



Final Report

# Mid Size Sustainable Energy Financing Facility (MidSEFF)

## Çayaltı I-II Hydro Electric Power Plants: Non Technical Summary (NTS)

March 2014

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### European Bank for Reconstruction and Development

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**March 2014**

The European Bank for Reconstruction and Development (EBRD) launched in January 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

This investment consists of the construction of two run of the river hydroelectric power plants in the west of the Black Sea Region. The project area is located in Zonguldak Province, Devrek District. The main water source of the project is Devrek River, a tributary of Filyos River.

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

- regulators and fish passages;
- water transmissions channels;
- Stilling basin;
- power houses;
- switchyards.

The production license has not yet been obtained from EMRA due to capacity increase and it is currently under revision. Table 1-1 presents the key aspects of the project.

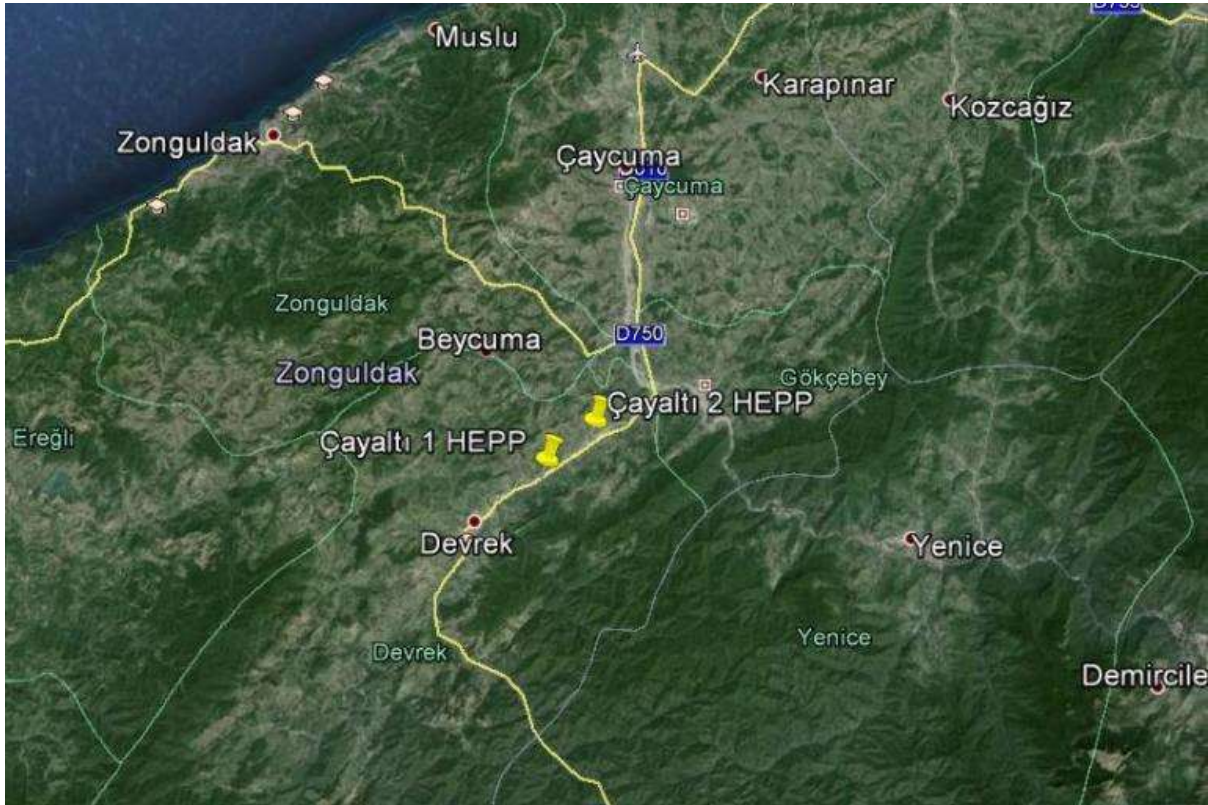


Figure 1-1: Project site



**Table 1-1: Key project summary data**

<b>Project Name</b>	Çayaltı I – II Regulator and HEPP
<b>Project Borrower</b>	Reis RS Enerji Elektrik Üretim Motorlu Araçlar Tütün Ürünleri Dağıtım Pazarlama Sanayi ve Ticaret A.Ş.
<b>Project Sponsors</b>	Reis Group
<b>EBRD Transaction</b>	The total project cost is USD 21,991,997 including USD 307,500 investment interest expense and USD 325,650 commitment and arrangement fees and USD 327,365 working capital requirement. The proposed financial scheme includes debt financing in the amount of USD 13,026,000 and the borrower's own contribution in the amount of USD 8,965,997. The debt to equity ratio is approximately 59:41. The investment duration will be 18 months approximately.
<b>Project Description / Business Purpose:</b>	<p>The location of the proposed hydro power plant is the Western Black Sea Region, Zonguldak Province, Devrek District. The main water source of the project is Devrek River.</p> <p>According to the turbine agreement contract, Çayaltı I-II has a total installed capacity 11.023 MWe. Both the plants will be realized with 3 horizontal Kaplan S-type turbines with a rated power of <math>2.254 \text{ MW} \times 2 + 0.998 \text{ MW} = 5.506 \text{ MWe}</math>. The HEPPs exploit a net head of about 10 and 13.5 m and a nominal flow rate of <math>55 \text{ m}^3/\text{s}</math>.</p> <p>Çayaltı I and II HEPP projects will contribute to the share of renewable energy in the Turkish energy market replacing electricity from the national grid and enabling the reduction of 19,495 tCO<sub>2</sub>/year.</p>
<b>Installed Power</b>	11.012 MWe (according to Turbine Contract)
<b>Annual Electricity Production</b>	34,420 MWh

## 2. Environmental and Social Baseline

### 2.1 Environmental description of the project area

Zonguldak Province is a province along the western Black Sea coast region of Turkey. The province is 3,481 km<sup>2</sup> in size and surrounded by numerous from small to medium sized mountain chains and the province is under the effect of these regions' climate. Lake Mountain is the highest mountain in the vicinity of the Devrek district. Zonguldak province is situated between 41°00" - 41°35" N latitude and 31°18" - 32°19" E longitude within of the Euxinian section of the Euro-Siberian floristic region of Turkey. The climate of the province of Zonguldak is significantly changed from the coastal to the inland areas because of the mountains that run parallel to the coast. Depending on the climatic changes, different types of vegetation such as Oceanic, Sub-Mediterranean and Mediterranean was occurred from the north to the south of the area. The flora of the project site is mainly meadow, bushes and shrubs. Iron-steel industry has been also developed in the region.

The project site is located near highway and it comprises dry forestry land and meadow area. The lands belong to the forestry, treasury and private owners.

In the project region there are 76 flora species. 2 species out of them are endemic and listed under IUCN as LC category. There are 2 species of fish within the plant area which are *Barbus Plebejus* and *Cyprinus Corpio*. In accordance with IUCN *Barbus plebejus* is listed under LC (least concerned), *Cyprinus carpio* is listed under VU (Vulnerable).

**Table 2-1: Environmental characteristic**

ENVIRONMENTAL ASPECTS	PRESENCE/DISTRIBUTION	COMMENTS
Land use	Forestry, Private and Treasury	-
Water surface	N.A.	-
Protected area	N.A.	-
Flora and Fauna	76 flora species and two of them are endemic and listed in IUCN; two fish species listed under IUCN, LC and VU categories	2 endemic species

### 2.2 Social condition of the project area

According to the year 2013 census (provided in the [www.tuik.gov.tr](http://www.tuik.gov.tr)) the total population of the Zonguldak is 125,914 people. Some scattered residential areas are near the project site. The closest scattered houses are 95 m far away from of Çayaltı I HEPP and 50 m far away from Çayaltı II HEPP.

In general terms the provided documents and general know-how on the project location do not highlight any particular utilization of the river by local people.

In order to assess the project acceptance by potentially affected communities a stakeholder engagement plan was conducted on 19.12.2013.

## 3. Environmental and Social Impact

### 3.1 Land Use

In the project area there are private, forestry and treasury lands.

The size of the private lands to be expropriated has not been explored yet. There is no evidence of agricultural activities which has economic value 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 to the Water Pollution Control Regulation. Domestic waste water amount is calculated as to be 10.5 m<sup>3</sup>/day during construction phase and 1.2 m<sup>3</sup>/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 due to the employees is calculated as to be around 79.8 kg/day during construction phase and 9.12 kg/day during operation phase. Recyclable waste such as wood, glass 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.

The excavation material will be used firstly for upgrading the surrounding of regulator area and power plant area. Later on it will be used as refill material through tailwater channel and road upgrading. The excess excavation material will be stored in a special storage yard. The storage will be made in accordance with the Turkish regulations: "The Regulation on Control of Excavation Material, Construction and Residue Waste" which was released on 18.03.2004 on Official Gazette n. 25406. In total there will be 7 storage yards.

### 3.4 Fisheries

As indicated in the supplied Project Information Report, two different species of fish have been found within the plant area which is *Barbus Plebejus* and *Cyprinus Corpio*. In accordance with IUCN *Barbus plebejus* is listed under LC (least concerned), *Cyprinus carpio* is listed under VU (Vulnerable).

The project will affect the fish habitat in the river but the developer will take precautions such as constructing a fish passage and grid device with an appropriate mesh size which will impede the entrance of small fish into the tunnel/channel and water intake structure during operation. Having protected species, in any case a monitoring campaign during operation phase as well as the construction phase will put in place and compensation measure (repopulation, increasing of the water in the river bed, etc) will implemented. Particular attention will be paid during construction and operation to avoid the negative effects on endemic fishes as well as other aquatic organisms.



### 3.5 Emissions: Noise and Particulate

Dust will be generated by earth-moving and material storage; air pollutant emissions are generated by the operation of construction machinery and equipment. Some considerations are included in the PIR Report and show that the levels of air-emissions are mostly acceptable (below 1 kg/h). The dust emissions originated by excavation activities, related to the construction works, are expected to be lower than 1 kg/h.

During operation minimal emissions can be originated not directly associated with plant operation but with traffic, maintenance etc. During operation phase, no relevant critical aspects are expected related to air-emissions.

The PC suggests implementing an air monitoring during construction phase and to put in place the engineering action to reduce dust issues.

Noise emissions will be generated during construction due to equipment/machinery operation. Assessments within PIR show that noise emissions are at acceptable levels and the sponsor has stated to work according to related regulations and all precautions will be taken into account by the sponsor before and during construction.

Minimum noise emissions are expected during operation due to electro mechanic working and water flow/fall.

### 3.6 Landscape

Landscape is usually not a really sensitive aspect for this kind of project. In any case the Sponsor prepared a visual impact study. This study was shown in the stakeholder meeting on 19.12.2013. No opposition was received from the locals regarding visual impact of the plant.

**Table 3-1: Impact Quantification**

COMPONENT	IMPACT	QUANTIFICATION
Land use	<u>Different use of the land</u>	Forestry, Private and treasury (quantity to be defined)
Water	<u>Utilization and Discharge</u>	10.5 m <sup>3</sup> /day during construction 1.2 m <sup>3</sup> /day during operation
Waste	<u>Production of solid waste</u>	79.8 kg/day (70 workers) during construction 9.12 kg/day (8 workers) during operation
	<u>Excavation waste</u>	799,480 m <sup>3</sup> – Çayaltı I 2,133,969.5 m <sup>3</sup> – Çayaltı II
Fish life	<u>Entering to channel/tunnel to the turbines</u>	No evidence of threatened or endangered species
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
Landscape	<u>Visual Impact</u>	-

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