



Final Report

Mid Size Sustainable Energy Financing Facility (MidSEFF)

Serhat Hydro Electric Power Plant: Non Technical Summary (NTS)

March 2014

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European Bank for Reconstruction and Development

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The European Bank for Reconstruction and Development (EBRD) launched in April 2011 a financing facility aimed at scaling up Renewable Energy and Energy Efficiency investments in Turkey, to increase the country's energy savings and decrease its carbon emissions. The Turkish Mid Size Sustainable Energy Financing Facility (MidSEFF) launched by the EBRD with support from the European Investment Bank (EIB) and European Commission (source of the Technical Cooperation funds) will provide a total of EUR 1 billion in loans through 7 Turkish banks for on-lending to private sector borrowers.

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Acronyms

EBRD	European Bank for Reconstruction and Development
EMRA	Energy Market Regulatory Authority
HEPP	Hydro Electric Power Plant
MidSEFF	Mid Size Sustainable Energy Financing Facility
PC	Project Consultant
PIR	Project Information Report
NTS	Non Technical Summary
VAT	Value Added Tax

1. Project Description

Serhat HEPP project is a hydroelectric power plant situated within the Dereli Municipality in the Giresun Province in the Black Sea Region of Turkey. The project is taking the waters of Uzundere Creek, an affluent of the Aksu River and it is a run-of-the-river type. The project is built on the Aksu river.

Serhat HEPP project is intended for energy generation purpose only; no irrigation or water supply facilities have been considered in the design. Serhat HEPP main project items are:

- A Regulator and a fish passage;
- A water intake structure;
- A sedimentation tank;
- A non-pressurized tunnel;
- A circular headpond;
- A ST52 steel penstock;
- A powerhouse which hosts 2 horizontal axis Francis turbines;
- Switchyard;
- A tail water channel;
- Grid connection facilities.

Serhat HEPP project has been granted with Energy production license by the Energy Market Regulatory Office (EMRA) with EÜ/3201-8/1930, issue code on 27th December 2011.

Table 1 presents the key aspects of the project.

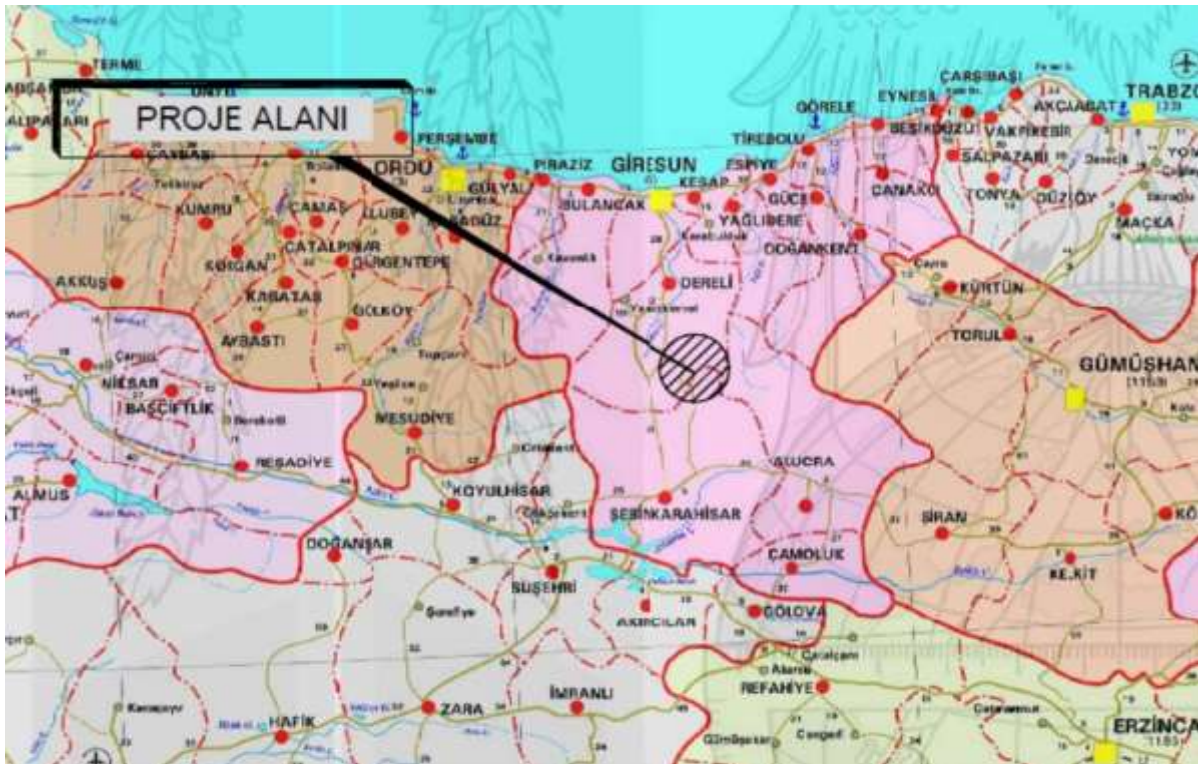


Figure 1.1: Project site

Table 1-1: Key project summary data

Project Name	Serhat Hydro Power Project
Project Borrower	Kayen Omirkon Enerji Elektrik Üretim San. Ve Tic. Ltd. Şti. (Kayı Enerji)
Project Sponsors	Kayı Group
EBRD Transaction	Total Project cost is USD 24,268,698 including VAT, investment period interest, premiums and arrangement fees. The proposed financing scheme includes debt financing of USD 14,047,915 (all financed through MidSEFF) and borrower's contribution of USD 10,220,783. The debt to equity ratio is approximately 58:42. The investment will be completed in the first quarter of 2015.
Project Description / Business Purpose:	<p>Serhat HEPP project is a hydroelectric power plant situated within the borders of Giresun Province in Black Sea Region, in the Dereli Municipality.</p> <p>The date for starting the construction of the power plant is September 2013 and the expected date for commencing operation is April 2015.</p> <p>Serhat HEPP is a run-off-river hydro power plant which is designed with two Francis turbines for a nominal installed power of 8.89 MWe (total) and a design flow rate of 4 m³/s. The plant will produce 24.21 GWh of electricity annually (P50).</p> <p>Serhat HEPP project will contribute to the share of renewable energy in the Turkish market. The generation of electricity from renewable source will replace electricity from the national grid and enable reduction of 13,243 tCO₂ per year.</p>
Installed Power	8.89 MWe
Annual Electricity Production	24.21 GWh/year

2. Environmental and Social Baseline

2.1 Environmental description of the project area

The province is surrounded by Trabzon and Gümüşhane to the east, Ordu to the west, Sivas and Erzincan to the South, and again Sivas to the southwest, situated 175 kilometres west of the city of Trabzon.

94.3% of the territory of the city is covered by mountains; 1.2% by uplands, 4.3% by plateaus, and just 0.2% by lowlands. The higher mountain areas are forest and pasture and in places there are minings of copper, zinc, iron and other metals. The mountain villages are remote, with poor roads and infrastructure and furthermore the hillsides are too steep for agriculture. One third of the territories of Giresun city is covered by forests and naturally ascends from the sea level up to 1900 m, high mountain vegetation emerges at higher part. The Kelkit Plateau Base is covered by steppe.

The territory of the city in the Black Sea region is rich of valleys. The main rivers in these valleys and their length is as follows: Aksu 60 km, Harşit Stream (Doğankent Stream) 50 km, Özlüce Creek (Gelevera Creek) 80 km, Pazarsuyu 80 km, Yağlıdere 70 km, Batlama Creek 40 km, and Kelkit River 65 km.

The local economy is mainly based on hazelnut farming.

The project site is located in the hilly sections of the Giresun valleys and it comprises forestry and private lands.

Resident fish communities in the project river are *Cyprinus carpio*, *Alburnoides bipunctatus*, *Barbus plebejus escherichi*, *Leuciscus (Squalius) cephalus*. None of these species are endemic. There are 5 amphibian and 8 reptile species observed in the project area which are protected under BERN Convention. Based on the IUCN categorization, their class is NT.

Furthermore no protected or designated areas were found around the project location.

Table 2-1: Environmental characteristic

ENVIRONMENTAL ASPECTS	PRESENCE/DISTRIBUTION	COMMENTS
Land use	Private and Forestry	-
Waters surface	N.A.	-
Protected area	N.A.	-
Flora and Fauna	5 amphibian and 8 reptile species observed in the project are protected under BERN Convention.	No specie is endemic

2.2 Social condition of the project area

The most recent data (December 31st 2010, as checked by PC on the Turkish Statistical Institute's web site), mentions a population of abt. 419,256 of people for Giresun Province.

The project area is close to some residential areas. The nearest settlement, Uzundere Village, is abt. 100 meter away from the regulator.

3. Environmental and Social Impact

3.1 Land Use

Some parts of the project area are classified as Forestry area. The sponsor received Forest permit. The size of the private lands to be expropriated is under assessment. There is no evidence of agricultural activities on these lands.

3.2 Water

There will be household waste water both during construction and operation phase. This is generally employees' daily waste. The pollution is biological and physical. Some considerations included in the Project Information Report show that water discharge will be managed according the Water Pollution Control Regulation. Domestic waste water amount is calculated as 7.5 m³/day during construction phase, and 1.5 m³/day during operation phase.

3.3 Waste

The hazardous waste is expected in negligible level due to used oils from construction machines, waste batteries and accumulators etc. These will be handled according to the related regulation. The amount of household waste caused by employees is calculated about 60.5 kg/day during construction phase and 12.1 kg/day during operation phase. Recyclable waste such as wood and plastic will be collected in separate boxes and will be delivered to licensed companies. All these activities related to waste management will be carried out according to the related regulations such as Solid Waste Control Regulation.

3.4 Fisheries

As indicated in the supplied Project Information Report, there are resident fish communities which are *Cyprinus carpio*, *Alburnoides bipunctatus*, *Barbus plebejus escherichi*, *Leuciscus (Squalius) cephalus*, none of these species are endemic.

The project will affect the fish habitat in the river but the developer should take precautions such as constructing of a fish passage and put in place a grid device with a proper mash dimension. The biota monitoring during operation is recommended by the PC. Compensation measures (such as repopulation) could be prescribed according to monitoring results in case.

3.5 Emissions: Noise, Particulate and Vibration

Dust is generated from earth-moving and material storage, and air emission from the operation of construction machinery and equipment. A study in the PIR shows that air-emissions are at acceptable levels and the sponsor is obliged to work with the related Turkish regulation (Evaluation and Management of Air Quality). Common good engineering practices are usually enough to cover this aspect. A more "formal" construction yard environmental management plan has been suggested.

During operation minimal emissions can appear not directly associated with plant operation but with traffic, maintenance, etc. So it can be easily concluded that, for what concerns emissions, there are no relevant aspect, both in the construction and in the operation phase.

Noise emissions will be generated during construction due to equipment/machinery operation. Within the PIR, it was committed that during construction and operation periods all noise levels will be kept at

legally agreed level in line with the Turkish Regulation on Noise Control. Minimum noise emissions are expected during operation due to electro mechanic working and water flow/fall.

Blasting will be made according to related regulations and all precautions will be taken by the sponsor before blasting. By considering the nearest house is 100 m away from project site, the effects from blasting will be kept under control.

Table 3-1: Impact Quantification

COMPONENT	IMPACT	QUANTIFICATION
Land use	<u>Different use of the land</u>	Private (to be explored) and forestry (64,963.59 m ²)
Water	<u>Utilization and Discharge</u>	7.5 m ³ /day during construction 1.5 m ³ /day during operation
Waste	<u>Production of solid waste</u>	60.5 kg/day during construction 12.1 kg/day during operation
	<u>Excavation waste</u>	To be defined
Fisheries	<u>Loss fish/loss Habitat</u>	Monitoring campaign suggested during operation phase and repopulation in case.
Emissions	<u>Noise</u>	Construction phase < 70dBA (law limit) Operational phase: No disturbance for the nearest receptors
	<u>Particulate</u>	< 1.5 kg/h (law limit) monitoring campaign suggested during construction phase
	<u>Vibration</u>	No disturbance for the nearest receptors



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