**CLEAN DEVELOPMENT MECHANISM**
**PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)**
**Version 03 - in effect as of: 22 December 2006**

# GRID-CONNECTED ELECTRICITY GENERATION FROM RENEWABLE SOURCES: YAZI, 1.13 MW HYDRO POWER PLANT PROJECT, TURKEY

## CONTENTS

## SECTION A. General description of small-scale project activity

### A.1 Title of the small-scale project activity:

Title:Yazi Hes 1.13 MW Hydro Power Plant
Version:09
Date: 21.10.2010.

### A.2. Description of the small-scale project activity:

Yazi Hydro-Electric Power Plant is designed by Elestas Elektrik Uretim A.S. which is private company contributes Hydro-Electric and Wind Power projects within Turkish Renewable Energy sector.

Yazi HEPP is located right at the downstream of the 'Guldurcek Dam' built on the Devres stream, which is one of the branches of the Kizilirmak River inside the boundaries of the province of Cankiri. The project aims to generate electricity by utilizing the downstream flow from Gurdurcek Dam which is designed for irrigation and water supply to the region.

The Guldurcek Dam's construction has been completed in 1988 by DSI. The measurement from the thalweg is 51.00 m. As the main purpose of the Dam is actually irrigation and supplying portable water, only excess water arriving at the Dam could be utilized for power generation. According to the data; Yazi Hydro-Electric Power Plant targets to supply about 1.13 MW of renewable electricity to the rapidly grow Turkish electricity market. The project is expected to generate about 5.203 MWh of electricity annually and to reduce 2,825 tonnes of $CO_2$ emissions per year.

At the construction process and after the construction Yazi Hydro-Electric Power Project will provide industrialization that Cankiri province needed at the area. Legal documents demonstrate Cankiri province takes only 59$^{th}$ place among 81 provinces on socio-economic development list of Turkey. At the area industrialization rate is 5.23% whereas agricultural rate is 66.09%.[1] Percentage of university graduates over high school or lower degree graduates is only 5.41. All those findings state that Yazi HEPP will be a leading path for future private sector industrialization and at the construction stage; the project will provide employment opportunities for unemployed workers.

The project has no adverse environmental impacts and will reduce greenhouse gas emissions. Renewable resources will be utilized to generate electricity and therefore fossil fuel resources will be avoided in power generation. After the construction of the Guldurcek Dam in 1988, fauna and flora enhanced in a positive way as a result of environmental impact of the dam. Since Yazi HEPP has built to the downstream of the Guldurcek Dam, it is going to use the capacity of the dam without affecting the environment.

Specific benefits of the Project regarding the sustainable development of the region and country can be summarized as follows:

- Increasing supply of electricity from sustainable resources: The Project will generate electricity from renewable resources and will contribute to greenhouse gas emission reduction. Run of river hydro projects has capacity factors which leads to higher emission reductions compared to other renewable energy resources.

[1] State Planning Organisation, Regional Development Index. (http://www.dpt.gov.tr/bgyu/ipg/icanadolu/cankiriPER.pdf)

- Reducing the demand for new thermal power plants using fossil fuels and the dependency on imported energy sources.
- Ensuring sufficient, reliable and clean energy in order to support social and economic development.
- Encouraging investment in renewable energy sources to meet growing energy demand.
- Create local employment both during the construction and the operational phase. For the operation of the project 6 people will be employed and trained, of which 2 will be local residents.

No risks are identified that may substantially affect the implementation of the Project and GHG emission reductions and removal enhancement. The Project is a greenfield one developed for carbon emission removal and will not create GHG emissions for the purpose of its subsequent removal or destruction.

## A.3. Project participants:

| Name of Party involved (*) ((Host) indicates a host Party) | Private and/or public entity(ies) project participants (*) (as applicable) | Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| TURKEY (Host) | Elestas Elektrik Uretim A.S | No |
| TURKEY (Host) | SerCarbon | No |

## A.4. Technical description of the small-scale project activity:

### A.4.1. Location of the small-scale project activity:

The plant is constructed on right at the downstream of the Guldurcek Dam built on Devres stream Orta district in the west part of Cankiri province in the Central Anatolian Region.


**Figure.1. Location of project activities**

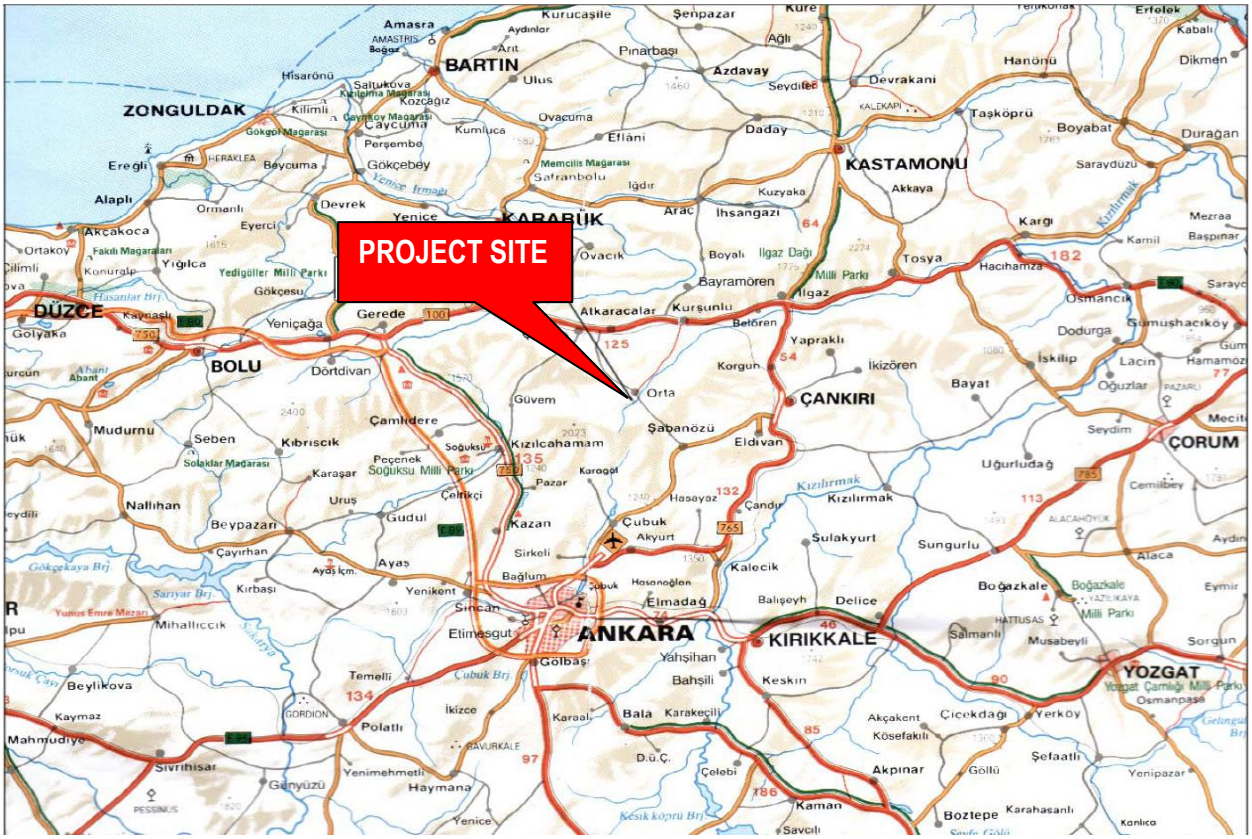


**Figure.2. Location of project activities**

**A.4.1.1. Host Party(ies):**

The Host country is Republic of TURKEY. Since Turkey does not have any quantitative reduction target under the Kyoto Protocol, the Project is eligible for the VER application.

**A.4.1.2. Region/State/Province etc.:**

The project will be accomplished in the Central Anatolian Region, Cankiri Province and Orta district

**A.4.1.3. City/Town/Community etc:**

The location of the power plant will be at the downstream of the Devres River in Orta district and 44km west to Cankiri Province close to Orta district.

**A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :**

Yazi HEPP is constructed between the latitudes of 40° 34′ 06″N and the longitudes of 32° 56′ 40″E in the Central Anatolian Basin in the Province of Cankiri. The plant is near the Guldurcek Dam which is 44km west side of Cankırı Province, close to Orta district. The geographical coordinates of Gurdurcek Dam and Powerhouse are given below:

Gurdurcek Dam: 40° 34′ 54.85″N; 32° 56′ 08.35″E
Power House: 40° 33′ 22.68″N; 32° 57′ 34.23″E

**Figure.3. Penstock (Below Ground)**

**Figure.4. Valve House**

**Figure.5. Power House**

**A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:**

The project is under the sectoral scope 1 Energy Industry – Renewable Resources

The project includes the following parts:

1) Penstock: The penstock has a 90 cm diameter and will be taken out by a manifold. Then it will be connected to a butterfly valve through a 1.00 m diameter pipe. This butterfly valve will be taken into a cubbyhole and 1.00 m diameter penstock will be lengthening by 1425 m on the right side and will be hold as buried.

2) Turbine: The turbine is a Francis with horizontal shaft which has 2*600 kW capacities. The generator is senkron and is also horizontal shaft. All the electro mechanic equipment is planted in the power house will generate an estimated amount of 5,203 MWh. The trade-mark of the turbines is Gebbert from Austria. Generation capacity of the turbines is 1.13 MW stated in the custom records and confirmed by the provider company.

3) Generator: Two generators which are horizontal shaft synchronous with a power of 650 kVA will be applied
4) Transformation: 2 oil filler transformation with the capacity of 700 kVA will be used.
5) The expected annual electricity generation is calculated as 5,203 MWh. The monthly generation is 433.6 MWh.

The project schedule is summarized below:

**Table.1. Project Schedule**

| | |
|---|---|
| Feasibility study finalized | 27/07/2004 |
| License start date (49 years) | 31/08/2006 |
| Change in the partnership structure and revision on the license | 01/11/2007 |
| Purchase agreement of electronic equipment | 19/12/2007 |
| Construction period | 01/01/2008-01/09/2009 |
| Commissioning date | 02/10/2009 |
| Lifetime of the project | 46 |
| Period of monitoring and reporting | Monthly electricity readings |

The feasibility studies were conducted in the second half of 2004. The license of the project has been acquired in 31/08/2006 for 49 years However; the project could not be commissioned pursuant to financial difficulties. After change in the partnership structure, new partners could provide financial resources and decided to start the investment. The purchase agreement of the electronic equipment was signed in December just before the kick off of the construction. The construction started in January 2008 and ended in September 2009. This was the real start of the action for the project and the project was operational on 02 October 2009 which is the beginning of the crediting period as well. The license will be active until 2055, meaning that the plant will be operational for 46 years.

### A.4.3 Estimated amount of emission reductions over the chosen crediting period:

**Table.2. Estimated amount of emission reductions over the chosen crediting period**

| Years | Annual estimation of emission reductions (Tonnes of $CO_2$ e) |
|---|---|
| October 2009 | 940 |
| 2010 | 2,825 |
| 2011 | 2,825 |
| 2012 | 2,825 |
| 2013 | 2,825 |
| 2014 | 2,825 |
| 2015 | 2,825 |
| 2016 | 2,825 |
| 2017 | 2,825 |
| 2018 | 2,825 |
| January to September 2019 | 1,885 |
| **Total emission reductions (tonnes of $CO_2$ e)** | **28,250** |
| Total number of crediting years | 10 Years |
| Annual average over the crediting period of estimated reductions (tonnes of $CO_2$e) | 2,825 |

Since the project activity is going to reduce 2,825 tons $CO_2$ each year which is smaller then 5,000 tons $CO_2$ called micro scale project according to VCS 2007.1.

### A.4.4. Public funding of the small-scale project activity:

No public funding or ODA is used for the project. There is no green investment scheme in Turkey and the project does not create any other form of environmental credits.

### A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

Yazi Hydro-Electrical Power Plant project is an independent project and is not a debundled component of a larger project activity and is not a part of a project group.

## SECTION B. Application of a baseline and monitoring methodology

### B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

Approved methodology for small scale projects, AMS-I.D. "Grid connected renewable electricity generation" version 15 has been applied for baseline and monitoring methodology. AMS-I.D. refers to the following tool:

- "Tool to calculate the emission factor for an electricity system", Version 2.0[2]

[2] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf

## B.2 Justification of the choice of the project category:

According to the Appendix B to the simplified modalities and procedures for small-scale CDM project activities the proposed project activity falls under the following type and category.

**Project Type**: Type I – Renewable Energy Projects.
**Category I.D**: Grid connected renewable electricity generation

The choice of methodology AMS-I.D., Version 15 is justified as the Project activity meets its applicability criteria:

- Yazi HEPP Project activity has an installation capacity of 1.13 MW hydro power plant within the limit of 15 MW and according to UNFCCC approved methodologies[3] it is counted as small scale project activity
- The project supplies electricity to and displace electricity from an electricity distribution system that would have been supplied by at least one fossil fuel fired generating unit.
- There is no commercially sensitive information regarding Yazi HEPP in the PDD

Since the project activity reduces less than 5.000 t/$CO_2$ it is considered as micro-scale project activity according to the definitions in VCS 2007.1

## B.3. Description of the project boundary:

**Table.3. Gases included in the Project boundary**

| | Source | Gas | Included? | Justification/Explanation |
|---|---|---|---|---|
| **Baseline** | Electricity generation in baseline (Turkey Grid) | $CO_2$ | Yes | Main Emission Source |
| | | $CH_4$ | No | Minor emission source. Excluded for simplification |
| | | $N_2O$ | No | Minor emission source. Excluded for simplification |
| **Project Activity** | Emission from the reservoir of the proposed project (inside project boundary) | $CO_2$ | No | Zero-emission electricity generation |
| | | $CH_4$ | No | Minor emission source since power density is very high. Excluded for simplification |
| | | $N_2O$ | No | Zero-emission electricity generation |

The Project boundary is limited by the National Electricity Grid of Turkey. The geographical and physical boundaries of the Turkish grid and location of the power plants are clear. All the data about power generation including imported electricity is obtained from TEİAŞ and have been included in the calculations of the combined margin emissions.

[3] http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

**B.4. Description of baseline and its development:**

AMS-I.D requires the application of the following tool which has been applied for this project as explained below:

- Tool to calculate the emission factor for an electricity system, version 2.0

The baseline scenario has been identified as: "*Electricity delivered to the grid by the Project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system"*

The rapid increase in electricity demand in Turkey creates a new demand on power plants. However, the inadequate legal subsidies for the renewable power plants such as wind power, solar energy, increases the necessity of using fossil fuels in electricity generation. Accordingly, the baseline methodology has been applied in a conservative manner in a way that the expected increase in the use of fossil fuels for electricity generation has been ignored although it is well-known that new domestic coal reserves will be utilized in future and are likely to form a higher proportion of the electricity generated in Turkey. Therefore, the basic assumptions are:

- Weight of thermal power plants (and thus the emission factor) will remain same over the crediting period.
- When there is no data about the emission factor of fuels sources, it has been accepted as "0" or the lowest value of IPCC Guidelines for National Greenhouse Gas Inventories has been used.

In addition, the default values have been taken into consideration in the Build Margin Emission factor calculations in accordance with the applied methodology. The emission factors for fuels have been taken as the IPCC values at the lower limit of the uncertainty at 95% interval. Net calorific values of the fuels, on the other hand, have been calculated by the country specific data.

The additionality of the Project activity has been demonstrated using the latest version (version 5.2) of the Tool for assessment and demonstration of additionality obtained from the UNFCCC website.

The main gases included in the Project boundary are summarized in Table 3 above while the other key data and parameters used in the calculations are given in Annex 3.

**B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:**

**Table.4. The laws applicable to the project are summarized as follows:**

| Law (Nr./ issuance date) | Aim o f the law | Project interfere |
|---|---|---|
| Environmental Law (Nr. 2827 / 11.08.1983) | The aim of the law is to minimize the negative effects to the environment that project causes. Furthermore, proposed project activity implemented | The project does not require a complete EIA study according to the law but should be inline with the law. |

| | | |
|---|---|---|
| | according to the law. | |
| Electricity Market Law (Nr. 4628 / 03.03.2001) | This law aims to accommodate the sale price of the electricity in order to prevent the inequalities in the market. Since it is an electricity generating facility, and running by selling the electricity that generated, it is related with the law. | The sale of electricity generated has been done according to the terms of the law. |
| Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy(Nr. 5346 / 18.05.2005) | All the renewable Energy sources including the proposed project activity have to be in compliance with this law. | The project should be in line with terms of the law. |
| Energy Efficiency Law (Nr. 5627 / 02.05.2007) | Proposed project activity is also has to be in compliance with this law. | The project should be in line with terms of the law. |

Attachment A to Appendix B[4] is implies that the project activity would not have occurred anyway due to at least one of the following barriers:

(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;
(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
(c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
(d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

(a) Investment barrier:

The project faces serious investment barriers. To determine whether the project is economically feasible without the revenue from the sale of verified emission reductions, the benchmark analysis has been chosen. The excel sheet to calculate the financial transactions have been completed for the proposed project activity is given separately from the PD to the DOE.

According to the "Tool for the demonstration and assessment of additionality", a relevant benchmark for an equity IRR can be derived from eurobond rates increased by a suitable risk premium (to reflect private investment and/or project type). The eurobond rates has been used from the bussiness social networking website for financial market members for the benchmark of the analysis of the project.

[4] http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentA.pdf

**Table.5. Eurobond Rates[5]**

| Eurobond Code | Settlement Date / Maturity Date | Currency | Rate |
|---|---|---|---|
| DE000A0BVB39 | 25-10-2004 / 25-10-2024 | USD | 9.6 % |
| UNS89065AF89 | 24-03-2004 / 24-03-2014 | USD | 8.0 % |
| XS0190240324 | 07-03-2004 / 07-03-2014 | USD | 7.875 % |
| US922646BM57 | 08-10-2004 / 08-10-2014 | USD | 8.5 % |
| XS0205828477 | 16-10-2004 / 16-10-2014 | USD | 8.875 % |
| *Average* | | | *8.57 %* |

**Table.6. Financial Indicators**

| *Parameters* | Unit | Data Value |
|---|---|---|
| *Installed Capacity* | MW | 1.13 |
| *Grid Connected Output* | GWh | 5.203 |
| *Capital Investment* | Million $ | 1,289,399 |
| *Corporate Tax Rate* | % | 20 |
| *Expected Tariff* | € Cents/kWh | 5.5 |
| *Parity of Eur/USD* [6] | € / $ | 1.2109 |

Equity IRR of Yazı HEPP has been calculated as 13.33% based on the parameters given in the table 6 without considering the carbon revenue. All the financial indicators have been taken from the feasibility data. Electricity tariff has been used as 5.5 Eur/cent per kWh, converted price of 6.66 USD/cent with average exchange rate of Eur/USD in March 2004 per kWh and annual electricity generation has been accepted as 5.203 GWh. If the carbon revenue taking into account as cash flow, the equity IRR increases to 14.25% and the project becomes more attractive for the investor.

Considering the selected 2004 Eurobond rates in average (8.57%) and estimated total risk premium rate of Turkey/2004[7] (13.09%), it can be stated that expected return on investment rate should be higher than 21.66% (8.57+13.09) for these type of projects for the reasonable investors. In order to reach this IRR value, the carbon revenue should be considered as a cash flow so that the project becomes reasonable investment.

**Sensitivity Analysis**

Sensitivity analysis has been done according to three main indicators;

- Investment cost
- Operating Cost
- Electricity Revenue

[5] www.cbonds.info

[6] www.tcmb.gov.tr

[7] http://pages.stern.nyu.edu/~adamodar/ (Section:Risk Premiums for Other Markets-2004)

Between the ranges of ± 10% fluctuations in parameters above, the table below has been obtained

**Table.7. Sensitivity Calculation**

| | *% Fluctuation* | | | | |
|---|---|---|---|---|---|
| **SENSITIVITY** | **-10%** | **-5%** | 0.00% | **5%** | **10%** |
| Investment cost | 15.13% | 14.18% | 13.33% | 12.58% | 11.89% |
| Operational Cost | 14.22% | 13.78% | 13.33% | 12.89% | 12.44% |
| Electricity revenue | 10.92% | 12.13% | 13.33% | 14.52% | 15.70% |

As it is seen in the sensitivity analysis, the IRR of the project becomes 15.70 with a 10% rise in electricity revenue, 15.13% with a 10% decrease in investment cost and 14.22% with a 10% decrease in operational cost. As a result, the project will be competitive if the carbon revenue considered as a cash flow in order to reach the total rate of Eurobond and the total risk premium 21.66%.

The electricity selling price for renewable power plants has been fixed by Renewable Energy Law and no revisions are expected in the following years. Therefore no fluctuation is expected in the electricity revenue exists. The operational cost will be same during crediting period as the capacity of the power plant is limited by the licence given and no additions are applicable. Therefore, the maintenance and operational cost will be same as well as the number of personnel working for the plant.

As it is understood from the table above both the investment and the sensitivity analysis; the VER income rises up the economical and financial indicators of the project which makes the project more attractive for the investors. Even though, the values for the electricity generation have been taken from the most optimistic values, project is not the most attractive option. However, the carbon revenue increases the attractiveness of the project. Therefore, the project could be considered as additional to the baseline scenario.

## B.6. Emission reductions:

### B.6.1. Explanation of methodological choices:

**Baseline Emission**

According to methodology AMS-I.D. (version 15), the baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in kWh of electricity produced by the renewable generating unit multiplied by an emission factor.

$BE_y = EG_{BL,y} * EF_{CO2}$

Where:

$BE_y$ : Baseline Emissions in year y; t CO2
$EG_{BL,y}$: Energy baseline in year y; kWh
$EF_{CO2}$ :CO2 Emission Factor in year y; t CO2e/kWh

The Emission Factor can be calculated in a transparent and conservative manner as follows:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'(version 02).
OR
(b) The weighted average emissions (in kg CO2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

For the Project, method (a) is adopted to calculate the combined margin emission factor.

The emission factors are determined according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system" (version 02) as following seven steps:

***Step 1. Identify the relevant electric power system***

The spatial extent of the project boundary for the displacement of electricity generation includes the Project site and all power plants physically connected to the national grid.Each power plant can be dispatched without significant transmission constraints from the central grid ( Figure.7.).

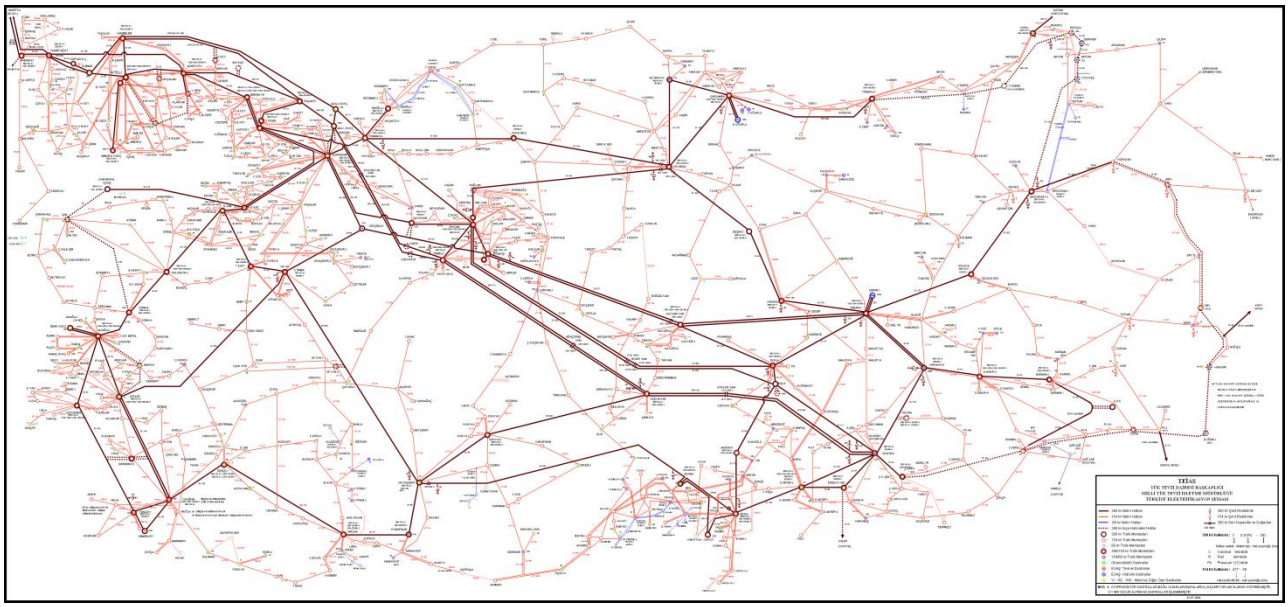

**Figure.7. Interconnected national grid of Turkey[8]**

In order to determine the CO2 emission factor for net electricity imports from a connected electricity system within the same host country, the following options are available:
"a) 0tCO2/MWh,or
b) The weighted average operating margin (OM) emission rate of the exporting grid;or
c) The simple operating margin emission rate of the exporting grid, determined as described in Step 4(a), if the conditions for this method, as described in step 3 below, apply to the exporting grid;or
d) The simple adjusted operating margin emission rate or of the exporting grid, determined as described in Step 4(b) below"

[8] http://www.geni.org/globalenergy/library/national_energy_grid/turkey/turkishnationalelectricitygrid.shtml

Option c) has been chosen for the calculations.

***Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)***
Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.

Option I is chosen.

***Step 3. Select an operating margin (OM) method***
The calculation of the operating margin emission factor ( *grid,OM,y EF* ) is based on one of the following methods:
(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch Data Analysis OM, or
(d) Average OM

The Simple OM has been selected as the methodology as the availability of accurate data on grid system. There are no data specific to the power plants in the grid. The dispatch order for each power plant in the system and the amount of power dispatched from all plants in the system during each hour are not known.

The Simple OM method (a) can only is used if low-cost/must run resources constitute less than 50% of total grid generation in:
1) Average of the five most recent years, or
2) Based on long-term averages for hydroelectricity production.

As electricity generated by solar and low cost biomass facilities are insignificant and there is no nuclear plant in Turkey, only hydro, wind and geothermal facilities are accepted as the low cost /must run plants..11 below show the share of hydro and renewable resources in electricity generation for the ten most recent years (1999-2008) and it is below 50% of the total grid generation.

**Table.8. Share of primary sources in electricity generation, 1999 – 2008**[9,10]

| *YEAR* | *THERMAL* | | *HYDRO* | | *GEOTHERM.WIND* | | *TOTAL* |
|---|---|---|---|---|---|---|---|
| | *GWh* | *%* | *GWh* | *%* | *GWh* | *%* | *GWh* |
| **1999** | 15,556 | 59.6 | 10,537 | 40.3 | 26.2 | 0.1 | 26,119 |
| **2000** | 16,053 | 58.9 | 11,175 | 41.0 | 36.4 | 0.1 | 27,264 |
| **2001** | 16,623 | 58.7 | 11,673 | 41.2 | 36.4 | 0.1 | 28,332 |
| **2002** | 19,569 | 61.4 | 12,241 | 38.4 | 36.4 | 0.1 | 31,846 |
| **2003** | 22,974 | 64.6 | 12,579 | 35.3 | 33.9 | 0.1 | 35,587 |
| **2004** | 24,145 | 69.2 | 12,645 | 30.6 | 33.9 | 0.2 | 36,824 |

[9] Annual Development of Turkey's Gross Electricity Generation by Share of Primary Energy Resources (1970-2008) (http://www.teias.gov.tr/istatistik2008/3.xls)

[10] Annual Development of Turkey's Installed Capacity by primary energy resourced (1984-2008),( http://www.teias.gov.tr/istatistik2008/3.xls)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2005** | 25,902 | 75.4 | 12,906 | 24.4 | 35.1 | 0.2 | 38,844 |
| **2006** | 27,420 | 74.8 | 13,063 | 25.1 | 81.9 | 0.2 | 40,565 |
| **2007** | 27,271 | 81,0 | 13,394 | 18.7 | 169.2 | 0.3 | 40,835 |
| **2008** | 27,595 | 82.7 | 13,828.7 | 16.8 | 393.5 | 0.5 | 41,817 |

The Simple OM can be calculated using either of the two following data vintages for year(s) y:

- Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.

- Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required calculating the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

Based on the most recent data available, ex ante option is chosen.

***Step 4. Calculate the operating margin emission factor according to the selected method***

There are two options calculating the Simple OM emission factor (grid, OM simple, y EF):

Option A: Based on the net electricity generation and a CO2 emission factor of each power unit;3 or Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:
(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation.

As the data on each power plant/unit is not publicly available and renewable power generation are considered as low-cost/must-run power sources, Option B is selected. Off-grid power plants are not included in the calculations.

The simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} * NCV_{i,y} * EF_{CO2,i,y}}{EG_y}$$

Where:
$EF_{grid,OMsimple,y}$ =Simple operating margin CO2 emission factor in year y (tCO2/MWh)
$FC_{i,y}$ = Amount of fossil fuel type i consumed in the project electricity system in year y(mass or volume unit)
$NCV_{i,y}$ = Net calorific value(energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$ = CO2 emission factor of fossil fuel type i in year y(tCO2/MWh)
$EG_y$ = Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year y(MWh)
i = All fossil fuel types combusted in power sources in the project electricity system in year y
y = The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option).

Additionally, if the grid involves in net electricity import, the simple OM emission factors of the export electricity grid will be used.

***Step 5: Identify the group of power units to be included in the build margin***

The sample group of power units m used to calculate the build margin consists of either:
(a) The set of five power units that have been built most recently; or
(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use the set of power units that comprises the larger annual generation.

The larger annual generation set of power plants shall be used from those options. Therefore; set of power plants that comprise 20% of the system generation and have been recently added to the system is chosen for BM calculations.

In terms of vintage of data, project participants can choose between one of the following two options:

**Option 1:** For the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

**Option 2:** For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Option 1 is selected as the vintage option.

***Step 6. Calculate the build margin emission factor***

The build margin emissions factor is calculated as the generation-weighted average emission factor (tCO2e/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} * EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:
$EF_{grid,BM,y}$ = Build margin $CO_2$ emission factor in year y ($tCO_2$/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$ = $CO_2$ emission factor of power unit m in year y ($tCO_2$/MWh)
m = Power units included in the build margin
y = Most recent historical year for which power generation data is available

The $CO_2$ emission factor of each power unit m ($EF_{EL,m,y}$) is determined as per the guidance in Step 4 (a) for the simple OM, using options A2, using for y the most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

Option A2. If for a power unit m only data on electricity generation and the fuel types used is available, the emission factor should be determined based on the $CO_2$ emission factor of the fuel type used and the efficiency of the power unit, as follows:

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} * 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL,m,y}$ = CO2 emission factor of power unit m in year y (tCO2/MWh)
$EF_{CO2,m,i,y}$ = Average CO2 emission factor of fuel type i used in power unit m in year y (tCO2/GJ)
$\eta_{m,y}$ = Average net energy conversion efficiency of power unit m in year y (ratio)
m = All power units serving the grid in year y except low-cost/must-run power units
y = The relevant year as per the data vintage chosen in Step 3

***Step7. Calculate the combined margin emission factor***

The combined margin emissions factor $EF_{grid,CM,y}$ is calculated as follows:

$EF_{grid,CM,y} = EF_{grid,OMsimple,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}$
$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO2/MWh)
$EF_{grid,OMsimple,y}$ = Operating margin CO2 emission factor in year y (tCO2/MWh)
$w_{OM}$ = Weighting of operating margin emissions factor (%)
$w_{BM}$ = Weighting of build margin emissions factor (%)
The combined margin emissions factor $EF_{grid,CM,y}$ should be calculated as the weighted average of the Operating Margin emission factor ($EF_{grid,OMsimple,y}$) and the Build Margin emission factor ($EF_{grid,BM,y}$), where

$w_{OM}$ = 0.5 and $w_{BM}$ = 0.5 for hydropower project for the first crediting period and for subsequent crediting periods.

**Project Emission**
The project is a new run-of-river project which does not involve any reservoir, PE=0

**Leakage**
According to the AMS-I.D. (version 15), leakage of the project is 0.

**Emission Reduction**
The emission reductions are calculated as follows:

*ERy= BEy-PE y- LE y*

**B.6.2. Data and parameters that are available at validation:**

| **Data / Parameter:** | Electricity generation |
|---|---|
| Data unit: | MWh |
| Description: | Total electricity generated by all power plants connected to the national grid including low-cost must run power plants between 2006-2008. |
| Source of data used: | TEIAS (Turkish Electricity Transmission Company) annual data |
| Value applied: | Detailed in Annex.3 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Official data used for CM calculations. |
| Any comment: | |

| **Data / Parameter:** | $EG_y$ |
|---|---|
| Data unit: | MWh |
| Description: | Net electricity generated by all power plants connected to the national grid excluding low-cost must run power plants between 2006-2008. |
| Source of data used: | TEIAS (Turkish Electricity Transmission Company) annual data |
| Value applied: | Detailed in Annex.3 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Official data used for CM calculations. |
| Any comment: | |

| **Data / Parameter:** | Electricity imported |
|---|---|
| Data unit: | MWh |
| Description: | Electricity imported to the national grid between 2006-2008. |
| Source of data used: | TEIAS (Turkish Electricity Transmission Company) annual data |
| Value applied: | Detailed in Annex.3 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Official data |
| Any comment: | |

| **Data / Parameter:** | FC |
|---|---|
| Data unit: | Tonnes or $m^3$ |
| Description: | Fossil fuel consumed by thermal power plants between 2006-2008 |
| Source of data used: | TEIAS (Turkish Electricity Transmission Company) annual data |
| Value applied: | Detailed in Annex.3 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Official data |
| Any comment: | |

| **Data / Parameter:** | NCV |
|---|---|
| Data unit: | TJ/mass or volume |
| Description: | Net calorific value of each fossil fuel type between 2006-2008 |
| Source of data used: | TEIAS (Turkish Electricity Transmission Company) annual data |
| Value applied: | Detailed in Annex.3 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Official data |
| Any comment: | |

| **Data / Parameter:** | $EF_{CO2}$ |
|---|---|
| Data unit: | $tCO_2/TJ$ |
| Description: | Emission Factor for each fuel type |
| Source of data used: | IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories |
| Value applied: | Detailed in Annex.3 |
| Justification of the | Official data |

| | |
|---|---|
| choice of data or description of measurement methods and procedures actually applied : | |
| Any comment: | |

| **Data / Parameter:** | $\eta_{m,y}$ |
|---|---|
| Data unit: | - |
| Description: | Average net energy conversion efficiency of thermal power units connected to the grid |
| Source of data used: | Annex.1. of 'Tool to calculate emission factor for an electricity system' |
| Value applied: | Detailed in section B.6.3 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | No official record available. |
| Any comment: | |

| **Data / Parameter:** | Capacity addition |
|---|---|
| Data unit: | MWh |
| Description: | Capacity addition to the national grid between 2004-2008 |
| Source of data used: | TEIAS (Turkish Electricity Transmission Company) annual data |
| Value applied: | Detailed in Annex.3 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Official data |
| Any comment: | |

### B.6.3 Ex-ante calculation of emission reductions:

Referring to B 6.1. above, emission reductions for the project are calculated as follows:

**Calculation of Operating Margin**

The following data are available on the Turkish Electricity Transmission Company (TEİAŞ) web site:

- Annual fuel consumption by fuel type[11],
- Annual heating values for fuels consumed for electricity generation[12]

[11]( http://www.teias.gov.tr/istatistik2008/index.htm/43.xls)&(http://www.teias.gov.tr/istatistik2008/index.htm/44.xls)

[12] (http://www.teias.gov.tr/istatistik2008/45.xls)& (http://www.teias.gov.tr/istatistik2008 /46.xls)

- Annual electricity generation by fuel type, import and export[13]

Annual heating values for each fuel type are directly related with the fuel consumption and are used to calculate Net Calorific Values (TJ/kt) for each year (Table.9). Heating value for each fuel type in each year has been converted and divided by the related fossil fuel consumption. The following formula is applied:

$NCV_{f,y} = HV_{f,y} * CF / FC_{f,y}$

where:

NCVf,y= net calorific value for the fuel type f in year y (TJ/kt)
$HV_{f,y}$ =Heating value for the fuel type f in year y (Tcal)
CF= conversion factor from TJ to Tcal (4.1868 TJ/Tcal)
$FC_{f,y}$= Fuel consumption for the fuel type f in year y (kton)

**Table.9. Net Calorific Values for each fuel type for Turkey.**

| Fuel Type | NCV (TJ/kt) | | |
|---|---|---|---|
| | **2006** | **2007** | **2008** |
| *Hard Coal + Imported Coal* | 21.99 | 22.30 | 22.24 |
| *Lignite* | 6.95 | 6.86 | 6.83 |
| *Fuel Oil* | 40.20 | 39.87 | 39.70 |
| *Diesel Oil* | 42.68 | 43.09 | 42.38 |
| *Naphtha* | 43.88 | 43.18 | 44.61 |
| *Natural Gas* | 37.01 | 36.76 | 36.63 |

The coefficients required for calculation of $CO_2$ emission factor ($tCO_2/TJ$) have been obtained through IPCC 2006 guidelines for GHG inventories[14]. Using the available data, overall $CO_2$ production by electricity generation is calculated as given in Table 10 below.

**Table.10. Calculation of total emission by electricity generation**

| | **COEF ($tCO_2/TJ$) (Lower)** | **Fuel Consumption (2006-2008)** (tons or 1000$m^3$) | **Total Emission (2006 - 2008) ($tCO_2$)** |
|---|---|---|---|
| *Hard Coal+ Imported Coal* | 94.600 | 17,917,014 | 37,598,650.54 |
| *Lignite* | 90.933 | 178,181,751 | 111,311,692.92 |
| *Fuel Oil* | 67.833 | 6,170,427 | 18,590,040.95 |
| *Diesel Oil* | 72.600 | 242,940 | 751,393.27 |
| *Naphtha* | 69,300 | 35,500 | 107,934.03 |
| *Natural Gas* | 54.267 | 59,099,976 | 118,054,570.32 |

[13]( http://www.teias.gov.tr/istatistik2008/istatistik2008/36(01-05).xls)&( http://www.teias.gov.tr/istatistik2008/37(06-08).xls)

[14] Table 2.2.Default Emission Factors for Stationary Combustion in the Energy Industries, Vol.2. Energy, 2006 IPCC Guidelines for National Greenhouse Gas Inventories,
(http://www.ipccnggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf)

| Total Emissions | 286,414,282 |
|---|---|

Net electricity generated and supplied to the grid by thermal plants has been calculated using data obtained from the TEİAŞ web page[15]. The ratio between gross and net generation has been calculated first, and assuming that the same ratio is valid for thermal plants; gross generation by thermal power plants has been multiplied by this ratio in order to find net generation by thermal plants. Summing up this with the imported electricity, total supply excluding low cost / must run sources are determined as given in Table.11 below.

**Table.11. Net Electricity Generation from thermal power plants (units in GWh)**

| Year | Gross generation | Net generation | Net/Gross (1) | Gross Gen. Thermal (2) | Net Gen Thermal (1x2) | Import | Total Supply to the grid |
|---|---|---|---|---|---|---|---|
| 2006 | 176,299 | 169,543 | 0.962 | 131,835 | 126,783 | 573 | 127,356 |
| 2007 | 191,558 | 183,339 | 0.957 | 155,196 | 148,537 | 864 | 149,402 |
| 2008 | 198,418 | 189,761 | 0.956 | 164,139 | 156,978 | 789.4 | 157,768 |
| | | | **Total Net Thermal Gen.** | | **432,299** | **2,227** | **434,525.8** |

Finally, using the data tabulated in the previous two tables, the OM emission factor considering years 2006 -2008 has been calculated as generation weighted average from equation for OM above;

$$EF_{grid, OMsimple, y} = 0.659\ tCO_2/\ MWh$$

The Operating Margin emission factor calculated above will be constant throughout the 10 year crediting period.

**Calculation of Build Margin**

The gross electricity generation in year 2008 is taken as reference for determination of plants that comprise 20% of the system generation. The gross generation was 198,418 GWh in 20078 and 20% of that amount is calculated as 39,683.6 GWh. Summing up all the plants build in 2008, 2007, 2006, 2005 and some of the capacity addition in 2004 the total generation is 42,035.7 GWh.

The following assumptions have been made for the calculation of BM:

- *Where no data is available about the annual electricity generation of the power plants added to the grid, the data are taken from the existing situation presented in capacity projection report (2009-2018)[16] (years 2006, 2007 and 2008).*
- *The corrections to the data and capacity additions from retrofits of power plants are excluded from calculation in accordance with the methodology.*
- *For the generation efficiencies, Annex.1-Default efficiency factors for power plants of "Tool to calculate emission factor for an electricity system"*

[15] Annual Development of Electricity Generation-Consumption and Losses in Turkey (http://www.teias.gov.tr/ist2006/30(84-06).xls)

[16] http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf

- *Data for oxidation index and default values for effective $CO_2$ emission factor have been obtained through IPCC[17] guidelines.*
- *The coal power plants are assumed to be sub-critical, natural gas plants are taken as combined cycle and oil power plants are assumed to be steam turbine.*

The Build Margin emission factor has been determined for most recent capacity additions using the EF values calculated for each fuel source (Table 12).

**Table.12. Calculation of emission factor from most recent plants.**

| | A | B | C | D |
|---|---|---|---|---|
| | **COEF (tCO2/Tj)** (Lower) | **OXID** | **Generation Efficiency %** | **$EF_{EL}$ ($tCO_2$/MWh)** |
| **Coal** | 94,600 | 1 | 39% | 1.014 |
| **Lignite** | 90,933 | 1 | 39% | 0.998 |
| **Fuel Oil** | 67,833 | 1 | 39% | 0.774 |
| **Diesel** | 72,600 | 1 | 39% | 0.949 |
| **Naphtha** | 69,300 | 1 | 39% | 0.554 |
| **Natural Gas** | 54,267 | 1 | 60% | 0.425 |

The Build Margin emission factor is separately calculated for each year and generation weighted average is taken.

Finally, overall build margin emission factor have been calculated as:

$$\mathbf{EF_{grid,\ BM,\ y} = 0.426}$$

**Calculation of the Combined Margin**

$$\mathbf{EF_{grid,\ CM,\ y} = 0.5 * 0.659 + 0.5 * 0.427 = 0.543}$$

The combined margin emission factor is therefore **0.543 $tCO_2$/MWh** which will be used as the baseline factor in calculation of emission reduction by project activity.

**Emission reduction (ERy*)* by the proposed project activity**

For the first crediting period of 10 years, annual emission reduction will be;
5,203,000 kWh * 0.543 $tCO_2e$/ MWh = **2,825 tCO2** equivalent
Whereas total emission reduction will be; **2,825 $tCO_2$** equivalent

[17] Table 1.4.Default CO2 emission factors for Combustion,Vol.2. Energy, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)

### B.6.4 Summary of the ex-ante estimation of emission reductions:

| Year | Estimation of project activity emission (tCO2e) | Estimation of baseline Emission (tCO2e) | Estimation of leakage (tCO2e) | Estimation of emission reductions (tCO2e) |
|---|---|---|---|---|
| 2009 | **0** | 940 | **0** | 940 |
| 2010 | **0** | 2,825 | **0** | 2,825 |
| 2011 | **0** | 2,825 | **0** | 2,825 |
| 2012 | **0** | 2,825 | **0** | 2,825 |
| 2013 | **0** | 2,825 | **0** | 2,825 |
| 2014 | **0** | 2,825 | **0** | 2,825 |
| 2015 | **0** | 2,825 | **0** | 2,825 |
| 2016 | **0** | 2,825 | **0** | 2,825 |
| 2017 | **0** | 2,825 | **0** | 2,825 |
| 2018 | **0** | 2,825 | **0** | 2,825 |
| 2019 | **0** | 1,885 | **0** | 1,885 |
| Total ($tCO_2e$) 10 Years | **0** | **28,250** | **0** | **28,250** |

## B.7 Application of a monitoring methodology and description of the monitoring plan:

### B.7.1 Data and parameters monitored:

| **Data / Parameter:** | **$EG_y$** |
|---|---|
| Data unit: | MWh |
| Description: | Net Electricity generated and delivered to the grid by the Yazi HEPP in year "y" |
| Source of data to be used: | Metering devices used in power plants, monthly records signed by TEIAS and plants manager and invoices will be used. |
| Value of data | Estimated annual generation forming the basis for emission reduction calculation is 5,203 GWh |
| Description of measurement methods and procedures to be applied: | Generation data will be recorded by two metering devices continuously. These records will provide the data for the monthly invoicing to TEIAS. Each month, an officer from TEIAS and the manager/electricity technician of the plant will record the readings and sign. This record will form the basis for monthly invoicing. |
| QA/QC procedures to be applied: | Two calibrated ammeters will act as backup for each other. Maintenance and calibration of the metering devices will be made by TEIAS periodically. If the difference between the readings of two devices exceeds 0.2%, maintenance will be done before waiting for periodical maintenance. |
| Any comment: | |

### B.7.2 Description of the monitoring plan:

The Monitoring Plan used for determining the emission reduction by the Project is based on the approved methodology AMS-I.D. The aim of the plan is to maintain credible and transparent measurement and collection of data for precise calculation of emission reduction during the crediting period.

In order to demonstrate the emission reduction, the only required data is the amount of electricity generated by the project activity. The Monitoring Plan used for determining the emission reduction by the Project is based on the approved methodology AMS-I.D. Monitoring Plan will be implemented by the Project Owner who will keep track of gross electricity production by an automated system. TEIAS officers will do monthly readings for the sale of net electricity fed into the grid and issue reports. Two data sets will be used for cross-checking.

The emission reduction calculations will be based on the TEIAS reports as the power meters are placed where net electricity fed into the grid.

The internal energy consumption will be supplied from the plant generation and will be deducted from the total generation. When there is no electricity production in the plants, the internal consumption will be supplied from grid. The amount of supplied has been reported in monthly TEIAS monitoring reports. In case of emergency, a generator has been provided. However, the emissions from the generator have been neglected as it is estimated to be less than 1% of the total emission reductions achieved.

Two power meters will back up each other for accuracy. Calibration report of meters will be presented in any occurrence.

## B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

Date of completion of the baseline study: 10th August 2009
Baseline determined by SerCarbon (Ser-C Elektrik Uretim Ins. ve Tic. Ltd. Sti.)
Contact Person: Caglayan Bulut
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## SECTION C. Duration of the project activity / crediting period

## C.1 Duration of the project activity:

### C.1.1. Starting date of the project activity:

Actual start date of the Project is 02 October 2009

### C.1.2. Expected operational lifetime of the project activity:

Expected economical life time of the Project activity is 44 years.

**C.2 Choice of the crediting period and related information:**

**C.2.1. Renewable crediting period**

Renewable crediting will be 10 years, renewable twice. The total crediting period will be 30 years.

**C.2.1.1. Starting date of the first crediting period:**

First crediting period is expected to start in 02 October 2009

**C.2.1.2. Length of the first crediting period:**

Length of the crediting period is 10 years.

**C.2.2. Fixed crediting period:**

**C.2.2.1. Starting date:**

>>

**C.2.2.2. Length:**

>>

## SECTION D. Environmental impacts

**D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:**

Environmental Impact Assessment study is not mandatory for that size of projects. However; the project owner is responsible in taking necessary precautions during construction phase and operational phase of the project in accordance with the laws and the agreement between General Directorate of State Hydraulics and the project owner.

In accordance with the agreement, the project owner gave commitment on taking responsibility of any damage on the environment. The articles 18 and 19 of the agreement imply that the project will not change or harm the quality of water which is used to generate electricity. A pre-calculated amount of water flow by considering the human and the habitat activities will be released. Furthermore, the project owner cannot claim any rights on the water quality; however, he/she has to run all the quality tests in order to achieve the State Hydraulic Works' criteria. After evaluating all the tests regarding to water quality state hydraulic works will inform the project proponent in two months in case further improvements in the operation should be implemented. [18]

The company decided to locate the penstock under the soil under in order to do no harm to the environment. In addition 500 (five hundred) trees will be planted, which will change the region in a positive way.

[18] Water Right Agreement with State Hydraulic Works pg. 3 clause 18-19

**D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:**

No significant impacts are foreseen for the project.

## SECTION E. Stakeholders' comments

**E.1. Brief description how comments by local stakeholders have been invited and compiled:**

The project is located far away from residential areas and does not have any adverse environmental impacts to the surrounding. Comments have been received were during the site visit while one of the residents hosted the project developer at his house.

The project owner and the residents confirmed that only three or four of the all houses were occupied during the winter and the population rises up to eight or ten households during the summer. It has been observed that the residents use the water for irrigation purposes. The company should release the water without impairing the quality of the water in accordance with the water rights agreement.

Even tough, no stakeholder meeting has been held due to any residential area, the project proponents will keep the relationship with two or three local home owners. Moreover, headman of the Kayioren Village and the project proponent had a meeting before the construction of the project.

**E.2. Summary of the comments received:**

During the site visit it has seen that local people has no problem with the project. The results of the informal meeting with the local residents were open and peaceful.

Mr. Idris who owned a bee farm in order to produce honey and Mr. Huseyin Bayram and his wife who hosted the project developer and the project verifier were also stated that the project had contributions to regional development and they were happy to see that a facility which generates electricity has constructed in such a small village. The only concern of the residents was the roads which have been distracted during the construction of the project activity. Also, the headman of the Kayioren village Mr. Ahmet Bilgin requested some construction materials such as cement, ceramics, iron, sand, for the purpose of reconstruction of the mosque and school of the village.

**E.3. Report on how due account was taken of any comments received:**

Project owner replied positively to the comments given by the stakeholders. He stated that, they would reconstruct the roads that he distracted during the construction of the project activity. The construction materials requested by the mosque and school will be provided as well. Sufficient amount of water for living and irrigation purpose will be released directly from purification facility very close to power house In addition, 500 (five hundred) trees will be planted to form a recreational area. The project proponent also stated that the last meeting held by board of directors made a decision on giving scholarship to the local students for their further education purposes. The scholarships are going to be given from a certain proportion of annual profit. The students are going to be chosen from the area where the proposed project is in operation. Project proponent states that by the scholarships, they are aiming not only to operate a facility which generates electricity but also by the time they are located in the area, they wanted to create a sustainable interest for the local people.

## Annex 1
## CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

| | |
|---|---|
| Organization: | SerCarbon |
| Street/P.O.Box: | Ogretmenler Cad. Cukurambar/Balgat |
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| Represented by: | |
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| Last Name: | Bulut |
| Middle Name: | |
| First Name: | Caglayan |
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| | |
|---|---|
| Organization: | Elestas Elektrik Üretim A.S |
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| Represented by: | |
| Title: | Vice Chief Executive |
| Salutation: | Mr. |
| Last Name: | Çiçek |
| Middle Name: | |
| First Name: | Ali |
| Department / Responsibilities: | Managing all the activites regarding running the proposed project activity and collecting data at the monitoring stage |
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## Annex 2

## INFORMATION REGARDING PUBLIC FUNDING

N/A

## Annex 3

## BASELINE INFORMATION

### Data Used in calculation of OM for Turkish Electricity Grid

**Table.A. Heating Values of Fuels Consumed in Thermal Power Plants in Turkey by the Electric Utilities (Tcal)[19]**

| *Years* | *2006* | *2007* | *2008* |
|---|---|---|---|
| *Hard Coal Imported Coal* | 29,504 | 32,115 | 33,310 |
| *Lignite* | 83,932 | 100,320 | 108,227 |
| *Total* | **113,436** | **132,435** | **141,537** |
| *Fuel Oil* | 16,769 | 21,434 | 20,607 |
| *Diesel Oil* | 627 | 517 | 1,328 |
| *Naphta* | 141 | 118 | 113 |
| *TOTAL* | **17,537** | **22,069** | **22,048** |
| *Natural Gas* | **150,588** | **179,634** | **189,057** |
| *TOTAL* | **281,561** | **334,138** | **352,642** |

**Table.B. Fuel Consumed in Thermal Power Plants in Turkey by the Electric Utilities (ton/m³)[20]**

| *Years* | *2006* | *2007* | *2008* |
|---|---|---|---|
| *Hard Coal Imported Coal* | 5,617,863 | 6,029,143 | 6,270,008 |
| *Lignite* | 50,583,810 | 61,223,821 | 66,374,120 |
| *TOTAL* | **56,201,673** | **67,252,964** | **72,644,128** |
| *Fuel Oil* | 1,746,370 | 2,250,686 | 2,173,371 |
| *Diesel Oil* | 61,501 | 50,233 | 131,206 |
| *Lpg* | 33 | 0 | 0 |
| *Naphta* | 13,453 | 11,441 | 10,606 |
| *TOTAL* | **1,821,357** | **2,312,360** | **2,315,183** |
| *Natural Gas* | **17,034,548** | **20,457,793** | **21,607,635** |

[19] http://www.teias.gov.tr/istatistik2008/46.xls

[20] http://www.teias.gov.tr/istatistik2008/44.xls

**Table.C. Net Electricity supply to the grid by thermal plants and imports[21]**

| Year | Gross generation | Net generation | Import |
|---|---|---|---|
| 2006 | 176299.8 | 169543.1 | 573.2 |
| 2007 | 191558.1 | 183339.7 | 864.3 |
| 2008 | 198418.0 | 189761.9 | 789.4 |

**Table.D. Default Emission Factors for Stationary Combustion in the Energy Industries (kg of greenhouse gas per TJ on a Net Calorific Basis)[22]**

| Fuel | $CO_2$ | | |
|---|---|---|---|
| | Default Emission Factor | Lower | Upper |
| Residual Fuel Oil | 77,400 | **75,500** | 78,800 |
| Gas/Diesel Oil | 74,100 | **72,600** | 74,800 |
| Residual Fuel Oil | 77,400 | **75,500** | 78,800 |
| Liquefied Petroleum Gases | 63,100 | **61,600** | 65,600 |
| Naptha | 73,300 | **69,300** | 76,300 |
| Anthracite | 98,300 | **94,600** | 101,000 |
| Lignite | 101,000 | **90,900** | 115,000 |
| Natural Gas | 56,100 | **54,300** | 58,300 |

**Data Used in calculation of BM for Turkish Electricity Grid**

**Table.E. Generation Units put into Operation in 2004 used for BM calculations[23]**

| *GENERATION UNITS PUT INTO OPERATION IN 2004* | | | | | | |
|---|---|---|---|---|---|---|
| **POWER PLANTS** | **INSTALLED CAPACITY (MW)** | ***ELECTRICITY UTILITIES*** | ***FUEL TYPE*** | **GENERATION CAPACITY (GWh)** | | **COMMISSIONARY DATE** |
| | | | | Average | Firm | |
| STANDART PROFİL 3 GM | 6.7 | AUTOPRODUCERS | *N.GAS* | 49.,2 | 49.2 | 22.10.2004 |
| KARKEY-II 3+3 DGM | 54.3 | IPP | *FUEL-OIL* | 369.7 | 369.7 | 12.11.2004 |
| ALTINMARKA GIDA GR I-II-III | 3.6 | AUTOPRODUCERS | *N.GAS* | 28.8 | 28.8 | 17.12.2004 |
| **TOTAL** | **64.6** | | | **447.7** | **447.7** | |

[21] http://www.teias.gov.tr/istatistik2008/30(84-08).xls

[22] Table 1.4 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)

[23] http://www.teias.gov.tr/istat2004/7.xls

## Table.F. Generation Units put into Operation in 2005[24]

| SANTRALIN ADI<br>*POWER PLANTS* | KURULU GÜÇ<br>*INSTALLED CAPACITY* (MW) | KURULUŞ ADI<br>*ELECTRICITY UTILITIES* | | ÜRETİM KAPASİTESİ (GWh)<br>*GENERATION CAPACITY (GWh)*<br>Ortalama *Average* | <br>Güvenilir *Firm* | GİRİŞ TARİHİ<br>*COMISSIONARY DATE* |
|---|---|---|---|---|---|---|
| ÇAN GR I | 160.000 | EÜAŞ | *LIGNITE* | 1,040.0 | 1,040.0 | 14/02/2001 |
| ÇAN GR II | 160.000 | EÜAŞ | *LIGNITE* | 1,040.0 | 1,040.0 | 14/03/2001 |
| ELBİSTAN-B GR I | 360.000 | EÜAŞ | *LIGNITE* | 2,340.0 | 2,340.0 | 14/02/2001 |
| AKBAŞLAR GR-II(İZOLE) | 8.830 | OTOPRODÜKTÖR | *N.GAS* | 73.0 | 73.0 | 23/06/2001 |
| AKÇA ENERJİ GR-III | 8.730 | OTOPRODÜKTÖR | *NAPHTHA* | 65.4 | 65.4 | 13/12/2001 |
| AYKA TEKSTİL GR-I | 5.500 | OTOPRODÜKTÖR | *N.GAS* | 40.0 | 40.0 | 23/09/2001 |
| BAYDEMİRLER GR IV-V-VI | 6.210 | OTOPRODÜKTÖR | *N.GAS* | 51.4 | 51.4 | 03/02/2001 |
| BOSEN GR-III | 50.000 | OTOPRODÜKTÖR | *N.GAS* | 350.0 | 350.0 | 29/12/2001 |
| BOSEN (DÜZELTME) | -6.500 | OTOPRODÜKTÖR | *N.GAS* | -45.5 | -45.5 | 29/12/2001 |
| ÇUMRA ŞEKER | 16.000 | OTOPRODÜKTÖR | *LIGNITE* | 40.0 | 40.0 | 31/12/2000 |
| ETİ MAD.(BAN.ASİT)(SÖKÜLDÜ) | -3.800 | OTOPRODÜKTÖR | *RENEW.+ WASTES* | -28.5 | -28.5 | 14/07/2001 |
| ETİ MAD.(BAN.ASİT)GR-I | 11.500 | OTOPRODÜKTÖR | *RENEW.+ WASTES* | 85.0 | 85.0 | 14/07/2001 |
| EVYAP GR I-II | 5.120 | OTOPRODÜKTÖR | *N.GAS* | 30.0 | 30.0 | 26/08/2001 |
| GRANİSER GRANİT GR-I | 5.500 | OTOPRODÜKTÖR | *N.GAS* | 42.0 | 42.0 | 13/11/2001 |
| HABAŞ ALİAĞA GR III | 47.694 | OTOPRODÜKTÖR | *N.GAS* | 381.6 | 381.6 | 01/06/2001 |
| HABAŞ ALİAĞA GR IV | 47.694 | OTOPRODÜKTÖR | *N.GAS* | 381.6 | 381.6 | 20/09/2001 |
| HABAŞ ALİAĞA GR-V | 24.600 | OTOPRODÜKTÖR | *N.GAS* | 196.8 | 196.8 | 23/11/2001 |
| HABAŞ ALİAĞA (DÜZELTME) | 6.158 | OTOPRODÜKTÖR | *N.GAS* | 49.3 | 49.3 | 23/11/2001 |
| HAYAT KAĞIT GR-I | 7.531 | OTOPRODÜKTÖR | *N.GAS* | 56.0 | 56.0 | 26/05/2001 |
| İÇDAŞ ÇELİK GR-I | 135.000 | OTOPRODÜKTÖR | *IMPORTED COAL* | 1,080.0 | 1,080.0 | 29/11/2001 |
| KAHRAMANMARAŞ KAĞIT GR-I | 6.000 | OTOPRODÜKTÖR | *IMPORTED COAL* | 45.0 | 45.0 | 07/12/2001 |
| KORUMA KLOR GR I-II-III | 9.600 | OTOPRODÜKTÖR | *N.GAS* | 77.0 | 77.0 | 02/12/2001 |
| KÜÇÜKÇALIK TEKSTİL GR I-II-III-IV | 8.000 | OTOPRODÜKTÖR | *N.GAS* | 64.0 | 64.0 | 26/11/2001 |
| MERCEDES BENZ TURK GR I-II-III-IV | 8.280 | OTOPRODÜKTÖR | *N.GAS* | 68.0 | 68.0 | 03/02/2001 |
| MODERN ENERJİ GR-III | 8.380 | OTOPRODÜKTÖR | *N.GAS* | 62.9 | 62.9 | 13/06/2001 |
| MODERN ENERJİ (DÜZELTME) | -10.000 | OTOPRODÜKTÖR | *N.GAS* | -75.0 | -75.0 | 13/06/2001 |
| MODERN ENERJİ GR-II | 6.720 | OTOPRODÜKTÖR | *LPG* | 50.4 | 50.4 | 13/06/2001 |
| MOSB GR I-II-III(SÖKÜLDÜ) | -54.300 | OTOPRODÜKTÖR | *F.OIL* | -407.3 | -407.3 | 30/04/2001 |
| MOSB GR I-II-III-IV-V-VI-VII | 84.834 | OTOPRODÜKTÖR | *N.GAS* | 434.0 | 434.0 | 01.03 - 01.08.2005 |
| ORS RULMAN | 12.420 | OTOPRODÜKTÖR | *N.GAS* | 99.4 | 99.4 | 24/08/2001 |
| PAK GIDA(Kemalpaşa) GR-I | 5.670 | OTOPRODÜKTÖR | *N.GAS* | 45.0 | 45.0 | 06/12/2001 |
| TEZCAN GALVANİZ GR I-II | 3.664 | OTOPRODÜKTÖR | *N.GAS* | 29.0 | 29.0 | 26/05/2001 |
| YONGAPAN(KAST.ENTG) GR-II | 5.200 | OTOPRODÜKTÖR | *N.GAS* | 32.7 | 32.7 | 24/05/2001 |
| ZEYNEP GİYİM SAN. GR-I | 1.165 | OTOPRODÜKTÖR | *N.GAS* | 9.0 | 9.0 | 06/07/2001 |
| OTOP DÜZELTME | 0.024 | OTOPRODÜKTÖR | *RENEW.+ WASTES* | 0.0 | 0.0 | |
| OTOP DÜZELTME | -0.187 | OTOPRODÜKTÖR | *N.GAS* | 0.0 | 0.0 | |
| OTOP DÜZELTME | -7.202 | OTOPRODÜKTÖR | *LIQUID* | -55.2 | -55.2 | |
| OTOP DÜZELTME | -1.016 | OTOPRODÜKTÖR | *F.OIL* | -6.0 | -6.0 | |
| OTOP DÜZELTME | 2.109 | OTOPRODÜKTÖR | *SOLID* | 5.2 | 5.2 | |
| OTOP DÜZELTME | 0.060 | OTOPRODÜKTÖR | *LIGNITE* | 0.0 | 0.0 | |
| OTOP DÜZELTME | -0.300 | OTOPRODÜKTÖR | *NAPHTHA* | 0.0 | 0.0 | |

[24] http://www.teias.gov.tr/istatistik2005/7.xls

| | | | | | | |
|---|---|---|---|---|---|---|
| OTOP DÜZELTME | 0.612 | OTOPRODÜKTÖR | *D.OIL* | 1.8 | 1.8 | |
| AK ENERJİ(K.paşa) GR- III | 40.000 | SERBEST ÜR.ŞTİ. | *N.GAS* | 256.9 | 256.9 | 08/11/2001 |
| AK ENERJİ(K.paşa) GR I-II | 87.200 | SERBEST ÜR.ŞTİ. | *N.GAS* | 560.1 | 560.1 | 29/04/2001 |
| ALTEK ALARKO GR I-II | 60.100 | SERBEST ÜR.ŞTİ. | *N.GAS* | 420.0 | 420.0 | 13/10/2001 |
| BİS ENERJİ GR VII | 43.700 | SERBEST ÜR.ŞTİ. | *N.GAS* | 360.8 | 360.8 | 17/03/2001 |
| CAN ENERJİ GR-I | 3.900 | SERBEST ÜR.ŞTİ. | *N.GAS* | 28.0 | 28.0 | 24/08/2001 |
| ÇEBİ ENERJİ BT | 21.000 | SERBEST ÜR.ŞTİ. | *N.GAS* | 164.9 | 164.9 | 26/08/2001 |
| ÇEBİ ENERJİ GT | 43.366 | SERBEST ÜR.ŞTİ. | *N.GAS* | 340.1 | 340.1 | 22/08/2001 |
| ENTEK ELK.A.Ş.KOÇ ÜNİ.GR I-II | 2.332 | SERBEST ÜR.ŞTİ. | *N.GAS* | 19.0 | 19.0 | 06/02/2001 |
| KAREGE GR IV-V | 18.060 | SERBEST ÜR.ŞTİ. | *N.GAS* | 141.9 | 141.9 | 06/04/2001 |
| KARKEY(SİLOPİ-4) GR-IV | 6.150 | SERBEST ÜR.ŞTİ. | *F.OIL* | 47.2 | 47.2 | 29/06/2001 |
| KARKEY(SİLOPİ-4) GR-V | 6.750 | SERBEST ÜR.ŞTİ. | *F.OIL* | 51.9 | 51.9 | 22/12/2001 |
| METEM ENERJİ(Hacışıramat) GR I-II | 7.832 | SERBEST ÜR.ŞTİ. | *N.GAS* | 58.0 | 58.0 | 28/01/2001 |
| METEM ENERJİ(Peliklik) GR I-II-III | 11.748 | SERBEST ÜR.ŞTİ. | *N.GAS* | 89.0 | 89.0 | 28/01/2001 |
| NOREN ENERJİ GR-I | 8.730 | SERBEST ÜR.ŞTİ. | *N.GAS* | 70.0 | 70.0 | 23/08/2001 |
| NUH ENERJİ-2 GR I | 46.950 | SERBEST ÜR.ŞTİ. | *N.GAS* | 319.7 | 319.7 | 23/05/2001 |
| ZORLU ENERJİ KAYSERİ GR-I-II-III | 149.871 | SERBEST ÜR.ŞTİ. | *N.GAS* | 1,144.1 | 1,144.1 | 21/07/2001 |
| ZORLU ENERJİ KAYSERİ GR-IV | 38.630 | SERBEST ÜR.ŞTİ. | *N.GAS* | 294.9 | 294.9 | 25/10/2001 |
| ZORLU ENERJİ YALOVA GR I-II | 15.930 | SERBEST ÜR.ŞTİ. | *N.GAS* | 122.0 | 122.0 | 25/11/2001 |
| **TERMİK TOPLAM** | **1,757.749** | | | **12,236.3** | **12,236.3** | |
| TEKTUĞ(Kargılık) GR I-II | 23.900 | SERBEST ÜR.ŞTİ. | *RUN OF RIVER* | 83.0 | 19.0 | 24/04/2001 |
| İÇTAŞ ENERJİ(Yukarı Mercan) GR I-II | 14.190 | SERBEST ÜR.ŞTİ. | *RUN OF RIVER* | 44.0 | 20.0 | 21/05/2001 |
| MURATLI GR I-II | 115.000 | EÜAŞ | *DAM* | 444.0 | 400.0 | 02/06/2001 |
| BEREKET EN.(DALAMAN) GR XIII-XIV-XV | 7.500 | SERBEST ÜR.ŞTİ. | *RUN OF RIVER* | 35.8 | 0.0 | 15/07/2001 |
| YAMULA GRUP I-II | 100.000 | YİD | *DAM* | 422.0 | 345.0 | 30/07/2001 |
| **HİDROLİK TOPLAM** | **260.590** | | | **1,028.8** | **784.0** | |
| SUNJÜT(RES) GR I-II | 1.200 | OTOPRODÜKTÖR | *WIND* | 2.4 | 2.0 | 22/04/2001 |
| **RÜZGAR TOPLAM** | **1.200** | | | **2.4** | **2.0** | |
| **GENEL TOPLAM** | **2,019.539** | | | **13,267.5** | **13,022.3** | |

**Table.G. Generation Units put into Operation in 2006[25]**

| | | | *GENERATION CAPACITY (GWh)* | |
|---|---|---|---|---|
| *ELECTRIC UTILITIES* | | *INSTALLED CAPACITY* | **Ortalama** | **Güvenilir** |
| | | **(MW)** | *Average* | *Firm* |
| EÜAŞ | | 1,080.0 | 7,020.0 | 7,020.0 |
| OTOPRODÜKTÖR | *AUTOPRODUCER* | 143.5 | 1,086.2 | 1,086.2 |
| SERBEST ÜR.ŞTİ. | *IPP* | 389.8 | 3,048.8 | 3,048.8 |
| **THERMAL TOTAL** | *THERMAL TOTAL* | **1,613.3** | **11,155.0** | **11,155.0** |
| SERBEST ÜR.ŞTİ. | *IPP* | 46.8 | 188.0 | 164.5 |
| JEOTER.+RÜZGAR TOP. | *GEOTHERMAL+WIND TOTAL* | 46.8 | 188.0 | 164.5 |
| EÜAŞ | | 52.1 | 124.0 | 0.0 |
| SERBEST ÜR.ŞTİ. | *IPP* | 105,4 | 358.1 | 211.0 |
| **HYDROLIC TOTAL** | *HYDRO TOTAL* | **157.5** | **482.1** | **211.0** |
| **TOTAL** | *GENERAL TOTAL* | **1,817.6** | **11,825.1** | **11,530.5** |

**Table.H. Thermal Power Electricity Utilities put into Operation in 2006[26]**

| ÜNİTENİN ADI | ÜNİTE GÜCÜ (MW) | KURULUŞ ADI | YAKIT CİNSİ | SERVİSE GİRİŞ TARİHİ |
|---|---|---|---|---|
| EKOTEN TEKSTİL GR-I | 1.932 | OTOPRODÜKTÖR | DOĞALGAZ | 16.02.2006 |
| ERAK GİYİM GR-I | 1.365 | OTOPRODÜKTÖR | DOĞALGAZ | 22.02.2006 |
| ALARKO ALTEK GR-III | 21.89 | SERBEST ÜRETİM ŞTİ. | BUHAR | 23.02.2006 |
| AYDIN ÖRME GR-I | 7.52 | OTOPRODÜKTÖR | DOĞALGAZ | 25.02.2006 |
| NUH ENERJİ-2 GR II | 26.08 | SERBEST ÜRETİM ŞTİ. | BUHAR TÜRBİNİ | 02.03.2006 |
| MARMARA ELEKTRİK (Çorlu) GR I | 8.73 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 13.04.2006 |
| MARMARA PAMUK (Çorlu) GR I | .,73 | OTOPRODÜKTÖR | DOĞALGAZ | 13.04.2006 |
| ENTEK (Köseköy) GR IV | 47.62 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 14.04.2006 |
| ELSE TEKSTİL (Çorlu) GR I - II | 3.16 | OTOPRODÜKTÖR | DOĞALGAZ | 15.04.2006 |
| BARES IX GRUP | 13.5 | SERBEST ÜRETİM ŞTİ. | RÜZGAR | 20.04.2006 |
| SÖNMEZ ELEKTRİK (Çorlu) GR I - II | 17.46 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 03.05.2006 |
| DENİZLİ ÇİMENTO(DÜZELTME) | 0.445 | OTOPRODÜKTÖR | DOĞALGAZ | 04.05.2006 |
| MENDERES ELEKTRİK GR I | 7951 | SERBEST ÜRETİM ŞTİ. | JEOTERMAL | 10.05.2006 |
| KASTAMONU ENTEGRE (Balıkesir) GR I | 7.52 | OTOPRODÜKTÖR | DOĞALGAZ | 24.05.2006 |
| BARES X. ve XX. GRUPLAR | 16.5 | SERBEST ÜRETİM ŞTİ. | RÜZGAR | 26.05.2006 |
| BOZ ENERJİ GR I | 8.73 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 09.06.2006 |
| ADANA ATIK SU ARITMA TESİSİ | 0.803 | OTOPRODÜKTÖR | BİOGAZ | 09.06.2006 |
| AMYLUM NİŞASTA (ADANA) | -6.2 | OTOPRODÜKTÖR | FUEL-OİL | 09.06.2006 |
| AMYLUM NİŞASTA (ADANA) | 14.25 | OTOPRODÜKTÖR | DOĞALGAZ | 09.06.2006 |

[25]http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf

[26]http://www.teias.gov.tr/ist2006/8.xls

| | | | | |
|---|---|---|---|---|
| ŞIK MAKAS (Çorlu) GR I | 1.58 | OTOPRODÜKTÖR | DOĞALGAZ | 22.06.2006 |
| ELBİSTAN B GR III | 360 | EÜAŞ | LİNYİT | 23.06.2006 |
| ANTALYA ENERJİ GR I - II - III - IV | 34.92 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 29.06.2006 |
| HAYAT TEM. VE SAĞLIK GR I - II | 15.04 | OTOPRODÜKTÖR | DOĞALGAZ | 30.06.2006 |
| EKOLOJİK EN. (Kemerburgaz) GR I | 0.98 | SERBEST ÜRETİM ŞTİ. | ÇÖP GAZI | 31.07.2006 |
| EROĞLU GİYİM (Çorlu) GR I | 1,165 | OTOPRODÜKTÖR | DOĞALGAZ | 01.08.2006 |
| CAM İŞ ELEKTRİK (Mersin) GR I | 126.1 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 13.09.2006 |
| ELBİSTAN B GR II | 360 | EÜAŞ | LİNYİT | 17.09.2006 |
| YILDIZ ENT. AĞAÇ (Kocaeli) GR I | 6.184 | OTOPRODÜKTÖR | DOĞALGAZ | 21.09.2006 |
| ÇERKEZKÖY ENERJİ GR I | 49.164 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 06.10.2006 |
| ENTEK (Köseköy) GR V | 37 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 03.11.2006 |
| ITC-KA EN. MAMAK TOP.M. GR I-II-III | 4.239 | SERBEST ÜRETİM ŞTİ. | ÇÖP GAZI | 03.11.2006 |
| ELBİSTAN B GR IV | 360 | EÜAŞ | LİNYİT | 13.11.2006 |
| MARE MANASTIR RÜZGAR (X GRUP) | 8 | SERBEST ÜRETİM ŞTİ. | RÜZGAR | 08.12.2006 |
| ÇIRAĞAN SARAYI GR I | 1.324 | OTOPRODÜKTÖR | DOĞALGAZ | 01.12.2006 |
| ERTÜRK ELEKTRİK Tepe RES GR I | 0.85 | SERBEST ÜRETİM ŞTİ. | RÜZGAR | 22.12.2006 |
| AKMAYA (Lüleburgaz) GR I | 6.91 | OTOPRODÜKTÖR | DOĞALGAZ | 23.12.2006 |
| BURGAZ (Lüleburgaz) GR I | 6.91 | SERBEST ÜRETİM ŞTİ. | DOĞALGAZ | 23.12.2006 |
| VAN-2 | -24.7 | | | |
| | | | | |
| **TERMİK TOPLAM** | **1562.294** | | | |

**Table.I. Generation Units put into Operation in 2007[27]**

| **2007 YILINDA İŞLETMEYE GİREN ÜRETİM TESİSLERİ**<br>*GENERATION UNITS PUT INTO OPERATION IN 2007* |
|---|

| **KURULUŞ ADI**<br>*ELECTRIC UTILITIES* | | **KURULU GÜÇ**<br>*INSTALLED CAPACITY*<br>**(MW)** | **ÜRETİM KAPASİTESİ (GWh)**<br>*GENERATION CAPACITY (GWh)*<br>**Ortalama**<br>*Average* | <br><br>**Güvenilir**<br>*Firm* |
|---|---|---|---|---|
| OTOPRODÜKTÖR | *AUTOPRODUCER* | 144.6 | 864.4 | 864.4 |
| SERBEST ÜR.ŞTİ. | *IPP* | 490.9 | 3,390.1 | 3,390.1 |
| **TERMİK TOPLAM** | *THERMAL TOTAL* | **635.6** | **4,254.5** | **4,254.5** |
| SERBEST ÜR.ŞTİ. | *IPP* | 87.3 | 273.9 | 131.0 |
| **JEOTER.+RÜZGAR** | *GEOTHERMAL+WIND* | **87.3** | **273.9** | **131.0** |

27 http://www.teias.gov.tr/ist2007/8.xls

| | | | | |
|---|---|---|---|---|
| **TOP.** | *TOTAL* | | | |
| EÜAŞ | | 300.6 | 1,039.0 | 600.0 |
| SERBEST ÜR.ŞTİ. | *IPP* | 36.1 | 183.8 | 82.7 |
| **HİDROLİK TOPLAM** | *HYDRO TOTAL* | **336.7** | **1,222.8** | **682.7** |
| **GENEL TOPLAM** | *GENERAL TOTAL* | **1,059.6** | **5,751.1** | **5,068.2** |

**Table.J. Generation Units put into Operation in 2008[28]**

| SANTRAL ADI | FUEL TYPE | KURULU GÜCÜ (MW) | ÜRETİMLERİ (MWh) |
|---|---|---|---|
| MB ŞEKER NİŞASTA SAN. A.Ş. (Sultanhanı) | NATURAL GAS | 8.800 | 0 |
| AKSA ENERJİ (Antalya) | NATURAL GAS | 183.800 | 133,736 |
| AKSA ENERJİ (Manisa) | NATURAL GAS | 52.380 | 79,183 |
| ANTALYA ENERJİ (İlave) | NATURAL GAS | 17.460 | 256,120 |
| ATAÇ İNŞAAT SAN. A.S.B.(ANTALYA) | NATURAL GAS | 5.400 | 10 |
| BAHÇIVAN GIDA (LÜLEBURGAZ) | NATURAL GAS | 1.165 | 0 |
| CAN ENERJİ (Çorlu-TEKİRDAĞ) (İlave) | NATURAL GAS | 52.380 | 274,260 |
| FOUR SEASONS OTEL (ATİK PASHA TUR.A.Ş) | NATURAL GAS | 1.165 | 0 |
| FRİTOLAY GIDA SAN.VE TİC.AŞ.(İlave) | NATURAL GAS | 0.060 | 0 |
| ITC-KA Enerji Üretim A.Ş.(Mamak)(İlave) | WASTE | 14.130 | 95,832 |
| KARKEY(SİLOPİ-5) (154 kV) (İlave) | FUEL OIL | 14.780 | 16,362 |
| MELİKE TEKSTİL (GAZİANTEP) | NATURAL GAS | 1.584 | 0 |
| MİSİS APRE TEKSTİL BOYA EN. SAN. | NATURAL GAS | 2.000 | 5,324 |

[28] http://www.teias.gov.tr/istatistik2008/8.xls

| | | | |
|---|---|---|---|
| MODERN ENERJİ (LÜLEBURGAZ) | NATURAL GAS | 13.400 | 508,942 |
| ORTADOĞU ENERJİ (ODA YERİ) (Eyüp/İST.) | WASTE | 2.830 | 0 |
| POLAT TURZ. (POLAT RENAISSANCE İST.OT.) | NATURAL GAS | 1.600 | 490 |
| SARAYKÖY JEOTERMAL (Denizli) | GEOTHERMAL | 6.850 | 14,099 |
| YILDIZ SUNTA (Uzunçiftlik-Köseköy)(Düzeltme) | NATURAL GAS | 22.630 | 136,018 |
| SÖNMEZ Elektrik (İlave) | NATURAL GAS | 8.730 | 61 |
| AKKÖY ENERJİ (AKKÖY I HES) | HYDRO | 101.940 | 21,608 |
| ALP ELEKTRİK (TINAZTEPE) ANTALYA | HYDRO | 7.689 | 9,245 |
| CANSU ELEKTRİK (Murgul/ARTVİN) | HYDRO | 9.180 | 12,518 |
| ÇALDERE ELK.(ÇALDERE HES)Dalaman-MUĞLA | HYDRO | 8.740 | 11,153 |
| DAREN HES ELKT. (SEYRANTEPE BARAJI VE HES) | HYDRO | 49.700 | 14,370 |
| DEĞİRMENÜSTÜ EN. (KAHRAMANMARAŞ) | HYDRO | 25.700 | 0 |
| GÖZEDE HES (TEMSA ELEKTRİK) BURSA | HYDRO | 2.400 | 6,107 |
| H.G.M. ENERJİ (KEKLİCEK HES) (Yeşilyurt) | HYDRO | 8.674 | 120 |
| HAMZALI HES (TURKON MNG ELEKTRİK) | HYDRO | 16.700 | 2,934 |
| HİDRO KNT.(YUKARI MANAHOZ REG.VE HES) | HYDRO | 22.400 | 13,772 |
| İÇ-EN ELK.(ÇALKIŞLA REGÜLATÖRÜ VE HES) | HYDRO | 7.660 | 3,364 |
| KALEN ENERJİ (KALEN II REGÜLAT. VE HES) | HYDRO | 15.650 | 10,281 |
| MARAŞ ENERJİ (FIRNIS REGÜLATÖRÜ VE HES) | HYDRO | 7.220 | 0 |
| SARMAŞIK I HES (FETAŞ FETHİYE ENERJİ) | HYDRO | 21.040 | 1,472 |

| | | | |
|---|---|---|---|
| SARMAŞIK II HES (FETAŞ FETHİYE ENERJİ) | HYDRO | 21.580 | 1,221 |
| TORUL | HYDRO | 105.600 | 18,551 |
| YEŞİL ENERJİ ELEKTRİK (TAYFUN HES) | HYDRO | 0.820 | 0 |
| ZORLU ENERJİ (MERCAN) (Düzeltme) | HYDRO | 1.275 | 22,828 |
| BAKİ ELEKTRİK ŞAMLI RÜZGAR | WIND | 21.000 | 60,943 |
| DATÇA RES (Datça) | WIND | 8.100 | 3,778 |
| ERTÜRK ELEKTRİK Çatalca RES | WIND | 60.000 | 65,961 |
| İNNORES ELK YUNTDAĞ RÜZG. (Aliağa) | WIND | 42.500 | 98,058 |
| LODOS RES (Taşoluk)(G.O.P./İSTANBUL) | WIND | 24.000 | 25,714 |
| SAYALAR RÜZGAR (Doğal Enerji) | WIND | 30.600 | 53,925 |

## Annex 4

## MONITORING INFORMATION

The Monitoring Plan used for determining the emission reduction by the Project is based on the approved methodology AMS-I.D. It will be recorded by Elestas Elektrik A.S. during the project activity as required in the approved methodology referred in the PDD. The Project manager who is charged by the Elestas Elektrik A.S. will be responsible for the keeping all relevant data and gathering electricity generated during the completion of the crediting period.

The collected data will be submitted to SerCarbon who is responsible to calculate the emission reduction subject to verification; generation data will be used to prepare monitoring reports which will be used to determine the vintage from the project activity. All these reports will be submitted to the authorized designed operational entity before every verification period

## Annex 5

### Official Documentary

### 1. Exemption letter for Environmental Impact Assessment (EIA)

T.C.
BAKIRKÖY 10.NOTERLİĞİ
Sırasırıpaşa Mah. Barbaros Cad.
No:38 Bahçelievler-İSTANBUL
Tel: 441 95 05

No 16452

23 MAYIS 2007

T.C.
ÇANKIRI VALİLİĞİ
İl Çevre ve Orman Müdürlüğü

SAYI : B.18.0.İÇO.0.18.ÇED.02- 510/1440 ÖRNEK 09../11/2006
KONU : ÇED Kararı

**ELESTAŞ ELEKTRİK ÜRETİM A.Ş.**
**Mevlevihane Cad. Fırın Sok.No:4 34780**
**Zeytinburnu /İSTANBUL**

İLGİ: 23.10.2006 tarihli yazınız.

İlgi yazınız ile; İlimiz Orta İlçesi, Tutmacıbayır Köyü Mevkiinde 1.20MW kurulu gücündeki H.E.S 'ne 1425m Boru hattı, Santral Binası ve 18km Nakil hattına ilişkin gerekli iznin verilmesi talep edilmektedir.

Talep konusu işlem; 16.12.2003 tarih ve 25318 sayılı Resmi Gazetede Yayımlanarak Yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği Kapsamı dışında olduğu müteala edilmektedir.

Ancak; 2872 sayılı Çevre Kanunu 13.05.2006 tarihli ve 26167 sayılı Resmi Gazetede Yayımlanarak Yürürlüğe giren, 26.04.2006 tarihli 5491 sayılı Çevre Kanununda Değişiklik Yapılmasına Dair Kanun'la değiştirildiğinden, değişiklik yapılan Kanun ve bu Kanuna bağlı Yönetmelikler ile diğer mer'i mevzuatlara uyulması, ekolojik dengenin bozulmaması ile çevrenin korunması için gereken tedbirlerin alınması hususunda;

Gereğini bilgilerinize rica ederim.

Erhan DEMİRCİOĞLU
Vali a.
İl Müdür V.

İŞBU SURET
ASLINA UYGUNDUR
Bakırköy 10. Noteri
Serpil YILDIRIM

T.C.
Bakırköy 10. Noterliği
1. Derece İmza yetkilisi
Başkatip DOĞAN KARA

Çankırı İl Çevre ve Orman Müdürlüğü Tel : 0 376 2138855 Faks : 0 376 2132937 e-posta: cankiri@cevreorman.gov.tr
Web : www.cankiri-cevreorman.gov.tr/ 8:32 09.11.2006

**Translation of Exemption letter for Environmental Impact Assessment (EIA)**

**Ruplic of Turkey**
**Governership of Çankırı**
**Provincial Department of Environment and Forestry**

NUMBER: B.18.0.İÇO.0.18.ÇED-510/1840
TOPIC: Decision of Environmental Impact Assessment

**Elestaş Elektrik Üretim A.Ş.**
**Mevlevihane Cad. Fırın Sok. No: 4 34780**
**Zeytinburnu/ Istanbul**

We have received your application for the related permission from our institution about HEPP where is located in Tutmacıbayır village, Orta district of Cankırı province. The installed power of the HEPP is 1.20 MW and the HEPP includes 1425m pipeline, power house and 18 km transmission line.
As a result of your application, we decided that the HEPP is exempted from an Environmental Impact Assessment.
However; the Regulation about alteration in Environment By-law and other related regulations have to be fulfilled by the company, to sustain ecological system and the related precautions should be taken by the company.

**2. Energy Market Regulatory Authority and the License, (The decision numbered EU/902-3/709 on August 31st, 2006.)**

KİMDEN :OKYONUS-CORAP---- FAKS NO. :02124952883 EKİ. 10 2009 09:29

**ÖZEL HÜKÜMLER**

**1- Üretim tesisine ilişkin bilgiler**

Bu Lisans, Elestaş Elektrik Üretim Anonim Şirketi'ne ait ve bilgileri aşağıda yer alan Yazı HES üretim tesisi için verilmiştir.

| | |
|---|---|
| İli | : Çankırı |
| Bildirim adresi | : Mevlevihane Cad. Fırın Sok. No:4 (34780) Zeytinburnu / İSTANBUL |
| Tesis tipi | : Yenilenebilir, Hidrolik, Rezervuarlı |
| Ünite sayısı | : 1 adet |
| Ünite kurulu güçleri | : 1,135 MWm / 1,062 MWe |
| Tesis toplam kurulu gücü | : 1,135 MWm / 1,062 MWe |
| Enerji üretim kaynağı | : Hidrolik |
| Öngörülen ortalama yıllık üretim miktarı | : 5.203.000 kWh |
| Sisteme bağlantı noktası ve gerilim seviyeleri | : Orta DM üzerinden Çankırı TM ve Kurşunlu TM'lerin OG barasına, 33 kV |
| Tesis tamamlanma tarihi | : 31/06/2009 (İnşaat öncesi 16 ay İnşaat dönemi 18 ay) |

**2- Lisansın yürürlüğe girmesi**

Bu lisans, 31/08/2006 tarihinde yürürlüğe girer ve lisans sahibinin bu lisans kapsamındaki hak ve yükümlülükleri, lisansın yürürlük tarihinden itibaren geçerlilik kazanır.

**3- Tüzel kişilikte yüzde on ve üzerinde doğrudan veya dolaylı pay sahibi olan gerçek ve tüzel kişiler**

| Doğrudan Pay Sahibi Ortaklar | Hisse Oranı (%) |
|---|---|
| - Ömer Hulusi ZEREN | 40 |
| - Mustafa Şahin ÖZCAN | 40 |
| - Ali ÇİÇEK | 10 |

**4- Lisansın süresi**

Bu lisans, yürürlük tarihinden itibaren 49 (kırkdokuz) yıl süreyle geçerlidir.

**5- Proje yükümlülükleri**

Lisans sahibi tüzel kişi, Su Kullanım Hakkı Anlaşması İmzalayabilmeye Hak Kazanıldığına Dair Belge ve ekinde DSİ Genel Müdürlüğü tarafından öngörülen şartları yerine getirmekle mükelleftir.

**6- Lisansta yapılan tadiller**

| Sıra No | Tadilin Kapsamı | | Tarihi ve Sayısı |
|---|---|---|---|
| 1 | Tüzel kişilikte yüzde on ve üzerinde doğrudan veya dolaylı pay sahibi olan gerçek ve tüzel kişiler: | Doğrudan Pay Sahibi Ortaklar / Hisse Oranı<br>- Şemsettin YEŞİLYURT ; % 70<br>- İlhan YEŞİLYURT ; % 10<br>- Ali ÇİÇEK ; % 10<br>Değiştirilmiştir. | 01/11/2007<br>595<br>(Başkanlık Oluru) |

EÜ/902-3/709 1/2

**Translation of Energy Market Regulatory Authority and the License, (The decision numbered EU/902-3/709 on August 31st, 2006.)**

**Special Provisions**

**1. Information regarding genarating facility**

This license belongs to Elestas Elektrik Uretim Sirketi which contains the information of generation facility below.

| | |
|---|---|
| Province | : Çankırı |
| Information Address | : Mevlevihane Blv. Fırın str. No:4 Zeytinburnu/Istanbul |
| Facility Type | : Renewable Hydroelectric run-off river type |
| Number of Units | : 1 |
| Total Capacity of Installed Power | : 1.135 $MW_m$/ 1.062 $MW_e$ |
| Resource Type | : Hydraulic |
| Average Estimated Amount of Generation | : 5,203,000 kWh |
| The Point of System Connection and Voltage Level | : Yazi HEPP Cankırı TM, Kursunlu TM 33 kV |
| Completion of the Facility | : 31/08/2006 as from 34 months |

**2. Force of License**

This license will come into force in the date of 31/08/2006 and all the rights and liabilities of the license owner will be valid after the date of enforcement date.

**3. The legal and private entities which have ten percent or more direct or indirect shares on the legal entity.**

*Direct Partners*

| | |
|---|---|
| Omer Hulusi ZEREN | 40% |
| Mustafa Sahin OZCAN | 40% |
| Ali CICEK | 10% |

**4. Validity of the License**

This license will be valid for 49 (forty nine) years as from the enforcement date.

**5. Project Liabilities**

The legal entity which owns the license has to offer a document which demonstrates the right to sign an agreement on water rights and it is also obligated to perform the liabilities which have been estimated by State Hydraulic Works in the annex of the document.

**6. Amendments on the License**

Amendment has been done on the partnership of the project. These amendments are including the partners who own directly 10 % or more shares.

| | |
|---|---|
| Semsettin Yesilyurt | 70% |
| Ilhan Yesilyurt | 10% |
| Ali Cicek | 10% |

## 3. State Water Right Agreement

ÖRNEK

№30279

T.C. ANKARA 26. NOTERLİĞİ Necatibey Cad. No:22 / 2 Sıhhiye Tel: 0312 22 19 - 230 72 44 ANKARA

17 AĞUSTOS 2006

**YAZITEŞ HİDROELEKTRİK ENERJİ ÜRETİM TESİSİNİN SU KULLANIMI HAKKI VE İŞLETME ESASLARINA İLİŞKİN ANLAŞMA**

**Anlaşmanın konusu ve taraflar**

**Madde 1-** "Elektriğin yeterli, kaliteli, sürekli, düşük maliyetli ve çevreye uyumlu bir şekilde tüketicinin kullanımına sunulması için rekabet ortamında özel hukuk hükümlerine göre faaliyet gösterebilecek, mali açıdan güçlü, istikrarlı ve şeffaf bir elektrik enerjisi piyasasının oluşturulması ve bu piyasada bağımsız bir düzenleme ve denetimin sağlanması" amacını taşıyan 4628 sayılı Elektrik Piyasası Kanunu hükümleri çerçevesinde halen piyasada faaliyet gösteren veya gösterecek tüzel kişiler tarafından hidroelektrik enerji üretim tesisleri kurulması ve işletilmesine ilişkin üretim, otoprodüktör, otoprodüktör grubu lisanslarına yönelik düzenlenen işbu Su Kullanım Hakkı Anlaşması, Yazı HES üretim tesisi için üretim lisansı verilmesi 17.01.2005 tarih ve 423/2 sayılı EPDK Kurul Kararı ile uygun bulunması nedeniyle, Devlet Su İşleri Genel Müdürlüğü ile Elestaş Elektrik Üretim Anonim Şirketi arasında akdedilmiştir.

**Tanımlar**

**MADDE 2-** Anlaşmada adı geçen:

1. Bakanlık: Enerji ve Tabii Kaynaklar Bakanlığını,
2. DSİ: Devlet Su İşleri Genel Müdürlüğünü,
3. EİE: Elektrik İşleri Etüt İdaresi Genel Müdürlüğünü,
4. EPDK: Enerji Piyasası Düzenleme Kurumunu,
5. TEFE: DİE tarafından yayımlanan Toptan Eşya Fiyat Endeksini,
6. Piyasa: Elektrik enerjisi piyasasını,
7. Lisans: Bir tüzel kişinin piyasada faaliyet gösterebilmesi için EPDK'dan almak zorunda olduğu yetki belgesini,
8. Ortak Tesis: Enerji üretimi yanında sulama suyu, içme ve kullanma suyu temini ve taşkın koruma gibi birden fazla maksada hizmet eden tesisi,
9. Su Kullanım Hakkı Anlaşması: Hidroelektrik enerji üretim tesislerinin su kullanımına ilişkin işletme esaslarını ve DSİ'ye ödenecek bedellerin ödeme şeklini belirleyen yazılı hükümlere ve şartlara göre DSİ ile Şirket arasında akdedilen anlaşma,
10. Şirket: Lisans almak üzere Su Kullanım Hakkı Anlaşması yapmak için müracaat eden Anonim veya Limited Şirketi,

ifade eder.

**Esaslar**

**Madde 3-** Aşağıdaki maddelerde belirtilen hususlar, Çankırı İli sınırları içerisinde elektrik enerjisi üretimi amacıyla Şirket tarafından inşa edilecek 1,20 MWm / 1,17 MWe kurulu gücündeki Yazı HES üretim tesisinin, lisansın geçerli olduğu süredeki su kullanımına ilişkin işletme esaslarını belirler.

**Madde 4-** Hidroelektrik enerji üretim tesislerinin bulunduğu bölgenin havza gelişimine paralel olarak DSİ tarafından yürütülmekte olan çalışmalar çerçevesinde, havzadaki mevcut, inşa halinde ve mutasavver projeler (kesin proje, planlama, master plan, ön inceleme ve ilk etüt) kapsamında içme-kullanma, turizm ve endüstri suyu temini, sulama, taşkın koruma ve enerji maksatları ile bunların dışında olabilecek başka maksatlara yönelik olarak diğer kuruluşlara ve tüzel kişilere tahsis edilecek suların miktar ve zamanlamasını belirleyecek olan işletme planları DSİ tarafından yapılır ve şirkete bildirilir. Şirket bu planlara uymakla yükümlüdür.

Şirket, dere yatağının su alma yeri mansabında doğal hayatın idamesini sağlayacak ve bu kesimde su haklarını karşılayacak miktardaki suyu yatağa bırakacaktır. Doğal hayat için dere yatağına bırakılacak suyun miktar ve zamanlaması, kurulacak hidroelektrik enerji üretim tesisleri ile ilgili şirket tarafından hazırlanarak Çevre ve Orman Bakanlığı'ndan onay alınacak olan ÇED, ÇED Ön Araştırma Raporu'nda belirlenecektir.

1

AS[illegible] VARDİR

№30279

**Madde 14-** Hidroelektrik enerji üretim tesislerinin fizibilite raporu kapsamında olabilecek yetersiz etüt ve değerlendirmelerden dolayı ilerideki safhalarda hidrolojik, jeolojik, teknik, çevresel, sosyal ve ekonomik yönden oluşabilecek her türlü olumsuz sonuçtan yalnız şirket sorumludur.

Şirket tarafından kurulacak hidroelektrik enerji üretim tesislerinin yatırımında doğabilecek her türlü hidrolojik, jeolojik, teknik, çevresel, ekonomik ve mali riskler ile tabii afet riski şirket tarafından yüklenilecektir.

**Madde 15-** Şirket tarafından kurulacak hidroelektrik enerji tesisleri ile ilgili olarak fizibilite raporunda öngörülen proje formülasyonunda (teklif edilen tesislerin konumları, kapasiteleri, boyutları gibi); ÇED/ÇED Ön Araştırma Raporunda, kati proje, uygulama projesi, inşaat ve işletme safhalarında muhtemel bir değişiklik söz konusu olması halinde, bu değişikliklere yönelik DSİ'nin uygun görüşü alınacaktır. DSİ tarafından gerekli görülmesi halinde bu anlaşmaya ek bir protokol yapılacaktır. Aksi halde doğabilecek her türlü olumsuz durum, zarar ve riskten şirket sorumlu olacaktır.

**Madde 16-** Hidroelektrik enerji üretim tesislerinin işletilmesi esnasında kullanılabilecek olan suların sağlıklı olarak belirlenebilmesi için DSİ ve şirketçe uygun görülecek yerlerde, tesis, teçhizat ve yapım bedeli şirket tarafından karşılanmak üzere DSİ'ce uygun görülen elektronik sistemli akım gözlem/göl seviye ölçüm istasyonları DSİ kontrollüğünde şirket tarafından kurulacaktır.

Birinci fıkrada belirtilen akım gözlem/göl seviye ölçüm istasyonlarının korunması, bakım ve onarımı gerektiğinde yenilenmesi şirket tarafından yapılacak ve DSİ yetkili elemanlarınca kontrol edilecektir.

Hidrometrik ölçüm ve değerlendirmeler şirket ve DSİ tarafından müştereken yapılacaktır. Şirketin ölçümlere katılmaması halinde DSİ'ce tespit edilen değerlere itibar edilecektir.

Elektronik ölçüm sistemlerinin arızalanması durumunda, üretim tesisine alınabilecek su miktarını belirleme yöntemine DSİ ve şirket müştereken karar verecektir. Müşterek karar oluşturulamadığı takdirde DSİ görüşüne itibar edilecektir.

**Madde 17-** DSİ'nin uygun görüşü alınmak kaydıyla ortak tesislerde enerji üretimine yönelik rehabilitasyon (kapasite artırımı, yükseltme gibi) yapılması gerektiğinde, söz konusu işlere ait harcamaların tamamı şirket tarafından karşılanacak ve DSİ 'den katılım payı talep edilmeyecektir.

**Madde 18-** Şirket enerji üretiminde kullandığı suyun kalitesini bozmayacak, insan, hayvan ve bitki hayatı ile normal gelişimi etkileyecek kimyasal maddelerle kirletmeden tabii yatağına bırakacaktır.

Suyun kalitesi konusunda şirket bir hak iddia edemez. Ancak istenilen kalitede su elde etmek için hazırlayacağı bütün projeleri DSİ'nin onayından sonra uygulamaya koyacaktır. Şirket tarafından hazırlanacak projenin eksiksiz olarak DSİ'ye teslimiden itibaren 2 ay içerisinde görüş bildirilir.

**Madde 19-** Şirket tarafından inşa edilecek bütün tesislere ilişkin olarak ilgili mevzuat çerçevesinde ÇED/ÇED Ön Araştırma raporu hazırlanması ve Çevre ve Orman Bakanlığından ÇED olumlu kararı veya ÇED gerekli değildir kararı alınması şirketin sorumluluğundadır. Şirket tarafından inşa edilecek tesislerle ve tesis yerleri ile ilgili olarak ve ayrıca ÇED veya ÇED ön araştırma raporunda verilecek taahhütler ile ilgili muhtemel bir olumsuz durumun ortaya çıkması halinde bütün sorumluluk şirkete ait olacaktır.

Şirket tarafından inşa edilecek tesisler ile ilgili Çevre ve Orman Bakanlığından "ÇED Olumsuz Kararı" verilmesi halinde Su Kullanım Hakkı Anlaşması hükümsüz kalır.

**Madde 20-** Şirket, tesislerin inşaatına ve işletmesine başlama tarihini üç ay, depolamalı tesislerde ise su tutma tarihini ise 6 ay önce DSİ'ye bildirecektir. Bu tarihler şirketin lisansında yer alan tarihler ile aynı olacaktır.

**Geri ödeme esasları, hesaplama şekli ve ödenmesi**

**Madde 21-** Hidroelektrik santral, DSİ'ce geliştirilerek inşa edilen/edilmekte olan "Güldürcek Barajı Projesi" kapsamında yer aldığından "Ayrılabilir Maliyetler, Arta Kalan Faydalar Metodu" ile yapılan maliyet taksimine göre, enerji hissesi %5,74 sulama hissesi %23,61 içme suyu hissesi %70,65 olarak belirlenmiştir.

5346 sayılı Yenilenebilir Enerji Kaynaklarının Elektrik Enerjisi Üretimi Amaçlı Kullanımına Ilişkin Kanun'un Geçici 4'üncü Maddesinin ikinci paragrafında "4628 sayılı Kanun kapsamında kurulmuş veya

3

ASLINDA İMZA VARDIR

**Translation of State Water Right Agreement**

**The Agreement of Water Right and Operation Fundemental of Yazi Hydroelectrical Energy Generation Plant**

**Parties and subject of water right agreement**

**Article 1**

In reference of the 4628 numbered law of the Electric Market Regulations, this document refers the agreement between the project proponent Elestaş Elektrik Üretim A.Ş and General Directorate of State Hydraulic Works.

**EXPLANATIONS**

**Article 2**
Institutions and explanations subject to the agreement

1. Ministry: Ministry of Energy and Natural Resources
2. DSI: General Directorate of State Hydraulic Works.
3. EIE: General directorate of Electrical Power Resources Survey and Development Administration
4. EPDK: Energy Market Regulatory Authority
5. TEFE: Wholesale Price Index published by State Statistics Institution
6. Market: Refers to Electrical Energy Market
7. License: License of the energy generation plants which is taken from EPDK
8. Mutual Plant: Parts of the plant which will serve more than one parties such as irrigation water, providing drinking water and flood control.
9. Water Right Agreement: Agreement between DSI and the project proponent which is clarifying the rules and regulation of the use of water and details about the payment to DSI
10. Company: the Company which is applying for the Water Right Agreement and license.

**Guidelines**

**Article 3**
Detailed information below explains the Water Right Agreement of Yazi HEPP which will be constructed with 1.2 MWm /1.06 MWe generation capacities.

**Article 4**
With no harm on the ecological balance of the nature; the company has to apply all of the regulations, provide mutual plants, and also the company has to provide the service on the water demand of government and non-government institution, which will be indicated by DSI. The company has to accept all of the changes on regulation by DSI.
The Company will leave enough water to stream bed for the protection of natural life. The amount and timing of the water which will leave to the stream bed will indicate on the Environmental impact Assessment or pre EIA letter.

**Article 18**
Company will not impair the quality of the water while generating electricity; furthermore, the company will release the water without using any chemicals which is going to affect human, animal and plant lives.

The company cannot claim any rights on the water quality, however, all the projects that the company will prepare to reach the proper quality standards is going to commended by the Directorate of State Hydraulic Works in two months.

**Article 19**

All the facilities which are going to be constructed by the company, has to gather either EIA, Prior EIA or EIA unnecessary, and these reports are under the responsibility of the company.

## Annex 6

### Abbreviations

1. HEPP :Hydroelectric Power Plant
2. EIA :Environmental Impact Assessment
3. GHG :Greenhouse Gas
4. VER : Voluntary/Verified Emission Reduction
5. UNFCCC : United Nations Framework Convention on Climate Change
6. TEIAS :Turkish Electricity Transmission Company
7. IPCC :Intergovernmental Panel on Climate Change
8. CM :Combined Margin
9. OM :Operating Margin
10. BM :Built Margin
11. NCV :Net Calorific Value
12. DOE :Designated Operational Entity
13. PD :Project Document
14. IRR :Internal Rate of Return
15. PO :Project Owner
16. EMRA :Energy Market Regulatory Authority
17. USD :United States Dollar