CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

Title: 16.00 MW RESADIYE-I Hydro Electric Power Plant
Version: 09
Date: 10/05/2012

A.2. Description of the project activity:

RESADIYE-I is a run-off river type hydroelectric power plant(HEPP) project located on Kelkit River in Turkey. The electricity generation license has been awarded to TURKON-MNG Elektrik Uretimi ve Ticaret A.Ş. for a period of 49 years by the Turkish licensing authority named as Energy Market Regulatory Authority (EPDK).

The original project design which involves a single HEPP with a higher capacity has been revised considering the geological characteristics of the site and divided into three projects namely, Resadiye-I, Resadiye-II and Resadiye-III HEPP projects. Resadiye-I HEPP project has remained in boundaries of Koyulhisar District of Sivas Province, whereas other two has remained in Resadiye District of Tokat Province. The aim of splitting the Reşadiye-I HEPP Project into three consecutive hydro power projects was to propose a cost competitive and more workable method of realisation that optimises the water-use efficiency, improve environmental performance and mitigation practices at the new power plants. A preferable solution would be to split the Resadiye HEPP Project into three hydropower projects in order to provide easier project financing and more efficient and high capacity energy generation using indigenous hydropower resources of Kelkit river.

Milestones of the Project

Milestone	Date
Revised Feasibility Study	June 2006
License Issuance	05/10/2006
EIA Approval	19/10/2006
Loan Agreement	19/10/2006
Board Decision for carbon certification	20/10/2006
2nd Revised Feasibility Study	October 2006
Equipment Purchase Contract*	22/05/2007
License Amendment	25/05/2007
EIA Amendment Approval	16/09/2008
LSC Meeting	04/02/2009
Start of Construction	01/03/2009
Uploading LSC Report to GS Registry	05/03/2009
Submission of draft PDD to DOE	04/04/2009
Expected Commissioning Date	01/01/2011

*Investment Decision Date

Table 1. Resadiye-I Project Milestones

Project investment decision date has been determined as the date of equipment purchase agreement. Since the investment decision has been made after 2nd revision of Feasibility Study Report(FSR). Although there has been a loan agreement signed earlier, since this loan agreement includes another project of the same project owner which started implementation earlier and since construction has started after about 2.5 years after loan agreement date and no loan has been used regarding Resadiye-I project until the design of the project is finalized, loan agreement date has not been considered as investment decision date.

Resadiye-I HEPP will have a total installed capacity of 16.0 MW with an expected electricity generation of about 115 GWh per annum. Corresponding emission reduction is about 64,630 tCO_2 per year. Compared with a natural gas power plant, the Project will replace consumption of about 27 million m^3 of natural gas and save about 12 million US Dollar foreign currency per year.

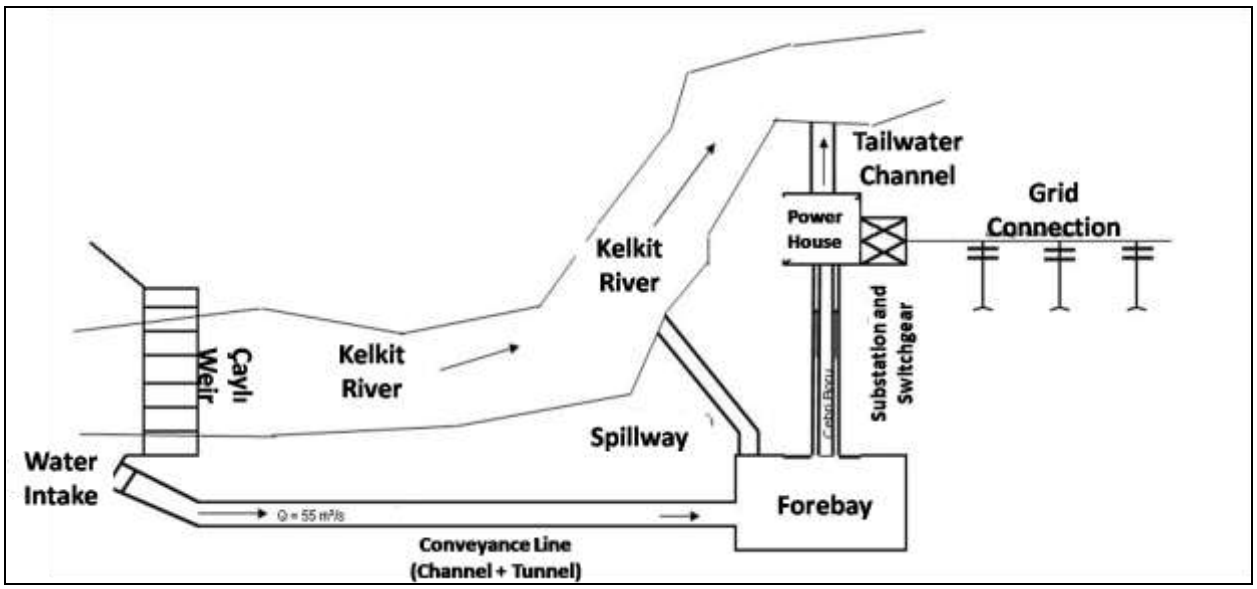

Figure 1. Resadiye-I HEPP Project Layout

The purpose of the project is to generate energy from the running waters of Kelkit River and consists of a weir, derivation tunnel, source and downstream cofferdams, spillway, conveyance channel and power house with turbines. Location of the project is selected to utilize the hydraulic potential of tail water of Koyulhisar HEPP which is diverted to conveyance channel through Çaylı weir. Total length of the conveyance line is 12.05 km including 10.80 km long conveyance channel and 1.25 km long conveyance tunnel whereas design flow rate of the project is 55 m3/s and elevation difference of about 37.0 m.

The main goals of the Resadiye-I HEPP project include;

- Using Turkey's hydroelectric potential to meet the increasing demand for electricity and contributing toward the guarantee of Turkey's energy security.

- Increase the share of run-off river type HEPPs in the mix of electricity generation in Turkey, reduce dependency on imported fossil fuel and providing as a consequence a tangible reduction in GHG emissions.
- Contribute to economic development by creating direct and indirect job opportunities during the construction and operation phases.

The project will contribute to the sustainable development in the region through creating new job opportunities during the construction and operational phases. Approximately 200 people will be employed during construction phase. After the commissioning of the plant, the project is expected to create permanent job opportunities for about 15 local employees. According to the research conducted by State Planning Organization(SPO) on socio-economic level of Districts in Turkey, Koyulhisar is ranked as 692nd among 872 Districts in Turkey in terms of development level and classified in fifth(out of 6) group. About 85% of the population works on agriculture and 12% works on low value added service sector whereas only 2.6% works on industry which places Koyulhisar to 653rd in ranking[1]. In that respect, direct and indirect contribution of project activities to local economy through employment and supply of needs from the region will have a significant effect on development in the region. In addition to direct and indirect job opportunities the project will contribute to sustainable development through activities conducted within the framework of corporate social responsibility. In addition to contribution to local economy, project will also contribute use of local and renewable resources to meet the increasing energy demand of Turkey and reduce dependency on fossil fuels. According to Turkish Electricity Transmission Company(TEIAS) statistic, in 2007 about 50% of the electricity has been generated by natural gas(NG) power plants which is fully imported and 20bn m^3 NG has been consumed. In terms of fuel dependency, Resadiye-I Hepp is expected to replace about 25 million m^3 NG and contribute to balance of payments which will, in addition, increase air quality and access to affordable energy services in national level[2].

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
Turkey (Host)	TURKON-MNG Elektrik Üretimi ve Tic. A.Ş. Global Tan Energy Ltd.	NO

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

The Resadiye-I HEPP project is located within the boundaries of Koyulhisar District of Sivas Province. The nearest settlements to the project site are Ortaseki, Cayli, Sarikaya and Sugozu Villages.

[1] http://ekutup.dpt.gov.tr/bolgesel/gosterge/2004/ilce.pdf (page 202)

[2] http://www.teias.gov.tr/ist2007/43.xls

A.4.1.1.	Host Party(ies):

Although Turkey, the Host Country, passed legislation in Parliament on February 5th 2009 to ratify the Kyoto Protocol - Turkey does not have yet a quantitative emission reduction limit and it is likely that it will not have a quantitative emission reduction limit until post 2012. As such, Turkey will in the interim period continues to be eligible for voluntary emission reduction projects.

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

Central Anatolia Region, Sivas Province

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

Sugözü Village, Koyulhisar District.

A.4.1.4.	Details of physical location, including information allowing the unique identification of this project activity (maximum one page):

GPS coordinates of the weir and powerhouse is given below.

	LONGITUDE	LATITUDE
ÇAYLI Weir	E 37° 44′ 51″	N 40° 18′ 00″
Power House	E 37° 37′ 23″	N 40° 19′ 28″

The closest settlements to project site are Ortaseki, Cayli, Sarikaya and Sugozu Villages.

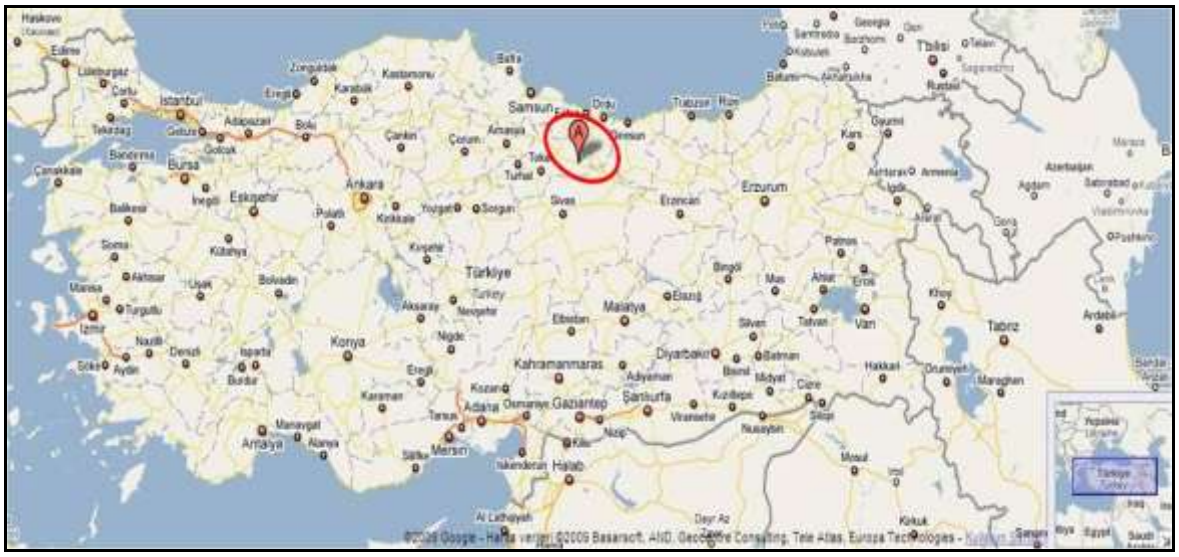

Figure 2. Location of the Project Activity

Figure 3. Resadiye HEPP Project Site

A.4.2. Category(ies) of project activity:

The project category is included in the sectoral scope 1 "Energy Industry – Renewable Sources" according to the UNFCCC definition.

A.4.3. Technology to be employed by the project activity:

Hydroelectric power plants are structures that generate electricity utilizing the energy of flowing water. The project consists of two turbines and generators which are used to transform the potential energy of water to mechanical energy at a first stage and later into electrical energy. A table summarizing the technical characteristics of the Resadiye –I HEPP project is given below.

LOCATION:	ON KELKIT RIVER COURSE, IN KOYULHISAR DISTRICT OF SIVAS PROVINCE
DESIGN DISCHARGE:	55.00 M^3/SEC
LENGTH OF OPEN CHANNEL:	10.80 KM
LENGTH OF TUNNEL:	1.30 KM
TOTAL LENGTH OF CONVEYANCE LINE:	12.10 KM
NET HEAD:	32.75 M
TOTAL INSTALLED CAPACITY:	16.00 MWm
NUMBER OF UNITS:	2 EACH
TURBINE TYPE:	FRANCIS TYPE – VERTICAL AXIS – SIZE 18.10 WITH 5 RUNNER BLADES
TURBINE MANUFACTURER:	VOITH-SIEMENS (SPAIN)
GENERATOR TYPE:	INDAR PSA 1600 L/22 WITH 8.570 KVA APPARENT POWER, NOMINAL SPEED 273 RPM

GENERATOR MANUFACTURER:	INDAR (SPAIN)
TRANSFORMER MANUFACTURER:	BEST (TURKEY)
LENGTH OF ENERGY TRANSMISSION LINE:	12.00 KM
ENERGY TRANSMISSION LINE CAPACITY:	154 KV
NUMBER OF PENSTOCKS:	2 EACH
LENGTH OF PENSTOCKS:	2 X 72 M
AVERAGE ANNUAL POWER GENERATION:	115 GWH
TYPE OF METERING DEVICES	To be determined according to local regulations of Energy Market Regulatory Authority(EMRA) of Turkey[3].

Table 2. Technical Characteristic of Resadiye-I HEPP project.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Years	**Annual estimation of emission reductions in tones of CO_2 e**
2011	64,630
2012	64,630
2013	64,630
2014	64,630
2015	64,630
2016	64,630
2017	64,630
Total emission reductions (Tones of CO_2 e)	**452,410**
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tones of CO_2e)	64,630

Table 3. Estimated amount of emission reduction

A.4.5. Public funding of the project activity:

No public funding or ODA is used for the project.

[3] http://www.epdk.gov.tr/english/regulations/electric/meters.doc

SECTION B. Application of a baseline and monitoring methodology

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

The United Nations approved consolidated baseline methodology applicable to this project is ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources", Version 9[4].

ACM0002 refers to the following tools:

- "Tool for the demonstration and assessment of additionality", Version 05.2, [5]and
- ''Tool to calculate the emission factor for an electricity system'', Version 01.1[6].

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The choice of methodology ACM0002, Version 9, is justified as the project activity meets its applicability criteria:

- The Resadiye-I HEPP is a grid connected renewable electricity generation project,
- The project does not involve switching from fossil fuel use to renewable energy at the site of the project activity; and
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.
- Power density of the reservoir is higher than 4 W/m^2

Surface area of the lake that will form after implementation of the proposed project is 0.497 km^2 [7] which corresponds to 32.2 W/m^2. This value represents the minimum power density as in practice when surface the area of existing river bed is considered, actual value would be higher.

Since there exists no delineation of project electricity system or connected electricity systems by DNA, following criteria has been used to determine the existence of significant transmission constraints:

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4 http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_71ZC14NVE4V5DHA3TUT3896PFLPVGG

5 http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf

6 See: http://cdm.unfccc.int/methodologies/Tools/EB35_repan12_Tool_grid_emission.pdf

7 Resadiye HEPP, Revised Feasibility Report Section 7.2, page 7-3

- In case of electricity systems with spot markets for electricity: there are differences in electricity prices (without transmission and distribution costs) of more than 5 percent between the systems during 60 percent or more of the hours of the year.

- The transmission line is operated at 90% or more of its rated capacity during 90% percent or more of the hours of the year.

Since the project output is fed to the Turkish electricity grid which does not involve any distinct electricity systems that applies different price, first criteria defined above is not applicable. Also, since the transmission line between the proposed projects and nearest substation is built within the scope of the project and there exist no information on grid capacity utilization, second criteria is also inapplicable. Based on assessment above, it is difficult to conclude with a significant transmission constraint or grid boundary. Since there is no dispatch grid system in Turkey, the project boundary is considered as the National Electricity Grid of Turkey according to applied tool. The geographical and physical boundaries of the Turkish grid and location of the power plants are well identified as given diagram below.

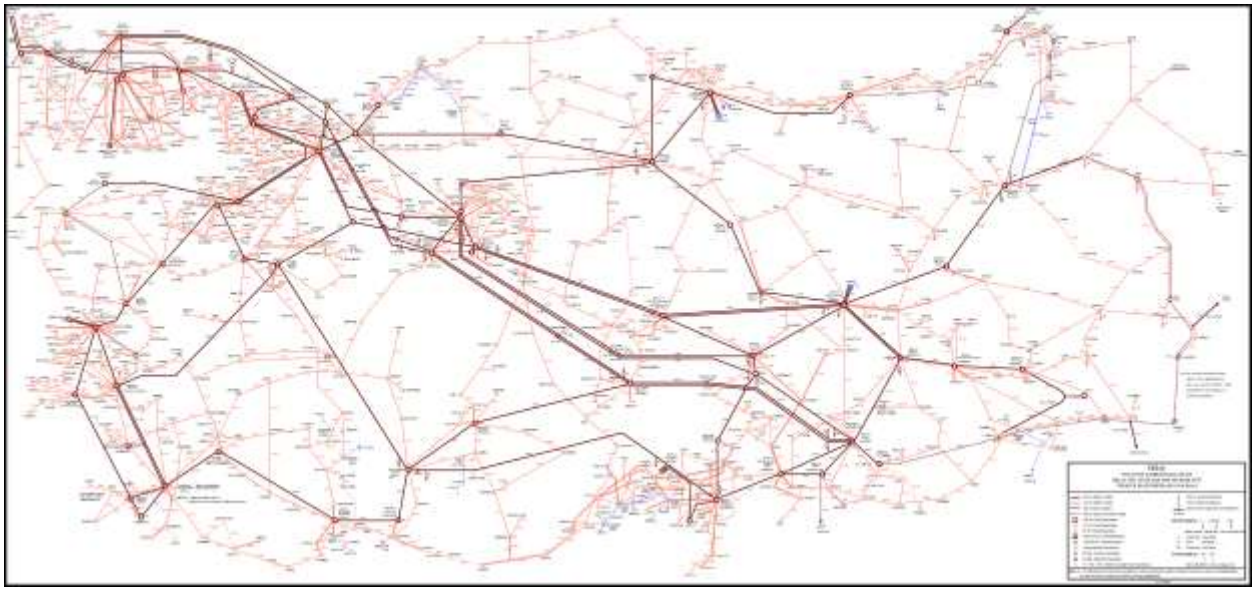

Figure 4. Turkish Electricity Grid

B.3. Description of the sources and gases included in the project boundary:

GHG included in the project boundary and used in the calculation of emission reduction by the project activity are given in table below.

	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 is excluded as per the	CO_2	No	Zero-emission electricity generation

	tool applied requires.	CH_4	No	Zero-emission electricity generation
		N_2O	No	Zero-emission electricity generation

Table 4. GHG gases included in the project boundary

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. Import data obtained from the relevant government agencies (EUAS- Turkish Electricity Generation Corp., TEIAS – Turkish Electricity Transmission Corp., Ministry of Energy and Natural Resources) have been included in the calculations of the combined margin emissions.

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

This project follows the methodology described in the ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", Version 09. Selected methodology has been applied together with the "tool to calculate the emission factor for an electricity system, version 01.1" and "tool for assessment and demonstration of additionality, version 5.2".

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"*

Turkish electricity generation is mainly composed of thermal power plants and the share of renewable resources; especially hydroelectric power plants have decreased significantly in recent years. Since Turkey is an advanced developing country, there is an increasing demand for electricity which is fully expected to continue in the foreseeable future.

The trend in Turkey to date and given historically slow development of alternative energy resources is to build an increasing number of thermal power plants in the future to satisfy the annual growth in energy consumption demand. Turkey as an advanced developing nation has looked at dealing with energy security by developing and constructing high capacity coal and natural gas power plants. The development of thermal power plants has been also encouraged by the large natural resource availability in Turkey, especially the abundance of economically accessible lignite.

In the absence of the proposed project activity, the same amount of electricity is required to be supplied via either the current power plants or by increasing the number of thermal power plants thus increasing GHG emissions.

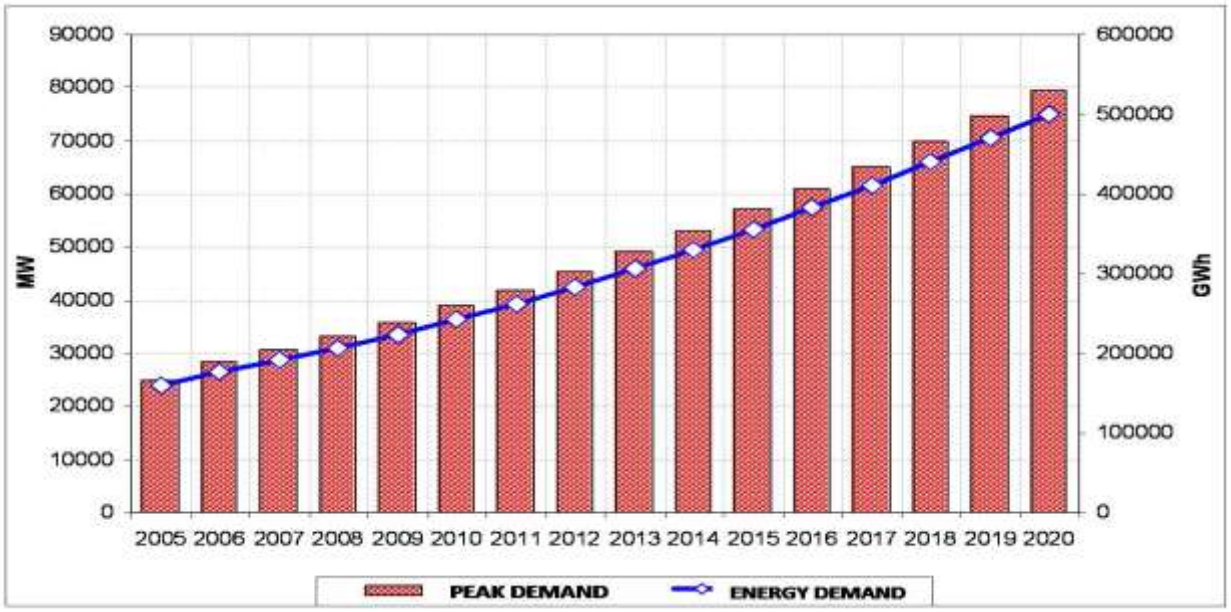

Figure 5. Peak Load and consumption projection for Turkish electricity system between 2005-2020[8]

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 CDM project activity (assessment and demonstration of additionality):

Project owner was aware of the carbon income and has implemented similar projects considering carbon revenue previously. It is clear from timeline given in table.1 that carbon revenue had been considered when the decision for project investment is made.

According to the applied methodology (ACM0002, version 09) the baseline scenario for the project has been defined as "generation of equal amount of electricity by the power plants connected to the grid". Emission factor for the baseline scenario has been calculated according to the combined margin approach as defined by the selected methodology. Within this framework, the project is expected to generate about 115.00 GWh electricity and reduce about 64,630 tCO_2 emissions through replacing the electricity that would need to be supplied via the National grid in the absence of the project activity. Additionality of the proposed project has been assessed according to the applied tool for demonstration of additionality as shown in following steps.

Step 1 - Identification of Alternatives to the project activity consistent with current laws and regulations

***Sub-step 1a* - Define alternatives to the project activity:**

The most realistic and reliable alternatives to the project activity are:

[8] http://www.teias.gov.tr/apkuretimplani/veriler.htm

1. Proposed project not undertaken as a VER project activity,
2. Supply of equal amount of electricity by the plants connected to the grid,

The first alternative, which is the implementation of the project without carbon revenue is not financially attractive as discussed in investment analysis section below.

The Second alternative (Scenario 2) is the baseline scenario and implementation of the proposed project as a VER activity would be additional to this scenario. Since the electricity demand in Turkey is increasing, in the absence of the proposed project, equal amount of electricity should be supplied by the new power plants implemented and connected to the grid including mainly thermal and renewable power plants since the growth of thermal power plants has increased (figure 6) and is expected to continue to disproportionately increase in the future due to demand for electricity predicted to increase by near 100% from the current level of approximately 40,000 MW to 79,000 MW by 2020, share of thermal generation and emissions is expected to increase.

Outcome of Step 1a
Continuation of the current situation is not considered as a realistic alternative due to increasing electricity demand, therefore the second alternative need to happen which will continue to increase emissions due to electricity generation.

Sub-step 1b. Consistency with mandatory laws and regulation

The following applicable mandatory laws and regulations have been identified:

1. Electricity Market Law[9]
2. Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy[10]
3. Energy Efficiency Law [11]
4. Forest Law[12]
5. Environment Law[13]

The resultant alternatives to the project as outlined in Step (1a) are in compliance with the applicable laws and regulations.

Outcome of Step 1b

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[9] Law number 4628, enactment date 03/03/2001 http://www.epdk.gov.tr/english/regulations/electricity.htm

[10] Law number 5346, enactment date 18/05/2005 http://www.eie.gov.tr/duyurular/YEK/LawonRenewableEnergyReources.pdf

[11] Law number 5627, enactment date 02/05/2007 http://www.eie.gov.tr/english/announcements/EV_kanunu/EnVer_kanunu_tercume_revize2707.doc

[12] Law number 6831, enactment date 31/08/1956

[13] Law number 2872. Published in official gazette No. 18132 on 11/08/'83

Mandatory legislation and regulations for each alternative are taken into account in sub-step 1b. Based on the above analysis, the proposed project activity is not the only alternative amongst the project participants that is in compliance with mandatory regulations. Therefore, the proposed VER project activity is considered as additional.

Step 2 - Investment analysis

An investment analysis has been carried out in order to make an economic and financial evaluation of the project. No public funding or ODA are available in Turkey for the finance of this type of project. Resadiye-I HEPP has been financed through loans from commercial banks (70%) and companies own resources (30%).

***Sub-step 2a* - Determine appropriate analysis method**

There are three options for the determination of analysis method which are:

- Simple Cost Analysis
- Investment Comparison Analysis and
- Benchmark Analysis

Since the Project generates economic benefits from sales of electricity, the simple cost analysis is not applicable. Also, since the baseline of the project is generation of electricity by the grid, no alternative investment is considered at issue. So, it has been decided to use benchmark analysis for evaluation of the project investment.

Sub-step 2b. Option III. Apply benchmark Analysis

According to the "Tool for the demonstration and assessment of additionality", a relevant benchmark for an equity IRR can be derived from government bond rates increased by a suitable risk premium (to reflect private investment and/or project type) or from Government approved benchmark values. For benchmark analysis of the project, values derived from Government bond rates given in table below.

Government Bond	Currency	Auction Date	Rate
TRT260214T10	TRY	06/03/07	20.95
TRB120907T18	TRY	13/03/07	17.72
TRT070312T14	TRY	13/03/07	18.45
TRB040707T10	TRY	03/04/07	18.57
TRT040209T13	TRY	17/04/07	16.42
TRT070312T14	TRY	17/04/07	17.98
TRT040209T13	TRY	08/05/07	17.83
TRT260214T10	TRY	08/05/07	21.74
TRT070312T14	TRY	15/05/07	17.75
		Average	**18.60**

Table 5. Government bond rates used for comparison of investment[14]

[14] http://www.tcmb.gov.tr/evds/dibs/istihl.xls (Column Z)

Although there exist no Government approved benchmark, most private equity investors look for IRRs above 20%.[15]

Considering references above and additionality tool applied, minimum attractive IRR figure was determined as 18.60% for the investment type although expectation which does not include the risk premium for investment in the country. For the proposed project, equity IRR has been calculated as 6.5% based on the parameters given below and without considering the carbon revenue. Investment period has been assumed as 20 years including two years construction period. Investment decision date has been selected as the equipment purchase agreement date (22/05/2007). For capital costs (especially for construction costs) since the project had not started yet, estimations have been based on the costs estimated in the feasibility report which is expected to be discounted around 10% since the project owner has its own construction company. Decrease in investment cost has been realized as around 26% after commissioning of the plant and this has been included in sensitivity analysis below.

Sub-step 2c. Calculation and comparison of financial indicators

Parameters	Unit	Data Value
Installed Capacity	MWm	16[16]
Grid Connected output	GWh	115[17]
Capital Investment(Exc VAT)	Million €	43,398[17]
Corporate tax rate	%	20[18]
Loan	%	70[19]
Expected Tariff	€ Cents/kWh	5.5[10]
Expected VERs price	€/ tCO2e	10

Table 6. Main financial parameters used for investment analysis

Benchmark IRR has been calculated without considering the interest payments for the loan as stated in the applied methodology. Electricity tariff has been used as €5.5 Cent/kWh although this is the maximum amount and floor price is €5.0 Cents/kWh as given in renewable energy law. Annual generation has been taken as 115.00 GWh. This IRR value represents the most optimistic scenario in terms of capital investment and electricity generation whereas electricity tariff is expected to increase so that the investment becomes attractive. Alternatively, benchmark analysis has been made considering a World

[15] http://www.greatturkfund.com/images/data/GTF_Presentation_9Nov2009.pdf (page 2)

[16] Resadiye HEPP, Generation License

[17] Resadiye HEPP, Feasibility Report

[18] http://www.izmirvdb.gov.tr/down_files/vergi_oranlari.doc (page 4, accessed on 30/01/2010)

[19] Loan Agreement dated 19/10/2006

Bank(WB) study which determines threshold IRR is determined as 15% for similar projects[20] in a study conducted in 2009, whereas earlier studies of the WB has determined that average levels for IRR of similar projects are around 19-23% [21] The study dated 2009 was not available at time of investment decision, however, even if we refer to this study, IRR of the project activity would still be below the benchmark.

When we include the carbon revenue in the cash flow, equity IRR increases to 8.77% and the project becomes more attractive and viable for the investors as coupled with the view that energy sale prices that can be achieved from the project will likely increase in future years. Expectation that the electricity prices will increase is the risk for investors whereas realization of this expectation will the premium. Carbon revenue has a significant affect in this respect in terms of decreasing the period for return on investment and risk of investment decision. Considering the rapidly increasing electricity demand of Turkey, electricity tariff is expected increase which will make investment more reasonable.

However, due to the uncertainty in economical environment, demand for electricity has decreased significantly in recent years which have frustrated the investors expecting higher electricity prices. Under this circumstances most reliable scenario for financiers and investors is the renewable law which guarantees 5.0€ to 5.5€ cents per kWh. Recent trends in global economy have shown that the consideration of guaranteed price is a realistic and reliable scenario that should be considered in investment analysis for similar projects.

Following figure is given in order to reflect the actual electricity prices realized obtained from monthly reports of Market Settling and Balancing Center[22] between 01/01/2009-31/01/2010. It should be considered that these prices are highest prices obtained and power plants which sell electricity through bilateral agreements have lower income. Figure shows that the actual prices have even been lower than guaranteed price in some cases therefore assumption of 5.5€cents per kWh (or 55€ /MWh) is a realistic scenario as demonstrated below.

[20] http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2009/05/11/000333037_20090511030724/Rendered/PDF/468080PAD0P112101Official0Use0Only1.pdf (page 81)

[21] http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/03/09/000090341_20040309095924/Rendered/PDF/254970TR.pdf (page 36)

[22] http://pmum.teias.gov.tr/UzlasmaWeb/

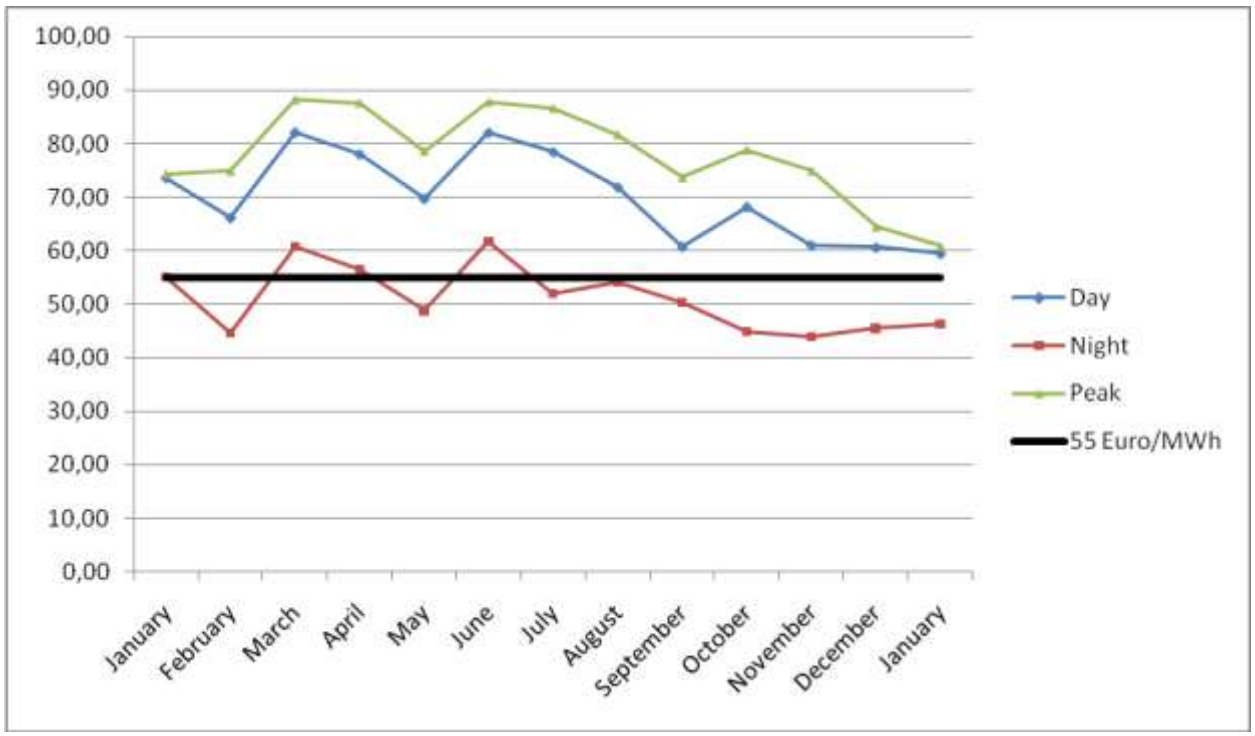


Figure 6. Highest tariffs observed between January 2009-January 2010 (€/MWh)

Sub-step 2d - Sensitivity Analysis
Sensitivity analysis has been carried out for three main parameters as identified below;

- Investment Cost,
- Operating Cost,
- Electricity Sales Revenue.

For a range of -±30% fluctuations in investment and operating cost and ±40% fluctuation in electricity income, table below has been obtained.

	--30	-10	-5	0	5	10	30
Investment Cost	12.6	8.0	7.2	6.5	5.9	5.3	3.6
Operating Cost	7.8	6.9	6.7	6.5	6.3	6.1	5.2
	-40	**-10**	**-5**	**0**	**5**	**10**	**40**
Electricity Income	-0.14	4.8	5.7	6.5	7.4	8.3	13.95

Table 7. Sensitivity analysis for Resadiye-I HEPP project

Outcome of Step 2:
The investment and sensitivity analysis shows that the VER revenues will improve the financial indicators of the project and make the project more attractive for investors and funding institutions.

Technical difficulties experienced due to geological structure of the project site have required change in project design which has resulted in splitting the original project into three projects. This change in project design has caused a significant increase in both initial investment and operational costs.

It was expected that investment and operational costs will be lower than given in feasibility report since the company has two other project in the downstream and they can use the same infrastructure. For the actual cost scenario which includes about 26% decrease in investment and operation costs, IRR is calculated as 11.66% in the absence of carbon revenue. The other main parameter subject to change is electricity income which is a combination of tariff and generation. Electricity price, which is expected to increase and exceed 8 €c/kWh levels to meet expectations so that the investment becomes reasonable. When we use the best case scenario, which brings 40% increase in tariff and 30% decrease in operational cost together with actual investment cost, IRR becomes 25.53% which is higher than benchmark. However, there is no guarantee to reach that price and the figure on market price above shows that actual price has been even less than 5.5€cents/kWh many times and there is no guarantee for 40% increase in tariff hence it is not likely to happen. Considering the fact that income of HEPPs is also dependent on generation and availability of water and hydros have lower generation in summer months(when the prices are higher) due to insufficient flow, this also creates significant risk as also seen from tariffs in figure 6 above.

Based on the above information, it is seen that project is not the most attractive option. Therefore project is considered as additional to the baseline scenario.

Step 3. Barrier analysis

This step is not applied for the proposed project activity.

Step 4. Common Practice Analysis

Sub-step 4a. Analysis of other activities similar to the proposed project activity

According to the TEIAS statistics[23], share of HEPPs in total installed capacity of Turkey is about 32.8% whereas share of HEPPs in total generation has been realized as about 18.6% in 2007[24]. However, when we look at the historical data, it seen that total installed capacity of thermal power plants has shown a rapid growth in parallel with the demand for electricity whereas the increase in hydroelectric power generation has been much slower. This has decreased the share of hydroelectric power from 40% in the past to the current levels, as seen in the Figure below [25].

[23] http://www.teias.gov.tr/ist2007/1.xls

[24] http://www.teias.gov.tr/ist2007/13.xls

[25] IEA Turkey Country Report, 2005 (Table 16 in page 117)

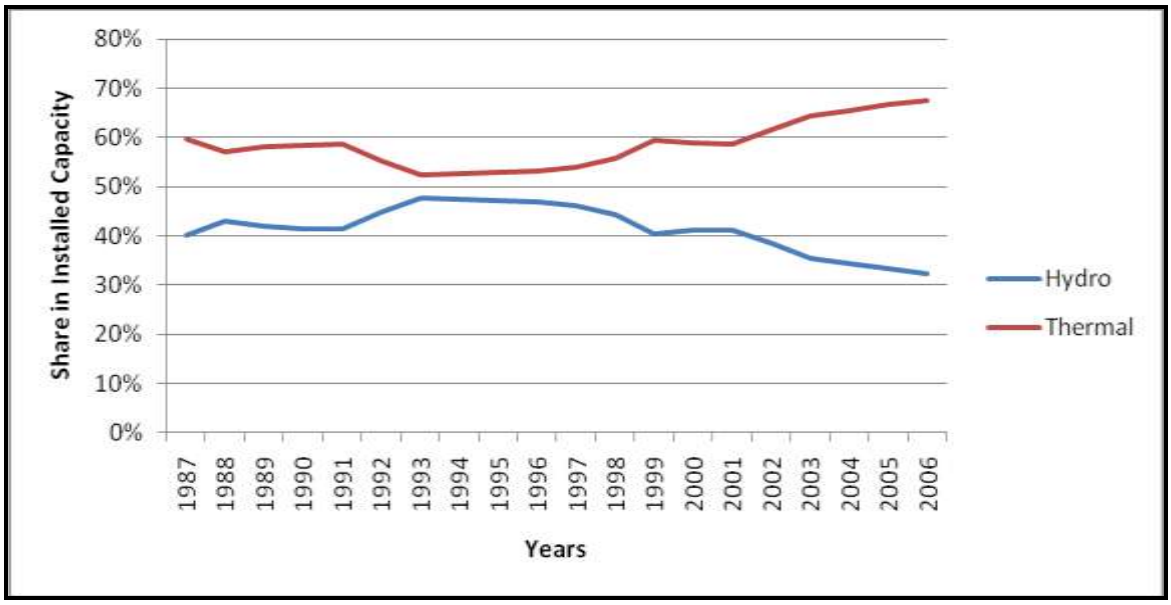


Figure 6. Annual Development of Turkey's Installed Capacity

Sub-step 4b. Discuss any similar options that are occurring:

The main reason behind the decrease in share of hydro electricity power is the changes in government's energy policy which intends to encourage private companies to invest in energy generation and lower the weight of government on energy generation as a part of privatization efforts. On the other hand, private companies have mainly preferred to invest in thermal power plants which can be commissioned in shorter time periods, require lower initial investment and uses conventional technologies.

Installed capacity of thermal power plants owned by private generation companies has increased from 123.4 MW in 1996 to 10,688.8 MW in 2007 whereas the total capacity of hydro electricity power plants has only increased from 75.3 MW to 1,345 MW(including autoproducers, private generation companies, Build-Operate-Transfer(BOT)plants and concessionary companies) in the same period which show that private companies find more attractive to invest is thermal power plants[26,27,28].

When we look at the distribution of hydro power capacity by utilities, it is seen that total generation capacity of the hydroelectric power plants owned by private generation companies is 1,273 GWh by end of 2006[29] which corresponds to 0.72% of the total generation capacity (176,299.8 GWh)[30] of Turkey at that time. However, a detailed review of these has shown that majority of these plants have been initially licensed/implemented as either Autoproducer or BOT power plants but later licenses have been revised as Generation Company License during liberalization of Turkish Electricity Market and some of them have

[26] http://www.teias.gov.tr/ist2007/5(1984-05).xls

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

[28] http://www.teias.gov.tr/ist2007/8.xls

[29] http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf (page 75)

[30] http://www.teias.gov.tr/ist2007/13.xls

been built using VER revenue (See Annex 8 for details). When these plants are excluded, there exist only one plant in the list which is operational at time of investment decision (0.6 MW Basaran HEPP) which corresponds to less than **0.003%** of total generation capacity at time of investment decision.

Besides the fact that each project is different and has unique characteristics, information (Investment Model, incentives, investment&finance cost or IRR) about individuals' plants is not publicly available. Therefore a reliable comparison of these plants would not result in a reliable outcome. Figure below demonstrates that recently built hydroelectric power plants are not as efficient as the previous ones and serve as a good example to the point issued in previous statement. The figure also shows the fluctuation in electricity generation which poses high investment risk especially for run-off-river type hepps.

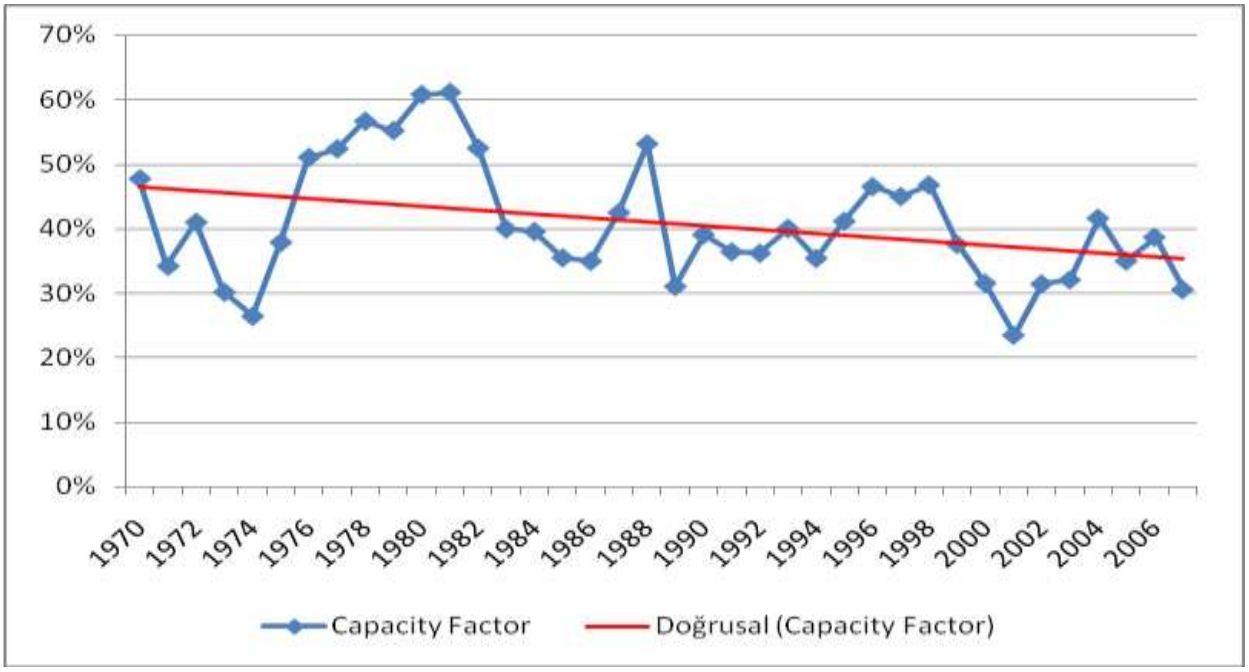


Figure 7. Evolution of Capacity (Plant Load) Factor of HEPPs in Turkey.[23,24]

A major difference between dam type and run-off-river type HEPPs is dependency and sensitivity on natural resources. Generation capacity of the HEPPs is mainly dependent of the precipitation and flow rate of the basin.

Outcome of step 4:

Within the framework of the discussion above, considering that share of run-off-river type hydroelectric power plants constructed by private generation companies are less than 0.003. Even, if the share of hydro power seems high at overall generation mix of Turkey, considering that most of them have storage facilities and built by government or through concessionary agreements, it is clear that the existing projects are not similar to the proposed project.

Given the past and continuing weight and presence of the Government influence, as mentioned and illustrated from the above facts, the proposed type of project should not be considered as a common practice in Turkey.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Emission factor has been calculated in a conservative manner as requested by the methodology. Basic assumptions made are;

- Emission factor will remain same over the crediting period,
- Emission factor of fuels sources is "0" or the lowest value in the references when there is no information.

The additionality assessment of the project activity has been demonstrated using the latest version of the 'Tool for assessment and demonstration of additionality'.

According the "Tool to calculate the emission factor for an electricity system", ver. 01.1, the following four methods are applicable to calculate the operating margin:

a) Simple OM,
b) Simple adjusted OM,
c) Dispatch Data Analysis OM, and
d) Average OM.

Also Due to insufficient availability of data, methods (b), (c) and (d) could not be applied. Thus (a) simple OM method is used in calculations. The following table is used for demonstrating the share of low cost/must run resources.

		2007	2006	2005	2004	2003	Average
Total Generation	**[GWh]**	191,558	176,300	161,956	150,698	140,581	164,219
Low-cost / must run	**[GWh]**	36,362	44,465	39,714	46,235	35,480	40,451
Low-cost / must run	**[%]**	19	25	25	31	25	25

Table 8. Breakdown by source of electricity generation for the five most recent years[31]

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

Data / Parameter:	**EG_y**
Data unit:	MWh
Description:	Net Electricity delivered to the grid by the Resadiye-I HEPP in year "y"

[31] http://www.teias.gov.tr/ist2007/13.xls

Source of data used:	Feasibility Report for Resadiye-I HEPP
Value applied:	115.00 GWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used for emission reduction calculation.
Any comment:	

Data / Parameter:	**$EG_{y, Total}$**
Data unit:	MWh
Description:	Net Electricity delivered to the grid by power plants in Turkey in year 2007
Source of data used:	TEIAS web page - http://www.teias.gov.tr/ist2007/30(84-07).xls
Value applied:	183,339.7 GWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used for emission reduction calculation(for calculation of OM, Net-to-Gross electricity ratio and share of low-cost must-run sources)
Any comment:	

Data / Parameter:	**$EF_{CO2, i, y i}$**
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor of fossil fuel type "i" in year "y"
Source of data used:	-For EF of fossil fuels, IPCC values at the lower limit has been used.
Value applied:	
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to ACM0002, IPCC default values at lower limit of 95% confidence interval can be used. Although, the actual emission reduction is expected to be higher due to high EF of fuels consumed in existing power plants, IPCC values have been used for conservativeness as requested by the methodology.
Any comment:	

Fuel Source	**EF(tCO2/Tj)**
Coal	89.5
Lignite	90.9
Fuel Oil	75.5
Diesel	72.6
LPG	61.6
Naphta	69.3
Natural Gas	54.3

Data / Parameter:	**$FC_{i,y}$**
Data unit:	Tons or 1000 m^3 for gases
Description:	Amount of fuels consumed by thermal power plants for electricity generation in terms of fossil fuel type i in year y
Source of data used:	TEIAS web page (http://www.teias.gov.tr/ist2007/43.xls)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used for OM calculation
Data / Parameter:	**GE**
Data unit:	%
Description:	Generation efficiency of thermal power plants
Source of data used:	Annex-I of Tool applied.
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used for BM calculation
Any comment:	

Data / Parameter:	**NCV**
Data unit:	Tj/kt
Description:	Net Calorific Values of Fuel combusted in power plants.
Source of data used:	TEIAS web page (http://www.teias.gov.tr/ist2007/45.xls)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used for OM and BM calculation
Any comment:	

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

As per the tool, the following six steps for calculation of emission reductions have been applied:

Step 1. Identification of the relevant electrical power system

According to the ‘‘Tool to calculate the emission factor for an electricity system’’, Version 01, a project electricity system has to be defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity, and that can be dispatched without significant transmission constraints. Therefore, in this project activity the project electricity system includes the project site and all power plants attached to the Interconnected Turkish National Grid, which has an installed capacity of 40,835.7MW and gross generation about 191,558.1 by 2007[32,33].

For imports from connected electricity systems located in another host country (ies), the emission factor is taken as “0” tCO_2/MWh as requested by the methodology.

Step 2. Select an operating margin method

Since the fuel consumption data is not available for each power plant, method (d) is eliminated. Also due to insufficient data, methods (b) and (c) are not considered and thus (a) simple OM method is used in calculations. The following table is used for demonstrating the share of low cost/must run resources.

		2007	2006	2005	2004	2003	Average
Total Generation	**[GWh]**	191,558	176,300	161,956	150,698	140,581	164,219
Low-cost/ must run	**[GWh]**	36,362	44,465	39,714	46,235	35,480	40,451
Low-cost/ must run	**[%]**	19	25	25	31	25	25

Table 9. Breakdown by source of electricity generation for the five most recent years[34]

The Simple Operating Margin (OM) emission factor ($\mathbf{EF}_{grid, OM, y}$) is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all the generating plants serving the system, excluding low-cost/must-run power plants. As electricity generation from solar and low cost biomass facilities is insignificant and there are no nuclear plants in Turkey, the only low cost /must run plants considered are hydroelectric, wind and geothermal facilities.

The tool gives two options for the calculation of $\mathbf{EF}_{grid, OM, y}$;

- *Ex-ante* option

A 3-year generation-weighted average, based on the most recent data available at the time of submission of the VER-PDD to the DOE for validation, without the requirement to monitor and recalculate the emissions factor during the crediting period, or

- *Ex-post* option

32 http://www.teias.gov.tr/ist2007/1.xls

33 http://www.teias.gov.tr/ist2007/13.xls

34 http://www.teias.gov.tr/ist2007/13.xls

The year in which the project activity displaces grid electricity, with the requirement that the emissions factor to be updated annually during monitoring.

For this project the *ex-ante* approach is selected. Data for calculating the three year average is obtained from the period 2005 – 2007, the most recent data available at the time of PDD submission to the DOE.

Step 3. Calculating the operating margin emission factor according to the selected method.

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must run plants / units. It may be calculated:

- Based on fuel consumption and net electricity generation data of each power plant / unit (Option A), or
- Based on net electricity generation data, the average efficiency of each power unit, and the fuel type(s) used in each power unit (Option B), or
- Based on total net electricity generation data of all power plants serving the system, fuel types, and total fuel consumption of the project electricity system (Option C)

As fuel consumption and average efficiency data for each power plant / unit are not available, Option C is used for simple OM calculation. Under Option C, 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 fuel type(s), and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,y} * NCV_{i,y} * EF_{CO_2,i.y}}{EG_y} \quad \textbf{(1)}$$

where:

$\mathbf{EF_{grid, OM, y}}$ Simple operating margin CO_2 emission factor in year y (tCO_2/GWh)
$\mathbf{FC_{i, y}}$ Amount of fossil fuel type *i* consumed in the project electricity system in year y (mass or volume unit)
$\mathbf{NCV_{i, y}}$ Net calorific value (energy content) of fossil fuel type *i* in year y (GJ / mass or volume unit)
$\mathbf{EF_{CO2, i,}}$ CO_2 emission factor of fossil fuel type *i* in year y (tCO_2/GJ)

EGy 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 Either the 3 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) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

For the calculation of the Simple OM, the amount of fuel consumption ($FC_{i,y}$) and heating values of fuels are taken from website of TEIAS[35,36,37,38], the official source of related data. Fuel consumption values for the relevant years are in table below.

	$FC_{i,y}$ unit [Ton, except for Natural Gas (NG) (1000 m^3)]			
Fuel Type	**2007**	**2006**	**2005**	**Total**
Hard Coal	6,029,143	5,617,863	5,259,058	16,906,064
Lignite	61,223,821	50,583,810	48,319,143	160,126,774
Fuel Oil	2,250,686	1,746,370	2,005,899	6,002,955
Diesel Oil	50,233	61,501	28,442	140,176
LPG	0	33	12,908	12,941
Naphtha	11,441	13,453	84,481	109,375
Natural Gas	20,457,793	17,034,548	15,756,764	53,249,105

Table 10. Fuel Consumption in thermal power plants

The NCV of the fuels consumed have been calculated using data from the TEIAS web page. The emission factors required for calculation of CO_2 emission coefficient have been obtained through IPCC 2006 guidelines for GHG inventories for fuels. Details of the data used for the calculations are given in Annex 3.

	COEF (tCO_2/kt)	**Consumption (2005 - 2007)** (tons or 1000m^3)	**Total Emission (2005 - 2007) (tCO_2)**
Coal	1,954	16,906,064	33,032,943
Lignite	601	160,126,774	96,197,334
Fuel Oil	3,026	6,002,955	18,165,198

35 http://www.teias.gov.tr/ist2007/42.xls

36 http://www.teias.gov.tr/ist2007/43.xls

37 http://www.teias.gov.tr/ist2007/44.xls

38 http://www.teias.gov.tr/ist2007/45.xls

Diesel Oil	3,112	140,176	436,185
LPG	2,830	12,941	36,623
Naphtha	3,061	109,375	334,828
Natural Gas	2,003	53,249,105	106,643,758
Total Emissions			**254,846,869**

Table 11. Calculation of emission factors for fuels

Net electricity generated and supplied to the grid by thermal plants has been calculated using data obtained from the TEIAS web page[39,40,41,42]. 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. The calculation of $EF_{grid,OM,\ y}$ requires the inclusion of electricity imports with an emission factor of 0 tCO_2/GWh. By including the imports in the electricity production this requirement is fulfilled. Summing up this with the imported electricity, total supply excluding low cost / must run sources are determined as given in table below.

Year	Gross Generation	Net Generation	Net/Gross	Gross Gen. Thermal	Net Gen Thermal	Import	Total Supply to the grid
2005	161,956	155,469	0.960	122,242	117,346	636	117,982
2006	176,299	169,543	0.962	131,835	126,783	573	127,356
2007	191,558	183,340	0.957	155,195	148,537	864	149,401
			Total Net Thermal Gen.		**392,665**	**2,073**	**394,739**

Table 12. Gross/Net electricity generation by Turkish Grid

Having calculated the total fuels emissions and net generation by thermal power plants as given in previous two tables, The $EF_{grid,\ OM\ ,y}$, is calculated by simply dividing total emission by total net thermal electricity generation as defined in equation (1) above;

$$\mathbf{EF}_{grid,\ OM,\ y} = 254{,}846{,}869\ tCO_2 / 394{,}739\ GWh$$
$$\mathbf{= 646\ tCO_2/GWh.}$$

39 http://www.teias.gov.tr/ist2007/35(2001-2005).xls

40 http://www.teias.gov.tr/istatistik2007/36(06-07).xls

41 http://www.teias.gov.tr/ist2007/35(2001-2005).xls

42 http://www.teias.gov.tr/istatistik2007/35.xls

Step 4. Identifying the cohort of the power units to be included in the build margin.

The sample group of power units (m) used to calculate the build margin consists of whichever is larger of:

a) The set of five power units that have been built most recently, and
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[43].

Option (b) has been chosen to identify this cohort of power units to be included in the build margin, since it is larger (in terms of power generation) than the result of (a).

The list of the most recent capacity additions to the grid and their average and actual generation capacities are available at the TEIAS web page [44,45,46,47,48,49]. For determination of plants that comprise 20% of the system's generation, gross generation in year 2007 which is 191,558.1 GWh has been taken as reference and its 20% has been determined as about 38,311.6 GWh. Since 20% of the most recent year's generation (38,311.6 GWh) falls partly on capacity of a power plant, this plant was fully included in the calculations as requested by the methodological tool applied. Thus, total capacity included in BM calculation has increased to 41,056 GWh which reduces to 40,519.3 GWh after excluding plants benefitting from VER revenue.

Step 5. Calculate the build margin emission factor

The Build Margin emission factor $\mathbf{EF}_{grid,\ BMs,\ y}$ is calculated as the generation-weighted average emission factor of a sample of power plants *m* for a specific year, as follows:

$$\mathbf{EF}_{grid,\ BM,\ y} = \sum \mathbf{EG}_{m,y} \cdot \mathbf{EF}_{EL,m,y} / \sum \mathbf{EG}_{m,y} \qquad \textbf{(2)}$$

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

"Tool to Calculate the Emission Factor for an Electricity System" has been used for plant efficiency data although this approach is very conservative. Since tool does not contain any

43 If 20% falls on part capacity of a unit, that unit is fully included in the calculation

44 http://www.teias.gov.tr/istat2004/7.xls
45 http://www.teias.gov.tr/istatistik2005/7.xls
46 http://www.teias.gov.tr/ist2006/8.xls
47 http://www.teias.gov.tr/ist2007/8.xls

48 http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf

49 http://www.teias.gov.tr/projeksiyon/CAPACITY%20PROJECTION%202008-2017.pdf

specific data for plants with LPG, Naphta etc. all of the plants consuming liquid fuels have been considered as open cycle plants. Plants using lignite and coal have been assumed as suing subcritical technology, whereas natural gas plants have been assumed as combined cycle plants. The assumptions have been based on TEIAS statistics which gives heating values of fuels consumed in thermal power plants[50] and corresponding electricity generation[51, 52] which shows that values used are very conservative compared to actual situation.

For EF values of fuels consumed, IPCC values at lower limit of 95% confidence interval has been used as requested by applied methodology.

	EF CO_2 (tCO2/Tj)	Generation Efficiency	EF (tCO_2/MWh)
Coal	89.5	39.0%	0.826
Lignite	90.9	39.0%	0.839
Fuel Oil	75.5	39.5%	0.688
Diesel	72.6	39.5%	0.662
LPG	61.6	39.5%	0.561
Naphtha	69.3	39.5%	0.632
Natural Gas	54.3	60.0%	0.326

Table 13. Calculation of emission factor from most recent power plants

The build margin emission factor has been determined for the most recent capacity additions as shown in table below. For electricity generation from renewable and solid wastes, the emission factors have been taken as being “zero” since data is not available and the contribution of these plants is insignificant. The Build margin emission factor in the last column has been determined by multiplying each EF value with the corresponding electricity generation value for that fuel and dividing it by the total generation by the most recent capacity additions.

Fuel Source	Generation (MWh)	Percent Generation	EF	Weighted EF
Coal	1,463	3.6%	0.826	0.03
Lignite	11,482	28.0%	0.839	0.23
Fuel Oil	675	1.6%	0.688	0.01
Diesel oil	2	0.0%	0.662	0.00
LPG	50	0.1%	0.561	0.00
Naphtha	323	0.8%	0.632	0.00

50 http://www.teias.gov.tr/ist2007/45.xls

51 http://www.teias.gov.tr/ist2007/36(06-07).xls

52 http://www.teias.gov.tr/ist2007/35(2001-2005).xls

Natural Gas	23,974	58.4%	0.326	0.19
Renewable and wastes	85	0.2%	0.000	0.00
Solid	5	0.0%	0.000	0.00
Total Renewable	2,999	7.3%	0.000	0.00
TOTAL Capacity additions	41,056.3	100.0%		

Table 14. Most recent capacity additions corresponding to 20% by fuel source

From the list of the plants included in BM calculation, those built using VER revenue has been excluded as per the tool.

PROJECT	TYPE	INSTALLED CAPACITY (MW)	GENERATION CAPACITY (GWh)	STANDARD
ANEMON	WPP	30.4	92	GS
BARES	WPP	30.0	105	VER+
DOGAL ENERJI (BURGAZ)	WPP	14.9	48	GS
KARAKURT	WPP	10.8	28	GS
MARE MANASTIR	WPP	39.2	129	GS
KARGILIK	HEPP	23.9	83	VCS
KALEALTI	HEPP	15.0	52	VCS
Total		**164.2**	**537.0**	

Table 15. List of plants identified as VER projects
Source: http://www.markitenvironmental.com and http://cdmgoldstandard.org

Finally, by summing up the weighted EF values, overall build margin emission factor have been calculated as:

$$\mathbf{EF}_{grid,\,BM,\,y} = 19{,}350\ tCO_2 / (41{,}056.3\text{-}537)\ GWh$$
$$\mathbf{= 478\ tCO_2/GWh.}$$

STEP 6 - Calculate the combined margin emission factor

Based on ACM0002, weighted average baseline emission factor is calculated as follows;

$$\mathbf{EF}_{grid,\,CM,\,y} = \mathbf{w}_{OM} * \mathbf{EF}_{grid,\,OM,\,y} + \boldsymbol{w}_{BM} * \mathbf{EF}_{grid,\,BM,\,y} \quad \mathbf{(3)}$$

Where:

EFgrid,BM,y =Build margin CO2 emission factor in year y (tCO_2/MWh) as calculated from equation above.
EFgrid,OM,y =Operating margin CO2 emission factor in year y (tCO_2/MWh) as calculated from equation (1) above.

wOM =Weighting of operating margin emissions factor (%)
w_{BM} =Weighting of build margin emissions factor (%)

The default values of the weights, w_{OM} and $w_{BM,}$ as recommended by the selected methodology are 0.5, respectively. These default values have been used in calculating CM emission factor together without rounding the values of EF_{OM} and EF_{BM}.

Based on the formula above, baseline emission factor is calculated as;

$$\mathbf{EF}_{grid,\ CM,\ y} = 0.5 * 646 + 0.5 * 478 = \mathbf{562}$$

The combined margin emission factor is therefore **562 tCO_2/GWh.** Emission factor will remain same during the first crediting period as recommended by the methodology ACM0002, version 9.

Project emissions

The proposed project activity involves the generation of electricity by hydro electric power plant therefore project activity does not result in greenhouse gas emissions. Power density of the project is higher than 10 W/m^2 for 16. MW installed capacity and 0.497km^2 maximum lake area[53].

The power density of the project activity (PD) is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

PD	=	Power density of the project activity (W/m^2)
Cap_{PJ}	=	Installed capacity of the hydro power plant after the implementation of the project activity (W)
Cap_{BL}	=	Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero
A_{PJ}	=	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2)
A_{BL}	=	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m2). For new reservoirs, this value is zero

For Resadiye-I HEPP,

Cap_{PJ}	=	15,680,000 W
Cap_{BL}	=	0.0 W

[53] Resadiye HEPP, Revised Feasibility Report, page 7-3

A_{PJ} = 497,000 (m^2)[53]
A_{BL} = 0.0 (m^2)

Therefore PD is calculated as ;

$$PD = \frac{15680000 - 0}{497000 - 0}$$

$$PD = \underline{48.7\ W/m^2}$$

The only emission source in the plant is the diesel generator which is used as auxiliary power source when there is no electricity generation in the plant or supply by the grid. According to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" CO_2 emissions from fossil fuel combustion for process j are calculated based on the quantity of fuels combusted and the CO_2 emission coefficient of those fuels, as follows:

$$\mathbf{PEFC_{j,y} = \sum FC_{i,j,y} \times COEF_{i,y}} \quad \textbf{(4)}$$

Where:
$PEFC_{j,y}$ = Are the CO_2 emissions from fossil fuel combustion in process j during the year y (tCO2/yr);
$FC_{i,j,y}$ = Is the quantity of fuel type i combusted in process j during the year y (mass /volume)
$COEF_{j,y}$ = Is the CO_2 emission coefficient of fuel type i in year y (tCO2/mass or volume unit)
i = Is the fuel types combusted in process j during the year y

Leakage
The energy generating equipment is not transferred from or to another activity. Therefore leakage is also considered as "0".

$$\mathbf{LE_y = 0} \quad \textbf{(5)}$$

As a result: Total Emission Reduction is;

$$\mathbf{ER_y = BE_y - PE_{FCj,y}} \quad \textbf{(6)}$$

Although the emission from fossil fuel consumption is expected as much less than 1% of the emission reduction, it has been included in calculations as per the tool. The exact value of the project emission will be determined during verification process.

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

Years	Estimation of Project Activity Emissions* (*Tonnes of CO_{2e}*)	Estimation of Baseline Emissions (*Tonnes of CO_{2e}*)	Estimation of Leakage (*Tonnes of CO_{2e}*)	Annual estimation of emission reductions (Tonnes of CO_{2e})
2011	0	64,630	0	64,630
2012	0	64,630	0	64,630
2013	0	64,630	0	64,630
2014	0	64,630	0	64,630
2015	0	64,630	0	64,630
2016	0	64,630	0	64,630
2017	0	64,630	0	64,630
Total (Tonnes of CO_{2e})	**0**	**452,410**	**0**	**452,410**

*****Project emissions due to Diesel Generator will be calculated during verification and included in emission reductions.

Table 16. Estimated emission reduction by the proposed project

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

Data / Parameter:	**EG_y**
Data unit:	MWh
Description:	Net Electricity generated and delivered to the grid by the Resadiye-I Hydroelectric Power Plant 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 applied for the purpose of calculating expected emission reductions in section B.5	Estimated annual generation forming the basis for emission reduction calculation is 115.00 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. In addition to invoices and metering devices, the electricity delivered to the grid can be cross checked through TEIAS web page(http://pmum.teias.gov.tr) using the ID and password of the project owner.
Any comment:	

Data / Parameter:	$FC_{i,j,y}$
Data unit:	Mass or volume unit per year (e.g. ton/yr or m^3/yr)
Description:	Quantity of fuel type i combusted in Diesel power generator during the year y
Source of data to be used:	Annual fuel consumption will be determined annually during verification using metering devices mounted on equipment.
Measurement Procedure	Gauges and reading devices on diesel generator
Monitoring Frequency	Continuously
QA/QC procedures to be applied:	Data recorded by the equipment will be cross-checked by the fuel invoices
Any comment:	-

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data to be used:	Project site
Measurement Procedure	Measured from topographical surveys or maps
Monitoring Frequency	Once after construction is completed
QA/QC procedures to be applied:	-
Any comment:	The project uses flow from an existing dam, therefore no reservoir will form.

B.7.2. Description of the monitoring plan:

Monitoring is a key procedure to verify the real and measurable emission reductions from the proposed project. To guarantee the proposed project's real, measurable and long-term GHG emission reductions, the monitoring plan is established.

In order to demonstrate the emission reduction, only the required data is the net electricity delivered to the grid by the project activity and consumption for the auxiliary diesel generator. Annual fuel consumption will be determined annually during verification using metering devices mounted on equipment and cross checked with fuel invoices. For consistency, same emission factor for diesel fuel which is also used in baseline calculations will be taken as reference for calculating the project emissions due to diesel fuel consumption.

Net electricity generation will be measured and recorded by both TEIAS and project owners for billing purposes therefore no new additional protocol will be needed monitoring emission reduction. Power Plant Manager, will be responsible for the electricity generated, gathering all relevant data and keeping the records. He will be informed about VER concepts and mechanisms and how to monitor and collect the data which will be used for emission reduction calculations.

Generation data collected during crediting period will be submitted to Global Tan Energy who will be responsible for calculating 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. These reports will be submitted to the duly authorized and appointed Designated Operational Entity 'DOE' before each verification period.

The monitoring system organization chart is shown in Figure below, in which the authority and responsibility of project management are defined.

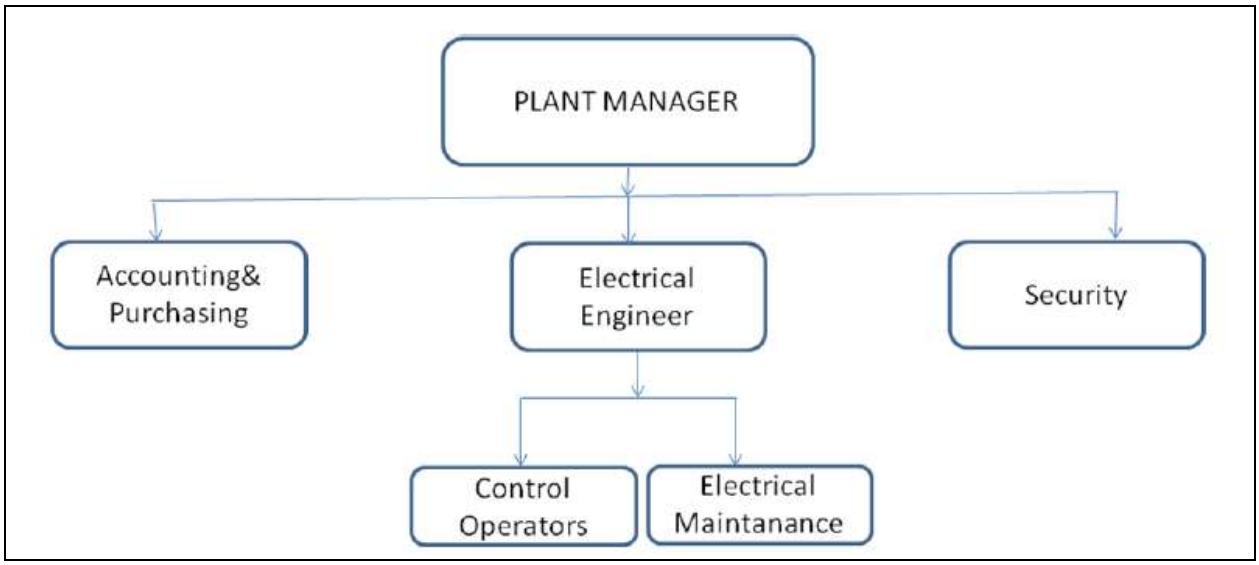


Figure 7. Operational structure of Resadiye I HEPP

VER Team Members is expected to include;

Plant Manager: Overall responsibility of compliance with VER monitoring plan
Electrical Engineer: Responsible for day to day running of plant, recording and monitoring of relevant data and periodic reporting
Accounting Manager: Responsible for keeping data about power sales, invoicing and purchasing.
Control Operators&Electrical Maintanance: Staff will responsible for day to day operation and maintenance of the plant and equipments. All staff will be trained and have certificated for working with high voltage equipments.
Global Tan Energy: Responsible for emission reduction calculations, preparing monitoring report and periodical verification process.

Installation of meter and data monitoring will be carried out according to the regulations by TEIAS. Two metering devices (one of them used as spare) will be used for monitoring the electricity generated by the power plant. Readings will be done using main metering devices and spare metering device will be used for comparison only. Data from metering devices will be recorded by TEIAS monthly and form the basis for invoicing using the template formed by TEIAS[54]. In addition to the two metering devices, generation

[54] http://www.teias.gov.tr/mali/GDUY/PRO_FORM/OLCUM/K01.xls

of the Resadiye-I HEPP can be cross checked from TEIAS – PMUM web site(http://pmum.teias.gov.tr) which is accessible using a password provided to electricity generation companies. Since the data in PMUM web page will show the net electricity generated less transmission loss, in order to match the data, the figures taken from PMUM web site must be multiplied by transmission loss factor of the grid.

In case of a major failure at both metering at the same time, electricity generation by the plant since the last measurement will be able to be monitored by another metering device at the inlet of the main substation operated by TEIAS where the electricity is fed to the grid.

The net electricity fed to the grid will be measured continuously and recorded monthly by the TEIAS and plant staff. For consistency, recorded data will be compared with electricity sale receipts. All data collected will be recorded daily and archived both as electronically and as hard copy for at least two years.

Calibration of the metering devices will be made by TEIAS and sealed during first operation of the plant. The meters will be calibrated by TEIAS when there exists significant inconsistency between two devices using a fixed template[55] or upon request by either project owner or TEIAS[56].

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

Baseline and monitoring methodology completed in 01/06/2010
By:
Mehmet Kemal Demirkol
Global Tan Energy Limited (GTE- http://www.gte.uk.com)
Telephone: +90 312 472 35 00
Fax: +90 312 472 33 66
E-mail: kemal@gte.uk.com

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:

Starting date of project is 01/03/2009, date of construction.

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

[55] http://www.teias.gov.tr/mali/GDUY/PRO_FORM/OLCUM/DAG02.xls

[56] http://www.epdk.gov.tr/english/regulations/electric/balancing/balancing.doc

The license has been issued to project owner for 49 years starting from the date of issue. The plant will be delivered to the government at the end of operation period at no cost. Considering the implementation period, the expected operational lifetime of the project is estimated as at least 46 years.

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

Renewable crediting period is chosen for the project activity.

C.2.1. Renewable crediting period:

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

The crediting period is expected to start in 01/01/2011

C.2.1.2. Length of the first crediting period:

First crediting period will be valid for seven years.

SECTION D. Environmental impacts

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

The EIA assessment for Resadiye-I HEPP project has been prepared by *En-Cev Ltd. Şti.* as defined by the regulations. The Report was approved by the Ministry of Environment and Forestry (MoEF) on 19th October 2006. After the change in project design and dividing the project into three parts, an EIA has also been prepared for the new project design. This EIA study has also been evaluated by relevant authorities and "EIA not required" letter for design changes of Resadiye –I HEPP has been provided for the project as given in Annex of this document.

The EIA Report prepared for the project covers all aspects of the project including capacity, interaction with other plants in the vicinity, natural resources used, waste management, social and economic impacts, technology and materials used, current land use in the region, any historical or protected site within the project boundaries, geological assessment of the project site and any communities affected by the project.

Also, since the project is a run-off-river type hydro electric power generation activity, effects of project on environment has been assessed according to the table C.2 of special guidance of Gold Standard toolkit. Assessment has shown that project activity complies with GS guidance for run off river type HEPPs. Since the project is a run-off-river type HEPP and does not include a dam, it does not include any resettlement. Sediment management and flow regime has been considered in project design in order to minimize the impact on river ecosystem. Also, in order to minimize the impact of project on biodiversity, fish passage has been included in weir design and continuous water flow from the weir and passage has been included in optimization of installed capacity. Some trees have been cut during channel construction and in order to prevent falling of these trees due to landslide into the channel during construction and operation phases which have been compensated through payments made to the fund established by Regional Directorate of Forestry to be used for renovation of forest areas and planting new trees.

This Report has been evaluated by the relevant local government agencies and Ministry of Environment and Forestry (MoEF). After evaluation of the project and comments of the local agencies, the Ministry of Environment and Forestry has concluded that project does not have significant environmental effects and the EIA assessment is positive for the project activities.

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:

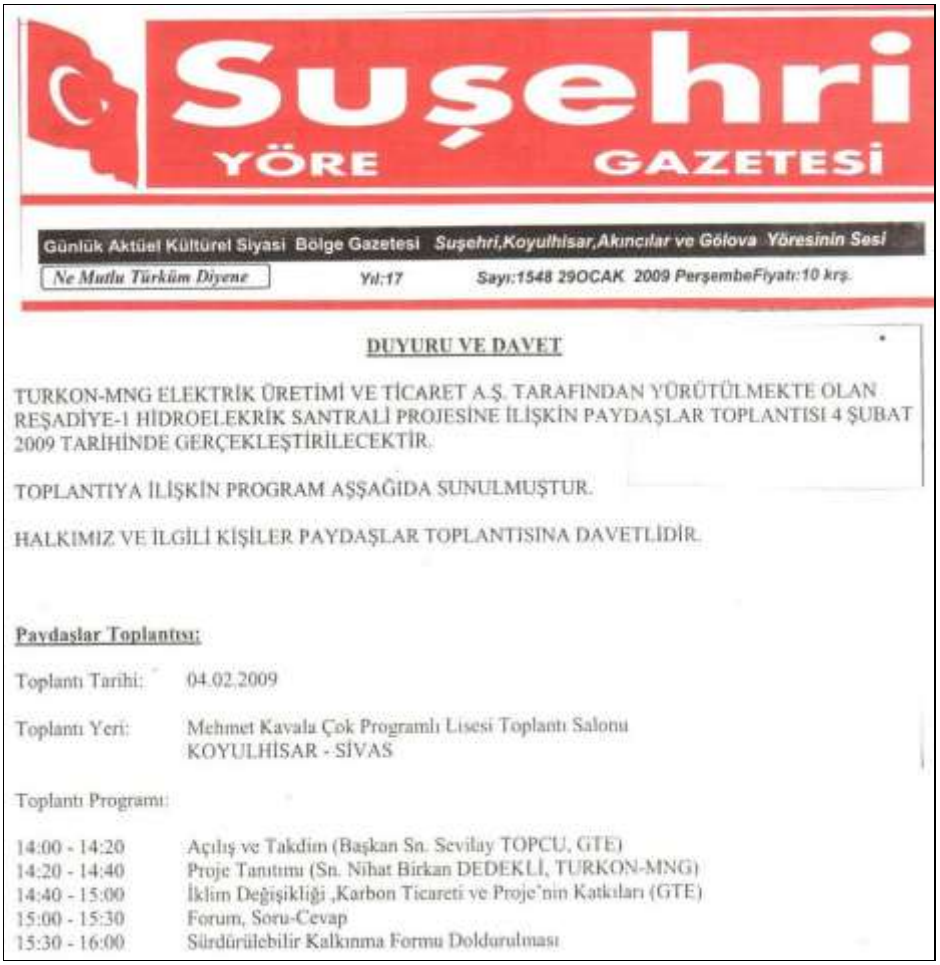
The environmental impacts of the proposed project are not considered to be significant since no negative impact of the project activities have been identified. Land use, grazing or agricultural activities will not be affected negatively by the project activity. All necessary permissions including, environmental, health and safety, have been acquired from relevant agencies and all precautions have been applied strictly by the Investor Company.

SECTION E. Stakeholders' comments

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

Local Stakeholder meeting of the project was organized and held on February 4th, 2009 in Koyulhisar District of Sivas Province. Invitation list for the local stakeholder meeting has been based on Gold Standard Toolkit. Local and international NGOs, Government Agencies and individuals were invited.

Invitations were made by registered mails, newspaper ads and through village heads. Although there exist no DNA in Turkey, Ministry of Environment and Forestry and Ministry of Energy and Natural Resources were invited by registered mail to the meeting. When possible, participation of the invitees was confirmed in order to make necessary arrangements for the meeting. Local representatives of three GS supporting NGOs were invited through postal system and or courier or hand delivery letters.



Suşehri
YÖRE GAZETESİ

Günlük Aktüel Kültürel Siyasi Bölge Gazetesi Suşehri,Koyulhisar,Akıncılar ve Gölova Yöresinin Sesi

Ne Mutlu Türküm Diyene Yıl:17 Sayı:1548 29OCAK 2009 PerşembeFiyatı:10 krş.

DUYURU VE DAVET

TURKON-MNG ELEKTRİK ÜRETİMİ VE TİCARET A.Ş. TARAFINDAN YÜRÜTÜLMEKTE OLAN REŞADİYE-1 HİDROELEKRİK SANTRALİ PROJESİNE İLİŞKİN PAYDAŞLAR TOPLANTISI 4 ŞUBAT 2009 TARİHİNDE GERÇEKLEŞTİRİLECEKTİR.

TOPLANTIYA İLİŞKİN PROGRAM AŞŞAĞIDA SUNULMUŞTUR.

HALKIMIZ VE İLGİLİ KİŞİLER PAYDAŞLAR TOPLANTISINA DAVETLİDİR.

Paydaşlar Toplantısı:

Toplantı Tarihi: 04.02.2009

Toplantı Yeri: Mehmet Kavala Çok Programlı Lisesi Toplantı Salonu
KOYULHİSAR - SİVAS

Toplantı Programı:

14:00 - 14:20	Açılış ve Takdim (Başkan Sn. Sevilay TOPCU, GTE)
14:20 - 14:40	Proje Tanıtımı (Sn. Nihat Birkan DEDEKLİ, TURKON-MNG)
14:40 - 15:00	İklim Değişikliği ,Karbon Ticareti ve Proje'nin Katkıları (GTE)
15:00 - 15:30	Forum, Soru-Cevap
15:30 - 16:00	Sürdürülebilir Kalkınma Formu Doldurulması

Figure 8. Newspaper announcement dated on 29th of January 2009 for initial SC meeting of Resadiye-I HEPP Project

The meeting was held in the conference room of Mehmet Kavala High School of Koyulhisar District, which is the closest settlement to the site of Resadiye-I HEPP Project. Agenda of the meeting was scheduled as requested by GS toolkit. Meeting schedule was published in local newspaper/s as given above. Meeting was recorded on video also.

Figure 9. Resadiye-I HEPP Project Stakeholder Meeting

Local Stakeholders Consultation Meeting was recorded on video and minutes of the meeting were noted. Comments were also requested from the government agencies and invitees by postal letters.

E.2. Summary of the comments received:

Local stakeholders consultation meeting has been organised and held on February 4th, 2009 in Koyulhisar District of Sivas Province. In general stakeholders' comments were positive about the Project. Some negative scores given by stakeholders have been assessed in LSC report and will be further discussed during feedback round which will be organised after receiving Gold Standard's comments about local stakeholder consultation.

Three main issues raised by the participants during the SC meeting were:

- Impact of project on biodiversity,
- Precautions to be taken around conveyance channel to prevent any accident, and
- Consideration of earthquake risk within project design.

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

All comments from stakeholders are taken into account and promptly responded as given below.

Impact on wildlife & Risk of accident around conveyance channel:

In order to minimize the impact on wildlife, all necessary precautions will be taken during construction and implementation phases. These precautions mainly include replanting the trees that have been cut

during construction, building fences and overpasses around conveyance channel to enable access to both sides of the channel.

Risk of landslide/Earthquake

All necessary engineering calculations have been performed and technical measures have been considered in the revision of the original design against the risk of landslide and earthquake when the original project was divided into three hydro power projects. Revision of the original project design and division into three projects has also been useful in diminishing risk of any damage that can be caused by an earthquake in the region.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	TURKON-MNG Elektrik Üretimi ve Ticaret A.Ş.
Street/P.O.Box:	Ugur Mumcu Caddesi, GOP
Building:	No. 88
City:	Ankara
Postfix/ZIP:	06700
Country:	Turkey
Telephone:	+90 312 436 30 00 (30 lines)
Fax:	+90 312 436 64 66
E-Mail:	nihatdedekli@mng.com.tr , mesut.ozden@mng.com.tr
URL:	www.turkon-mng.com.tr
Represented by:	
Title:	Manager
Salutation:	Mr.
Last Name:	Dedekli
Middle name:	Birkan
First name:	Nihat
Department:	Management
Direct fax:	+90 312 447 72 97
Direct tel:	+90 312 436 64 66
Personal E-Mail:	nihatdedekli@mng.com.tr

Organization:	Global Tan Energy Limited
Street/P.O.Box:	Ehlibeyt Mahallesi 1259. Sokak
Building:	No. 7/2
City:	Ankara
State/Region:	Ankara
Country:	Turkey
Telephone:	(0090) 312 472 35 00
Fax:	(0090) 312 472 33 66
E-Mail:	email@gte.uk.com
URL:	www.gte.uk.com
Represented by:	
Title:	Director
Salutation:	Mr.
Last name:	Demirkol
Middle name:	Kemal
First name:	Mehmet
Department:	Management
Direct fax:	(0090) 312 472 35 00
Direct tel:	(0090) 312 472 33 66
Personal e-mail:	kemal@gte.uk.com

Annex 2

INFORMATION REGARDING PUBLIC& ODA FUNDING

No public funding was used for financing the project activities.

TURKON – MNG
ELEKTRİK ÜRETİMİ VE TİCARET A.Ş.
Uğur Mumcu Caddesi No: 88
06700 Gaziosmanpaşa – ANKARA
Tel:(0312) 436 30 00 (30 hat)
Faks:(0312) 436 64 66

Ankara, 02 January 2009

Project reference: **Hamzalı and Reşadiye (Reşadiye I-II-III) Hydroelectric Power Plants**

To: **Gold Standard Foundation**

Declaration of Non-Use of Official Development Assistance by Project Proponent;

As Legal Owner ("Project Proponent") of the above-referenced Projects, acting on behalf of all Projects participants, I now make the following representations:

I. Gold Standard Documentation:
I am familiar with the provisions of Gold Standard Documentation relevant to Official Development Assistance (ODA). I understand that the above-referenced Projects are not eligible for Gold Standard registration if the Projects receive or benefit from Official Development Assistance under the condition that some or all credits coming out of the Projects are transferred to the ODA donor country. I now expressly declare that no financing provided in connection with the above-referenced Projects have come from or will come from ODA that has been or will be provided under the condition, whether express or implied, that any or all of the credits (CERs, ERUs or VERs) issued as a result of the Projects' operation will be transferred directly or indirectly to the country of origin of the ODA.

II. Financier Declarations:
I hereby declare that I have submitted 1 declaration of Non-Use of ODA,representing declarations from all project financiers. If additional financiers are added to the Projects, I will promptly notify the Gold Standard Foundation and ensure that additional declarations are promptly submitted.

III. Financing Plan:
I agree to complete and submit a sufficiently clear and transparent financing plan for the Projects so that during validation the Validator can assess compliance with the Non-Use of ODA requirement.

IV. Duty to Notify Upon Discovery:
If I learn or if I am given any reason to believe at any stage of projects design or implementation that ODA has been used to support the development or implementation of the Projects, or that an entity providing ODA to the host country may at some point in the future benefit directly or indirectly from the credits generated from the projects as a condition of investment, I will make this known to the Gold Standard immediately.

V. Sanctions:
I am fully aware that under Section 10 of the Gold Standard Terms and Conditions sanctions and damages may be incurred for the provision of false information related to Projects and/or Gold Standard credits.

TURKON - MNG
ELEKTRİK ÜRETİMİ
VE TİCARET A.Ş.

Signed:
Name: **Güven BALKAN**
Title: **Member of Board**
On behalf of: **TURKON-MNG Electricity Generation and Trading Co. Inc.**

Annex 3

BASELINE INFORMATION

Data Used in calculation of OM for Turkish Electricity Grid

	NCV (Tj/kt) ($1000m^3$ for gas)	EF (tCO_2/Tj)	COEF(tCO2/kt)
Coal	21.83	89.5	1,954
Lignite	6.61	90.9	601
Fuel Oil	40.08	75.5	3,026
Diesel Oil	42.86	72.6	3,112
LPG	45.94	61.6	2,830
Naphtha	44.17	69.3	3,061
Natural Gas	36.88	54.3	2,003

Table 17. Values used in calculation of OM

	2005	2006	2007	Total Fuel Consumption 2005-2007	Total Emission 2005-2007
Hard Coal	5,259,058	5,617,863	6,029,143	16,906,064	34,915,268
Lignite	48,319,143	50,583,810	61,223,821	160,126,774	96,197,334
Fuel Oil	2,005,899	1,746,370	2,250,686	6,002,955	18,165,198
Diesel Oil	28,442	61,501	50,233	140,176	436,185
LPG	12,908	33	0	12,941	36,623
Naphtha	84,481	13,453	11,441	109,375	334,828
Natural Gas	15,756,764	17,034,548	20,457,793	53,249,105	106,643,758

Table 18. Amount of fuels used for electricity generation[57,58,]

Year	Gross Generation	Net Generation	Net/Gross	Gross.Gen. Thermal	Net.Gen Thermal	Import	Total
2005	161,956.2	155,469.1	0.960	122,242.3	117,345.9	636	117,982
2006	176,299.8	169,543.1	0.962	131,835.1	126,782.5	573	127,356
2007	191,558.1	183,339.7	0.957	155,195.2	147,274.7	864.3	148,139
Total Net Thermal Gen.					**392,665**	**2,073**	**393,476.5**

57 http://www.teias.gov.tr/istatistik2005/46.xls

58 http://www.teias.gov.tr/ist2007/43.xls

Table 19. Net Electricity supply to the grid by thermal plants and imports (GWh)[59]

Data Used in calculation of BM for Turkish Electricity Grid

	NCV	EF $_{CO2}$	Generation Efficiency	EF
	(Tj/kt or m^3 for gas)	(tCO_2/Tj)	%	(tCO_2/MWh)
Coal	21.83	89.5	39.0%	0.826
Lignite	6.61	90.9	39.0%	0.839
Fuel Oil	40.08	75.5	39.5%	0.688
Diesel	42.86	72.6	39.5%	0.662
LPG	45.94	61.6	39.5%	0.561
Naphtha	44.17	69.3	39.5%	0.632
Natural Gas	36.88	54.3	60.0%	0.326

Table 20. Net calorific values, generation efficiency and emission factor data used in calculations

Fuel Source	**Electricity Generated** (MWh)	**EF**	**Share in total generation**
Coal	1,463	0.826	3.6%
Lignite	11,482	0.839	28.0%
Fuel Oil	675	0.688	1.6%
Diesel oil	2	0.662	0.0%
LPG	50	0.561	0.1%
Naphtha	323	0.632	0.8%
Natural Gas	23,974	0.326	58.4%
Renewable and wastes	85	0.826	0.2%
Solid	5	0.839	0.0%
Total Renewable	2,999	0.688	7.3%
TURKEY'S TOTAL	41,056.3		100.0%

Table 21. Most recent capacity additions corresponding to 20%.[60,61,62,63]

59 http://www.teias.gov.tr/ist2007/49.xls

60 http://www.teias.gov.tr/istat2004/7.xls

61 http://www.teias.gov.tr/istatistik2005/7.xls

62 http://www.teias.gov.tr/ist2006/8.xls

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

Annex 4

MONITORING INFORMATION

Information about monitoring plan is given in section B.7.2.

Annex 5

EIA APPROVAL LETTER

T.C.
ÇEVRE ve ORMAN BAKANLIĞI
ÇEVRESEL ETKİ DEĞERLENDİRMESİ VE PLANLAMA
GENEL MÜDÜRLÜĞÜ

Karar Tarihi: 19./10/2006
Karar No : 1166

ÇED OLUMLU BELGESİ

16.12.2003 tarih ve 25318 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin 14. maddesi gereğince; *"Reşadiye HES (3 Regülatör-3 HES) ve Malzeme Ocakları"* projesi hakkında *"Çevresel Etki Değerlendirmesi Olumlu Kararı"* verilmiştir.

Mehmet KARAOĞLAN
Bakan a.
Genel Müdür V.

Proje Sahibi : MNG Elektrik Üretim Ticaret A.Ş.

Figure 10. EIA Approval Letter provided by Ministry of Environment and Forestry

T.C.
SİVAS VALİLİĞİ
İL ÇEVRE VE ORMAN MÜDÜRLÜĞÜ

SİVAS VALİLİĞİ

Karar Tarihi : 16.09.2008
Karar No : 079

ÇEVRESEL ETKİ DEĞERLENDİRME BELGESİ

*17 Temmuz 2008 tarih ve 26939 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin Ek-II listesinde yer alan " **Reşadiye HES ve Malzeme Ocakları Projesi HES (1/3) Kapasite Artırımı**" projesi ile ilgili olarak inceleme değerlendirme yapılmış ve Proje Tanıtım Dosyasında çevresel etkilere karşı alınması öngörülen önlemler yeterli görülmüştür. Ayrıca ÇED Raporu hazırlanmasına gerek bulunmadığı tespit edilmiş olup, söz konusu projeye ÇED Yönetmeliğinin 17. Maddesi gereğince Valiliğimizce "Çevresel Etki Değerlendirmesi Gerekli Değildir" kararı verilmiştir.*

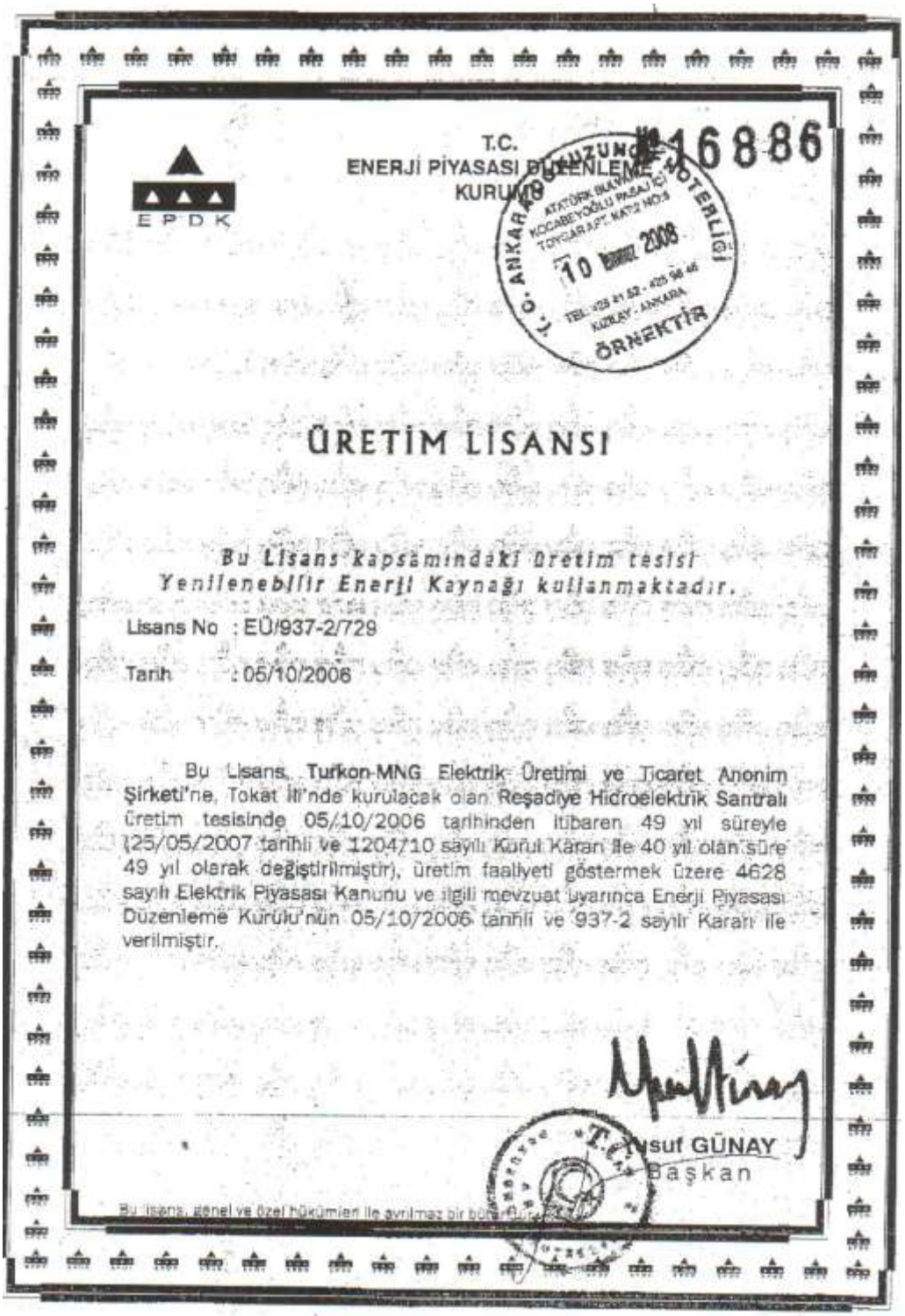
Kadir EKİNCİ
Vali a.
Vali Yardımcısı

Proje Sahibi : Turkon –MNG Elektrik Üretimi ve Tic. A.Ş
Proje Yeri : Koyulhisar İlçesi Kuzulu Mahallesi Mevkii/ SİVAS

Figure 11. EIA "not required" letter for Resadiye-I HEPP for amendments in project design.

Annex 6

GENERATION LICENSE



T.C.
ENERJİ PİYASASI DÜZENLEME KURULU

EPDK

16886

T.C. ANKARA 12. NOTERLİĞİ
ATATÜRK BULVARI KOCABEYOĞLU PASAJI
TOPÇAR APT. KAT:2 NO:3
10 2006
TEL: 425 61 62 - 425 56 46
KIZILAY - ANKARA
ÖRNEKTİR

ÜRETİM LİSANSI

Bu Lisans kapsamındaki üretim tesisi Yenilenebilir Enerji Kaynağı kullanmaktadır.

Lisans No : EÜ/937-2/729

Tarih : 05/10/2006

Bu Lisans, Turkon-MNG Elektrik Üretimi ve Ticaret Anonim Şirketi'ne, Tokat İli'nde kurulacak olan Reşadiye Hidroelektrik Santralı üretim tesisinde 05/10/2006 tarihinden itibaren 49 yıl süreyle (25/05/2007 tarihli ve 1204/10 sayılı Kurul Kararı ile 40 yıl olan süre 49 yıl olarak değiştirilmiştir), üretim faaliyeti göstermek üzere 4628 sayılı Elektrik Piyasası Kanunu ve ilgili mevzuat uyarınca Enerji Piyasası Düzenleme Kurulu'nun 05/10/2006 tarihli ve 937-2 sayılı Kararı ile verilmiştir.

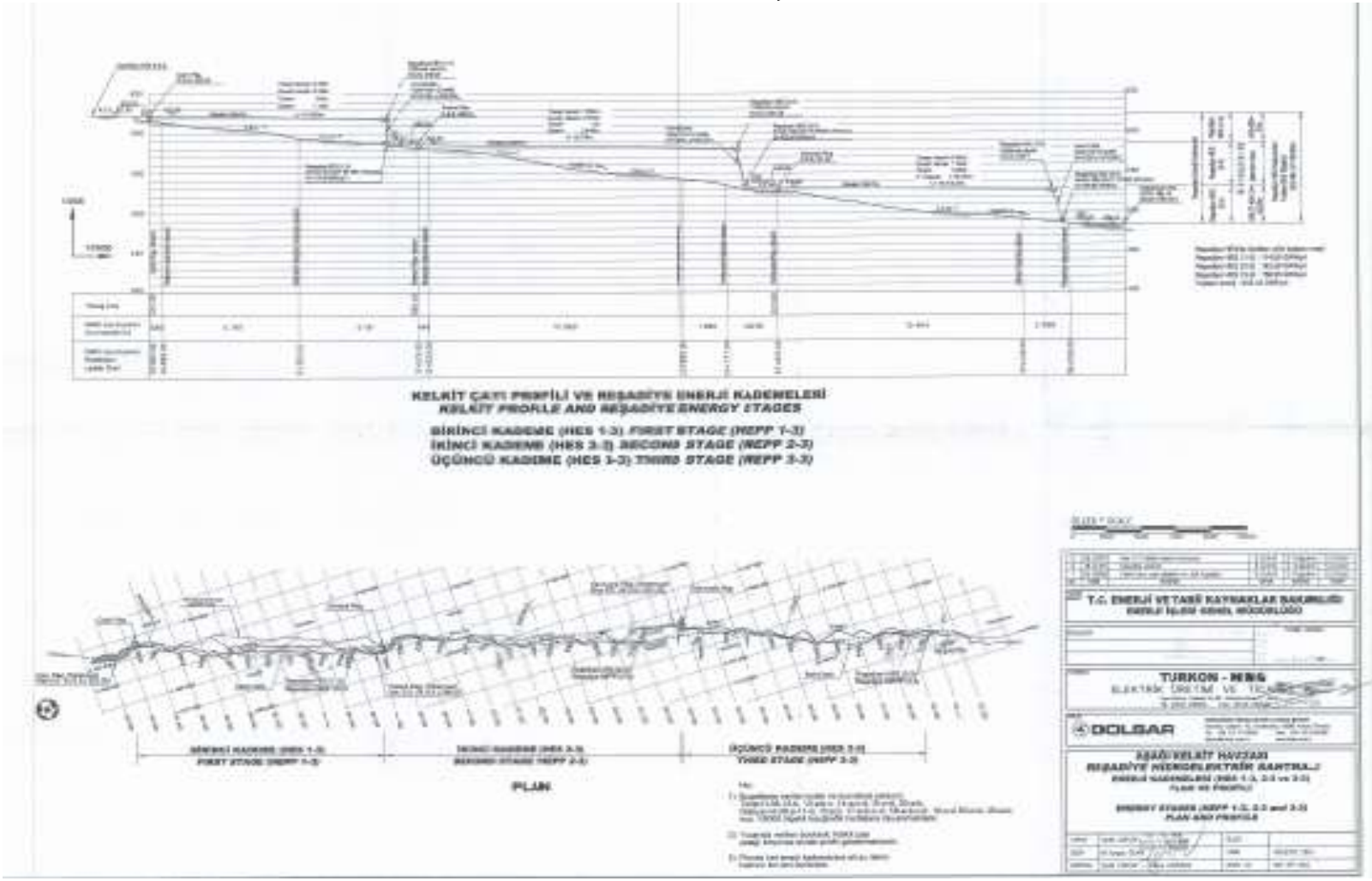
Yusuf GÜNAY
Başkan

T.C. Enerji Piyasası Düzenleme Kurulu

Bu lisans, genel ve özel hükümleri ile ayrılmaz bir bütün

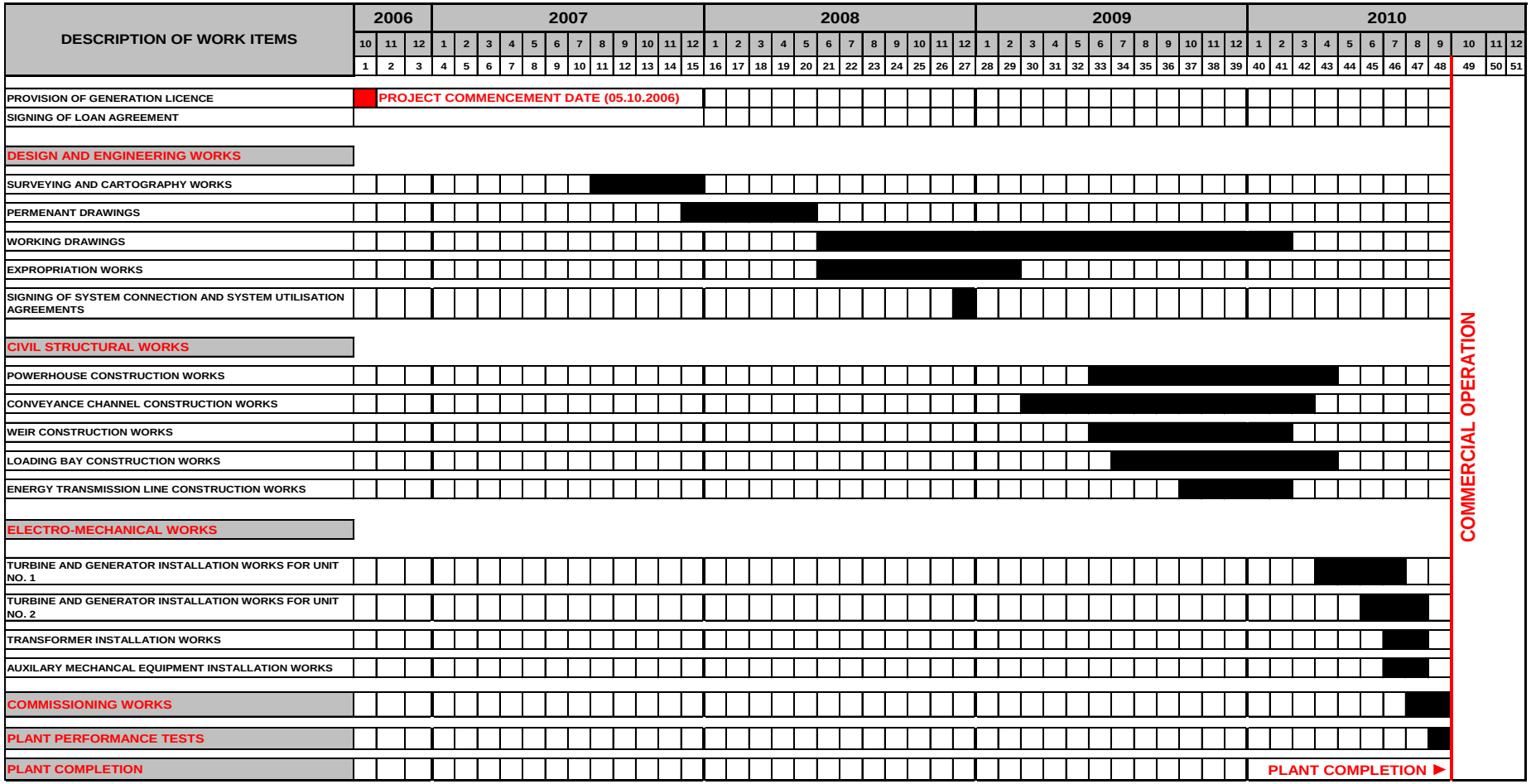
Annex 7

RESADIYE HEPP-ENERGY STAGES, PLAN and PROFILE



Annex 8

RESADIYE-1 HYDROELECTRIC POWER PLANT
PROJECT WORK SCHEDULE



Annex 9

POWER PLANTS CONSIDERED FOR COMMON PRACTICE ANALYSIS

Company / Name of Project	Installed Capacity (MW)	Generation Capacity (GWh)	Status	Link
BEREKET (DENİZLİ)	3.7	12	Built As Autoproducer	http://www.teias.gov.tr/istatistikler/12-13.xls
BEREKET (DALAMAN)	37.5	179	Built As Autoproducer	http://www.teias.gov.tr/istatistikler/12-13.xls
BEREKET (FESLEK)	9.5	41	Built As Autoproducer	http://www.teias.gov.tr/istat2004/7.xls
BEREKET (GÖKYAR)	11.6	43	Built As Autoproducer	http://www.dsi.gov.tr/skatablo/Tablo1.htm
BEREKET (MENTAŞ)	39.9	163	Built As Autoproducer	http://www.epdk.org.tr/lisans/elektrik/lisansdatabase/sonaerdirilen.asp
EKİN ENERJİ (BAŞARAN HES)	0.6	5	No information is available (Initially Designed by DSI)	http://www.dsi.gov.tr/skatablo/Tablo1.htm
ERE - BİRKAPILI	48.5	171	Initially Built as autoproducer	http://www.ere.com.tr/enerji_birkapili.html
ERE - AKSU - ŞAHMALLAR	14.0	45	Built As Autoproducer	http://www.ere.com.tr/enerji_gazipasa.html
ERE - SUGÖZÜ - KIZILDÜZ	15.4	55	Built As Autoproducer	http://www.ere.com.tr/enerji_gazipasa.html
EŞEN-II (GÖLTAŞ)	43.4	170	Built As Autoproducer	http://www.teias.gov.tr/istat2004/13-14.xls
ELTA (DODURGA)	4.1	12	Built As Autoproducer	http://www.teias.gov.tr/istat2004/7.xls
İÇTAŞ YUKARI MERCAN	14.2	44	Built As Autoproducer	http://www.epdk.org.tr/lisans/elektrik/lisansdatabase/sonaerdirilen.asp
MOLU ENERJİ (BAHÇELİK HES)	4.2	30	Built As Autoproducer	http://www.teias.gov.tr/istat2004/13-14.xls
PAMUK (Toroslar)	23.3	112	Build-Operate-Transfer	http://www.limak.com.tr/index.php?lang=tr&pid=420
SU ENERJİ (ÇAYGÖREN HES)	4.6	19	Build-Operate-Transfer	http://www.dsi.gov.tr/bolge/dsi25/topraksu.htm
TEKTUĞ-KARGILIK	23.9	83	Built as VER Project	www.markitenvironmental.com
TEKTUĞ-KALEALTI HES	15.0	52	Built AS VER Project	www.markitenvironmental.com
YAPISAN HACILAR	13.3	90	Built As Autoproducer	http://www.dsi.gov.tr/skatablo/Tablo1.htm
TOTAL HYDRAULIC	**326.7**	**1,326**		

Table 20. List of HEPPs Operational at the time of investment decision