SIRMA RUN-OF-RIVER HYDRO PROJECT

Document Prepared By Life Enerji

Project Title	SIRMA Run-of-river hydro project
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1 PROJECT DETAILS

1.1 Summary Description of the Project

Elen Enerji Üretimi Sanayi Ticaret A.Ş. (referred to as Elen Enerji from here on) has developed Sırma Run-of-River Hydro Project (in short: Sırma HPP). The 5,88 MWe (three 1,960 MWe units) small-scale Sırma Run-of-River Hydro Project produces electricity for transmission into the national grid.[1] For this purpose it uses kinetic energy of the water at Akçay River downstream of the existing Kemer weir. Water is taken from the existing irrigation canal that leads down from Kemer weir. Kemer dam and weir generates electricity from the Akcay River and feeds it to the national electricity grid. It belongs to DSI. In the project 3 Axis Kaplan turbines with 1960 kW each is used. The purpose of the Project is to export the generated electricity to the regional grid, thereby contributing to the Turkey's electricity demand and rapidly growing economy. Since the Project generates electricity from renewable energy resources, it makes a significant contribution to climate protection.

Project was expected to generate 23,230 MWh of electricity annually, and to reduce 12,551 tonnes of CO_2 emissions per year, by supplying renewable energy that would have been supplied by the existing power grid that generates electricity predominantly from fossil fuel powered thermal power plants.

The electricity produced by project activity will result in a total emission reduction of 12,551 tonnes of CO2e/year. The total emission reduction by the project activity is estimated to be 125,510 tonnes of CO2e for the second crediting period, which is 07/06/2019 to 06/06/2029.

The project will help Turkey to stimulate and commercialize the use of grid connected renewable energy technologies and markets. Furthermore, the project will demonstrate the viability of grid connected hydro power which can support improved energy security, improved air quality, alternative sustainable energy futures, improved local livelihoods and sustainable renewable energy industry development. The specific goals of the project are to:

- reduce greenhouse gas emissions in Turkey compared to the business-as-usual scenario;
- help to stimulate the growth of the hydro power industry in Turkey;
- create local employment during the construction and the operation phase of the hydro power plant;

[1] Please see; Provisional acceptance

- reduce other pollutants resulting from power generation industry in Turkey, compared to a business-as-usual scenario;
- help to reduce Turkeys increasing energy deficit;
- and differentiate the electricity generation mix and reduce import dependency.

1.2 Sectoral Scope and Project Type

Title: Grid Connected Renewable Electricity Generation

Reference: AMS-I.D (Version 18.0)[2]

For the determination of the baseline, Version 18 of CDM approved baseline and monitoring methodology AMS-I.D. – "Grid-connected renewable electricity generation" is applied. For baseline calculations AMS-I.D. refers to the "Tool to calculate the emission factor for an electricity system", Version 7.0. Additionality (see 2.5) is demonstrated via application of the "Tool for the demonstration and assessment of additionality", Version 07.0.

1. Tool to calculate the emission factor for an electricity system (Version 7.0.0)[3];
2. Tool for the demonstration and assessment of additionality (Version 07.0.0)[4];
3. Tool to determine the remaining lifetime of the equipment (Version 01.0.0.)[5]
4. Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)[6]

The choice of methodology AMS-I.D, version 18, is justified as the proposed project activity meets the relevant applicability criteria:

- The project is a Greenfield renewable energy power plant;
- The project is a small scale activity with a capacity less than 15 MWe;
- The project does not results in construction of a new reservoir.

Sirma HPP is a greenfield grid connected small-scale hydro power plant with 5.88 MWe installed capacity. Installed capacity is below appropriate equivalent of limit for small-scale project activity, which is 15 MWe for power generation activities. Regarding project emissions of hydro power plants, AMS-I.D. refers to ACM0002 where PD (power density) of the water reservoir is considered for determination of reservoir

[2] Please see https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

[3] Please see https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

[4] Please see https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

[5] Please see http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf

[6] Please see https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

emissions. Thresholds and calculation procedures defined there though are only applicable to projects with new reservoir capacity. As Sırma HPP does not include the construction of a new reservoir, such project emissions do not accrue. Thus, PEHP,y (project emissions) = 0

Since the project activity is a hydro power plant, the respective sectoral scope is scope 1: "Energy Industry – Renewable/Non-renewable Sources". Project participant hereby confirms that this is not a grouped project.

1.3 Project Eligibility

"Sırma Run-of-River Hydro Project" is classified in the Renewable Energy Source category as electricity from non-fossil and non-depletable energy sources, in this case from hydro power, is fed into the Turkish electricity grid.

1.4 Project Design

Eligibility Criteria

This is not a grouped project activity.

1.5 Project Proponent

Beyobası Elektrik Üretim A.Ş. has been changed as Elen Enerji A.Ş.

Beyobası Enerji Üretimi A.Ş. has transferred its rights to Elen Enerji Üretimi Sanayi Ticaret A.Ş. on 08/08/2019[7]. As of this date, the project proponent is Elen Enerji Üretimi Sanayi Ticaret A.Ş.

Organization name	Elen Enerji Üretimi Sanayi Ticaret A.Ş.
Contact person	Melis Ünal
Title	Deputy Manager
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Telephone	+90 (312) 408 10 00 - 1434
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[7] Necessary document has been now provided.

1.6 Other Entities Involved in the Project

Organization name	Life İklim ve Enerji Ltd. Şti.
Role in the project	Project Consultant
Contact person	Hazal Öztürk
Title	Expert
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1.7 Ownership

The Project is owned by individual Elen Enerji Üretimi Sanayi Ticaret A.Ş.

1.8 Project Start Date

Project start date is 07/06/2009 that is the first GHG emission reductions.

1.9 Project Crediting Period

Commissioning date of the project is 07 June 2009.

First Crediting Period: Start: 07/06/2009

End: 06/06/2019

Second Crediting Period: Start: 07/06/2019

End: 06/06/2029

10-years two-times renewed crediting period.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	x
Large project	

Year	Estimated GHG emission reductions or removals (tCO2e)
07/06/2019-31/12/2019	7,152
2020	12,551
2021	12,551
2022	12,551
2023	12,551
2024	12,551
2025	12,551
2026	12,551
2027	12,551
2028	12,551
01/01/2029-06/06/2029	5,399
Total estimated ERs	**125,510**
Total number of crediting years	10
Average annual ERs	**12,551**

1.11 Description of the Project Activity

Sırma Run-of-River Hydro Project is a 5,88 MWe (three 1,960 MWe units) small-scale run-of-river hydro power plant. It started commercial electricity production in 07/06/2009. Produced electricity is being fed into the national grid.

The project generates a substantial emission reduction by bringing carbon neutral electricity production to the Turkish grid. The hydro project shall be registered as a voluntary emission reduction project under the Voluntary Carbon Standard. The expected co-financing from carbon market proceeds has enabled the projects implementation.

The 5,88 MW Sırma Run-of-River Hydro Project produces electricity for transmission into the national grid. For this purpose it uses kinetic energy of the water in the pre-existing power channel on the left bank of Akçay River, downstream of Kemer Weir. The water is directed towards a head pond from where it is being send through a penstock to tree turbines powering three generators for electricity generation.

Sırma Run-of-River Hydro Project thus involves the constructions of installations on the left bank area of Akçay River. The Turbine type will be vertical-axis Kaplan type with fixed blades. Generated electricity will be fed into national grid via a connection to Bozdoğan distribution center via 36 kV single line from the switchyard close-by to the power plant. The net annual electricity production of the project activity is expected to be 23.230 GWh. Detailed technical characteristics of Sırma Run-of-River Hydro Project are given single line diagram below.

Table 1: Technical Characteristics of Sırma Run-of-River Hydro Project

Project Main Characteristics	Type: Run-of-river HPP Gross Head: 21.3 m Design Discharge: 33.00 m^3/s Total Installed Power: 5.88 MWe Net Power Generation: 23.230 GWh/year
Weir, Water Intake Structure	Type: Concrete Elevation at crest: 189.8 m Height from river bed: 12.8 m
Channel	Type: rectangular, concrete Gradient: 0.003 Bottom Width: 5.0 m Length (to head pond): 6,180 m
Headpond	Width: 10.0 m Length: 23.5 m Height: 9.5-20 m
Penstock	Diameter: 3.2 m, Length: 28.75 m, Steel Thickness:10 mm (St52)

Turbine	Type: Vertical Axis Kaplan, with fixed blades Installed Power: 3 x 1,960 MWe Manufacturer: Zhejiang Orient Engineering Co. Ltd.
Generator	Number of Generators: 3 Type: Vertical Axis, 3-phase, synchronised Nominal Voltage: 6.3 kV (+- 5%) Frequency: 50 hz Synchronic Rotation Frequency: 600 rpm Zhejiang Orient
Transmission Line	Type: 3x477 MCM, single line Line Voltage: 36 kV Connection Point: Nazilli-Bozdoğan Distribution Center

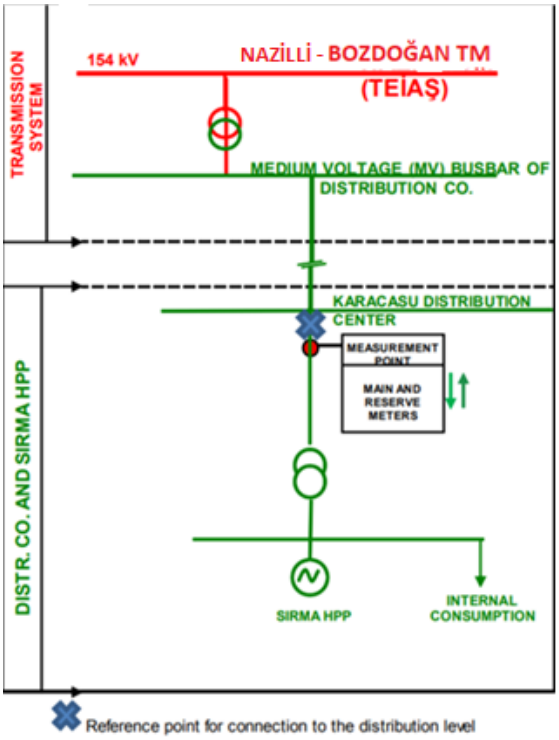


Figure 1: Single Line Diagram of Sırma Run-of-River Hydro Project

Figure 2: Photo of Kaplan Turbine

Plant Load Factor (PLF) is calculated as follows;

PLF= Annual Gen. / Installed Cap. * (working hours)

=23,230/5.88*8760

=0.451

1.12 Project Location

The project is located in Aegean Region, Aydın City, Bozdoğan district, close to Sırma village. The geographical coordinates of the hydro power plant are:

Table 2: Geographic coordinates of the Weir and the Sırma HPP

	Latitude (N)	Longitude (E)
Head pond	*37° 36' 24.960"" N*	28° 28' 26.460"" E
Power Houe	37° 36' 26.280"" N	28° 28' 26.340"" E

Figure 3*: Location of the plant*

1.13 Conditions Prior to Project Initiation

The pre-project scenario is same as baseline scenario. Please refer Section 3.4 (Baseline Scenario) for the description of baseline scenario.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

Laws as relevant to the project are (Law No. and Publication Date in Official Gazette):

(1) Electricity Market Law (6446, 30/3/2013) [8]

(2) Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy (5346, 18/5/2005) [9]

(3) Environment Law (2872, 11/8/1983) [10]

[8] See: https://www.resmigazete.gov.tr/eskiler/2013/03/20130330.pdf

[9] See: https://www.resmigazete.gov.tr/eskiler/2005/05/20050518-1.htm

[10] See http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf

(4) Occupational Health and Safety Regulation (6331, 30/6/2012) [11]

(5) Forest Law (Nr. 6831)[12]

The renewable Energy generation license for Sırma HPP has been issued considering Electricity Law and Law in utilization of Renewable Energy Resources for the purpose of generating electricity energy. The proposed project is also within the scope of and in compliance with Energy Efficiency Law. Environment Law is also satisfied and it has been confirmed by Ministry of Environment that the Sırma HPP is out of Environmental Impact Assessment Regulation. Forest Law which specifies that forest areas can be allocated by Ministry of Environment and Forestry to institutions or individuals for energy plants if the project implementation serves common good for public. As in Turkey there is no applicable local regulations to HPP constructions the list above includes national regulation only.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The project has not been registered or is seeking registration under any other GHG programs.

1.15.2 Projects Rejected by Other GHG Programs

Sırma HPP has not applied for crediting under any other GHG program nor has it been rejected from any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

Not applicable: The project activity is neither included in an emissions trading program nor does it take place in a jurisdiction or sector in which binding limits are established on GHG emissions.

1.16.2 Other Forms of Environmental Credit

The project has not created any form of other credit. Elen Enerji Üretimi Sanayi Ticaret A.Ş. does not obtain any public funding.

1.17 Additional Information Relevant to the Project

Leakage Management

There is no leakage management as per applied methodology AMS-I D, Version 18.0.

[11] See: http://www.mevzuat.gov.tr/MevzuatMetin/1.5.6331.pdf

[12] https://www.mevzuat.gov.tr/MevzuatMetin/1.3.6831.pdf

Commercially Sensitive Information

Commercially sensitive information has been excluded from this document.

Sustainable Development

Project developer believes that efficient utilization of all kinds of natural resources with a harmony coupled with responsible environmental considerations is vital for the sustainable development of Turkey and the World. This has been a guiding factor for the shareholders towards the concept of designation and installation of a hydro power project. Other than the objective of climate change mitigation through a significant reduction in greenhouse gas (GHG) emissions, the project has been carried out to provide a social and economic contribution to the region in a sustainable way. The benefits that are gained by the realization of the project compared to the business-as-usual scenario can be summarized under some main indicators. As per World Future Council's report, renewable energy power plants have positive environmental impacts and economic impacts. Moreover, renewable energy power plants help to ensure energy and economic security of the country. The benefits that will be gained by the realization of the project compared to the business-as-usual scenario can be summarized under four main indicators:

Environmental

The project activities will replace the grid electricity, which is constituted of different fuel sources causing greenhouse gas emissions. By replacing in the consumption of these fuels, it contributes to conservation of water, soil, flora and faunas and transfers these natural resources and also the additional supply of these primary energy sources to the future generations. In the absence of the project activity, an equivalent amount of electricity would have been generated from the power plants connected to the grid, majority of which are based on fossil fuels. Thus, the project is replacing the greenhouse gas emissions (CO_2, CH_4) and other pollutants (SO_X, NO_X, particulate matters) occurring from extraction, processing, transportation and burning of fossil-fuels for power generation connected to the national grid.

Economical

Firstly, the project will help to accelerate the growth of the hydro power industry and stimulate the designation and production of renewable energy technologies in Turkey. Then, other entrepreneurs irrespective of sector will be encouraged to invest in hydro power generations. It will also assist to reduce Turkey's increasing energy deficit and diversify the electricity generation mix while reducing import dependency, especially natural gas. Importantly, rural development will be maintained in the areas around the project site by providing infrastructural investments to these remote villages.

Social

Local employment will be enhanced by all project activities during construction and operation of the hydro power plant. As a result, local poverty and unemployment will be partially eliminated by increased job opportunities and project business activities. Construction materials for the foundations, cables and other auxiliary equipment will preferentially be sourced locally. Moreover, as contribution of the project to welfare of the region, the quality of the electricity consumed in the region will be increased by local electricity production, which also contributes decreasing of distribution losses.

Technological

Implementation of the proposed project will contribute to wider deployment of hydro power technology in local and national level. It will demonstrate the viability of larger grid connected hydro power plants, which will support improved energy security, alternative sustainable energy, and also renewable energy industry development. This will also strengthen pillars of Turkish electricity supply based on ecologically sound technology.

Further Information

Not applicable

2 SAFEGUARDS

2.1 No Net Harm

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

2.2 Local Stakeholder Consultation

Sırma HPP is a small-scale hydro project with limited impact to the environment due to minimum amount of facilities built in the project area. The bodies of the project are only: head pond, penstock, power plant and energy transmission line. The lands of the project belong to the Treasury Ministry and they have been rented by the project developer. Regarding for this monitoring period and also renewable of crediting period, stakeholder meeting procedure was conducted with the local stakeholders and Sırma HPP personnel via teleconference on 25/03/2021, and no complaints or problems were recorded regarding the Sırma HPP. So, no negative feedback has been received from Sırma HPP personnel or local people. Moreover, when the outcome were evaluated in general, it was seen that the project had a positive effect on the stakeholders such as providing employment opportunity for the local people and providing the assistance needed by the local people to the project area. Some villagers were asked for their comments about the project and their opinion about the project were positive as they said the project had no negative effects on the village but created jobs. There is ongoing communication between the local community and of Sırma Köyü village and the plant management. The village mayor (muhtar) is ready to gather and bring forward all upcoming issues from the local community vis-a-vis the HPP plant manager as well as vice-versa. Moreover, a grievance book was delivered to Muhktar of the Village so that local stakeholders can give their feedbacks/complaints on it.

2.3 Environmental Impact

According to the relevant Environmental Impact Assessment Regulation for Sırma HPP, an Environmental Impact Assessment was not required. The official letter from Environment and Forestry Ministry confirming non-applicability of this regulation is submitted to DOE during validation process[13].

Environmental benefits

The project helps Turkey to stimulate and commercialize the use of grid connected renewable energy technologies and markets. The specific environmental benefits are:

- Reduction of GHG emissions as attributable to conventional energy production in BAU (=business as usual) scenario;
- Reduction of other pollutants (like SO_2 from combustion of coal) from power generation in Turkey as compared to BAU.

2.4 Public Comments

There are no public comments.

[13] EIA Not Required document has been now provided to DOE.

2.5 AFOLU-Specific Safeguards

This is a non-AFOLU project.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Title: Grid Connected Renewable Electricity Generation

Reference: AMS-I.D (Version 18.0)

Version 18 of 'AMS-I.D: Grid Connected Renewable Electricity Generation'[14] is applied as baseline and monitoring methodology to the project activity.

The methodology is used in conjunction with the following tools:

1. Tool to calculate the emission factor for an electricity system (Version 07.0.0)[15];
2. Tool for the demonstration and assessment of additionality (Version 07.0.0)[16];
3. Tool to determine the remaining lifetime of the equipment (Version 01.0.0.)[17]
4. Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)[18]

[14] See, https://cdm.unfccc.int/filestorage/2/P/7/2P7FS6ZQAR84LG3NMKYUH50WI9ODBC/EB81_repan24_AMS-I.D_ver18.pdf?t=ZWZ8cW94ZHZnfDBD8chGZl_BFN-pqv2Masgr

[15] Please see https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

[16] Please see https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

[17] Please see https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf

[18] Please see https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

3.2 Applicability of Methodology

The choice of methodology AMS-I.D, version 18, is justified as the proposed project activity meets the relevant applicability criteria:

Applicability Conditions	Applicability to This Project Activity
This methodology is applicable to grid-connected renewable energy power generation project activities that: a) Install a Greenfield power plant; b) Involve a capacity addition to (an) existing plant(s) c) Involve a retrofit of (an) existing operating plants/units d) Involve a rehabilitation of (an) existing plant(s)/unit(s) or e) Involve a replacement of (an) existing plant(s)/unit(s)	The project is installation of a power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant). Thus, it meets the said applicability condition.
The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.	Sırma HPP project is a grid connected renewable energy generation project, utilizing hydraulic power to generate electricity.

Applicability Conditions	Applicability to This Project Activity
In case of hydro power plants, one of the following conditions shall apply: a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs, or b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m^2, or c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m^2 or d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m^2, all of the following conditions shall apply: i. The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m^2 ii. (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity iii. Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: • Lower than or equal to 15 MW, and • Less than 10 per cent of the total installed capacity of integrated hydro power project	Sirma HPP is a greenfield grid connected run-of-river type small-scale hydro power plant with 5.88 MWe installed capacity. Sırma HPP project is constructed at an existing reservoir. So, Sırma HPP project does not results in construction of a new reservoir. Regarding project emissions of hydro power plants, AMS-I.D. refers to ACM0002 where PD (power density) of the water reservoir is considered for determination of reservoir emissions. Thresholds and calculation procedures defined there though are only applicable to projects with new reservoir capacity. As Sırma HPP does not include the construction of a new reservoir, thus power density requirement is not applicable to the project.
In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	Project is not an additional to an existing renewable power generation facility.

Applicability Conditions	Applicability to This Project Activity
If the new unit has both renewable and nonrenewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	Sırma HPP project has only renewable component, utilizing hydraulic power. Its installed capacity is 5.88 MW which is less than the 15 MW limit value for small scale renewable type projects.
Combined heat and power (co-generation) systems are not eligible under this category.	The project is not a combined heat and power (co-generation) system.
In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	The project is not a retrofit, rehabilitation or replacement of an existing facility.
In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	The project is not a landfill gas, waste gas, wastewater treatment and agro-industries project.
In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	The project activity is not biomass fired power plant. Hence this criterion is not applicable.

Hence, the approved consolidated methodology AMS-I.D/ Version 18.0 is applicable to the project activity.

For the emission factors, that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey's National Electric Grid Emission Factor for the year of 2018 was used. Publication includes calculated Emission Factor values

that are Operating Margin (OM), Growth Based Margin (Build Margin-BM) and Combined Margin (CM) Emission Factors, for the relevant year (which is 2018) with usage of the IPCC's Clean Development Methodology Tool 07-V06.0. For this calculation, information regarding used data set is given detailed in section 4.1 of this document. In brief, the latest version of the Turkish National Electricity Grid Emission Factor was published in 2018 and the Emission Factors included in this document belong to the 2018 calculation period[19]. So, the data of the emission factors (the data set used for calculation of emission factors also belongs to 2018.) used in the calculation of the baseline scenario belongs to 2018.

Emission factor calculation is not given in detail in the document published by the Turkish Ministry of Energy and Natural Resources. However, the most recent data and official values for emission factor of Turkey are those published in this report (Please see: https://enerji.gov.tr/duyuru-detay?id=82). Also, the official values of Turkey used in this report have also been verified by the VVB.

[19] Please see: https://enerjiapi.enerji.gov.tr/Media/Dizin/ETKB/Duyurular//0c6b62ea-bf2f-4fea-b9b3-28bc6f48ddf2_Bilgi_Formu_-_Web_Sitesi.pdf or https://enerji.gov.tr/duyuru-detay?id=82

3.3 Project Boundary

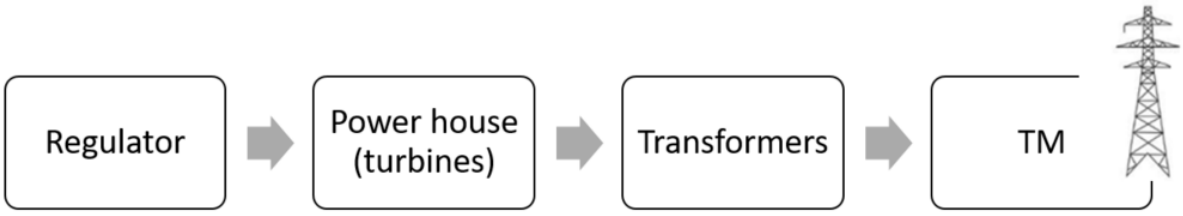
According to methodology AMS-I.D version 18, the project boundary encompasses the physical, geographical site of the renewable generation source.

Harnessing the hydro energy to generate electricity with electromechanical equipments (turbine and generator systems) is reliable and proven technology and being widely used in the world. Therefore, environmentally safe and sound technology and know-how is being applied by the project activity interalia technology transfer.

Table 3: Emissions sources included in or excluded from the project boundary

Source		Gas	Included?	Justification/Explanation
Baseline	CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO2	Yes	Main emission source: Fossil fuels fired for electricity generation cause CO2 emissions. It is included to baseline calculation to find the displaced amount by the project activity.
		CH4	No	Minor emission source. Excluded for simplification. This is conservative
		N2O	No	Minor emission source. Excluded for simplification. This is conservative
Project	Emissions of CH4 from the reservoir	CO2	No	Minor emission source. The project activity will not create a new reservoir. Therefore, there will not be any project emission. This is conservative
		CH4	No	
		N2O	No	

Project boundary diagram is depicted in the diagram below:



3.4 Baseline Scenario

The methodological tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (version 03.0.1) is adopted to assess the continued validity of the baseline and to update the baseline. This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism. According to this tool the following steps are applied.

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

The validity of the current baseline is assessed using the following Sub-steps:

Step 1.1 Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies.

The project baseline is the "Grid-connected electricity generation". It is in compliance with the current legal framework. There are no additional laws that came into force that has an impact on the project activity and the project activity is still in line with the available law and regulations.

Step 1.2 Assess the impact of circumstances.

The new national circumstances have an impact on the EF of the grid and thus on the project's current baseline emissions. Accordingly, the EF is updated for the second crediting period in conformity with the latest version of the publication of the Turkey's National Electric Grid Emission Factor for the year of 2018. There has been no major deviation or change in the market characteristic during the first crediting period.

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

The technical lifetime of the equipments (hydro turbines) are 150,000 hours (18 years) and lifetime exceeds the crediting period for which renewal is requested. Equipment only requires regular maintenance. The baseline scenario identified at the validation of the project activity was the continuation of grid-connected electricity generation. Under this scenario, no investment from the project's proponent or third party (or parties) has been envisioned later specifically for the project.

Step 1.4 Assessment of validity of the data and parameters.

The emissions reduction calculations are based on two main parameters: the energy produced and the grid emission factor. The latter will be updated as explained in the next paragraph.

As a requirement of the methodology, only the grid emission factor has been updated during the second crediting period renewal.

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

Step 2.1: Update the current baseline

As confirmed in Step 1, under the current context of the sectoral policies and circumstances, the project baseline for the next crediting period is the use of electricity from the national grid. This is conform to the provisions of the latest version of the approved applicable methodology to the project activity namely: AMS-I.D version 18.0 : Grid Connected Renewable Electricity Generation. So, there has been no deviation in the baseline scenario.

Step 2.2: Update the data and parameters

The grid emission factor is updated according to the publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey's National Electric Grid Emission Factor for the year of 2018.

3.5 Additionality

This alternative is realistic and credible as Sırma HPP may undertake project activity if it sees no risk for project and/or if the project turns out to be financially attractive without Verified Carbon Units (VCUs) income. However, investments analyse shows that the project is not economically feasible without VCUs income. Moreover, the sensitivity analysis confirms that the proposed project activity is unlikely to be economically attractive without the revenues from VCUs as even the maximum IRR result for the best case scenario (12.34%) is below the benchmark, which is 15%. Consequently, the project activity is additional, it has still ongoing financial need.

The energy sector in Turkey has been privatized and the installation of a hydro power plants is under the initiative of private companies, provided that they obtain a license from EMRA (Energy Market Regulatory Authority). Any legal legislation, law or regulatory framework in Turkey does not oblige hydro power plants installation. Sırma HPP obtained a 39-year license from EMRA on 05/07/2007 and sells the produced electricity in the free market.

The project shall not be mandated by any enforced law, statute or other regulatory framework. The project activity is not mandated by any state or national laws. The project proponent is not bound by any legislative mandate to implement the project activity.

Project Implementation Schedule

Table 4: Project Implementation Schedule

Date (DD/MM/YYYY)	Activity
05/07/2007	Issuance of the License
25/08/2007	Requests for proposals from consultants for VER development
16/10/2007	Contract Signature with Zhejiang Orient Engineering Co. Ltd. (generator/turbine)
23/10/2007	Contract Signature with Yapı-TEK and Bugato ĠnĢaat, Ordinary partnership (construction)
01/11/2007	Starting construction activities with roads and site preparation
01/03/2008	Agreement with Akfen İnşaat Co. (for management of construction)
07/05/2008	Contract agreement with Hitit Sanayi Ġnsaat for hydromechanical equipment
25/05/2008	Contract agreement with Köseoğlu Elektrik for transmission line
01/09/2008	Initial agreement with a VER consultant
07/06/2009	Start of commercial operation/starting date of VER project, first monitoring and crediting period
27/03/2009	Financial closure with bank
13/04/2010	Signature with FutureCamp Türkiye for VER development
31/07/2010	Termination of first monitoring/reporting period; An annual reporting is envisioned.
31/05/2019	Termination of the first crediting period
01/07/2013	Start date of the second monitoring period
05/06/2019	End date of the second monitoring period

3.6 Methodology Deviations

Any methodology deviations have not been applied during this monitoring period.

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

For the emission factors, that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey's National Electric Grid Emission Factor for the year of 2018 was used. Publication includes calculated Emission Factor values that are Operating Margin (OM), Growth Based Margin (Build Margin-BM) and Combined Margin (CM) Emission Factors, for the relevant year with usage of the IPCC's Clean Development Methodology Tool 07-V06.0. For this calculation, information regarding used data set is given below in detail;

- TEİAŞ Turkey's electricity generation-consumption and loss statistics,
- Common prepared report under Turkey's National Greenhouse Gas Inventory Reporting Format. - Common Reporting Format (CRF) tables for electricity generation (1.A.1.a.i) emission values
- Chronological order of power generation plants from TEİAŞ Load Dispatch Department with commissioning dates, plant names, fuel types, installed power values, electricity generation for the calculated year
- Checking off Volunteers from the websites of Gold Standard (GS) and Verified Carbon Standard (VCS) for the ownership status of the carbon reduction certificate and,
- From Clean Development Mechanism (CDM) Tool 009- V2.0, Power plant efficiency figures are used

According to this publication;
Operating Margin-OM; 0,6993 tCO2/MWh
Build Margin-BM; 0,3812 tCO2/MWh
Combined Margin-CM (for solar and wind); 0,5403 tCO2/MWh[20]

Baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

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

[20] https://enerji.gov.tr/duyuru-detay?id=82

Where:

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

EGpj,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).

EFgrid,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". (tCO2/MWh).

The project activity is the installation of a new grid-connected renewable power plant so, EGbaseline=0

Calculation of the Operating Margin Emission Factor

By using all of the data which were given above, Turkish Ministry of Energy and Natural Resources calculated EFgrid,OMsimple,y[21]. :

➔ $EF_{grid,OMsimple,y} = 0.6993(ktCO_2/GWh)$

Calculation of the Build Margin Emission Factor

For BM factor calculation, Chronological order of power generation plants from TEİAŞ Load Dispatch Department with commissioning dates, plant names, fuel types, installed power values, electricity generation for the calculated year were used as input data. Consequently, Turkish Ministry of Energy and Natural Resources calculated EFgrid,BM,y[22].

➔ $EF_{grid,BM,y} = 0.3812\ tCO_2/MWh$

Calculating of the Combined Margin Emission Factor

➔ $EF_{grid,CM,y} = 0.5403\ tCO_2/MWh$

Then:

ERy = BEy - PEy= EGpj,y * EFgrid,CM,y = 23,230 MWh/year * 0.5403 tCO2/MWh = 12,551 tCO2/year

Baseline scenario is identified and described in 4.1 Emission reductions due to project activity is calculated according to "Tool to calculate the emission factor for an electricity system" (Tool) version 7.0.0.

A brief explanation of this methodology is given in Tool as:

This methodological tool determines the CO2 emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the "combined margin" emission factor (CM) of the electricity system.

[21] https://enerjiapi.etkb.gov.tr/Media/Dizin/ETKB/Duyurular//0c6b62ea-bf2f-4fea-b9b3-28bc6f48ddf2_Bilgi_Formu_-_Web_Sitesi.pdf

[22] https://enerjiapi.etkb.gov.tr/Media/Dizin/ETKB/Duyurular//0c6b62ea-bf2f-4fea-b9b3-28bc6f48ddf2_Bilgi_Formu_-_Web_Sitesi.pdf

4.2 Project Emissions

The proposed project activity involves the generation of electricity by development of a hydro power plant. The generation of electricity does not result in greenhouse gas emissions and therefore is taken as 0 tCO_2/year.

4.3 Leakage

No Leakage emissions are considered. The main emission potentially giving rise to leakage in the context of electrical sector projects is emission arising due to activities arising such as power plant construction and upstream emission from fossil fuel use (e.g. extraction, processing, and transport). These emission sources are neglected.

Then: ERy = Bey

4.4 Estimated Net GHG Emission Reductions and Removals

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
07/06/2019-31/12/2019	0	7,152	0	7,152
2020	0	12,551	0	12,551
2021	0	12,551	0	12,551
2022	0	12,551	0	12,551
2023	0	12,551	0	12,551
2024	0	12,551	0	12,551
2025	0	12,551	0	12,551
2026	0	12,551	0	12,551
2027	0	12,551	0	12,551
2028	0	12,551	0	12,551

01/01/2029-06/06/2029	0	5,399	0	5,399
Total	**0**	**125,510**	**0**	**125,510**

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	**$EF_{grid,BM,y}$**
Data unit	tCO2/MWh
Description	For the emission BM factor, that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey's National Electric Grid Emission Factor for the year of 2018 was used. Publication includes calculated Emission Factor values that are Operating Margin (OM), Growth Based Margin (Build Margin-BM) and Combined Margin (CM) Emission Factors, for the relevant year with usage of the IPCC's Clean Development Methodology Tool 07-V06.0.
Source of data	Please see: 0c6b62ea-bf2f-4fea-b9b3-28bc6f48ddf2_Bilgi_Formu_-_Web_Sitesi.pdf (etkb.gov.tr)
Value applied:	0,3812 tCO_2/MWh
Justification of choice of data or description of measurement methods and procedures applied	Ministry of Energy and Natural Resources makes available the official data in Turkey. The latest data available during this document preparation was for 2018.
Purpose of Data	Used for baseline emissions
Comments	-

Data / Parameter	**$EF_{grid,CM,y}$**
Data unit	tCO_2/MWh
Description	For the combined margin CO2 emission factor that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey's National Electric Grid Emission Factor for the year of 2018 was used.

Source of data	Please see: 0c6b62ea-bf2f-4fea-b9b3-28bc6f48ddf2_Bilgi_Formu_-_Web_Sitesi.pdf (etkb.gov.tr)
Value applied:	0.5403 tCO2/MWh (this value will be used for second crediting period)
Justification of choice of data or description of measurement methods and procedures applied	The baseline emissions are the product of electrical energy baseline expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.
Purpose of Data	To show CO_2e reduction.
Comments	-

Data / Parameter	$\mathbf{EF_{grid,OM,y}}$
Data unit	tCO2/MWh
Description	For the combined margin CO2 emission factor that were used to calculate estimated emission reductions, publication of Turkish Ministry of Energy and Natural Resources which is indicating Turkey's National Electric Grid Emission Factor for the year of 2018 was used.
Source of data	Please see: 0c6b62ea-bf2f-4fea-b9b3-28bc6f48ddf2_Bilgi_Formu_-_Web_Sitesi.pdf (etkb.gov.tr)
Value applied:	0,6993 tCO2/MWh
Justification of choice of data or description of measurement methods and procedures applied	The baseline emissions are the product of electrical energy baseline expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.
Purpose of Data	-
Comments	-

5.2 Data and Parameters Monitored

Data / Parameter	$EG_{PJ,facility,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	The data from the Electricity Meters are the basis for the settlement notification of EPIAS. Data are gathered electronically from the meters by TEIAS and stored in secured website of EPIAS, which is accessible to project developer with a private password. For monitoring, the monthly settlement notification of EPIAS shall be used as source of data.
Description of measurement methods and procedures applied	Regarding the electricity meters: two meters are placed (one main and one reserve) at the TEIAS substation. These meters are sealed by TEIAS and intervention by project proponent is not possible. 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 not only in the interest of the emission reduction monitoring, but paramount for the business relation between the plant operator and the electricity buyers.
Frequency of monitoring/recording	Continuous monitoring, hourly measurement and at least monthly recording
Value applied:	**23,230 MWh/year**
Monitoring equipment	The data from the Electricity Meters are the basis for the settlement notification of EPIAS. Data are gathered electronically from the meters by TEIAS and stored in secured website of EPIAS, which is accessible to project developer with a private password. For monitoring, the monthly settlement notification of EPIAS shall be used as source of data. Calibration frequency: According to the Article 9 of the relevant regulation, periodical inspections of “gauges for electric, water, coal gas, natural gas and, current and voltage measuring transformers will be made once in 10 years”. This is in line with the monitoring plan and national requirements. TEIAS will decide when to carry out the next calibration. The Project owner has no control over or access to the

	measurement devices and is not entitled to perform any type of maintenance or calibration. ***Old meter*** | Main meter | Beck-up meter Serial no | 368721 (ELSTER) | 368720 (ELSTER) Accuracy class | 0.5 S | 0.5 S ***First index protocol date: 09/04/2009** ***New meter*** | Main meter | Beck-up meter Serial no | 84260496 (ITRON) | 84260497 (ITRON) Accuracy class | 0.5 S | 0.5 S ***Calibration test report date is 06/02/2019**[23] The electricity meters used in the Sırma HPP were purchased in 2009 and calibrated. Since these meters completed 10 years in 2019, they were replaced with ITRON electricity meters.
QA/QC procedures applied	According to the Article 2 of the 'Communiqué Regarding the Meters to be used in the Electricity Market '[24] (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'[25] (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. Also according to Article 67 (page 20) of this regulation, the calibration shall be done in calibration stations which have been tested and approved by Ministry of Trade and Industry. Article 10-d) of Communiqué requires the meters shall be three phase four wire and Article 64 of Regulation clearly states how calibration shall be performed for this kind of meters. According to Article 3 of System Usage Agreement[26] done by 'Elen Enerji' and TEIAS; other than periodic tests, if a party alleges the meters are not working appropriately tests of the meters will be done by

[23] Please see: Calibration test report.

[24] See, https://www.epdk.gov.tr/Detay/DownloadDocument?id=+6B2PMv4N4A = (https://www.epdk.gov.tr/Detay/Icerik/3-0-0-128/tebligler)

[25] See, http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch=

[26] See, http://www.teias.gov.tr/sistemkullanim1.doc , (page 3, 2-b)

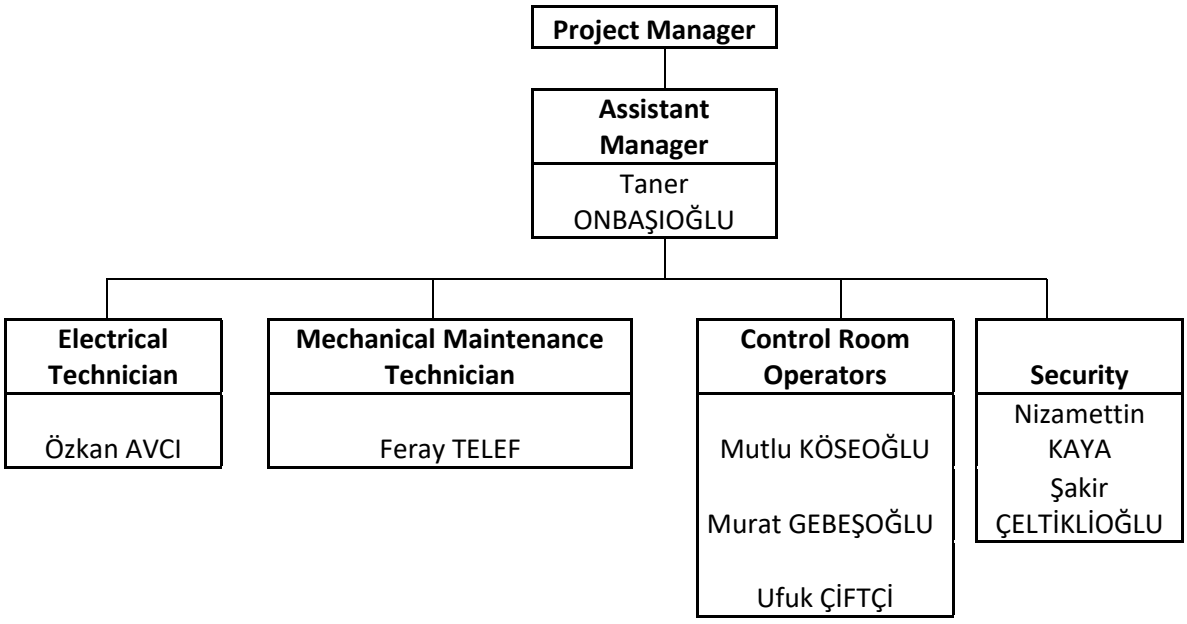
	presence of both parties. If, after controls, it is seen that the meter is not working appropriately, the measurements of reserve meters are taken into account beginning from date both meters are reading the same (page 3, 2-c) As above mentioned, the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan.
Purpose of data	To exhibit renewable electricity generation performance the plant.
Calculation method	Regarding the electricity meters: two meters are placed (one main and one reserve) at the Sırma HPP which meters the electricity transferred to TEİAŞ substation. These meters are sealed by TEIAS and intervention by project proponent is not possible. 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 not only in the interest of the emission reduction monitoring, but paramount for the business relation between the plant operator and the electricity buyers. Measured hourly and readings monthly. Monthly settlement notifications of EPİAŞ consist hourly electricity production and withdrawn from the grid. 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 which is be taken from monthly settlement notifications. Thus, with this procedure is monitored sufficient and no extra Monitoring has to be implemented.
Comments	-

5.3 Monitoring Plan

As described above, the only relevant data that has to be monitored is the net electricity generation ($EG_{PJ,facility,y}$) per year, These data are subject to the accounting quality systems of both parties to the power purchase agreement, TEİAŞ and 'Elen Enerji'. The monthly meter reading documents[27] (settlement notifications of EPIAS) are stored by 'Elen Enerji' and TEIAS. The settlement notification, which is issued by TEIAS and includes the meter reading data, is stored on a TEIAS file server and accessible for 'Elen Enerji' via a secured website. The meters themselves can always be read as plausibility check for verification. 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, which is planned to generally last one year, the data from the monthly settlement notifications will be added up to the yearly net electricity generation and multiplied with the combined margin emission factor with the help of an excel spreadsheet that also contains the combined margin calculation. Thus, the complete baseline approach is always transparent and traceable. For the elaboration and quality assurance of the monitoring report, Life Enerji Turkey, an expert in the project mechanisms who already supported in the project design, is assigned.

Currently the following information on staff and responsibilities at Sırma HPP can be seen below:



'Elen Enerji' will keep all the data needed for the calculation of emission reductions during the crediting period and until two years after the last issuance of VCS VERs for Sırma HPP.

[27] In this monitoring period, ADM invoices were used instead of monthly meter reading documents. However, monthly meter reading documents will continue to be used during the monitoring periods to be conducted during the second crediting period.

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	$EG_{PJ,facility,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Value applied:	**105,547.00 (for this monitoring period)**
Comments	-

6.2 Baseline Emissions

Used Formulas:

The total emission reductions can be calculated with the results of the below described equations. The emission reduction is equal to the baseline emissions minus project emissions and leakage emissions. Leakage emissions in this project are considered to be negligible. There are no project emissions in this kind of project. The general equation is as follows:

Emission reductions

Baseline emissions are calculated as per AMS-I.D., formula 1:

$BE_y = EG_{BL,y} \times EF_{CO2,grid,y}$ (1)

Where:

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

$EG_{BL,y}$: Electricity supplied by the project activity to the grid (MWh).

$EF_{CO2,grid,y}$: Combined margin CO_2 emission factor for grid connected power generation in year y and validated value = 0.5502 tCO2/MWh.

Emission reductions achieved by the project activity are calculated as per formula 2 of AMS-I.D.:

$ER_y = BE_y - PE_y - LE_y$ (2)

Where:

ER_y : Emission reductions in year y (tCO_2/yr).

BE_y : Baseline emissions in year y (tCO_2/yr).

PE_y : Project emissions in year y (tCO_2/yr); validated value = 0.

Le_y : Leakage emissions in year y (tCO_2/yr); validated value = 0.

BEy = EGfacility,y * EFgrid,CM, = 105,547 MWh * 0.5502 tCO2/MWh = 58,070 tCO_2

0.5502 tCO2/MWh is the emission factor of the first crediting period. Since this monitoring period belongs to the first crediting period, this emission factor is used in this section when calculation of emission reduction.

6.3 Project Emissions

There are no project emissions in this kind of project.

6.4 Leakage

No leakage needs to be considered.

6.5 Net GHG Emission Reductions and Removals

Emission reductions achieved by the project activity are calculated as per formula of AMS-I.D.:

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y : Emission reductions in year y (tCO_2/yr).

BE_y : Baseline emissions in year y (tCO_2/yr).

PE_y : Project emissions in year y (tCO_2/yr); validated value = 0.

Le_y : Leakage emissions in year y (tCO_2/yr); validated value = 0.

BEy = EGfacility,y * EFgrid,CM,

With an actual annual project electricity generation of amounts which was given in the Appendix 1 of this report, and EFgrid,CM,y given as 0.5502 tCO2/MWh[28] , 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)
Jul-13	1,861.481	0.00	0.00	1,861.481
Aug-13	1,896.368	0.00	0.00	1,896.368
Sep-13	826.505	0.00	0.00	826.505
Oct-13	256.304	0.00	0.00	256.304
Nov-13	6,270.520	0.00	0.00	6,270.520
Dec-13	0.000	0.00	0.00	0.000
Sum 2013	11,111.000	0.00	0.00	11,111.000
Jan-14	-0.068	0.00	0.00	-0.068
Feb-14	-0.125	0.00	0.00	-0.125
Mar.14	0.000	0.00	0.00	0.000
Apr.14	654.837	0.00	0.00	654.837
May.14	491.353	0.00	0.00	491.353
Jun-14	1,133.394	0.00	0.00	1,133.394
Jul-14	1,961.252	0.00	0.00	1,961.252
Aug-14	1,838.379	0.00	0.00	1,838.379
Sep-14	694.779	0.00	0.00	694.779

[28] 0.5502 tCO2/MWh is the emission factor of the first crediting period. Since this monitoring period belongs to the first crediting period, this emission factor is used in this section when calculation of emission reduction.

Oct-14	96.344	0.00	0.00	96.344
Nov-14	0.000	0.00	0.00	0.000
Dec-14	0.000	0.00	0.00	0.000
Sum 2014	6,870.000	0.00	0.00	6,870.000
Jan-15	1,644.146	0.00	0.00	1,644.146
Feb-15	1,837.704	0.00	0.00	1,837.704
Mar.15	1,991.793	0.00	0.00	1,991.793
Apr-15	1,708.416	0.00	0.00	1,708.416
May.15	1,451.508	0.00	0.00	1,451.508
Jun-15	1,486.635	0.00	0.00	1,486.635
Jul-15	1,913.069	0.00	0.00	1,913.069
Aug-15	2,042.372	0.00	0.00	2,042.372
Sep-15	1,472.529	0.00	0.00	1,472.529
Oct-15	758.196	0.00	0.00	758.196
Nov-15	-0.021	0.00	0.00	-0.021
Dec-15	0.000	0.00	0.00	0.000
Sum 2015	16,306.000	0.00	0.00	16,306.000
Jan-16	4.633	0.00	0.00	4.633
Feb-16	649.981	0.00	0.00	649.981
Mar.16	0.000	0.00	0.00	0.000

Apr-16	1,020.406	0.00	0.00	1,020.406
May.16	886.875	0.00	0.00	886.875
Jun-16	1,753.010	0.00	0.00	1,753.010
Jul-16	2,055.137	0.00	0.00	2,055.137
Aug-16	1,849.339	0.00	0.00	1,849.339
Sep-16	579.243	0.00	0.00	579.243
Oct-16	300.816	0.00	0.00	300.816
Nov-16	-4.482	0.00	0.00	-4.482
Dec-16	-6.661	0.00	0.00	-6.661
Sum 2016	9,088.000	0.00	0.00	9,088.000
Jan-17	-5.543	0.00	0.00	-5.543
Feb-17	-5.600	0.00	0.00	-5.600
Mar.17	-4.961	0.00	0.00	-4.961
Apr-17	253.679	0.00	0.00	253.679
May.17	563.151	0.00	0.00	563.151
Jun-17	1,113.626	0.00	0.00	1,113.626
Jul-17	2,021.668	0.00	0.00	2,021.668
Aug-17	1,785.419	0.00	0.00	1,785.419
Sep-17	538.095	0.00	0.00	538.095
Oct-17	-0.021	0.00	0.00	-0.021

Nov-17	-0.588	0.00	0.00	-0.588
Dec-17	-4.508	0.00	0.00	-4.508
Sum 2017	6,254.000	0.00	0.00	6,254.000
Jan-18	-2.163	0.00	0.00	-2.163
Feb-18	-0.520	0.00	0.00	-0.520
Mar.18	-2.891	0.00	0.00	-2.891
Apr-18	272.833	0.00	0.00	272.833
May.18	386.892	0.00	0.00	386.892
Jun-18	536.197	0.00	0.00	536.197
Jul-18	1,981.795	0.00	0.00	1,981.795
Aug-18	1,822.812	0.00	0.00	1,822.812
Sep-18	446.368	0.00	0.00	446.368
Oct-18	68.794	0.00	0.00	68.794
Nov-18	30.032	0.00	0.00	30.032
Dec-18	-6.770	0.00	0.00	-6.770
Sum 2018	5,533.000	0.00	0.00	5,533.000
Jan-19	-7.591	0.00	0.00	-7.591
Feb-19	1,100.175	0.00	0.00	1,100.175
Mar.19	423.376	0.00	0.00	423.376
Apr-19	772.983	0.00	0.00	772.983

May.19	413.653	0.00	0.00	413.653
05.Jun-19	205.860	0.00	0.00	205.860
Sum 2019	2,908	0.00	0.00	2,908
Total Sum 2013-2019	**58,070**	**0,00**	**0,00**	**58,070**

APPENDIX 1: < MONTHLY ELECTRICITY GENERATION DATA >

Months	Electricity supplied to the grid (MWh) (1)	Electricity consumption from the grid (MWh) (2)	Net electricity supplied to the grid[MWh] (3) =(1)-(2)
Jul.13	3,383.374	0.094	3,383.28
Aug.13	3,446.746	0.057	3,446.69
Sep.13	1,502.626	0.435	1,502.19
Oct.13	466.074	0.236	465.84
Nov.13	11,397.000	0.198	11,396.80
Dec.13	0.000	0.000	0.00
Sum 2013	20,195.82	1.02	20,194.80
Jan.14	0.000	0.123	-0.12
Feb.14	0.000	0.227	-0.23
Mar.14	0.000	0.00	0.00
Apr.14	1,191.418	1.238	1,190.18

May.14	894.91	1.862	893
Jun.14	2,060.76	0.794	2,059.97
Jul.14	3,564.663	0.047	3,564.62
Aug.14	3,341.369	0.076	3,341.29
Sep.14	1,262.945	0.170	1,262.78
Oct.14	175.127	0.019	175.11
Nov.14	0.000	0.00	0.00
Dec.14	0.000	0.00	0.00
Sum 2014	12,491.19	4.56	12,486.63
Jan.15	2,988.562	0.293	2,988.27
Feb.15	3,340.093	0.028	3,340.07
Mar.15	3,620.295	0.170	3,620.13
Apr.15	3,105.374	0.293	3,105.08
May.15	2,638.761	0.614	2,638.15
Jun.15	2,702.067	0.076	2,701.99
Jul.15	3,477.061	0.019	3,477.04
Aug.15	3,712.064	0.010	3,712.05
Sep.15	2,676.391	0.038	2,676.35
Oct.15	1,378.084	0.047	1,378.04
Nov.15	0.000	0.038	-0.04
Dec.15	0.000	0.00	0.00
Sum 2015	29,638.75	1.63	29,637.13
Jan.16	8.911	0.491	8.42
Feb.16	1,181.732	0.378	1,181.35
Mar.16	0.000	0.000	0.00
Apr.16	1,854.723	0.113	1,854.61
May.16	1,612.302	0.388	1,611.91

Jun.16	3,186.190	0.057	3,186.13
Jul.16	3,735.311	0.057	3,735.25
Aug.16	3,361.270	0.057	3,361.21
Sep.16	1,053.344	0.558	1,052.79
Oct.16	549.338	2.599	546.74
Nov.16	0.000	8.146	-8.15
Dec.16	0.000	12.106	-12.11
Sum 2016	16,543.12	24.95	16,518.17
Jan.17	0.000	10.074	-10.07
Feb.17	0.000	10.178	-10.18
Mar.17	0.000	9.016	-9.02
Apr.17	466.386	5.320	461.07
May.17	1,026.327	2.788	1,023.54
Jun.17	2,024.785	0.747	2,024.04
Jul.17	3,674.481	0.057	3,674.42
Aug.17	3,245.206	0.170	3,245.04
Sep.17	978.179	0.180	978.00
Oct.17	0.000	0.038	-0.04
Nov.17	0.000	1.068	-1.07
Dec.17	0.000	8.193	-8.19
Sum 2017	11,415.36	47.83	11,367.54
Jan.18	0.000	3.931	-3.93
Feb.18	0.000	0.945	-0.95
Mar.18	0.000	5.255	-5.26
Apr.18	500.075	4.196	495.88
May.18	705.320	2.136	703.18
Jun.18	976.166	1.616	974.55

Jul.18	3,601.981	0.028	3,601.95
Aug.18	3,313.065	0.066	3,313.00
Sep.18	812.133	0.850	811.28
Oct.18	127.406	2.372	125.03
Nov.18	64.345	9.762	54.58
Dec.18	0.000	12.305	-12.31
Sum 2018	10,100.49	43.46	10,057.03
Jan.19	0.000	13.797	-13.80
Feb.19	2,003.173	3.582	1,999.59
Mar.19	774.03	4.536	769.49
Apr.19	1,409.723	4.810	1,404.91
May.19	752.967	1.144	751.82
05.Jun.19	374.17	0.00	374.15
Sum 2019	5,314.06	27.87	5,286.18
Total Sum	105,698.80	151.31	105,547