construction workers and start of construction works
- depth of the dam lake
- flooding of Sadaklı community.

During the meeting, the concerns could be generally eliminated. Aslancık Elektrik Üretim A.Ş. explained the real potential impact of the project activity to the audience as simply and coherently as possible. A commitment to conduct appropriate mitigation measures was given, as well as to fully compensate any affected party for any unavoidable negative impacts. Also, the local sourcing of construction workers was agreed to. The meeting resulted in a generally positive assessment of, and support for, the project by the audience.

On the other hand, for the current crediting period, an online meeting with local stakeholders, VVB and employees of the project was conducted on the 14th of December, 2020. During the meeting, there were no any negative comments or feedbacks received from the participants. Moreover, a grievance book was delivered to Muhktar of the Village so that local stakeholders can give their feedbacks/complaints on it. The book and conctact information of project owner will be available at muhktar building and comments and feedbacks will be continued to receive to be considered for the following monitoring periods.

Aslancık Hydro Power Plant (HPP) project started its operation with an installed capacity of 93 MWe on 08th of March, 2014. However, on 18th of December, 2017, its capacity was increased from 93 MWe to 98 MWe. Provisional Acceptance Certificate for the new installed capacity was approved 18th of December, 2017. On the other hand, while validation procedure of the project in VCS was conducted by enveco GmbH, by starting from the first monitoring period, Life İklim ve Enerji Ltd. started giving consultancy service for the verification process of this project. For these updates, during online site visit and in grievance book no negative comments or feedbacks received from local stakeholders.

IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

Aslancık HPP comprises a barrage and reservoir, a diversion structure, an energy tunnel and penstock and the power house with the electro-mechanic equipment. The power generation is achieved by installing and operating a run-of-river HPP comprising 2 Vertical Francis turbines with a rated capacity of 60 MW each. The installed capacity totals 98 MWe only, because this is the maximum use of the turbine combination. The estimated annual electricity production is 428,624 MWh/yr.

Aslancık HPP produces GHG emission free, clean electricity, which is fed into the national Turkish grid. All Turkish power plants are connected to this grid[11] and are dispatched centrally by the Turkish grid operator Türkiye Elektrik İletim A.Ş (**TEİAŞ**) and its Market Financial Settlement Centre (Turkish: Piyasa Mali Uzlastirma Merkezi; **PMUM**). As Aslancık HPP is a run-of-river HPP, the electricity amount supplied to the grid depends on external physical conditions, i.e. the flow rate at Harşit Creek, though it is regulated to a certain extent by an appropriate management of the planned reservoir. In contrast, the thermal power plants connected to the national grid can fully be regulated. Concluding, the electricity produced by Aslancık HPP displaces power generation by thermal power plants, which leads to savings in fuel combustion and thus to the reduction of GHG emissions, as specified and explained in detail in Section 5 below.

Table 5 Technical Specifications of Electricity Meters[12]

Name	Brand & Model	Serial Number	Accuracy Class	Protocol Date
Main Meter 1	ELSTER & A1500	464256	0.5S	02/10/2014 27/10/2015 10/10/2017 18/09/2020
Back-up Meter 1	ELSTER & A1500	464257	0.5S	
Main Meter 2	ELSTER & A1500	471006	0.5S	
Back-up Meter 2	ELSTER & A1500	471007	0.5S	

11 The only exemption are the isolated autoproducer plants, where the plant operators use the generated electricity directly for their own demand.

12 Test Protocols of Meters

Table 6 Milestone Table of the Project

Project development step	Date
Agreement on use of water resources with (Devlet Su İşleri Genel Müdürlüğü, DSİ)	17/01/2007
Finalisation of EIA Report	01/02/2008
Granting of EPDK production licence	20/03/2008
Environmental Approval by ÇŞB	02/04/2008
Grid connection agreement with TEİAŞ	01/07/2008
Board Decision to use carbon credits	25/08/2008
First Carbon Market Consultant Contract	02/09/2008
Signing of loan term sheet	01/06/2010
Completion of pre-feasibility study	July 2010
Time of investment decision: Construction contract	21/07/2010
First down payment for construction works	22/07/2010
Contract with technology provider	22/12/2010
Contract for power line	30/11/2010
First payment for power line	14/12/2010
Bank loan contract	24/01/2011
First payment to technology provider	18/02/2011
Confirmation of Board Decision to use Carbon Credits	08/06/2011
Termination of Carbon Asset Development Agreement with initial consultant	15/06/2011
New carbon consulting contract with current carbon market consultant	01/07/2011
Date of full HPP commissioning	08/03/2014
Start date of the first crediting period	08/03/2014
Start date of the first monitoring period	08/03/2014
End date of the first monitoring period	31/12/2019

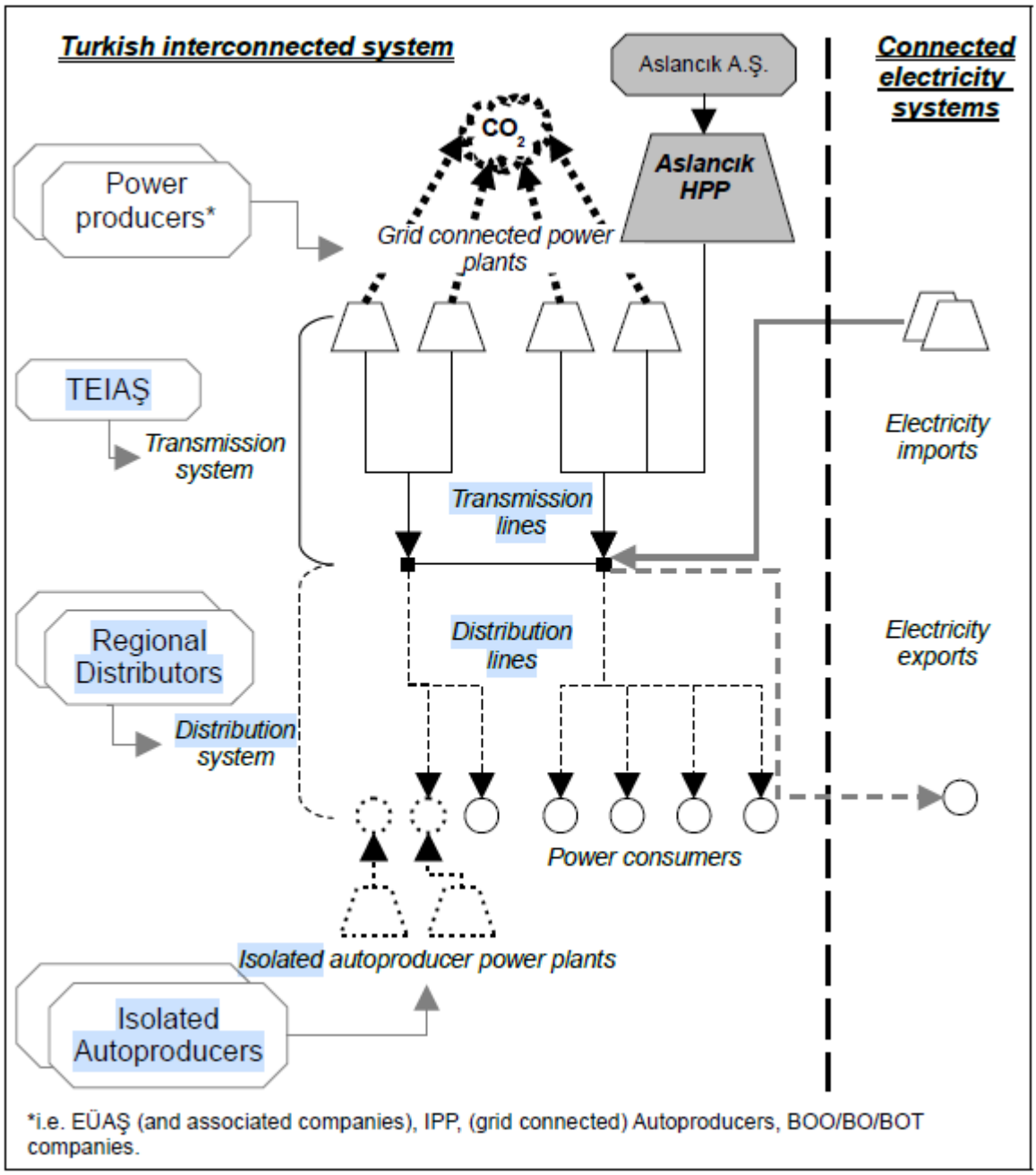


Figure 4 Single Line Diagram of Aslancık HEPP

3.2 Deviations

3.2.1 Methodology Deviations

N/A

3.2.2 Project Description Deviations

Aslancık Hydro Power Plant (HPP) project started its operation with an installed capacity of 93 MWe on 08th of March, 2014. However, on 18th of December, 2017, its capacity was increased from 93 MWe to 98 MWe. Provisional Acceptance Certificate for the new installed capacity was *approved 18th*

of December, 2017. After this capacity increase, renewable electricity generation amount still occurred/occurs lower than estimated electricity generation amount in registered PD. For this reason, the project is still additional.

On the other hand, while validation procedure of the project in VCS was conducted by enveco GmbH, by starting from the first monitoring period, Life İklim ve Enerji Ltd. started giving consultancy service for the verification process of this project.

In registered PD, the start date of the crediting period was given as the expected date of commissioning, i.e. 01/10/2013. However, project got its provisional acceptance protocol on 7th of March, 2014 and started operating on 8th of March, 2014. Therefore start date of the crediting period was taken as 8th of March, 2014.[13]

3.3 Grouped Projects

Aslancık Hydro Power Plant Project is a single project not a grouped project activity.

DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	**FCHV,i,y**
Data unit	Tcal
Description	Amount of fuel combusted for electricity production in Turkey in the years 2008-2010.
Source of data	[TEİAŞ Statistics]; https://webapi.teias.gov.tr/file/97edee23-52d9-4a8d-a7b5-168caac13cfe?download
Value applied	See Table C in Annex in Registered PDD: Baseline Information below.
Justification of choice of data or description of measurement methods and procedures applied	Data is necessary to calculate the OM emission factor, see equation (3) and equation (4) in Section 3.1.2. Step 4 of Registered PDD. Data source is published by state-owned company TEİAŞ.
Purpose of Data	Calculation of baseline emissions.
Comments	No additional comments

Data / Parameter	**EFCO2,i,y / EFCO2,i,m,y**
Data unit	tCO2/TJ

[13] Provisional Acceptance Certificate

Description	Carbon emission factors of fuels used for combustion for electricity production by fuel type (IPCC default values at the lower limit of the uncertainty at a 95% confidence interval)
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, table 1.4, pp. 1.23 and 1.24.
Value applied	See Table 20 p. 33 Section 3.1.2. Step 4 of Registered PDD for OM. See Table 23 p. 37 Section 3.1.2. Step 5 of Registered PDD for BM.
Justification of choice of data or description of measurement methods and procedures applied	Data is necessary to calculate both OM and BM emission factors. See equation (3) p. 32 Section 3.1.2. Step 4 of Registered PDD for OM. See equation (9) p. 37 Section 3.1.2. Step 5 of Registered PDD for BM. Data source is proposed and accepted by ACM0002.
Purpose of Data	Calculation of baseline emissions.
Comments	No additional comments

Data / Parameter	**Ely**
Data unit	GWh
Description	Gross electricity imports to the Turkish national grid 2008-2010.
Source of data	[TEİAŞ Statistics]; Türkiye Elektrik Enerjisi Üretiminin Üretici Kuruluşlara Dağılımı ile İhracat- İthalat ve Brüt Talebinin Yıllar İtibariyle Gelişimi (2006-2010) .xls
Value applied	See Table 21 p. 34 Section 3.1.2. Step 4 of Registered PDD for OM.
Justification of choice of data or description of measurement methods and procedures applied	Data is necessary for calculating electricity generation from sources included in OM emission factor calculation, see equation (5) Section 3.1.2. Step 4 of Registered PDD. Data source is published by state-owned company TEİAŞ.
Purpose of Data	Calculation of baseline emissions.
Comments	No additional comments

Data / Parameter	**EGTOTAL,y,GROSS**
Data unit	GWh

Description	Gross electricity production in Turkey in 2008-2010.
Source of data	[TEİAŞ Statistics]; OECD Ülkelerinde Brüt Üretim - Kayıplar - Brüt Arz- Net Tüketim (2010).xls
Value applied	See Table 21 p. 34 Section 3.1.2. Step 4 of Registered PDD for OM. See Table 22 p. 36 Section 3.1.2. Step 5 of Registered PDD for BM.
Justification of choice of data or description of measurement methods and procedures applied	Data is necessary as a basis for calculating OM generation, see equation (5) Section 3.1.2. Step 4 of Registered PDD. Data is also the basis for calculating the overall Turkish net-to-gross generation relation which is again necessary to estimate net generation from sources not considered as low-cost/must-run for OM emission factor, see equation (6) Section 3.1.2. Step 4 of Registered PDD and net generation from sources added to the system most recently and representing 20% of total generation for BM emission factor, see equation (8) Section 3.1.2. Step 5 of Registered PDD. Data source is published by state-owned company TEİAŞ.
Purpose of Data	Calculation of baseline emissions.
Comments	No additional comments

Data / Parameter	**EGTOTAL,y,NET**
Data unit	GWh
Description	Net electricity production in Turkey in 2008-2010.
Source of data	[TEİAŞ Statistics]; OECD Ülkelerinde Brüt Üretim - Kayıplar - Brüt Arz- Net Tüketim (2010).xls
Value applied	See Table 21 p. 34 Section 3.1.2. Step 4 of Registered PDD.
Justification of choice of data or description of measurement methods and procedures applied	Data is the basis for calculating net-to-gross relation for Turkish electricity generation which is again necessary to estimate net generation from sources not considered as low-cost/must-run for OM emission factor, see equation (6) Section 3.1.2. Step 4 of Registered PDD. Net-to-gross generation relation is also necessary for estimating net generation from sources added to the system most recently and representing 20% of total generation for BM emission factor, see equation (8) Section 3.1.2. Step 5 of Registered PDD. Data source is published by state-owned company TEİAŞ.

Purpose of Data	Calculation of baseline emissions.
Comments	No additional comments

Data / Parameter	**Capacity additions**
Data unit	
Description	Power plants most recently added to the Turkish electricity system and representing 20% of total current (i.e. 2010) generation
Source of data	https://www.epdk.gov.tr/Detay/DownloadDocument?id=aYZlyqYrK0I= For 2008: TEİAŞ: Türkiye elektrik enerjisi 10 yıllık üretim kapasite projeksiyonu (2009–2018); http://www.artienerji.com.tr/rapor/TEIAS_PROJEKSIYON_OZETI.pdf For 2009: TEİAŞ: Türkiye elektrik enerjisi 10 yıllık üretim kapasite projeksiyonu (2010–2019); pp. 98-101. For 2010: [TEİAŞ Projection]; http://www.artienerji.com.tr/rapor/TEIAS_PROJEKSIYON_OZETI.pdf
Value applied	See Table D in Annex of Registered PDD: Baseline Information below.
Justification of choice of data or description of measurement methods and procedures applied	Data is the basis for estimating net generation included in BM emission factor, see equation (8) Section 3.1.2. Step 5 of Registered PDD. Data sources are published by state-owned company TEİAŞ.
Purpose of Data	Calculation of baseline emissions.
Comments	No additional comments

Data / Parameter	**EGm,y,GROSS**
Data unit	GWh
Description	Annual gross generation of the power plants most recently added to the system and representing 20% of total current (i.e. 2010) gross generation in Turkey.
Source of data	For EÜAŞ plants: [TEİAŞ Statistics] OECD Ülkelerinde Kurulu Güç (2010) .xls For all other plants: [TEİAŞ Projection], pp. 90-101.
Value applied	See Table 22 p. 36 Section 3.1.2. Step 5 of Registered PDD.

Justification of choice of data or description of measurement methods and procedures applied	Data is the basis for determining net generation of BM plants as included in the BM emission factor, see equation (8) Section 3.1.2. Step 5 of Registered PDD. Net generation of BM emission plants is then used for estimating BM emissions as included in the BM emission factor, see equation (6) Section 3.1.2. Step 5 of Registered PDD. Data sources are published by state-owned company TEİAŞ.
Purpose of Data	Calculation of baseline emissions.
Comments	No additional comments

Data / Parameter	**EGLC-MR,y,GROSS**
Data unit	GWh
Description	Gross electricity production from low-cost/must-run sources in Turkey 2008- 2010.
Source of data	[TEİAŞ Statistics]; OECD Ülkelerinde Brüt Üretim - Kayıplar - Brüt Arz- Net Tüketim (2010).xls
Value applied	See Table 21 p. 34 Section 3.1.2. Step 4 of Registered PDD.for OM.
Justification of choice of data or description of measurement methods and procedures applied	Data is necessary for calculating electricity generation from sources included in OM emission factor calculation, see equation (5) Section 3.1.2. Step 4 of Registered PDD.. Data source is published by state-owned company TEİAŞ.
Purpose of Data	Calculation of baseline emissions.
Comments	No additional comments

4.2 Data and Parameters Monitored

Data / Parameter	**EGfacility,y**
Data unit	MWh/yr
Description	Quantity of net electricity generation supplied to by Aslancık HPP to the grid in year y.
Source of data	The data from the Electricity Meters are the basis for the settlement notification of EPİAŞ. Data are gathered electronically from the meters by TEIAS and stored in secured website of EPİAŞ, which is accessible to project developer

	with a private password. For monitoring, web screenshots of PMUM are used as source of data.
Description of measurement methods and procedures to be applied	Continuous measuring of electricity exported to and imported from the grid by Aslancık HPP, i.e. 100% of the data is monitored, and no sampling is applied.
Frequency of monitoring/recording	The electricity meters work continuously. Responsible TEİAŞ staff conducts data read-outs monthly and publishes results online in Aslancık Elektrik Üretim A.Ş.'s PMUM account. Data is cross-checked and recorded monthly by responsible Aslancık's staff.
Value monitored	1,553,154.50 (The details for the recorded data within this monitoring period is provided in Appendix 1: Monthly Electricity Generation Data.)
Monitoring equipment	Regarding the electricity meters: two meters were placed (one main and one reserve). The fact that two meters are installed in a redundant manner keeps the uncertainty level of the only parameter for baseline calculation low. High data quality of this parameter is in the interest of not only the emission reduction monitoring, but also paramount for the business relation between the plant operator and the electricity buyer. On the last day of each month, the production index is taken from the main as well as the reserve meter by EPİAŞ (a state institution responsible for electricity market settlement operations) via Automatic Meter Reading System (OSOS). In following month, EPİAŞ issue electricity generation records for each generation unit that can be accessed by plant operators via logging to secured website. These records are used to monitor net monthly generation of the power plant. For each month, the net electricity amount supplied to the grid is calculated by electricity fed into grid minus electricity withdrawn from the grid available in EPİAŞ records. However, as of 01/09/2015, EPIAS took over the PMUM procedures from TEIAS. After that date, EPIAS supplis the PMUM data. This means that the main source is the EPIAS data. TEIAS notices are used to cross-check the EPİAŞ records. TEIAS sends an electronic spreadsheet that includes daily and monthly electricity generation and withdrawn amounts for each power plant. Thus, cross-check source is the TEIAS meter readings.

Since the meters are reading electricity supplied to the system and withdrawn from the system separately, the net electricity amount supplied to the grid is calculated by electricity supplied minus electricity withdrawn. Thus, with this procedure, monitoring is sufficient and no extra monitoring has to be implemented.

The above described measurement method follows Article 81 of the official regulation "Electricity Market Balancing and Settlement Regulation".

The specification of electricity meters is provided in Table given below.

Name	Brand & Model	Serial Number	Accuracy Class	Protocol Date
Main Meter 1	ELSTER & A1500	464256	0.5S	02/10/2014 27/10/2015 10/10/2017 18/09/2020
Back-up Meter 1	ELSTER & A1500	464257	0.5S	
Main Meter 2	ELSTER & A1500	471006	0.5S	
Back-up Meter 2	ELSTER & A1500	471007	0.5S	

Moreover, transformer information for the electricity meters is given in the next table below.[14]

V primary	154000,00 V
V secondary	100,00V
PT Ratio	1540,0
I primary	300,00A
I secondary	1,00A
CT Ratio	300,0

QA/QC procedures to be applied

The calibration of the monitoring equipment was carried out according to the information provided in the registered PDD.

Technicians, employees of Aslancık HES conduct readings from two meters from the project site and sends it to TEIAŞ. By

[14] Meter Test Protocol

	this way, a cross-check is done. Moreover, continuously these two meters are compared with each other and if any differences are detected the necessary control measures are taken. According to the Article 2 of the Communiqué: 'The meters to be used in the electricity market shall be compliant with the standards of Turkish Standards Institute or IEC and have obtained "Type and System Approval" certificate from the Ministry of Trade and Industry.' Therefore, Ministry of Trade and Industry (Ministry) is responsible from control and calibration of the meters. paragraph b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems' 7 (Regulation) of Ministry states that: ' b) Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done every 10 years' . Therefore, periodic calibration of the meters will be done every 10 years.
Purpose of the data	Calculation of baseline emissions
Calculation method	The net electricity is calculated by: a) Subtracting self-consumption value from gross generation value for each month to find the net electricity supplied to the grid. b) Adding up all monthly net electricity values to calculate the total net electricity supplied to the grid during the monitoring period. Multiplying the total net electricity value with the CM emission factor.
Comments	-

4.3 Monitoring Plan

Monitoring will be done according to the methodology "ACM0002: Grid-connected electricity generation from renewable sources. As per the methodology TEİAŞ has installed one main electricity meter and one back-up electricity meter at the substation to which Aslancık HPP power plant is connected. Both electricity meters have 0.5s accuracy level and comply with TS EN 62053-22 standard. They have been calibrated by Turkish Standard Institute.

TEİAŞ performs read-out on these electricity meters at 00:00 of the first day of each month and calculate monthly net electricity fed into the grid. Upon performing monthly data read out on the primary data source, i.e. main electricity meter located at the substation, TEİAŞ publishes the results online on the PMUM website[58] no later than on the 8th day of the respective month.

The PMUM website provides for each power producer access to data concerning their own power plants, including gross electricity generation and consumption. Screenshots are prepared and printed monthly and stored electronically and as hard copy by Aslancık Elektrik Üretim A.Ş. staff at

the company headquarters for at least 2 years after the end of the last crediting period as required by ACM0002.

Additionally, two electricity meters are also read-out by Aslancık Elektrik Üretim A.Ş staff members, who determine the difference between the dial count at the time of last data read out and dial count at the time of current data read out for both, the gross electricity production and the own electricity consumption. No manipulation of meters by Aslancık Elektrik Üretim A.Ş. staff is possible, as they are sealed by and only accessible for TEİAŞ staff.

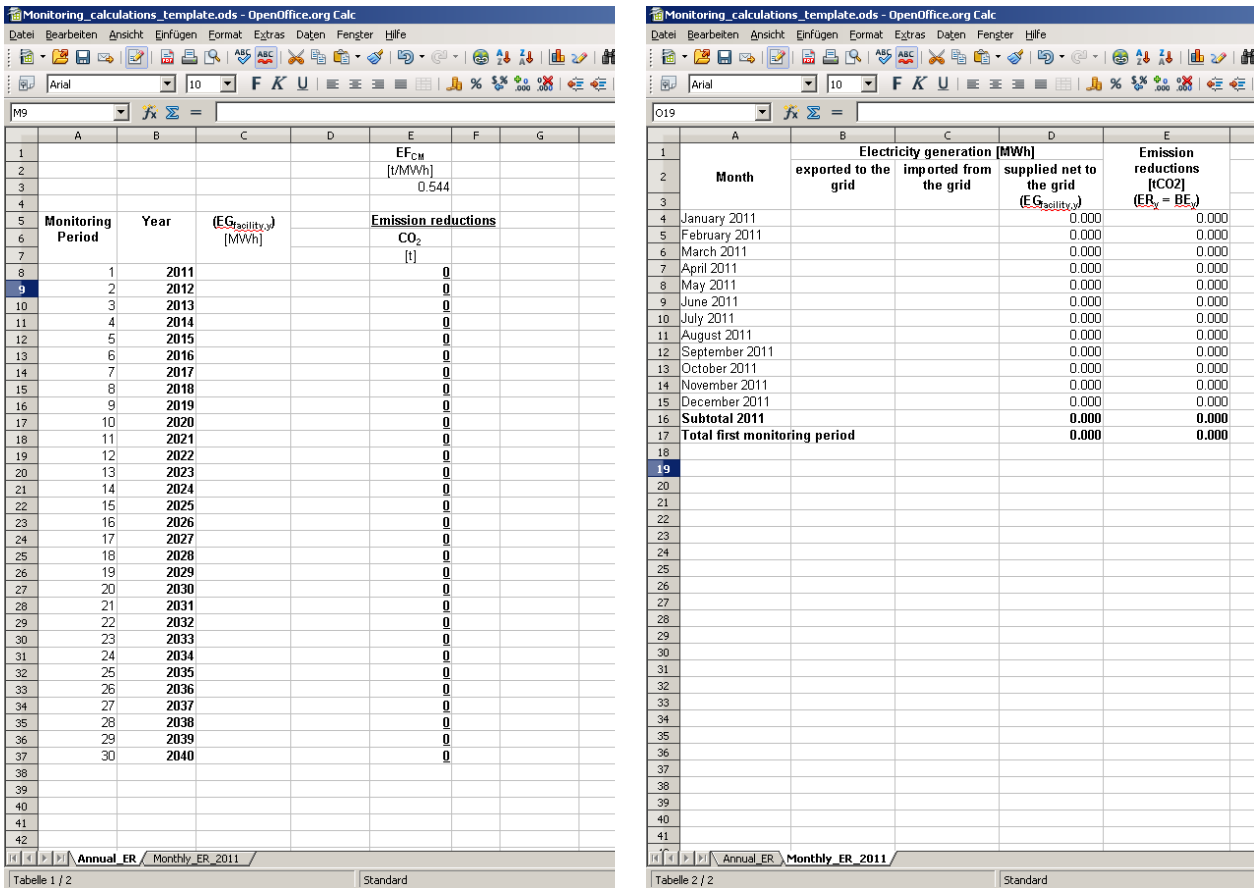
Results of monthly data read outs are compiled by Aslancık Elektrik Üretim A.Ş. in a data read out protocol which is stored as hard copy and scanned and stored as electronic file at the company headquarters, both for at least 2 years after the end of the last crediting period as well.

Aslancık Elektrik Üretim A.Ş staff compares TEİAŞ data with their own read-out protocols. In case of significant deviations, Aslancık A.Ş. exercises their right to object against TEİAŞ data. The time limit for objection is the 8th to 16th of each month, respectively. In case of no significant deviations, an invoice is prepared by Aslancık A.Ş. and sent to TEİAŞ, who returns a record for sold electricity to Aslancık Elektrik Üretim A.Ş Invoices are also stored as hard copy at Aslancık Elektrik Üretim A.Ş premises for at least 2 years after the end of the last crediting period.

Final data for gross electricity production and own electricity consumption is inserted into an electronic spreadsheet file. The template is presented in the figure given in the next page.

Moreover, there are always internal reviews of the meters data that is checked by different parties. First, data of the meters is collected by technicians daily in written forms. The data collected daily is saved in plant manager computer and backed up. Besides the data that can be get from meters, production amount can be checked from the SCADA system. SCADA figures differ a bit with meter data due to internal losses.

[58] See https://cas.epias.com.tr/cas/login?service=https%3A%2F%2Fdgpys.epias.com.tr%2Fdgpys%2F



Monitoring_calculations_template.ods - OpenOffice.org Calc

Datei Bearbeiten Ansicht Einfügen Format Extras Daten Fenster Hilfe

	A	B	C	D	E	F	G
1					EF_{CM}		
2					[t/MWh]		
3					0.544		
4							
5	**Monitoring Period**	**Year**	**($EG_{facility,y}$) [MWh]**		**Emission reductions CO_2 [t]**		
6							
7							
8	1	**2011**			**0**		
9	2	**2012**			**0**		
10	3	**2013**			**0**		
11	4	**2014**			**0**		
12	5	**2015**			**0**		
13	6	**2016**			**0**		
14	7	**2017**			**0**		
15	8	**2018**			**0**		
16	9	**2019**			**0**		
17	10	**2020**			**0**		
18	11	**2021**			**0**		
19	12	**2022**			**0**		
20	13	**2023**			**0**		
21	14	**2024**			**0**		
22	15	**2025**			**0**		
23	16	**2026**			**0**		
24	17	**2027**			**0**		
25	18	**2028**			**0**		
26	19	**2029**			**0**		
27	20	**2030**			**0**		
28	21	**2031**			**0**		
29	22	**2032**			**0**		
30	23	**2033**			**0**		
31	24	**2034**			**0**		
32	25	**2035**			**0**		
33	26	**2036**			**0**		
34	27	**2037**			**0**		
35	28	**2038**			**0**		
36	29	**2039**			**0**		
37	30	**2040**			**0**		

Annual_ER | Monthly_ER_2011

Tabelle 1 / 2 | Standard

Monitoring_calculations_template.ods - OpenOffice.org Calc

Datei Bearbeiten Ansicht Einfügen Format Extras Daten Fenster Hilfe

	A	B	C	D	E
1		**Electricity generation [MWh]**			
2	**Month**	**exported to the grid**	**imported from the grid**	**supplied net to the grid ($EG_{facility,y}$)**	**Emission reductions [tCO2] ($ER_y = BE_y$)**
3					
4	January 2011			0.000	0.000
5	February 2011			0.000	0.000
6	March 2011			0.000	0.000
7	April 2011			0.000	0.000
8	May 2011			0.000	0.000
9	June 2011			0.000	0.000
10	July 2011			0.000	0.000
11	August 2011			0.000	0.000
12	September 2011			0.000	0.000
13	October 2011			0.000	0.000
14	November 2011			0.000	0.000
15	December 2011			0.000	0.000
16	**Subtotal 2011**			**0.000**	**0.000**
17	**Total first monitoring period**			**0.000**	**0.000**

Annual_ER | Monthly_ER_2011

Tabelle 2 / 2 | Standard

Figure 5 Monitoring spreadsheet

EGfacility,y is calculated as the difference between electricity produced (i.e. exported to the grid) and electricity consumed (i.e. imported from the grid) by Aslancık HPP. EFgrid,CM,y will be used according to equation (1) in Section 3.1.1 above to determine baseline emissions. EFgrid,CM,y is not monitored but has been determined (in Section 3.1.2. above) once for the whole first crediting period and is recalculated for any subsequent crediting period (see Section 1.6 above). These calculations and parameters are compiled in the Monitoring Report (MR) using the VCS MR version 4.0.

Along with the above mentioned monitoring spreadsheet and additional relevant evidence (read-out protocols, invoices, screen-shots, EFgrid,CM,y calculation spreadsheet, etc.) it is subjected to VCS Verification, generally on an annual base. As the project is presumably registered retroactively, the first Monitoring Period comprises the whole time period starting with commissioning of Aslancık HPP power plant on 08/03/2014 and ending (presumably) with 31/12/2019. From 01/01/2015 on, monitoring documentation resumed the annual rhythm.

Figure 6 Monitoring Plan and GHG Information Sys.tem below provides for a comprehensive overview on the monitoring plan and the GHG information system. The responsible person for all processes to be conducted by Aslancık Elektrik Üretim A.Ş is the general project manager, Mr. Ceyhun YANIK.

Operational and Management Structure

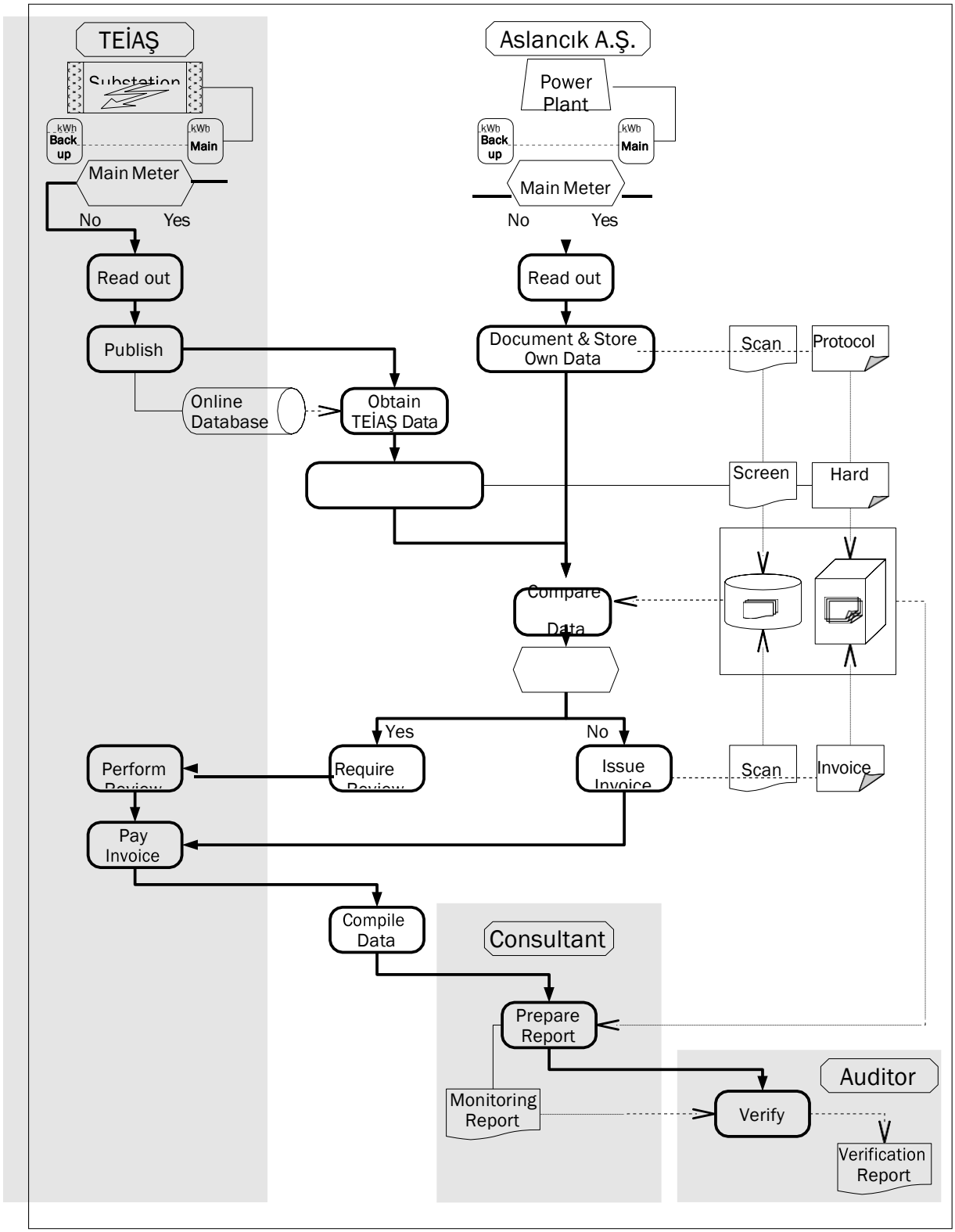


Figure 6 Monitoring Plan and GHG Information Sys.

Operational and Management Structure

As described before, there are two main factors important for the calculation of emission reductions. The only relevant data that have to be monitored is only net electricity generation ($EG_{facility,y}$) per year. Since project emission is zero no additional monitoring is required. The generation data are subject to the strict internal quality control systems of both parties. The monthly meter reading documents are stored by Aslancık HEPP and TEİAŞ. The settlement notification, which is issued by TEİAŞ and includes the meter reading data, is stored on a TEİAŞ file server and accessible for Aslancık via a secured website. The meters themselves can always be read as plausibility check for verification. The other important parameter is the emission factor. It is approved according to strict quality control parameters from an independent external party. With this, no additional structures or processes have to be implemented to insure the availability and high quality of the necessary data for monitoring.

At the end of each monitoring period, from the monthly meter reading records the net electricity generation amounts as calculated by electricity supplied to the grid minus withdrawn from the system is added up to the yearly net electricity generation and total project emissions is subtracted from this amount and result data is multiplied with the combined margin emission factor with the help of an excel spread sheet that also contains the combined margin calculation. Thus, the complete baseline approach is always transparent and traceable.

There are 21 employees within Aslancık HEPP covering this monitoring period. 14 of them are responsible for conducting maintenance and operations tasks. Also, 3 workers have been assigned for service tasks. All these workers from maintenance & operation and service departments are reporting to two administrative employees. Brief information about the roles and responsibilities of each personnel involved in the monitoring process is given in the figure below. On the other hand, there are one OHS specialist and Accounting Specialist who are working within the border of this power plant. The list of employees and their departments are provided by Table 7 .

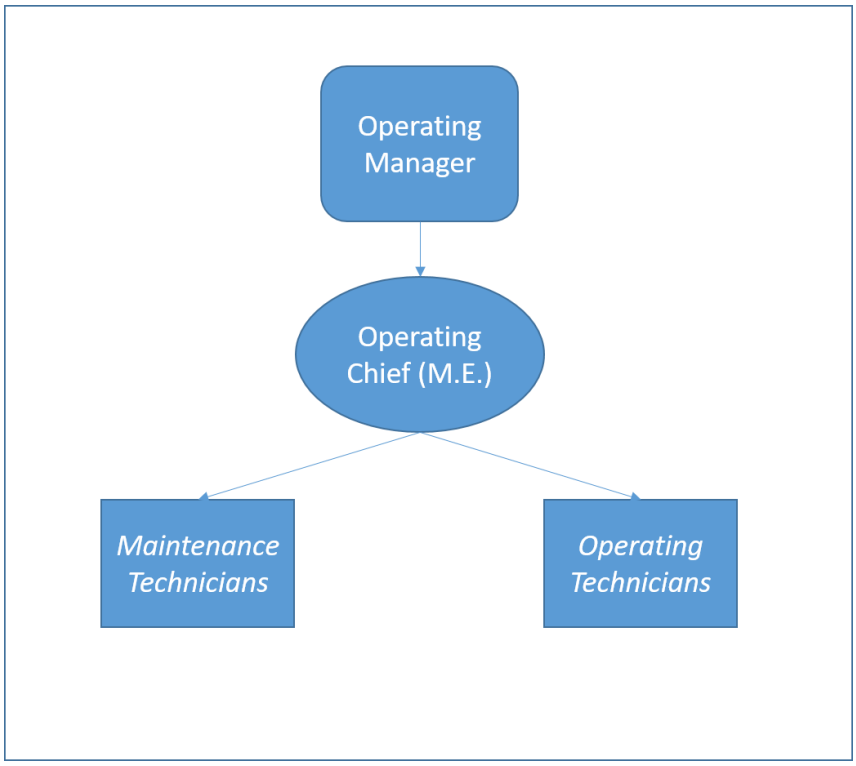


Figure 7 The Operational Flow of Aslancik HEPP

Table 7. List of Employees

Employee	Roles
Ceyhun YANIK	Manager
Gökhan BİRİNCİ	Mechanical Engineer
H.İbrahim GÜNER	OHS Specialist
Perhan Kabadayı	Accounting Specialist
Emrullah ÖZTÜRK	Maintenance & Operation
Mustafa YILMAZ	Maintenance & Operation
Özkan ATALAY	Maintenance & Operation
Uğur TARI	Maintenance & Operation
İhsan ÖZTÜRK	Maintenance & Operation
Ramazan KABADAYI	Maintenance & Operation
Murat KABADAYI	Maintenance & Operation
Serkan SARIÇİÇEK	Maintenance & Operation

Employee	Roles
Özgür PAMUK	Maintenance & Operation
Ali GÜVENDİ	Maintenance & Operation
Bünyamin BAYRAM	Maintenance & Operation
Fatih KARAMUSTAFAOĞLU	Maintenance & Operation
Eser ÇAVUŞOĞLU	Dam Control Operator
Yakup KUMAŞ	Maintenance & Operation
Emre ÖZDEN	Maintenance & Operation
Kamil KARA	General Service Officer
Ferhat KEMAL	Dam Lake Cleaning Staff

QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline scenario is identified according to the "Baseline Methodology Procedure" of ACM0002 Version 14[15]. Baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated via the following formula:

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

Where:

BE_y	=	Baseline emissions in year y (t CO_2/yr)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

[15] Please visit the methodolgy.

$EF_{grid,CM,y}$	=	Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO2/MWh)"

The calculation of EGPJ,y is different for Greenfield plants, retrofits and replacements; and capacity additions. If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$$\mathbf{BE_y = EG_{PJ,y}}$$

Where:

$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EF_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

5.2 Project Emissions

The project activity involves no emissions, except from a diesel generator used for emergency backup purposes. The possible emissions from the use of fossil fuels for the back up or emergency purposes by the operation of this diesel generator are neglected according to the methodology[16].

The power density (PD) for the Aslancık HEPP is calculated according to the directions given in the methodology[17]:

$$PD(W/m^2) = \frac{Installed\ Capacity}{Reservoir\ Surface\ Area}$$

$$PD\left(\frac{W}{m^2}\right) = \frac{98{,}000{,}000\ W}{175{,}000\ m^2} = 560\ \frac{W}{m^2}$$

Since installed capacity of the project was increased from 93 MWe to 98 MWe , project's power density is calculated different than given in the PD.

[16] Please visit the methodology: Section 5.4.1. Fossil fuel combustion (PEFF,y), Paragraph 32, page 11.

[17] Please visit the methodology (paragraph 37, pages 12-13).

5.3 Leakage

Leakage emissions are neglected and assumed as zero as per the Methodology.[18]

5.4 Net GHG Emission Reductions and Removals

According to ACM0002, emission reductions are calculated as

$$ER_y = BE_y - PE_y - LE_y$$

where

ER_y	=	Emission reductions in year y (t CO_2/yr)
BE_y	=	Baseline emissions in year y (t CO_2/yr)
PE_y	=	Project emission in year y (t CO_2/yr)
LE_y	=	Leakage emissions in year y (t CO_2/yr)

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

With an actual annual project electricity generation of amounts which was given in the Appendix 1 of this report, and EFgrid,CM,y calculated in Registered PD as 0.533 tCO2/MWh[19], net GHG emission reductions/removals are:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2014(08/03-31/12)	90,100	0	0	90,100
2015	104,871	0	0	104,871
2016	165,200	0	0	165,200
2017	156,103	0	0	156,103
2018	163,264	0	0	163,264
2019	148,290	0	0	148,290
Total	**827,828**			**827,828**

[18] Please visit the methodology: Section 5.6 Leakage, Paragraph 53, page 17.

[19] Registered PD (Dated: 2 June 2012)

APPENDIX 1: <MONTHLY ELECTRICITY GENERATION DATA>

Months	METERING DEVICE Electricity supplied to the grid (MWh) (1)	METERING DEVICE Electricity consumption from the grid (MWh) (2)	METERING DEVICE Net electricity supplied to the grid[MWh] (3) =(1)-(2)
8.Mar.14	8090.48	20.41	8,070.07
Apr.14	16820.32	27.51	16,792.81
May.14	11305.19	35.16	11,270.03
Jun.14	17033.42	34.56	16,998.86
Jul.14	13329.76	41.91	13,287.85
Aug.14	13043.33	44.20	12,999.13
Sep.14	11558.97	62.68	11,496.29
Oct.14	20323.83	64.12	20,259.71
Nov.14	25836.56	53.12	25,783.45
Dec.14	32135.87	49.40	32,086.47
Sum 2014	**169477.73**	**433.06**	**169,044.67**
Jan.15	32576.52	56.89	32,519.64
Feb.15	17346.15	65.88	17,280.27
Mar.15	27209.59	54.90	27,154.69
Apr.15	10459.08	71.78	10,387.30
May.15	1343.98	80.72	1,263.27
Jun.15	20736.79	55.31	20,681.48
Jul.15	8866.12	77.02	8,789.10
Aug.15	16050.99	63.25	15,987.74
Sep.15	9634.95	69.97	9,564.98
Oct.15	14653.70	63.40	14,590.30

Months	METERING DEVICE Electricity supplied to the grid (MWh) (1)	METERING DEVICE Electricity consumption from the grid (MWh) (2)	METERING DEVICE Net electricity supplied to the grid[MWh] (3) =(1)-(2)
Nov.15	20744.44	56.54	20,687.91
Dec.15	17922.85	72.06	17,850.79
Sum 2015	**197545.15**	**787.69**	**196,757.46**
Jan.16	40273.07	47.17	40,225.90
Feb.16	40500.74	45.06	40,455.68
Mar.16	45943.09	31.91	45,911.18
Apr.16	54255.18	16.14	54,239.04
May.16	6788.82	63.44	6,725.38
Jun.16	8030.50	56.69	7,973.81
Jul.16	16035.12	56.21	15,978.91
Aug.16	20472.91	57.40	20,415.51
Sep.16	17208.49	59.33	17,149.16
Oct.16	24725.11	56.81	24,668.30
Nov.16	19305.19	55.62	19,249.57
Dec.16	17046.67	93.52	16,953.14
Sum 2016	**310584.87**	**639.28**	**309,945.59**
Jan.17	16680.70	110.88	16,569.82
Feb.17	14259.81	86.26	14,173.55
Mar.17	38286.73	47.50	38,239.23
Apr.17	47097.91	31.51	47,066.40
May.17	47655.73	30.46	47,625.27
Jun.17	29508.75	49.37	29,459.38
Jul.17	22656.30	56.75	22,599.55
Aug.17	20418.69	52.61	20,366.07
Sep.17	17531.88	60.63	17,471.26

Months	METERING DEVICE Electricity supplied to the grid (MWh) (1)	METERING DEVICE Electricity consumption from the grid (MWh) (2)	METERING DEVICE Net electricity supplied to the grid[MWh] (3) =(1)-(2)
Oct.17	14896.91	64.48	14,832.43
Nov.17	11789.20	68.59	11,720.61
Dec.17	12834.41	81.80	12,752.61
Sum 2017	**293617.03**	**740.85**	**292,876.18**
Jan.18	18043.82	79.40	17,964.42
Feb.18	19456.02	70.23	19,385.79
Mar.18	24206.06	67.55	24,138.50
Apr.18	21630.67	54.31	21,576.36
May.18	49248.73	29.91	49,218.81
Jun.18	44854.64	28.68	44,825.96
Jul.18	30404.06	48.72	30,355.34
Aug.18	24611.93	50.15	24,561.79
Sep.18	26549.88	55.73	26,494.15
Oct.18	2931.24	71.83	2,859.40
Nov.18	14392.04	59.54	14,332.50
Dec.18	30649.44	50.70	30,598.74
Sum 2018	**306978.51**	**666.75**	**306,311.76**
Jan.19	18278.20	75.60	18,202.59
Feb.19	18902.52	66.30	18,836.22
Mar.19	27890.51	65.33	27,825.17
Apr.19	43726.20	33.39	43,692.80
May.19	45680.27	25.80	45,654.47
Jun.19	30498.67	43.12	30,455.56
Jul.19	29962.15	47.18	29,914.97
Aug.19	25803.23	50.45	25,752.78

Months	METERING DEVICE Electricity supplied to the grid (MWh) (1)	METERING DEVICE Electricity consumption from the grid (MWh) (2)	METERING DEVICE Net electricity supplied to the grid[MWh] (3) =(1)-(2)
Sep.19	15074.24	56.85	15,017.39
Oct.19	5212.13	69.97	5,142.16
Nov.19	10544.85	62.76	10,482.08
Dec.19	7339.48	96.84	7,242.65
Sum 2019	**278912.43**	**693.59**	**278,218.85**
Total Sum	**1557115.72**	**3961.22**	**1,553,154.50**