Voluntary Carbon Standard
Project Description

The Cevizlik Run-of-River-Hydroelectric Power Plant

June 2010

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Description of Project:

1.1 Project title

The Cevizlik Run-of-River Hydroelectric Power Plant
Version 6 17.06.2010

1.2 Type/Category of the project

This is a voluntary project, but it follows the CDM rules.

The approved baseline and monitoring methodology ACM0002-Version 10: *"Consolidated baseline methodology for grid-connected electricity generation from renewable sources*" ("*ACM0002*") is applied.

According to Annex A of the Kyoto Protocol, the Project fits in:
Sectoral Scope Number: 1
Sectoral Scope: Energy Industries -Renewable Energy

The project is not a grouped project.

1.3 Estimated amount of emission reductions over the crediting period including project size:

Project size	Tonnes CO_2 equivalent emissions reductions per year.	*Cevizlik Run-of-River Hydroelectric Power Plant*
Micro project	Less than 5,000	NO
Project	Between 5,000 and 1,000,000	YES
Mega Project	More than 1,000,000	NO

Once implemented, it is estimated that the Project will reduce 187.471,5 tCO_2e annually, generating an expected total of 1.874.715 tCO_2e for the duration of the initial 10-year crediting period. The Project's estimated annual ERs over the 10-year crediting period are as follows:

Year	Annual estimation of emissions reductions in tonnes of CO_2e
From 29th May to 31st December 2010	111.455,7
2011	187.471,5
2012	187.471,5
2013	187.471,5
2014	187.471,5
2015	187.471,5
2016	187.471,5
2017	187.471,5
2018	187.471,5
2019	187.471,5
From January 1st to May 28th 2020	76.015,9
Total estimated reductions (tonnes of CO_2)	1.874.715
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	187.471,5

1.4 A brief description of the project:

The Cevizlik Hydroelectric Project consists of the construction of a Greenfield 92.96 MW run-of-river hydroelectric power plant located in the İyidere river basin, in Turkey's Eastern Blacksea Region. The plant has been designed to generate electricity by utilizing the 230 m of head between the tailwater level of the upstream existing Ikizdere HEPP and the Kalkandere HEPP project which is under construction and will be located downstream.

The main purpose of the project is to generate approximately 335,03 GWh/year of electricity to supply the national grid using a renewable resource and tapping the significant hydropower potential in the region. The project activity reduces greenhouse gases (GHGs) emissions that would have otherwise occurred in the absence of the project activity by avoiding electricity generation from fossil fuel sources. The average annual emission reductions of the proposed Project are estimated to be 187.471,5 tonnes of CO_2e (tCO_2e).

The Cevizlik Hydroelectric Project contributes to the region's sustainable development in particular and Turkey's sustainable development in general by:

- increasing the use of renewable energy sources for generating electricity
- meeting the need of electricity generation and supply in Turkey in a sustainable way,
- decreasing the consumption of fossil fuels,
- reducing emission of GHGs from the national electricity grid, thereby reducing the effects of global climate change in the medium and long term, and
- providing job opportunities as expectedly 300 people will be hired during the three year construction phase of the project.

The project contributed in the social and economic development in the project area significantly as:

- the roads of Soguksu Village have been improved which helps the villagers access surrounding markets easily,
- the project owner has donated almost 500,000 Euros to social and economic development projects at the region of the project activity. Donations were made to Rize and Trabzon, the two nearest cities to the project area, Government Offices for renovations of Court Houses and some other public buildings. Some schools in the project area were provided with stationery supply as well as food and milk to improve the nutritional conditions for the students. Local people in the project area use mechanical cable cars for transportation. Maintenance supply is provided to the cable cars in the project area to improve safety conditions.

- the project owner made its machinery and equipment available for construction and improvement of public buildings and infrastructure in the project area,
- the project owner assisted the stakeholders to build better housing and creating more efficient economic activities for themselves after evacuating the project's area mainly by compensating them with amounts of funds significantly higher than those set by the arbitration court.

1.5 Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project:

The Project site is located in Turkey, in Eastern Black Sea, in the boundaries of Rize province; the Underground powerhouse is located between 40º50'37"- 40º50'38" north latitudes and 40º 28'29"- 40º 28' 31" east longitudes.

The following figure shows the project's location:

***Figure 1**: Project's location*

1.6 Duration of the project activity/crediting period:

- Project start date: 29th May 2010 (Date on which the project commenced electricity production)
- VCS crediting period start date: May 2010
- VCS project crediting period: 10 years, renewable once. (Total crediting period: 20 years)

1.7 Conditions prior to project initiation:

As the project activity is a Greenfield project, the conditions prior to the project initiation is the continuation of the current situation, i.e. the equivalent amount of energy would have been produced by other grid-connected units, which are mainly thermal power plants, undertaking business as usual maintenance.

1.8 A description of how the project will achieve GHG emission reductions and/or removal enhancements:

The Cevizlik Hydroelectric Power Plant reduces greenhouse gas emissions that would have otherwise occurred in the absence of the project activity by avoiding electricity generation from fossil fuel sources both in the operating margin and build margin of the system. The average annual emission reductions of the proposed Project are estimated to be , 187.471,5 tonnes of CO_2e (tCO_2e).

1.9 Project technologies, products, services and the expected level of activity:

Project technologies:
The following table shows a full detail of the project's technical specifications:

Property	Unit	Amount
Catchment Area	km^2	790
Annual Average Precipitation	mm	1100
Average Discharge	m^3/s	26,46
Design Discharge	m^3/s	50
Type	-	Ogee shaped concrete gravity
Crest Length	m	60
Crest Elevation	m	456
Thalweg Elevation	m	450
Foundation Elevation	m	444
Height above Thalweg	m	6
Height above Foundation	m	12
Flood Water Level	m	457.95
Q100	m3/s	557
Q500	m3/s	719.52
Flushing Gate		
Crest Elevation	m	450
Foundation Elevation	m	444
Crest Length	m	17
Number of Gates		3
Gate Size	m x m x m	3 x 2.50 x 4.00
Intake Structure Total Width	m	14
Settling Basin		
Length	m	64
Width	m	4 X 7
Settled Particular Size	mm	0.60
Regulation Pond Surface Area	m^2	14091
Regulating Pond Capacity Active Volume	m^3 m^3	200000 173000
Headrace Tunnel		
Type		Horseshoe, concrete lined
Inner Diameter	m	4.00
Thickness of Concrete	m	0,40
Tunnel Capacity	m3/s	50,00
Headrace Tunnel Length	m	7981,485
Access Tunnel 1 Length	m	410
Access Tunnel 2 Length	m	545
Access Tunnel 3 Length	m	960
Access Tunnel 4 Length	m	250
Access Tunnel 5 Length	m	113,50
Surge Tank		
Type		Varying Cross Section
Top Elevation	m	476
Bottom Elevation	m	412,40
Max. Water Level	m	470.10
Minimum Water Level	m	420.39
Inner Diameter	m	12.00 (412,40~430.00 between elevation) 16.00 (430.00~476.00 between elevation)
Penstock		
Inner Diameter	m	3.40
Excavation Diameter	m	4.60
Average Steel Thickness	m	20
Length	m	348,63

Powerhouse		
Type		Underground
Height	m	30,70
Length	m	43,80
Width	m	16
Project Discharge	m^3/s	50,00
Tailrace Elevation	m	226,90
Turbine Axis Level	m	221,00
Turbine Type		Vertical Axis Francis
Gross Head	m	230,00
Net Head	m	200,60
Installed Capacity	MW	92,96
Unit Capacity	MW	51,21
Number of Units		2
Underground Powerhouse Access		
Type		Modified Horseshoe
Tunnel Size	m	5 x 6
Concrete Thickness	m	0,50
Tunnel Length	m	98,225
Energy Transmission Line		
Type	kV	154
Characteristics		2 x 954MCM
Power Transmission Line Length	km	21

Table 1: *Cevizlik's Technical properties*

The turbine and generator manufacturer is Alstom. The manufacturer is a French company, acclaimed for its integrated power plants, power production services and air quality control systems. Alstom has been selected as the equipment provider because of its reliable quality products and technology, which is a grid friendly technology with low maintenance needs as well as low noise and low environmental impacts.

The design will be set according to the Computational Fluid Dynamics based calculations. The equipments and mechanical parts will be manufactured abroad and then delivered to the project site. This technology has been chosen because it has been considered to be the most suitable for the project.

Alstom offers a total guaranteed mechanical output of 92,96 MW with two units, each with an installed capacity of 51,21 MW. These two units will work together as the project has one energy tunnel and one penstock to serve them. Since there will be some hydraulic losses due to water speed, the total guaranteed mechanical output will diminish to 92,96 MW. Alstom will provide the equipments' maintenance as well.

Expected level of activity:
As it was stated in ***Section 1.4***, Cevizlik Hydroelectric Project will generate approximately 335,03 GWh of electricity annually. The following figure and table show the monthly expected level of activity:

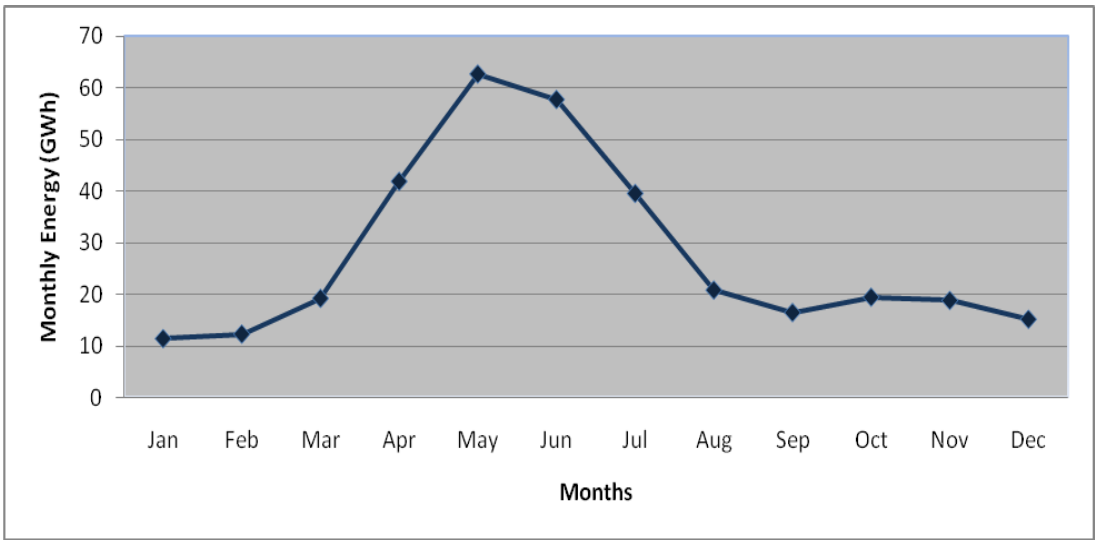

Figure 2: *Cevizlik's Expected level of Activity*

Months	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Jul***	***Aug***	***Sep***	***Oct***	***Nov***	***Dec***	***TOTAL***
Monthly Energy (GWh)	*11,39*	*12,26*	*19,19*	*41,84*	*62,61*	*57,69*	*39,5*	*20,79*	*16,43*	*19,41*	*18,78*	*15,14*	*335,03*

Table 2: *Expected Level of Activity of Cevizlik HEPP*

The following figures show the plant lay-out and the operation diagram:

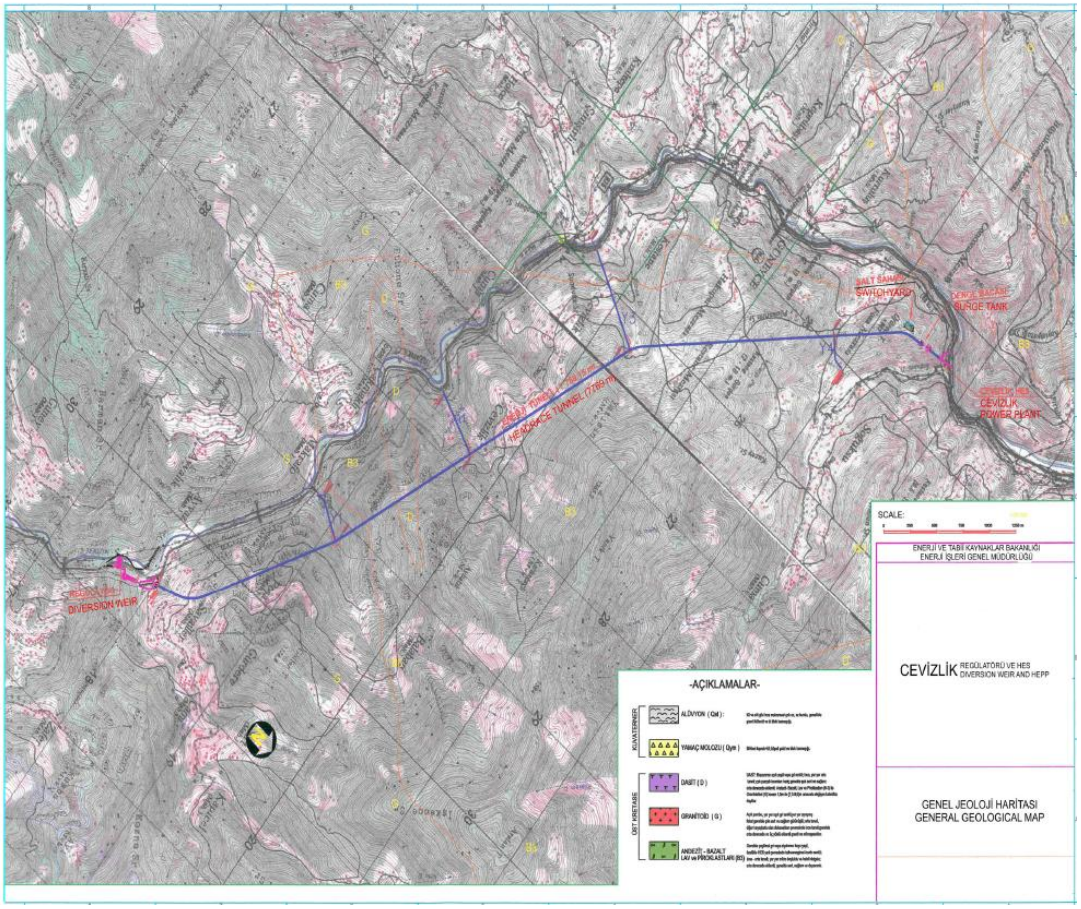

Figure 3: *Plant Layout*

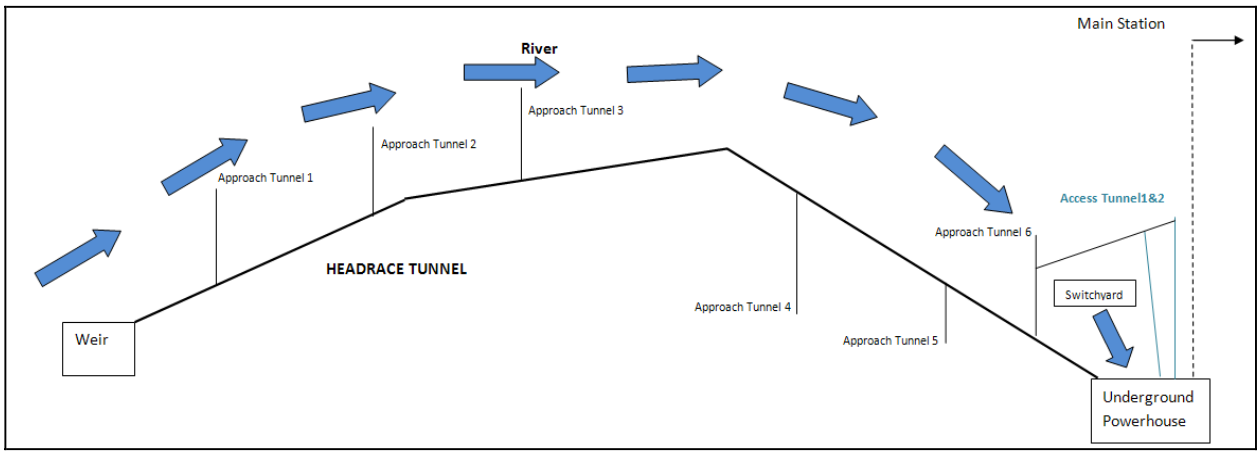

Figure 4: *Cevizlik Hydroelectric Power Plant Operation Diagram*

1.10 Compliance with relevant local laws and regulations related to the project:

The applicable mandatory laws that will be applied for the project are:

i. *Electricity Market Law*[1]: It was enacted in March 3rd, 2001. This Law aims to ensure the development of a financially sound and transparent electricity market operating in a competitive environment under the provisions of the civil law. It also underlines the needs to produce a sufficient, high quality, low cost and environmentally friendly electricity to consumers. The text also provides guidelines to structure the autonomous regulation and the supervision of the market.

ii. *The Renewable Energy Law*[2]: It compels electricity selling companies to purchase from "Green" energy providers until 2011 at a defined ratio and price. This ratio is based on previous year sales over total energy sold in the country. The price is based on a yearly average wholesale purchase price predetermined by the Energy Market Regulatory Authority (EMRA).

iii. *Environmental Law*[3]: This law came into force in 1983, it considers the environment as a single domain, aiming not only to prevent and eliminate environmental pollution, but also to allow the management of land and natural resources in an integrated manner. According to its basic principles, and as also stated in the Constitution, citizens as well as the State bear responsibility for the environment protection. Furthermore, this law states that in all economic activities, every measure should be taken to minimize pollution.[4]

iv. Regulation on procedures and principles of signing the agreement of water resources utilization to generate electricity for the electricity market[5].

The project complies with all aforementioned laws as its activity aims at generating electricity by using a renewable resource: hydroelectric power; in a sufficient, low-cost and environmentally-friendly manner, using the latest technology available on the market. Moreover, an Environmental Impact Assessment (EIA) has been carried out and the results of this study concluded that the project activity has no significant impacts on the environment. (Please refer to ***Section 5*** for detailed information).

Additionally, according to the letter from the Trabzon Regional Forestry Directorate Forest Operation Management, dated March 27th 2006[6], the project activity will supply added values and employment, and considering the EIA regulation, the facilities' construction will have no negative impact on the forest and its vicinities.(Please refer to ***ANNEX 1***)

Furthermore, in the official letter from Ministry of Culture and Tourism, Trabzon Regional Council of Protection of Cultural and Natural Assets, dated May 26th 2005[7], it was declared that there are not any cultural or historical assets in the Project site as defined within the scope of the Laws No: 3386, 5226 and 2863.

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[1] Law Number: 4628 Ratification Date: 20.02.2001 Enactment Date: 03.03.2001

[2] Law Number: 5346 Ratification Date: 10.05.2005 Enactment Date: 18.05.2005

[3] Law Number2872 Ratification Date: 09.08.1983 Enactment Date: 11.08.1983

[4] "*Turkey's Environment: a review and evaluation of Turkey's environment and its stakeholders*", May 2002. http://www.rec.org/REC/Programs/ExtensionToTurkey/TurkeysEnvironment.pdf

[5] Official Gazette: #25150, on 26.6.2003

[6] Letter number B.18.1.OGM.1.23.Ş3.231-2753.

[7] Letter number 254.

1.11 Identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements:

According to Water Utility Rights which was signed for Cevizlik HEPP with Turkish State Hydraulic Works (DSI), DSI may instruct to increase the amount of water to be released from the water intake structure to the river bed for the future basin's needs for potable water. This means that the expected electricity generation may be subject to decrease upon DSI's request. Thus, substantially affecting the project's GHG emission reductions.

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

At the project's site, it is only foreseen to generate electricity by the installation of a Greenfield renewable power plant. Hence, no previous GHG emissions have occurred.
The project proponent has initiated this project with the aim to supply electricity to the grid, and not primarily for creating GHG emissions in the prospect of their subsequent removal.
Moreover, since the project activity is the installation of a new hydroelectric power plant, the average annual emission reductions of the proposed Project are estimated to be 187.471,5 tonnes of CO_2e (tCO_2e).

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

The project has not created another form of Environmental Credit. (Please refer to ***ANNEX 2***).

1.14 Project rejected under other GHG programs (if applicable):

The project has not been rejected under any other GHG programs.

1.15 Project proponents roles and responsibilities, including contact information of the project proponent, other project participants:

The project developer:
In accordance with the Electric Market Law No. 4628, Akım Enerji Üretimi Sanayi ve Ticaret A.Ş. (hereafter, Akım Enerji) was founded to construct, commission, operate and transfer a hydroelectric power plant in order to generate and market electric power.

Its mission is to be one of the energy companies that effectively utilize domestic and renewable resources by transforming advanced technology and knowledge into efficiency and making a maximum contribution to national economy without neglecting international quality standards.

Akım Enerji has the vision and ambition to be a reputable and a leading company that takes a pioneering role in the world of today's standards by utilizing energy resources within the country in the most efficient and environmentally friendly way.

The Cevizlik Hydroelectric Power Plant project shall be registered as a Voluntary Carbon Standard (VCS-VER) project to enable the project implementation by means of financial inflows coming from the carbon credits sale. All elements mentioned in this document show that the proposed project activity is expected to fulfil the requirements of the Voluntary Carbon Standard.

The following table shows the project proponent's contact information:

Organization:	AKIM ENERJI URETIMI SANAYI VE TICARET A.S.
Street/P.O.Box:	SANKO HOLDING-ISKO SUBESI ORG.SAN.BOL.3.CADDE
Building:	B BLOK 3.KAT ATTN: MR.VOLKAN DOGAN
City:	INEGOL / BURSA
State/Region:	
Postfix/ZIP:	16400
Country:	TURKEY
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FAX:	+90-224-714-93-10
E-Mail:	sankoenerji@sankoenerji.com.tr
URL:	http://www.sankoenerji.com.tr/eng/default.asp
Represented by (1):	
Position:	INVESTMENT MANAGER, HYDROELECTRIC POWER PLANTS
Last Name:	DOGAN
Middle Name:	
First Name:	VOLKAN
Department:	ENERGY INVESTMENTS
Mobile:	+90-533-369-49-78
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The as stated before the contacts persons are Mr. Volkan Dogan and Mr. Taner Sengonul. Their Responsibilities regarding the carbon credits process are to analyze the related documents, the Coordination between internal departments and to setup meetings with companies.

The following table shows the Carbon consultants' contact information:

Organization:	ecosur
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Middle Name:	Belen
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Direct FAX:	+54 11 6379 1992

Direct tel:	+54 11 4776 4406
Personal E-Mail:	b.migone@ecosur.fr
Represented by (2):	
Position:	CDM/JI Advisory Services Manager
Last Name:	LEPAGE
Middle Name:	
First Name:	Aurélie
Department:	
Mobile:	
Direct FAX:	+33 1 47 55 96 90
Direct tel:	+33 1 47 55 06 78
Personal E-Mail:	a.lepage@ecosur.fr

Ecosur responsibilities regarding the carbon credits process are the preparation of the PD and assisting Akım Enerji during the validation process,

1.16 Any information relevant for the eligibility of the project and quantification of emission reductions or removal enhancements, including legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and temporal information.):

There is not any relevant information to supplement.

1.17 List of commercially sensitive information (if applicable):

As a Akım Enerji,company policy we do not find ethical to announce this social and financial aids, therefore this is commercially sensitive information that needs to be excluded from the public version of the VCS PD that will be displayed on the VCS Project Database.

2 VCS Methodology:

2.1 Title and reference of the VCS methodology applied to the project activity and explanation of methodology choices:

*Additionality, for the purpose of calculating the emission factor of the Turkish electricity grid," Tool to calculate emission factor for an electricity system", Version01.1 is employed*The baseline for the project was established through the official methodology of ACM0002 / Version 10, named "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"[8] as approved by the CDM Executive Board. Conservative options and data were selected during the implementation of the methodology.

2.2 Justification of the choice of the methodology and why it is applicable to the project activity:

The methodology is applicable to grid-connected renewable power generation activities under certain conditions. The applicability conditions of the approved consolidated methodology and how the project activity complies with them are described below:

Applicability condition in the ACM0002/Version 10	Compliance of the condition
This methodology is applicable when the project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.	The project activity is a Greenfield grid connected run-of–river hydropower project. The project activity is located across the İyidere river basin. The water is diverted using a diversion wall structure to the energy tunnel and then to the powerhouse. The water will be fed back to river through the tailrace canal. The diversion structure does not result in storage of water.
In the case of capacity additions, retrofits or replacements: the existing plant started commercial	This condition is not applicable to the project activity as it involves the installation of a new hydroelectric

operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	power plant.
In case of hydro power plants, one of the following conditions must apply: - The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or - The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2; or - The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.	This condition is not applicable to the project activity as it does not result in a new reservoir. However, the project activity involves the construction of a regulation pond with a surface area of 14 091 m^2. The power density (PD) for this regulation pond is calculated as follows: PD = 92 960 000 W/14 091 m^2 PD = 6 597 W/m^2 PD > 4 W/m^2 PD > 10 W/m^2, therefore, according to the methodology, there will be no emissions from the regulation pond.
This methodology is not applicable to project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the base line may be the continued use of fossil fuels at the site.	This condition is not applicable to the project activity as it does not involve switching from fossil fuel to renewable energy at the site of the project activity.
This methodology is not applicable to biomass fired power plants.	This condition is not applicable to the project activity as it does not involve the installation of a biomass fired power plant.
In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	This condition is not applicable to the project activity as it does not involve a capacity addition, retrofit or replacement of existing grid-connected renewable power plant/unit(s).

Hence, the approved consolidated methodology ACM0002 is applicable to the project activity.

The project activity also complies with the applicability conditions of the "*Tool to calculate the emission factor for an electricity system"* (Version 01.1) as it displaces electricity generated by power plants in the Turkish electricity system. Moreover, it complies with the applicability criteria of the *"Tool for the demonstration and assessment of additionality"* (Version 05.2), as according to paragraph 6, this tool provides a general framework for demonstrating and assessing additionality and is applicable to a wide range of project types.

2.3 Identifying GHG sources, sinks and reservoirs for the baseline scenario and for the project:

Potential leakage emissions in the context of power sector projects are emissions that arise from the project activities such as power plant construction, fuel handling and land inundation. According to ACM0002 / Version 10, such emissions do not need to be taken into account.

Turkish Electricity Sector[8]

Demand Side:

Gross electricity demand (Gross Generation + Imports – Exports) in Turkey rose at a rate of 8.0% per annum for the last three decades since 1975, which reflects one of the basic indicators of an emerging economy. Gross electricity demand in Turkey reached 198,085 GWh in 2008, which makes Turkey one of the ten largest markets for electricity among European countries. Even the devastating earthquake that hit

[8] http://www.teias.gov.tr/istatistik2008/index.htm

Turkey in 1999, and the economic crisis in 2001, could not reverse this robust growth record. In 1999, consumption grew by 4.5% despite the decline in GDP by 5%. In 2001, Turkey's electricity consumption dropped only 1.1% whereas GDP shrank by 7.5%. Parallel to the gross demand, the net consumption figure reflects an average of 7.9% increase since 1975, reaching to 161,948 GWh in 2008. Although there has been significant improvements in the recent years, Turkey's per capita electricity consumption figure is 2,053 kWh (as of 2006), which is one of the lowest among European countries. [9] According to International Energy Agency (IEA) statistics, OECD average per capita electricity consumption is 8,381 kWh in 2006, which is an indicator of the growth potential in Turkey.[10] This figure has been 3,258 kWh among CEE countries.[11] Per capita consumption is expected to increase to 5,050 kWh by 2020 according to the MENR base case demand growth scenario, and with a projected annual population growth rate of 1.5%.

Supply Side:

Installed capacity and electricity generation in Turkey increased in line with consumption growth in recent decades. In 2008, electricity generation reached 198,418 GWh while imports stood at 789 GWh – 0.40% of total supply. Turkey became an importer in the mid-1970s, however, the share of imports in total supply never exceeded 3.6% for the last 20 years. The imports reached its peak as a portion of total supply in 1984 with 8%. By the end of 2008 the installed capacity of Turkey reached 41,817 MW, representing a CAGR of 8.0% since 1975. The rate of the increase in the capacity was well above 10% from 1970 to 1980. 48.2% of the installed capacity of 41,817 MW in 2008, was held by the State Generation Company EUAS, 9.2% by Affiliated Partnerhips of EUAS, 0.6% Mobile Power Plants and the remaining 42.0% owned by autoproducers, Production companies, TOOR and ADÜAŞ. There is an increasing trend in favor of IPPs, switching away from the State Generation Company in the recent years. When we compare the breakdown of the installed capacity in 2000, we see that EUAS's contribution to the installed capacity was 80% whereas the IPPs' share was only 9%. This is a concrete indication of the trend of the generation in favor of independent producers. The contribution of thermal power has always been the dominant source in both the generation and the installed capacity. In 2008, thermal power plants accounted for the 66.0% of the installed capacity whereas the hydro power plants' contribution was 33.1%. This is one of the lowest figures since 1970. On the other hand geothermal and wind powered capacity is still negligible with 0,9%. The existing electricity grid in Turkey is an interconnected single entity which to a larger extend fed by fossil fuel fired power plants. (Graph 2.1)

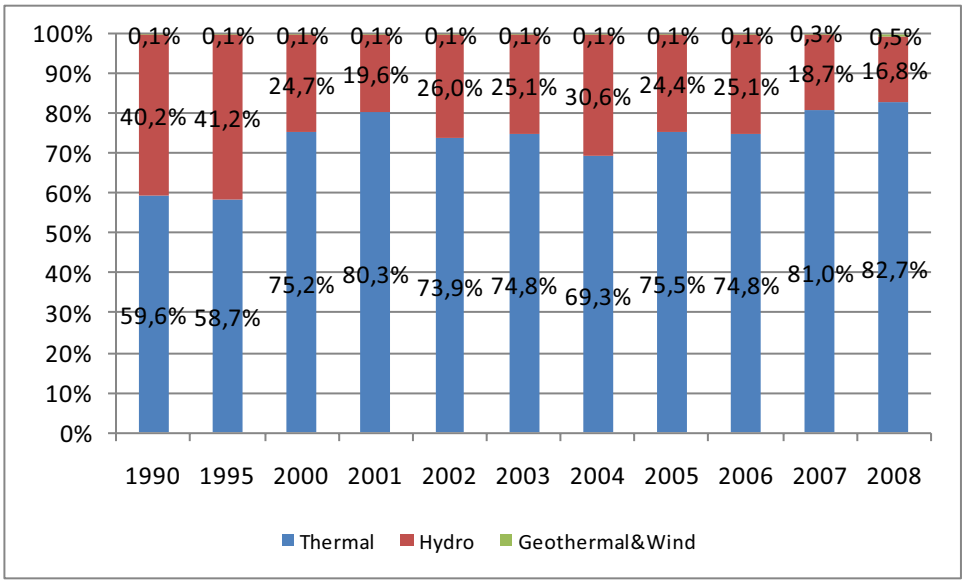


***Figure 5**: Electricity Production Fuel Type* [12]

The Graph below displays the forecast in increasing demand along the years between 2008 and 2017. The supply projection is based on the planned projects for energy production but it is very probable that, under increasing pressure of increasing demand, the government will shift to thermal power plants as they present higher financial feasibility with relatively short construction periods.

[9] http://www.iea.org/Textbase/country/maps/EUROPE/ele_pop.htm
[10] http://www.iea.org/Textbase/stats/indicators.asp?COUNTRY_CODE=28
[11] http://www.iea.org/Textbase/stats/indicators.asp?COUNTRY_CODE=33
[12]: http://www.teias.gov.tr/istatistik2008/32(75-08).xls

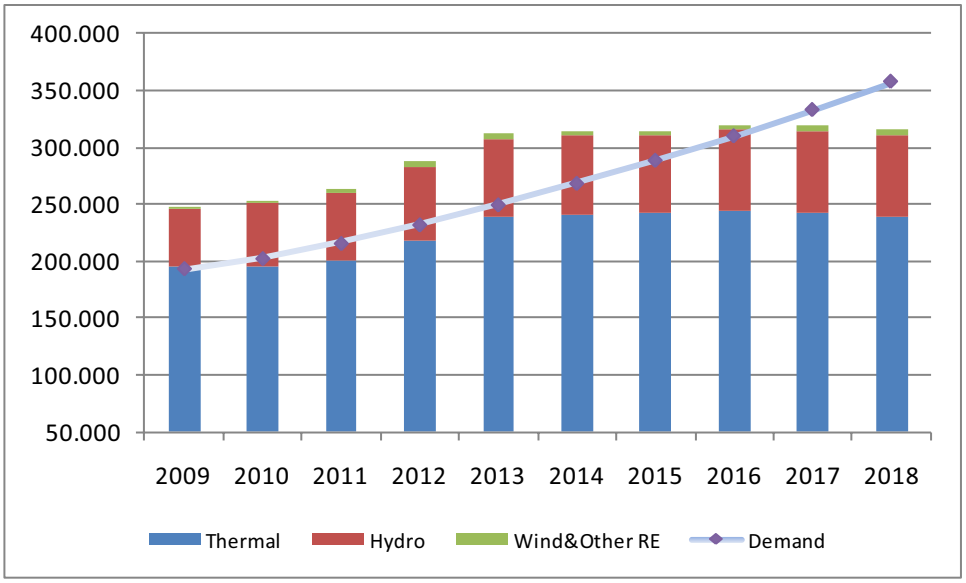


***Figure 6**: Electricity Supply and Demand Projections for Turkey*[13]

Turkish Renewable Energy Sector

Turkey was not a party to Kyoto Protocol (Minister of Forestry announced that Turkey is a party to Kyoto Protocol since 26th of August 2009, under certain conditions), having signed the United Nations Framework Convention on Climate Change it is committed to managing greenhouse gas emissions. The goal is to maintain emissions at the level of 1990 (3,15 per capita). Therefore, Turkish government keeps focusing on renewables.

Turkey enacted its first specific renewable energy law in 2005, but there are also provisions regarding renewable energy in the Electricity Market Law (EML), which authorises the Energy Market Regulatory Authority ("EMRA) to take measures to promote renewable energy use and in secondary legislation:

- The Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy[14] ("Law") was adopted on 18 May 2005. This article provides as overview of the general provisions of the Law, as well as other supporting legislation regarding renewable energy resources. However, the legislation on bio-fuel will not be taken into account.[15]
- Renewable energy resources ("RER") is not a brand-new topic, as the Electricity Market Law [16](**"EML"**), which was enacted in March 2001 and the Electricity Market License Regulation[17] ("Regulation") demonstrate. According to the EML, EMRA is authorized to take the necessary measures to encourage the utilization of RER.
- According to the European Council Decision of 23 January 2006 on the principles, priorities and conditions contained in the Accession Partnership with Turkey[18], one of the short-term priorities identified for Turkey relates to "[s]tart alignment on the acquis on energy efficiency and renewable energy sources and develop administrative capacity in these sectors". Therefore, the new Law contains new incentives for RER development.

Objective and Scope of the Law

It is important to note that there is no region specific regulation and law in Turkey as it is not a federal state. The purpose of the Renewable Law is "to expand the use of renewable energy resources for generating electricity and to benefit from these resources in a secure, economic and qualified manner; and to increase the diversification of energy resources, reduce greenhouse gas emissions, assess waste products, protect the environment and develop the related manufacturing sector to realize these objectives."

13: http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf

14 Law No. 5346, published in the Official Gazette dated 18 May 2005 and numbered 25819.

15 See Petroleum Market Law No. 5015, published in the Official Gazette dated 20 December 2003 and numbered 25322; Petroleum Market License Regulation, published in the Official Gazette on 17 June 2004 and numbered 25495; Regulation on Technical Criteria for Petroleum Market, published in the Official Gazette on 10 September 2004 and numbered 25579.

16 .Law No. 4628, published in the Official Gazette dated 3 March 2001 and numbered 24335

17 Published in the Official Gazette dated 4 August 2002 and numbered 24836; see moreover Electricity Market Grid Regulation, published in the Official Gazette dated 22 June 2003 and numbered 25001; Regulation on Balancing and Settlement, published in the Official Gazette dated 21 December 2004 and numbered 25677; Communiqué Regarding the Principles and Procedures of Financial Settlement, published in the Official Gazette dated 4 November 2003 and numbered 25279.

18 OJ 2006 L 22/34.

The Renewable Law covers wind, solar, geothermal, biomass, biogas, wave, stream, tidal, river and arc type hydroelectric generation facilities and hydroelectric generation facilities either canal or run of river type or with a reservoir area of less than 15 km^2.

Incentives provided by the Renewable Law and Electricity Market Licensing Regulation

Renewable Energy Law

(a) Development plans which might have a negative effect on the use and efficiency of RER areas can no longer be created on public land.

(b) Each legal entity holding a retail sale licence must purchase a specified amount of electrical energy from RER certified generators which have been in generation for less than 10 years. This amount is based on a comparison between the amount of energy sold by that retail sale licence holder, in the previous calendar year, and the total electrical energy offered for sale by all retail sale licence holders in Turkey.

The price of electrical energy bought in accordance with this provision is determined by EMRA and is the average Turkish wholesale price announced in the previous year. This amount is 9.67 Ykr/Kwh in 2007 (approximately 5 Euro cents). The retail price must be between 5.0 and 5.5 Euro cents but a generator can sell its electrical energy for a higher price if there is market demand.

In practice all generators are currently selling their electrical energy to the Market Financial Reconciliation Center, which currently offers the highest price in Turkey due to a recent supply gap.

(c) Real persons and legal entities establishing an isolated electricity generation plant and grid supported electricity generation plant; using hydraulic resources with a maximum installed capacity of 1,000 kW that is to be used solely to satisfy their own needs, are not required to pay service charges for these projects. This is provided that the final design, planning, master planning, preliminary surveying and first auditing were prepared by either the DSI (State Hydraulic Works) or the EIE (Electrical Power Resources Survey and Development Administration).

(d) The sale price, rent, rights of access and usage permissions of state owned land are subject to an 85% reduction where the property is used for the purpose of generating electrical energy from RER which fall within the scope of the Renewable Law. ORKOY (General Directorate of Forest and Village Relations) and forestation special allowance revenue are not charged for forested land.

(e) Within the framework of the Renewable Law: (i) investment in energy generation facilities; (ii) procurement of domestically manufactured electromechanical systems; (iii) investment in research, development and manufacturing in the scope of electricity generation systems using solar cells and concentrated collectors; and (iv) investment in research and development facilities for the generation of electrical energy or fuels by utilizing biomass resources, can benefit from incentives determined by the Council of Ministers. Nevertheless, despite good intention of the government to promote electricity generation from renewable energy sources, it is not possible to say that the incentives provided so far are sufficient or the existing incentives are applied properly. Considerable barriers for renewable energy projects still exist, as discussed in Section 2.5; Barrier Analysis.

Licensing Regulation

Legal entities applying for Licences for the construction of facilities based on domestic natural resources and RER only pay 1% of the total licensing fee and do not pay annual Licence fees for the first 8 years following completion of the facility.

Legal entities engaged in generation activities at facilities based on RER can purchase electricity from private sector wholesale companies on the condition that they do not exceed the annual average generation amounts indicated in their Licences for that calendar year.

TEIAS and/or legal entities holding distribution Licences must give priority for connection of generation facilities to the system based on whether they use domestic natural resources and RER.

Licence guarantee

Since November 2007 EMRA has been requesting bid bonds and performance bonds for Licence applications. Bid bonds with an amount of 10,000 YTL per mw are requested at the application stage and, if EMRA approves the application, a performance bond, with an amount to be calculated in accordance with the capacity to be installed, is also requested.

Renewable Energy Resource (RER) Certificates

If and when requested by any legal entity holding a generation Licence, a RER certificate must be granted by EMRA for the purpose of identifying and monitoring the resource type used in electrical energy generation or for the purpose of accessing the incentives applicable under the Renewable Law.

The principles and procedures relating to RER certification are governed by secondary legislation issued by EMRA in 2005. There are two types of RER certificates which govern the:

(a) type of resource utilized to generate electrical energy; and

(b) incentives that the owner is entitled to under the Renewable Law.

No GHG sources in terms of sinks and reservoirs could be identified for this project.

2.4 Description of how the baseline scenario is identified and description of the identified baseline scenario:

The Cevizlik Hydroelectric Power Plant Project entails the construction and operation of a 92,96 MW hydroelectric power plant. The project consists of 2 hydro schemes with turbines of 51.21 MW each.

	Source	Gas	Included?	Justification
Baseline	Generation mix of electricity grid in Turkey	CO_2	Yes	CO2 emission from fossil fuel fired power plant that are displaced due to project activity was taken into account.
		N_2O	No	Minor emission source as suggested by ACM0002, Version 10.
Project Activity	Construction and operation of HEPP	CO_2	No	As net electricity approach is adopted, emissons that occur during construction and during the operation are negligible and non-existent respectively.
		N_2O	No	Minor emission source as suggested by ACM0002, Version 10.
		CH4	Yes	Main emission source as suggested in ACM0002, Version 10. However, the emissions during the construction is at a negligible level and also, as the power density of the project is more than 10 W/m2, no CH4 emission is expected.

***Table 3**: The justification for project boundary*

The project electricity system is defined as "the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission constraints" in the "Tool to calculate the emission factor for an electricity system ". Similarly, "a connected electricity system, e.g. national or international, is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint" in the same document."
In this case "the project electricity system" and "the connected system" are same as also confirmed by TEIAS (Turkish Electricity Transmission Company Inc.),[19] the Turkish transmission system is interconnected. There is not an independent regional grid system neither in Rize nor in Black Sea Region.

[19] *TEIAS is the legal entity responsible by law to collect and announce data related to electricity production and consumption in Turkey. All Turkey related electricity production, fuel consumption in electricity production, average full load working hour, electricity consumption etc figures(or data used in calculating the related data) used in this document were received from the internet site of TEIAS (which is www. TEIAS.gov.tr) unless otherwise stated.*

In addition to this, since there is no DNA in the host country to delineate the project electricity system, the suggested criteria in "Tool to calculate the emission factor for an electricity system" was used. Since there is no capacity usage figure for transmission line published, the criteria "The transmission line is operated at 90% or more of its rated capacity during 90% percent or more of the hours of the year." could not be proved.

On the other hand, there is no spot electricity market available in the country as suggested in the other criteria "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." Therefore, this criterion is not applicable as well.

As suggested in "Tool to calculate the emission factor for an electricity system", "if these criteria does not result in a clear grid boundary, use a regional grid definition in the case of large countries with layered dispatch systems (e.g. provincial / regional / national)." However, there are no layered dispatch systems in the country. As a result the national grid was used as the project electricity system. Hence, the estimation of OM (Operating Margin) and BM (Built Margin) are based on the definition of the Turkish electricity network as one single interconnected system.

The method to describe and calculate the baseline has clearly been specified by the Baseline Methodology. CDM Executive Board has already provided a consolidated tool for appraising and demonstrating the additionality feature of the projects.

Since the project is an installation of a new grid-connected renewable power plant, the baseline scenario is formulated in ACM0002 / Version 10: *"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 below".*

The project is not a modification/retrofit of an existing grid-connected renewable power plant/unit. Therefore the other alternative baseline scenario mentioned in ACM0002 / Version 10 is not chosen.

According to the "Baseline Methodology Procedure" in "Tool to calculate the emission factor for an electricity system" following steps should be followed.

All the information pertaining to the grid and estimating baseline emissions are publicly available, and was available at the website of TEIAS (Turkish Electricity Transmission Company Inc. - www.teias.gov.tr).

2.5 Description of how the emissions of GHG by source in baseline scenario are reduced below those that would have occurred in the absence of the project activity (assessment and demonstration of additionality):

The project's additionality has been demonstrated using the latest version of the "*Tool for the demonstration and assessment of additionality"*- Version 05.2. This tool equals the Test 1- The Project test.

The following steps from the additionality tool are completed below:
***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 alternatives available to the proposed Project that provide outputs or services comparable with the proposed VCS project activity include:

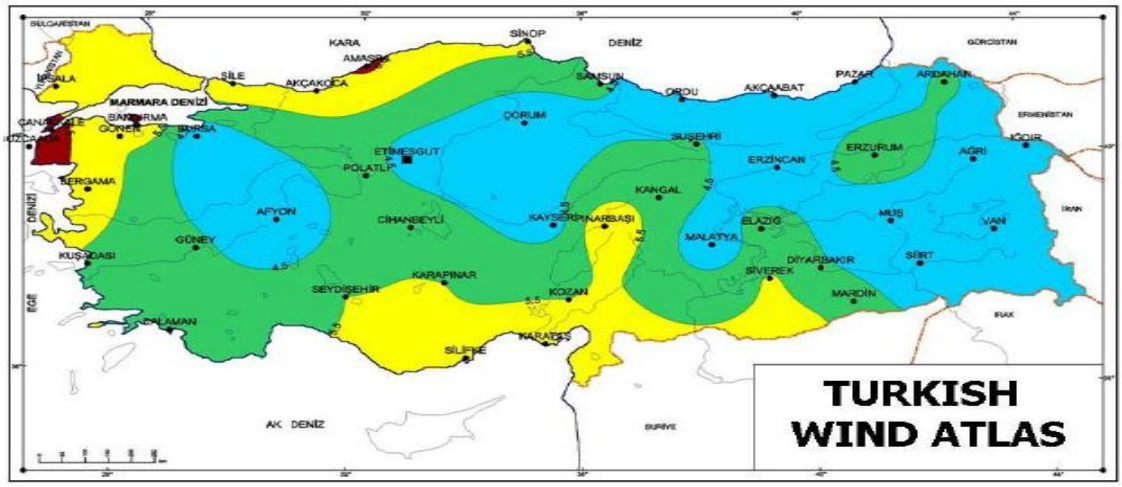
Alternative 1: The proposed project activity undertaken without being registered as a VCS project activity.
As it was stated in ***Section 1.10***, Alternative 1) is in compliance with legal and regulatory requirements.
Therefore, Alternative 1) is a credible alternative.

Alternative 2: Construction of a coal-fired power plant with equivalent installed capacity or annual electricity generation.
As the annual operation hours of a thermal power plant and a hydropower station differ considerably, the annual electricity generation and associated supply reliability remain incomparable in spite of their similar installed capacity. Moreover, Akım Enerji has no experience in the management of a coal-fired plant and also this kind of power plant is not aligned with its environmental policies (Please refer to ***Section 1.15***).

Hence, Alternative 2 is not a credible alternative.

Alternative 3: Construction of a new power plant generating the same annual power generation from other renewable sources such as wind power, solar power and thermal energy..

Besides hydro energy, other renewable energies such as thermal and wind energies are likely to be considered for electricity generation. However, thermal generation requires a lot of input material, which is lacking in the area where the project is located. In addition, power plants using wind energy face unattractive financial index like the proposed hydropower project; most of new wind power generation projects in Turkey are applying for a VER support, which shows that those projects are not themselves feasible and need VERs to overcome the investment barriers. In addition, due to its topography, the project area is not a proper location for a wind farm.



v (m/s)	> 7.5	6.5 – 7.5	5.5 – 6.5	4.5 – 5.5	< 4.5
P (W/m²)	> 500	300 - 500	200 - 300	100 - 200	< 100

Figure 7: *Turkish Wind Atlas*[20]

Consequently, Alternative 3) is not a viable alternative and should be eliminated from further consideration.

Alternative 4: The continuation of the current situation. The equivalent electricity will be provided by the existing power units connected to the national grid.

This alternative is in compliance with legal and regulatory requirements. Based on the above analysis, it is a plausible and realistic alternative.

Outcome of Sub-step 1a: Out of all the identified alternatives, only Alternative 4 and Alternative 1 are plausible and realistic.

Sub-step 1b- Consistency with mandatory laws and regulations:

As above mentioned all the alternatives available to the proposed Project that provide outputs or services comparable with the proposed VCS project activity are consistent with the mandatory laws and regulations.

Outcome of Sub-step 1b: The only plausible and realistic alternatives are "The proposed project activity undertaken without being registered as a VCS project activity and Alternative 1 *"The continuation of the current situation. The equivalent electricity will be provided by the existing power units connected to the national grid"* Based on the above analysis, the proposed project activity is not only the alternative amongst the project participants that is in compliance with mandatory regulations. Therefore, the proposed VCS project activity may be additional.

***STEP 2* – Investment analysis**

The purpose of the investment analysis is to determine whether the proposed project activity is not:

a) The most economically or financially attractive; or
b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (VCS-VERs).

To conduct the investment analysis, the following Sub-steps were used:

20 Turkish State Meteorological Service http://www.meteor.gov.tr/2006/arastirma/files/TurkishWindAtlas.pdf

Sub-step 2a- Determine appropriate analysis method

The *"Tool for the demonstration and assessment of additionality"* (Version 05.2) recommends three analysis methods, namely simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III).

The proposed Project generates financial and economic benefits through the sales of electricity other than Voluntary Emissions Reduction (VCS-VER) related income. Therefore the simple cost analysis (Option I) cannot be taken.

Investment comparison analysis (Option II) is only applicable to projects where alternatives should be similar investment projects. The alternative baseline scenario of the proposed project is the continuation of the current situation, where the equivalent electricity will be provided by the existing power units connected to the national grid. Among the investment comparison analysis (Option II) and the benchmark analysis (Option III), the benchmark analysis (Option III) is preferred.

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

When using the benchmark analysis option, the equity IRR has been used as the project owner's decision is based on the equity IRR[21]

According to the *"Tool for the demonstration and assessment of additionality"* (Version 05.2), in the cases of projects which could be developed by an entity other than the project participant the relevant benchmark for a Project's IRR should be based on publicly available data sources which can be clearly validated by the DOE. The benchmark for a Project's IRR shall, therefore, be derived from *"government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data"*[22].

For that reason, the IRR benchmark value has been selected as the Turkish Eurobonds rates, plus a risk premium as explained below.

Sanko Group decided to invest in Cevizlik Project in May 2005 and have the financial and technical feasibility report prepared by external advisors. Some of the assumptions used in the feasibility report are:

The first assumption pertains to the cost of equity benchmark which is calculated as the Turkish risk premium plus risk free rate.

As the Turkish Eurobonds represent a risk-free rate, it must be increased by a suitable risk premium, which reflects the premium that investors demand for an average risk investment. The interest rate for Eurobond with longest duration of 30 years which is US900123AT75-14.02.2034 – that is approximately 8% was chosen as it is considered to be the most conservative one.

According to Mr. Aswath Damodaran, professor of Finance at the Stern School of Business at New York University[23], the suitable risk premium for Turkey can be estimated as 10.2% for the year 2005.

The IRR benchmark value is then calculated using the interest rate delivered from the Turkish Eurobonds rates, 8.00%, plus the risk premium, 10.2%. As explained hereunder:

$$Ce = Rf + \beta \times (Rm - Rf)$$

Where:

Parameter		Chosen Value	Source
Rf	Risk-free rate	8.6%	The yield of a synthetic bond with 49 years maturity at the time of decision was calculated using the yield curve derived from http://www.ziraat.com.tr/tr/bankamiz/faiz-ve-ucretler/aspx/eurobond.aspx was used. The details of the calculation can be found in a separate excel sheet provided to DOE. Please see Annex 8to see the yield curve
β	Beta. Used to measure level of risk.	0.939	The average of energy companies traded in ISE 100 derived from one of the most prominet data provider Bloomberg. Please see Annex 8 for Betas of these companies

[21] Technical Feasibility Report Dated May 2005

[22] *"Tool for the demonstration and assessment of additionality" (Version 05.2), page 6, available at http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf*

[23] Aswath Damodaran is a Professor of Finance at the Stern School of Business at New York University, where he teaches corporate finance and equity valuation. He also teaches on the TRIUM Global Executive MBA Program, an alliance of NYU Stern, the London School of Economics and HEC School of Management. Professor Damodaran is best known as author of several widely used academic and practitioner texts on Valuation, Corporate Finance, and Investment Management

Rm-Rf	Market equity risk premium	10.2%	http://www.stern.nyu.edu/~adamodar/pc/archives/ctryprem05.xls
Rm	Expected market return	18.18%	-

	Rf	+	β	x	(	Rm	-	Rf	)	=	Ce
Cevizlik Ce	8.6%	+	0,939	x	(	18.8%	-	8.6%	)	=	18.18%

Therefore, a realistic equity benchmark IRR for this type of project should be greater than the base investment threshold (Turkish Eurobonds) plus a risk premium, which given the figures referenced, is greater than 18.18%.

The technical assumptions along with construction and M&E costs are calculated per DSI and other international standards to build this size of diversion weir by an independent advisor to the project owner. The feasibility study was the base for the investment decision.

In addition, the licence fee of USD 20 million was expected bidding price ticket for this project by the consultant at the time of the feasibility report preparation.

The cash flow was prepared for a licensing period of 49 years.

Electricity generation amount of 383 GWh was calculated from the inflows in the river during the years 1965 to 2003 in the technical part of the feasibility report.

Electricity Selling Price was assumed to be approximately 6 USD Cents/kWh which was the selling price of electricity to the Turkish Transmission Line Company according to EMRA's board decision number 412, dated December 30th 2004.[24]

Operation and Maintenance expenses were calculated according to State Hydraulic Works criteria based on their past experiences to be approximately 1% of the total construction and electromechanical costs.

In the financial part of the feasibility report transmission line losses were considered to be 2,5% of the generated electricity from the plant based on the invoices between transmission line companies and generation companies.

Interest rate of 9,5% (all in cost) was assumed with a 10 year loan with 3 year grace period for the construction. The leverage of 70% was also assumed with 30% equity contribution.

Sub-step 2c. Calculation and comparison of financial indicators (only applicable to options II and III):

The parameters needed for calculation of key financial indicators are as follows:

	Data	**Unit**
Capacity	90.00	MW
Utilization Rate	48.60	%
Total operating hours	8,760	hours
Actual operating hours	4,257	hours
Estimation of annual grid-connected power generation	383	GWh
Average unit price	0.06	USD/kWh
Total investment	137,250	000 USD
Annual operational costs	1,759	000 USD
Operational life	49	years
Crediting period	20	years
Anticipated price of VCS-VERs	7,0	USD/tCO_2

Table 4: *Basic financial parameters of the proposed Project Parameter*

Based on the parameters above, the equity IRRs with and without the VCS-VERs sales revenue are calculated and shown in

[24] Source : http*://www.epdk.gov.tr/mevzuat/kurul/elektrik.htm*

	IRR
Without VCS-VERs revenues	13,4 %
With VCS-VERs revenues	14.2%

Table 5: *Impact of VCS-VER revenues on the Proposed Project's IRR.*

Table 5 shows that the IRR of the total investment of the proposed project without VCS-VERs sales revenue is 13,4 %, lower than the benchmark IRR of 18.18 %, which means that the proposed project activity indeed faces significant financial barriers. Therefore, the project activity is not the most economically or financially attractive choice of investment.

Sub-step 2d. Sensitivity Analysis

The sensitivity analysis shall show whether the conclusion regarding the financial attractiveness is robust under reasonable variations in the critical assumptions. According to the additionality tool, only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subject to reasonable variation. For the proposed project, three basic parameters have been selected as sensitive factors to check out the financial attractiveness:

- Total investment
- Electricity selling price
- Annual operational costs

Table 6shows the variation of IRR when the three parameters fluctuate from -10% to +10%.

	-10%	-5%	0%	5%	10%
Total Investment	14,9%	14,1%	13,4%	12,7%	12,1%
Electricity Selling Price	11,9%	12,7%	13,4%	14,1%	14,8%
Annual operational cost	13,5%	13,4%	13,4%	13,3%	13,3%

Table 6: *IRR fluctuation*

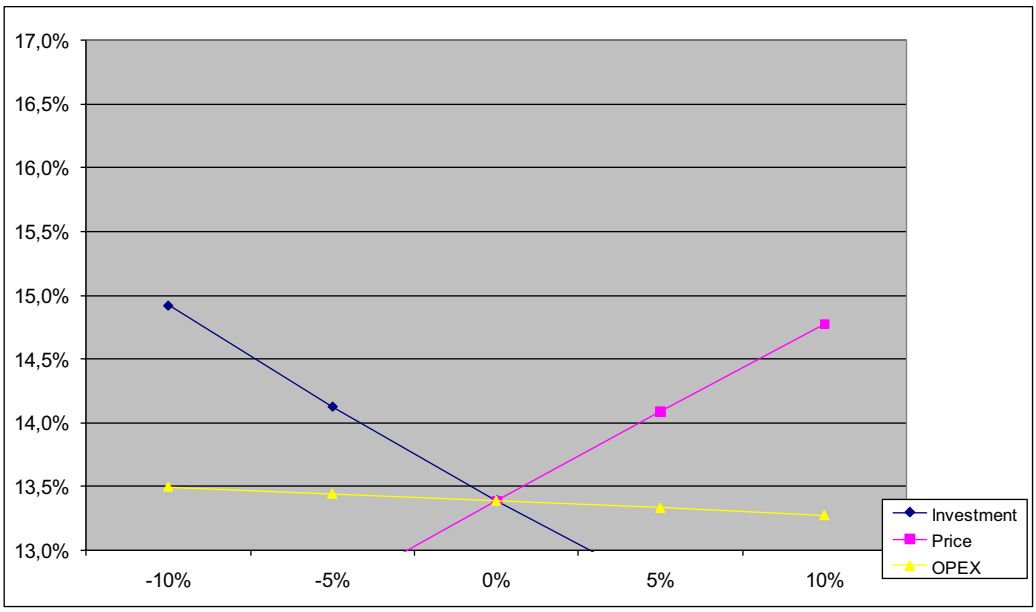


Figure 8: *IRR fluctuation*

Sensitivity analysis has been carried out for the stated costs and assumptions. It shows that under none of those scenarios the IRR of the project exceeds the Benchmark.

It is important to mention that an increase in the annual generation is not very probable because based on the EIA report the Ministry of Environment agreed on releasing 500 l/s to maintain the natural habitat. However, attending to public concerns, Akım Enerji decided to

increase the amount of water by 250 l/s to 750 l/s without any enforcement to demonstrate its good intention to preserve as much as possible the natural habitat. A parallel court case that lasted nearly two years put the verdict that the minimum release shall be 2.8m^3/s. Consequently, since the minimum water release is set by the court, the generation capacity cannot be higher than 335 GWh/y.

Outcome of Step 2: Hence, the above figures have demonstrated that the project activity is not the most economically or financially attractive alternative.[25]

***STEP 3* – Barrier analysis**

The purpose of the barrier analysis is to determine whether the proposed project faces barriers that:

a) Prevent the implementation of this type of proposed project activity; and
b) Do not prevent the implementation of at least one of the alternatives.

The following categories of barriers: (a) Technological barriers (b) Barrier due to prevalling practice and (c) Other barriers : Legal and bureaucratic barriers were used in the analysis as explained below:

The lack of financial incentives is the primary barrier for renewable energy investments in Turkey. The carbon market provides an innovative solution to encourage the use of renewable electricity generation sources and allows the project to overcome the investment barrier. The following barriers apply to hydro power projects in Turkey:

(a) Technological barriers

The proposed project activity requires the construction of 21 km of new transmission line to be connected to the national grid (See ***Table 1***). This additional cost leads to higher financial risks. Even though connection costs will be offset against operational fees, they are prepaid in advance by the project owner. The most sensitive issue on that matter lies on the authorities' approval. Moreover, the potential delays due to a slow administrative process as well as a long civil work schedule increase the project risk profile. Since the project is the largest and the first of its kind in the region it had to construct the transmission lines and other connection facilities to the grid. Some other similar projects in the region will be able to use the same transmission line and connection facilities and they will not face a similar barrier unlike the project.

In addition to the transmission line issue, the project faces some problems with its high turbine capacities. As it was stated in ***Section 1.9*****,** the equipment provider is a French company, named Alstom. The reason why a foreign supplier was selected is because there is no equipment supplier in the local market to supply such turbines and generators of these sizes. Moreover in the global market there is a shortage for hydro electrical equipments. Therefore equipments must be ordered two or more years in advance. Hence, the necessity of the equipment importation increases the investment costs.

Furthermore, these equipments need specific services and maintenance, which thus represents an additional operational cost as it is almost impossible to supply maintenance services locally for the turbines used in the project.

"Hydro turbines are usually individual products, which have to be designed according to the local conditions such as discharge, head and given geometrical situations. This requires an individual tailor-made design for the different components of the turbine, which causes a great demand of engineering effort. To obtain shapes with superior hydraulic efficiency for the components the designer must investigate many geometry variations. Therefore, there is the need for a qualified tool for the flow analysis, where many variations can be made in a short time, safety analysis carried out, and whether a variation needs an improvement over certain period. The research work shall focus on a combination of field testing, accurate laboratory testing and current computational modelling methods." [26]

Hydro power is dependent on individual dam site conditions, technical and operational requirements differ from plant to plant. This project's hydro generators are tailor-made for every project[27]

Although tailor-made production may increase the efficiency of turbines it also limits the flexibility of the investor to choose any turbine producer. The tailor-made engineering requirement of turbines force the investor to go to a producer with a good reputation. Usually these producers have long waiting lists and they ask a premium over a regular producer's price. It means taking extra engineering risk for the investor going to a Chinese or Russian turbine producers who do not have reputations as strong as European producers.

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[25] All financial data and calculations will be provided to the DOE.

[26] http://www.unilorin.edu.ng/unilorin/index.php/nachred-research-projects/small-hydro-turbines

[27] http://www.power.alstom.com/home/new_plants/hydro/products/generators/41332.EN.php?languageId=EN&dir=/home/new_plants/hydro/products/generators/

The carbon revenue will help the project to overcome some financial difficulties originating from technological barriers.

(b) Barriers due to prevailing practice:

The project activity is the biggest size run-off-river project ever realised in Turkey considering its installed capacity and first of its kind as it is constructed underground. Therefore, there is a lack of local knowledge and experience for both designing of civil works and construction for such a project as it was first of its kind. Although the installation of such a large installed capacity equipments within a run-of-river hydro project which is constructed underground will bring experience to the Turkish hydropower sector it also puts extra risks on shoulders of the project owner as the project is first of its kind in terms of size and being constructed underground.

One of the most important risks as far as the project is concerned is related to the climate conditions. Project designers were not experienced how heavy rains and possible water floods would affect the project. Climate conditions, such as long and heavy rains and water floods at the project site may affect the construction works, causing interruptions and delays in the project's schedule. In addition to this, the design of the project which is an under ground power house further aggravates the problem and creates an additional risk of flood compared to traditional designs where the power houses are located above the ground. Actually, the risk had realized and the power house of the project was filled with mud and water after a heavy rain. Fortunately, this was just before the installation of turbines and therefore the loss was limited to time and some construction equipments only. However, this experience showed that the project was exposed to some uncalculated risks. After this event, the design of the project was amended to prevent such a flood in the power house in the future.

The carbon revenues may help the project to overcome any financial burdens originating from unexpected risks due to the fact that the project is first of its kind. In addition to this, the carbon finance procedure will bring extra transparency to the project for investors and financier.

(c) Other Barriers

Until the 2003 definition of renewable energy sources[28] there have been no sectoral national policies but a few government incentives to promote the development of renewable energy. However, the Electricity Market Licensing Regulation is still not sufficient to overcome the high investment cost, the risks and the lack of security associated with the construction and operation of renewable energy power plants.[29] [30]

The lack of coordination and cooperation within and between various ministries, agencies, institutes and other stakeholders is also a major obstacle to the introduction and implementation of renewable energy technologies in the country.[31] [32]

This is reflected in the long waiting processes that the project developers must go through in order to obtain the legal permits.

The table below summarizes the history of the correspondence with the government authorities until obtaining the generation license and illustrates the legal and bureaucratic difficulties.

CORRESPONDENCE WITH GOVERNMENT AUTHORITIES UNTIL OBTAINING THE GENERATION LICENCE

Between first interest and bidding, the due diligence process was completed along with technical and financial feasibility studies.

Date	Action
23.07.2004	Board of Directors Decision to apply for obtaining generation licence.
29.07.2004	First application to State Hydraulic Works(DSİ) for Cevizlik HEPP.(only intention no feasibility report submission)
06.08.2004	DSİ accepted 6 generation companies' application including Akım Enerji and asked to prepare a feasibility report to be submitted before 02.11.2004.
02.11.2004	Submission of feasibility report to DSİ. (Please note that this feasibility report was prepared in accordance with DSI standards and is not intended to be used by neither investors nor financial institutions).
10.05.2005	DSİ sent a letter stating they reviewed the feasibility report and asked to apply to EMRA for the Generation Licence.
27.05.2005	First letter sent to EMRA to show interest in Cevizlik HEPP.

[28] Bilgen S, Keles S, Kaygusuz A, Sarı A, Kaygusuz K. "Global warming and renewable energy sources for sustainable development: A case study in Turkey. Renewable and Sustainable Energy Reviews". (Please refer to the decree "Modification of the License Regulation in the Electricity Market")

[29] International Energy Agency (IEA). Energy policies of IEA countries: Turkey. Paris: IEA; 2005.

[30] International Energy Agency (IEA). Renewable energy: market and policy trends in IEA countries. Paris: IEA; 2004.

[31] Kaya, D. "Renewable energy policies in Turkey. Renewable Sustainable Energy Rev 2006";10:152–63.

19.09.2005	Invitation to bidding sent by EMRA
21.09.2005	Akım Enerji submitted the performance bond to EMRA.
11.10.2005	Akım Enerji won the bidding (18.29 million USD)
20.10.2005	EMRA approved the bidding.
08.11.2005	EMRA officially informed Akım Enerji of the result of the bid and asked to complete the formalities and necessary documentation.
16.11.2005	Akım Enerji submitted the performance bond to EMRA in the total amount of bidding result.
01.12.2005	DSİ sent to Akım Enerji the draft of Water Utility Rights.
03.01.2006	Akım Enerji accepted the draft and asked DSİ further instructions.
31.01.2006	Akım Enerji signed the Water Utility Rights with DSİ.
03.02.2006	Akım Enerji submitted to EMRA all the relevant documents requested on 08.11.2005
24.02.2006	Akım Enerji received the Generation Licence.
27.06.2007	Akım Enerji received the revised Generation Licence.

The registration of the project as a VCS project will provide the following benefits that will help overcome the above mentioned barriers:
- additional revenues from the sale of VERs which will provide financial visibility, contributing significantly to the project's financial sustainability.
- enhanced corporate green image of the project developer through its contribution to a clean source of electricity and the diversification of electricity sources in Turkey, which broadens stakeholder confidence.

Outcome of Sub-step 3a: based on the above analysis, there are realistic and credible barriers that would prevent the implementation of the proposed project activity from being carried out if the project activity is not registered as a VCS activity.

Project Timeline and Timeline of events and actions which have been taken to achieve VCS-VER registration

Events and action	Date	Evidence
First VER consideration	July 23rd 2004	Board of Director's decision N°5 (Please refer to **ANNEX 3**)
Feasibility report	May 2005	The feasibility Report was prepared by the third party engineering company Hidrodizayn.
Stakeholder consultation	March 16th 2006	Please refer to ***Section 6*** *Stakeholder's comments:*
EIA approval (by the Ministry of Environment and Forestry)	July 24 2006	Ministry of Environment and Forestry statement.
Contract signature for the electrical works	December 4th 2006	Contract with Siemens
Contract signature for the equipments	December 5th 2006	Contract with Alstom
First discussions with financial institutions	February 2006	Meeting with IFC
First contacts with PDD consultants	October 2007	E-mail exchange and meetings with different PDD consultants (to be disclosed upon DOE request).
Loan signature	January 2008	Loan Agreement

Contract signature for the construction works	January 2nd 2008	Contract with Palet-Pustiler Construction Company
Contact with a PDD consultant	April 25th 2008	VER services proposal (ecosur)
Contact with a DOE	June 12th 2008	E-mail exchange between ecosur and the DOE.
Start of PDD elaboration	July 2008	First VER questionnaire sent by ecosur
Start of VER validation	November 2009	On-site audit by the DOE.
Expected commissioning of the power plant	May 2010	Project developer statement.
Project start date	May 2010	Project developer statement.

Table 7: *Project timeline and early consideration of carbon credits.*

The banking practice for project finance in Turkey requires certain commitments, especially in the form of signed supply agreements, from investors. As such, Akım Enerji signed the supply agreement before the loan agreement date of January 2008. Please note that Akım Enerji continuously discussed with different international/local financial institutions before the loan agreement with Yapı Kredi Bank was signed. In other words, during the supply agreement negotiations, Akım Enerji was already negotiating with the banks.

Sub-step 3b- Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)

The aforementioned barriers are largely specific to hydro power projects. They have minimal impact on the alternatives that have been analysed, namely electricity generation by existing grid-connected power plants.

The following table provides the assessment of the alternatives in light of the different barriers:

Barrier Evaluated	**Alternative 1**	**Alternative 4**
	The proposed project activity undertaken without being registered as a VCS project activity	**The continuation of the current situation. The equivalent electricity will be provided by the existing power units connected to the national grid.**
Investment barriers	Applicable	The Grid is not subject to investment barriers as no investment is needed to continue operating in the current situation.
Technical barriers (Lack of local practice and experience to construct such a big installed capacity run-off-river hydro power plant)	Applicable	The Grid mainly consists of thermal power plants which are well known technologies.
Barriers due to prevailing practices (The project being the first of its kind)	Applicable	The project is first of its kind and there is no similar project operating under the Grid.
Other barriers *(Legal and bureaucratic barriers)*	Applicable	The Grid in not subject to bureaucratic barriers since no additional permits are required to continue operating in the current situation.
Conclusion of the barrier analysis	*The project is deemed to be additional*	*This is the baseline scenario.*

As shown above, the barrier analysis illustrates that the proposed Project faces sizeable investment, technical and legal and bureaucratic barriers that would prevent its implementation without VER revenues, but not the implementation of the relevant alternative (i.e. Alternative 4 - *The continuation of the current situation. The equivalent electricity will be provided by the existing power units connected to the Turkish grid"*), which is identified as the baseline scenario.

Outcome Step 3: According to Sub-step 3a, there are realistic and credible barriers that would prevent the implementation of the proposed project activity from being carried out if the project activity is not registered as a VCS activity. However, as it was stated above, these barriers would not prevent the implementation of Alternative 4 "*The continuation of the current situation. The equivalent electricity will be provided by the existing power units connected to the Turkish grid".But the revenue from carbon markets would help the project to overcome these difficulties faced during different stages of the project.*

***STEP 4* – Common practice analysis**

Sub-step 4a- Analyze other activities similar to the proposed project activity

Even though Turkey has significant hydroelectric power resources, fossil fuels remain the main source of energy production in the country. Gas, oil and coal represent about 70% of total power production.

However, there are more than 100 hydropower plants, with total installed capacity of 12,878 MW generating an average of 46,277 GWh/year, which is 36% of the economically viable hydroelectric potential. Forty-one hydroelectric power plants are currently under construction with 3,962 MW of installed capacity to generate an average annual 9,779 GWh representing 8% of the economically viable potential.

Aware of Turkey's hydroelectric power potential, the government has financed most of the existing power plants. For instance, the State Hydraulic Works (DSI) has developed 10,380 MW (81%) out of the 12,878 MW of total installed capacity in Turkey, and also, it has built 20 of the 25 largest hydroelectric power plants.[33]

Moreover, it has put into practice the Southeastern Anatolia Project (GAP) along the basin of the Tigris and Euphrates Rivers. Under this project, which is considered one of the most ambitious water development projects ever undertaken, the Turkish government has completed 8 hydropower plants, representing 74% of total planned energy projects under the GAP scheme. The 8 power stations generated 18,700 GWh of electricity in 2005, adding substantially to the share of hydroelectricity in Turkey's energy mix.[34]

In order to promote even more the electricity generation, in March 2001, a new Electricity Market Law was enacted. This law sets the stage for liberalization of power generation and distribution activities. And, in May 2005, Turkey adopted a Renewable Energy Law, taking a first step towards the implementation of renewable energies in the country.

However, in spite of these efforts, according to the Turkish Electricity Generation Company (EÜAŞ), only 18% of the hydroelectric installed capacity has a private participation[35], which shows that there is a lack of investor interest.

The following table shows the hydroelectric units put into operation in 2003-2006:

POWER PLANT	INSTALLED CAPACITY (MW)	ELECTRICITY UTILITIES	TYPE	AVERAGE GENERATİON CAPACITY (GWh)	COMISSIONNING YEAR
MERCAN GR I-II-III	19.1	EÜAŞ	RUN OF RIVER	78.0	2003
PAMUK HES GR I-II-III	23,3	IPP	RUN OF RIVER	81	2003
HACILAR GRUP I-II	13.3	IPP	RUN OF RIVER	84	2003
KÜRTÜN GR-II	42.5	EÜAŞ	DAM	99	2003
KÜRTÜN GR-I	42.5	EÜAŞ	DAM	99	2003
BATMAN GR II-IV	70	EÜAŞ	DAM	170.8	2003
BATMAN GRUP I-III	128	EÜAŞ	DAM	312.2	2003
ELTA ELK(DODURGA) GR-I-II-III-IV	4.1	AUTOPRODUCERS	RUN OF RIVER	12.3	2004
İSKUR TEKSTİL(SÜLEYMANLI) GR I-II	4.6	AUTOPRODUCERS	RUN OF RIVER	17.86	2004
BEREKET EN.(Feslek Hes) Gr-1-2	9.5	AUTOPRODUCERS	RUN OF RIVER	41	2004
ERE(BİR KAPILI HES) GRUP-I	48.5	IPP	RUN OF RIVER	170.6	2004
BEREKET EN.(DALAMAN) GR XIII-XIV-XV	7.5	IPP	RUN OF RIVER	35.8	2005

[33] "DSI in brief- General Directorate of State hydraulic works (DSI) 1954-2007", page 28 *http://www.dsi.gov.tr/english/dsi_in_brief2007.pdf*

[34] http://www.eia.doe.gov/cabs/Turkey/Electricity.html

[35] http://www.teias.gov.tr/ist2007/7.xls

İÇTAŞ ENERJİ(Yukarı Mercan) GR I-II	14.19	IPP	RUN OF RIVER	44	2005
TEKTUĞ(Kargılık) GR I-II	23.9	IPP	RUN OF RIVER	83	2005
YAMULA GRUP I-II	100	BOT	DAM	422	2005
MURATLI GR I-II	115		DAM	444	2005
SEYHAN I-II	0.3	AUTOPRODUCERS	HYDRO	1.7	2006
EKİN (Başaran Hes) (Nazilli)	0.6	AUTOPRODUCERS	HYDRO	4.5	2006
MOLU EN. Zamantı Bahçelik GR I - II	4.22		HYDRO	16.7	2006
SU ENERJİ (Balıkesir) GR I - II	4.603		HYDRO	20.7	2006
ERE(AKSU REG.ve ŞAHMALLAR HES) GR I-II	14		HYDRO	26.7	2006
ERE(Sugözü rg. Kızıldüz hes) GR I - II	15.432		HYDRO	31.6	2006
BEREKET ENERJİ GÖKYAR HES 3 Grup	11.62		HYDRO	43.3	2006
TEKTUĞ(Kalealtı) GR I - II	15		HYDRO	52	2006
BEREKET EN.(Mentaş Reg) GR III	13.3		HYDRO	54.4	2006
BEREKET EN.(Mentaş Reg) GR I - II	26.6		HYDRO	108.7	2006
ŞANLIURFA GR I-II	51.8		HYDRO	122.2	2006

Table 8 : *Hydroelectric units put into operation in 2003-2006*

As shown in the table above, the facilities with a similar size than the proposed project activity correspond to Dams and Hydropower facilities. All run-of-river hydroelectric plants have lower installed capacities.

The following table shows a list of the run-of-river hydroelectric power plants owned by EÜAŞ. None of these facilities have a similar installed capacity than the proposed project activity.

POWER PLANT	LOCATION	INSTALLED CAPACITY (MW)	AVERAGE GENERATİON CAPACITY (GWh)
Ceyhan	K.Maraş	3.6	20
Çağ-Çağ	Mardin	14.4	42
Çamardı	Niğde	0.0688	1
Çemişgezek	Tunceli	0.116	1
Değirmendere	Adana	0.5	1
Dere	Konya	0.6	2
Derme (Sümer)	Malatya	4.5	14
Doğankent A+B	Giresun	74.5	314
Dörtyol-Kuzuculu	Hatay	0.272	1
Durucasu	Amasya	0.8	3
Engil	Van	4.59	14
Erciş	Van	0.8	2
Erkenek	Malatya	0.32	2
Ermenek	Karaman	1.12	1
Esendal	Artvin	0.3	1
Girlevik	Erzincan	3.04	17
Göksu	Karaman	10.8	70
Gülnar-Zeyne	İçel	0.3258	2
Hakkari-Otluca	Hakkari	1.28	3
Haraklı-Hendek	Sakarya	0.264	1
Işıklar-Visera	Trabzon	1.04	2.45
İnegöl-Cerrah	Bursa	0.272	2

İvriz	Konya	1.04	4
İznik-Dereköy	Bursa	0.24	2
Kadıncık I	İçel	70	345
Kadıncık II	İçel	56	320
Kars-Dereiçi	Kars	0.4	1
Kayadibi	Bartın	0.464	3
Kayaköy	Kütahya	2.56	7
Kepez I	Antalya	26.4	169
Kepez II	Antalya	6	21
Kernek	Malatya	0.832	3
Kiti	Iğdır	2.76	12
Koyulhisar	Sivas	0.2	0,5
Ladik-Büyükkızoğlu	Samsun	0.4	2
M.Kemal Paşa-Suuçtu	Bursa	0.472	1
Malazgirt	Muş	1.216	3
Mercan GR I-II-III		19.1	78
Mut-Derinçay	İçel	0.88	0
Osmaniye-Karaçay	Adana	0.4	3
Pazarköy-Akyazı	Sakarya	0.177	0.5
Pınarbaşı	Kayseri	0.0992	1
Sızır	Kayseri	6.78	50
Silifke	İçel	0.4	2
Şanlıurfa	Şanlıurfa	51.8	124
Turunçova - Finike	Antalya	0.552	1
Uludere	Şırnak	0.64	1
Varto-Sönmez	Muş	0.29	1
Yüreğir	Adana	6	21

Table 9: *Run-of-river hydroelectric power plants owned by EÜAŞ*[36]

Sub-step 4b- Discuss any similar Options that are occurring:
As it was demonstrated in ***Sub-step 4b***, there are no similar activities occurring concurrently. This could be explained because of the serious barriers that this kind of projects must overcome in order to be financially attractive to investors.
Therefore, nowadays, the VCS-VER project activity is the most suitable solution to increase the project's financial attractiveness and raising it to a reasonable level.

Impact of VCS-VER income
This section has clearly explained how the approval of the project as a VCS activity, and the attendant benefits and incentives derived from the project activity, will alleviate the barriers illustrated above, and thus enable the project to be undertaken.

As shown in Step 2 and Step 3 above, the project is unlikely to move forward without the additional financial support of the VCS-VER.

The financial benefit from the revenue obtained by selling the CO_2 emissions reductions has been one of the key issues encouraging investment in the proposed project activity (Please refer to **ANNEX 3**). In fact, it is a necessary factor to drive the loan acceptance, as it is shown in the letter from the bank (Please refer to **ANNEX 3**).

[36] http://www.teias.gov.tr/ist2007/10%2011.xls

3 Monitoring:

3.1 Title and reference of the VCS methodology (which includes the monitoring requirements) applied to the project activity and explanation of methodology choices:

The approved baseline and monitoring methodology ACM0002-Version 10*: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" ("ACM0002") is applied*[37].

3.2 Monitoring, including estimation, modelling, measurement or calculation approaches:

The purpose of the monitoring plan is to ensure that the monitoring and calculation of emission reductions of the proposed Project within the crediting period is complete, consistent, clear and accurate.

The project is operated by Akım Enerji which ensures the overall site management in accordance with Turkish Laws and technology providers' guidelines.

The monitoring will be performed in-house by the project proponent:

1. *Electrical Engineers* will undertake the specific actions required by the monitoring plan, i.e. they will measure the electricity generation,will make calibration according to procedures, the electricity supplied to the Turkish grid by the power plant, the electricity imports and the amount of fuel consumed, if fuel is consumed.
2. *Mechanical Engineers* will ensure that all the instrumentations and devices to perform the monitoring are working properly.
3. *Accounting Manager* will be in charge of providing the electricity sales receipts to the Operations Manager of the plant.
4. *Operations Manager* will be the VER coordinator. He will be in charge of:
   a) Ensuring that instrumentations and devices are available and properly suited to perform efficiently the monitoring.
   b) Communicating and coordinating the monitoring tasks of all business units.
   c) Developing, executing, analyzing and improving the VER Monitoring/Reporting Procedures. This includes the crosschecking and consolidation (with multiple sources whenever possible) of the data obtained from the electrical engineers and the accounting manager. He will also record this operation properly to be able to provide it to the DOE during the verification process.
   d) Calculating and report the emission reductions, and
   e) Organizing in-house seminars to inform and train the company staff to the monitoring procedures.

Please refer to *Figure 9* where the site organizational chart is presented.

In order to verify the generated units of emission reductions, the VER coordinator, Mr. Mehmet TURKMEN (Operation Manager) will prepare an annual Report of Vigilance of the Project, in which the following important aspects will be included:

- Year
- Net electricity supplied by the project activity to the grid (in MWh)
- Annual gross electricity generation(in MWh)
- Annual electricity consumption (in MWh)
- Calculation of the emissions reductions: ERs per year (in tCO_2e/yr) produced from the activity of the project

After the proposed Project is registered and begins its operations, the monitoring report will be submitted at the end of every year for the verification of DOE. The report will cover the monitoring of grid-connected power generation, check report, report on calculation of the emission reductions and records of monitoring instrument repair and calibration, etc.

Data will be recorded for each crediting period and maintained at least 2 years after its end. The company will establish a dedicated maintenance system to ensure the data availability for the required period.

[37] Available at: http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_YOYKBRCBIK7TSPSB7MQT75SPX75PE8

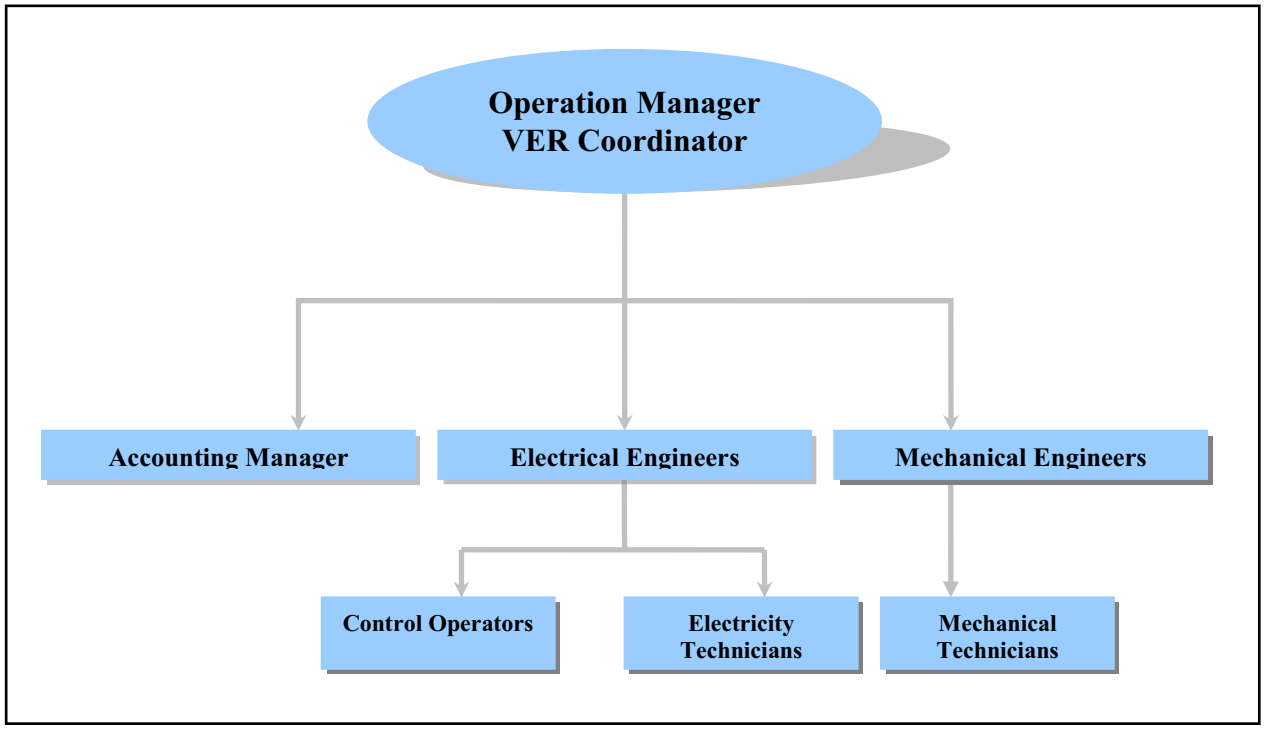

***Figure 9**: Site Organizational Chart*

Measuring

The Electrical Engineers will obtain the readings from the meters, will report them in the spreadsheet (please refer to *Figure 10*) for measurement control and will store the data discharged from the meters electronically.

The meter (ACE SL7000 series developed for Turkey) which will be used in the power house is produced by Actaris and is in line with the EMRA requirements for electricity meters. (Please find the information on the technical specifications of the meter and its conformity with the EMRA requirements on the website of Aktif Enerji which is the exclusive distributor for Actaris products in Turkey.)[38]

Also, the Actaris meter fully conforms to or exceeds all relevant IEC standards for electronic metering equipments. (IEC61036 for class 1 equipment and IEC60687 for class 0.5S equipment)[39] The Actaris meter ensures long term stability of the accuracy, and achieves a maintenance free design which makes unnecessary the re-calibration of the meter. However re-calibration periods are defined by national metrology institutes country by country and in Turkey this period is defined as 10 years. [40]

Besides, in order to measure the electricity production figure of the plant accurately, there will be two sets of meters in the power house. One is the main meter for measuring and the other is the check meter for control. Both of these meters are metering the energy in two directions (consumption and production). If there is a measuring difference between these two meters and one of the parties (TEIAS or the company) requests for calibration of the meters, in this case, the meters will be calibrated without waiting for the periodic calibration date. (TEIAS System Usage Agreement, Art 3, B./2./b))[41] This calibration process is done by another third party under the control of TEIAS. The company is not responsible for calibration of the meters in Turkey according to the local standards.

On the other hand, the emission reductions will be calculated according to the measurements of the main electricity meter, since the electricity production invoices are made out based on this meter. During the each monitoring period, the invoices will be presented to the DOE, together with the calculation details.

The Electrical Engineers will receive sufficient and continuous training in terms of monitoring and verification on aspects such as meter's reading and calibration and reading's recording, adjustment and reporting. If new personnel are hired, they will have to follow up a training program and will be trained in the specific skills required to carry out the Monitoring Plan.

[38] *http://www.aktifenerji.com.tr/index2.php?aktif=alturun&urun=1&id=36*
[39] *http://www.actaris.com/html/products-1577.html*
[40] *http://www.mevzuat.adalet.gov.tr/html/21179.html*
[41] *www.teias.gov.tr/sistemkullanim1.doc*

Cevizlik Run-of-River-Hydroelectric Power Plant

	MEASUREMENT AND CONTROL							VERs CALCULATION		
Year :	2011									
A	B	C	D	E	F	G	H	I	J	K
Month	Electricity generation data measured at measurement station (MWh)	Electricity consumption data measured at measurement station (MWh)	Net electricity delivered to the grid according to on-site measurement (MWh)	Electricity generation according to the energy bill (MWh)	Electricity consumption according to the energy bill (MWh)	Net electricity delivered to the grid according to bills (MWh)	CEVIZLIK validated electricity delivered to the grid (MWh) If D=G measurement validated*	CEVIZLIK electricity delivered to the gird (MWh) (data validated)	Emission factor ex ante (tCO_2/MWh)	Emission reductions (tCO_2) I x J
December								0,00	0,5596	0
TOTAL	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,5596	0

*If B ≠ C an internal audit will be carried out to verify the data in accordance to the Corrective and Preventive Actions.

Year :	2012									
A	B	C	D	E	F	G	H	I	J	K
Month	Electricity generation data measured at measurement station (MWh)	Electricity consumption data measured at measurement station (MWh)	Net electricity delivered to the grid according to on-site measurement (MWh)	Electricity generation according to the energy bill (MWh)	Electricity consumption according to the energy bill (MWh)	Net electricity delivered to the grid according to bills (MWh)	CEVIZLIK validated electricity delivered to the grid (MWh) If D=G measurement validated*	CEVIZLIK electricity delivered to the gird (MWh) (data validated)	Emission factor ex ante (tCO_2/MWh)	Emission reductions (tCO_2) I x J
January								0,00	0,5596	0
February								0,00	0,5596	0
March								0,00	0,5596	0
April								0,00	0,5596	0
May								0,00	0,5596	0
June								0,00	0,5596	0
July								0,00	0,5596	0
August								0,00	0,5596	0
September								0,00	0,5596	0
October								0,00	0,5596	0
November								0,00	0,5596	0
December								0,00	0,5596	0
TOTAL	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,5596	0

***Figure 10**: Spreadsheet dedicated to emission reductions monitoring*

3.3 Data and parameters monitored / Selecting relevant GHG sources, sinks and reservoirs for monitoring or estimating GHG emissions and removals:

Data / Parameter:	**$EG_{PJ,y}$**
Data unit:	**MWh/yr**
Description:	Quantity of net electricity generation supplied by the project to the grid in year *y*.
Source of data to be used:	Project activity site.
Value of data applied for the purpose of calculating expected emission reductions	335,030 MWh/yr (Please refer to ***Section 1.9***).
Description of measurement methods and procedures to be applied:	Electricity meters.
Monitoring frequency:	Continuous measurement and at least monthly recording.
QA/QC procedures to be applied:	Cross check measurements results with records for sold electricity. Calibration of all the meters will be undertaken at required intervals and faulty meters will be duly replaced immediately.
Any comment:	**-**

Data / Parameter:	**Cap_{PJ}**
Data unit:	**MW**
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data to be used:	Project site.
Value of data applied for the purpose of calculating expected emission reductions	92.96
Description of measurement methods and procedures to be applied:	The installed capacity will be determined based on recognized standards.
Monitoring frequency:	Yearly
QA/QC procedures to be applied:	-

Any comment:	-

Data / Parameter:	**A_{PJ}**
Data unit:	**m^2**
Description:	Area of the regulation pond measured in the surface of the water, after the implementation of the project activity. when is full
Source of data to be used:	Project site.
Value of data applied for the purpose of calculating expected emission reductions	14 091
Description of measurement methods and procedures to be applied:	Measured from topographical surveys, maps, satellite pictures, etc
Monitoring frequency:	Yearly
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	**$NCV_{i,y}$**
Data unit:	**TJ**
Description:	Heating values of fuels consumed in thermal power plants in Turkey by the electric utilities.
Source of data to be used:	TEIAS website: "Heating Values of Fuels Consumed in Thermal Power Plants in Turkey by the Electric Utilities" 2006-2008: http://www.teias.gov.tr/istatistik2008/46.xls
Value of data applied for the purpose of calculating expected emission reductions	Please refer to ***ANNEX 4***
Description of measurement methods and procedures to be applied:	
Monitoring frequency:	Once for each crediting period.
QA/QC procedures to be applied:	
Any comment:	Values are given in Tcal and where converted using to TJ using a conversion factor of 4.1868TJ/Tcal.

Data / Parameter:	**$EF_{CO2,I,y}$**
Data unit:	**tCO_2/GJ**
Description:	CO_2 emission factor of fossil fuel type *i* in year *y*
Source of data to be used:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Value of data applied for the purpose of calculating expected emission reductions	Please refer to ***ANNEX 4***
Description of measurement methods and procedures to be applied:	-
Monitoring frequency:	Once for each crediting period.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	**Electricity capacity additions**
Data unit:	-
Description:	Power plants which are most recently taken into operation
Source of data to be used:	TEIAS website: http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202005.pdf http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202006.pdf

	http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf
Value of data applied for the purpose of calculating expected emission reductions	Please refer ***ANNEX 4***
Description of measurement methods and procedures to be applied:	-
Monitoring frequency:	Once for each crediting period.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	$\eta_{m,y}$
Data unit:	**%**
Description:	Average net energy conversion efficiency of power unit *m* in year *y*
Source of data to be used:	UNFCC web site: "Tool to calculate the emission factor for an electricity system". Annex 1.
Value of data applied for the purpose of calculating expected emission reductions	Please refer to ***ANNEX 4***
Description of measurement methods and procedures to be applied:	
Monitoring frequency:	Once for each crediting period.
QA/QC procedures to be applied:	
Any comment:	No official efficiency values based on each power plant or each fuel type is available in Turkey Most natural gas power plants in Turkey are combined cycle, most coal power plants operate sub-critical and most liquid fuel power plants adopt an open cycle technology.

Data / Parameter:	**$EF_{grid,CM}$**
Data unit:	**tCO_2/MWh**
Description:	Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the *"Tool to calculate the emission factor for an electricity system"*
Source of data to be used:	TEIAS and IPCC default values.
Value of data applied for the purpose of calculating expected emission reductions	0,559
Description of measurement methods and procedures to be applied:	Calculated as per ACM0002 with 3 years vintage data and option of ex ante calculation based on "50% of OM and 50% of BM values approach for the first crediting period"
Monitoring frequency:	This value will be updated at the beginning of each new crediting period.
QA/QC procedures to be applied:	As per *"Tool to calculate the emission factor for an electricity system"*
Any comment:	.

3.4 Description of the monitoring plan

All data collected as part of monitoring plan is indicated in Section 3.3. They will be archived electronically and be kept at least for two years after the end of the last crediting period.

Please refer to ***Section 3.2*** for details on the Monitoring Plan.

4 GHG Emission Reductions:

4.1 Explanation of methodological choice:

The method used is the approved baseline and monitoring methodology ACM0002- Version 10*: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" ("ACM0002*"), as explained in ***Section 2.2***.

In line with the application of the methodology the emission factor for grid electricity is calculated as per the procedures detailed in the *"Tool to calculate the emission factor for an electricity system"* (Version 01.1)

4.2 Quantifying GHG emissions and/or removals for the baseline scenario:

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

Where:

BE_y	Baseline emissions in year y (tCO_2)
$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y(MWh/yr)
$EF_{grid,CM,y}$	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the *"Tool to calculate the emission factor for an electricity system*"

Calculation of $EG_{PJ,y}$
Since the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y (MWh/yr)
$EG_{facility,y}$	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr).

Calculation of $EF_{grid,CM,y}$
According to the *"Tool to calculate the emission factor for an electricity system"*, Project participants shall apply the following six steps:

STEP 1. Identify the relevant electric power system.
STEP 2. Select an operating margin (OM) method.
STEP 3. Calculate the operating margin emission factor according to the selected method.
STEP 4. Identify the cohort of power units to be included in the build margin (BM).
STEP 5. Calculate the build margin emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

STEP 1- Identify the relevant electric power system
The project electricity system is defined as "the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission constraints" in the "Tool to calculate the emission factor for an electricity system ". Similarly, "a connected electricity system, e.g. national or international, is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint" in the same document."

In the project's case "the project electricity system" and "the connected system" are same. As also confirmed by TEIAS (Turkish Electricity Transmission Company Inc.), the Turkish transmission system is interconnected. There isnot an independent regional grid system neither in Rize nor in Black Sea Region.

In addition to this, since there is no DNA in the host country to delineate the project electricity system, the suggested criteria in "Tool to calculate the emission factor for an electricity system" was used. According to this, 1-The capacity usage figure for the transmission line should be checked. 2-Spot market prices of different systems in the country should be compared.

Since there is no capacity usage figure for transmission line published, the criteria "The transmission line is operated at 90% or more of its rated capacity during 90% percent or more of the hours of the year." could not be proved.

On the other hand, there is no spot electricity market available in the country as suggested in the second criteria "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." Therefore, this criterion is not applicable as well.

As suggested in "Tool to calculate the emission factor for an electricity system", "if these criteria do not result in a clear grid boundary, use a regional grid definition in the case of large countries with layered dispatch systems (e.g. provincial / regional / national)." However, there are no layered dispatch systems in Turkey. As a result the national grid was used as the project electricity system. Hence, the estimation of OM (Operating Margin) and BM (Built Margin) are based on the definition of the Turkish electricity network as one single interconnected system.

STEP 2- Select an operating margin (OM) method

According to "Tool to calculate the emission factor for an electricity system", four alternative methods to calculate OM can be chosen. In choosing the right method for the calculation of OM, "Simple adjusted OM", "Dispatch data analysis OM" and "Average OM" methods are eliminated since all these methods require power plant specific information of power plants which are connected to the grid. However, no power plant specific information is available. Similarly, option A and option B of "Simple OM" methods were also eliminated as again there is no power plant specific data is publicly available.

All in all, option C of "Simple OM" method was adopted as "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" is the only available data in the host country.

Simple OM option C method is eligible when low cost and/or must run resources constitute, as an average of the five most recent years, less than 50 percent of the total generation for the grid. Nevertheless, the only relevant low operating cost and must run resource in Turkey is hydropower because the share of all other renewable resources is close to nil and therefore can be assumed negligible. The share of all non-hydro renewable resources in the entire electricity generation is 0,5 percent for the years between 2003 and 2008. There is no example of coal being used as must-run and nuclear energy is not practiced in Turkey.
As depicted in Table 2.1[42] the share of low-cost/must run resources were never higher than 50 percent in the last five years.

	2003	2004	2005	2006	2007	2008
Turkey's Gross Electiricity Production (GWh)	140.581	150.698	161.956	176.300	191.558	198.418
Electricity Production From Hydro (GWh)	35.330	46.084	39.561	44.244	35.851	33.270
Share (%)	25,1%	30,6%	24,4%	25,1%	18,7%	16,8%

Table 10: *Share of hydroelectric production in Turkey, 2003 – 2008[43]*

STEP 3- Calculate the operating margin emission factor according to the selected method
The Simple Operating Margin Emission Factor ($EF_{OM, y}$) is computed as the generation-weighted average emissions per electricity unit (tCO_2 /MWh) of the entire bundle of generating sources that supply into the system, except for low operating cost and must run resources including hydro, geothermal, wind, low-cost biomass, nuclear and solar generation as determined by the Baseline Methodology.

According to "Tool to calculate the emission factor for an electricity system", the formula given below is applied for computing the $EF_{grid, OMsimple, y}$.

42 All data presented in the baseline calculations are provided from official sources as mentioned in related footnotes.Therefore, uncertainities of data sets were not estiamted.
43 http://www.teias.gov.tr/istatistik2008/32(75-08).xls

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_y}$$

Where:

$EFgrid_{,OMsimple,y}$	=	Simple operating margin CO_2 emission factor in year y (tCO_2/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)
$EFCO_{2,i,y}$	=	CO2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
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	=	Either 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) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

In order to calculate the emission amounts from each fuel types, emission factors from IPCC website were used.[44] Three sets of emission factors were identified as minimum, medium and maximum values. To be conservative side, the minimum values are used in the OM calculations.

	kg CO2/GJ			Default Carbon
	min	mid	max	Oxidation Factor
hard coal	92,8	96,1	100,0	1,0
lignite	90,9	101,0	115,0	1,0
fuel oil	75,5	77,4	78,8	1,0
diesel oil	72,6	74,1	74,8	1,0
natural gas	54,3	56,1	58,3	1,0
lpg	61,6	63,1	65,6	1,0
naphta	69,3	73,3	76,3	1,0

Table 11: *Emission factors from IPCC*

Turkey's GHG Emissions Inventories for year 2006 and 2007 are announced by Turkish Statistical Institute (TUIK). However, to be on the conservative side, CO2 emissions figures from electricity production are not taken from these announced figures, as the calculation method is not known and these figures are a bit higher than the calculated figures.[45, 46, 47] As a result, for years 2006, 2007 and 2008, the CO2 emissions are calculated with the IPCC minimum values:
All in all;

[44] *http://www.ipcc-nggip.iges.or.jp/EFDB/find_ef_s1.php*
[45] http://www.tuik.gov.tr/PreHaberBultenleri.do?id=1996
[46] http://www.tuik.gov.tr/PreHaberBultenleri.do?id=4078
[47] http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=488

	2006	2007	2008
CO_2 Emmission from Electricity Production (tons)	83.173.585	98.352.660	104.062.368

Table 12: *CO2 Emission of Turkey from Electricity Production*

The calculation of net electricity production is demonstrated below. [48] As the efficiency factor from gross to net electricity for thermal resources is not known, the overall relation between gross and net electricity production is assumed to be the same for thermal production. Table 2.4 shows the overall gross/net relation where the estimated net electricity production from thermal resources were calculated by using the same relation.

	2006	2007	2008
Gross Electricity Production (a)	176.300	191.558	198.418
Net Electricity Production (b)	169.543	183.340	189.762
Net/Gross (c= a/b)	0,962	0,957	0,956
Gross Electricity Production from thermal sources (d)	131.835	155.196	164.139
Net Electricity Production from thermal sources (c*d)	126.783	148.538	156.979

Table 13*: Net Electricity Production of Turkey from Thermal Sources*

Obviously, using the same relation for both overall electricity production and thermal production is an approximation based on a rough assumption. Yet, obviously, such assumption results in a very conservative estimation because the efficiency of thermal plants is much lower than other plants as the operational consumption in those plants are relatively higher and this would only lead to a lower net electricity generation with higher OM emission factor and higher emission reductions.

With respect to the Baseline Methodology, electricity import amount is added to the domestic supply where the imports from connected grids located in other countries are weighted with an emission factor of zero tCO2/MWh.

The last part of Step 1 is calculating the ratio of emissions and generation. Based on the Simple Operating Margin Emission Factor formula, $EF_{OM,y}$ values for last three years are calculated as follows:

	2006	2007	2008
OM (MWh/tCO_2)	0,657	0,663	0,664

Table 14: *OM Emission Factor for 2006 – 2008*

According to the methodology, two data vintages are allowed for the calculation of the OM emission factor, ex-ante and ex-post:

- Ex-ante: A 3-year average, based on the most recent statistics available at the time of PDD submission
- Ex-post: The year in which project generation occurs, if the OM emission factor is updated based on ex-post monitoring

In this case, the ex-ante approach is preferred because the data is available and it is a conservative approach due to the forecast that the weight of fossil fuel use in the generation of electricity in Turkey will increase.

As the weighted average of the figures between 2006 and 2008 is computed, the OM emission factor is 0,661 tCO2 / MWh.

STEP 4- Identify the cohort of power units to be included in the build margin (BM)

Computing the BM is based on the sample of plants, in either of the two proposed ways:

- The five power plants that have been built most recently, or
- The most recently built power plants with capacity additions to the electricity system that cover 20 percent of the system generation in MWh.

Among these two options, the sample group that comprises the larger annual generation should be used.

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

The data for the recently built power plants is available for their capacity, type of utility in terms of IPP, auto-producer, BOT, fuel type and date of commissioning. According to the data:

- The total annual production of the five plants that have been built most recently is 1,842.3 GWh. Such capacity represents approximately 0.93 percent of the overall electricity generation capacity in Turkey which is in the amount of 198.4 TWh. Obviously, this is far below the 20 percent threshold proposed by the methodology.
- Instead, the Build Margin could also be computed by using the most recent capacity additions that comprise the 20 percent of the total system generation. This corresponds to 39.7 TWh which is 20 percent of the overall generation of 198.4 TWh.

The Table 32 displays the details of generation from those plants in specific

STEP 5- Calculate the build margin emission factor

According to the Baseline Methodology, the Build Margin (BM) Emission Factor EF_{BM} is calculated as the generation-weighted average emission factor of a sample of power plants m for a specific year, as follows:

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

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

There is no available CO2 emission data for the power units included in the BM calculation. The available data for on plant basis is the name, type, installed capacity and annual electricity production figures of these facilities. However, there is no available data for the electricity production figures of some small facilities, most probably because these projects are included in the "Other Projects". Therefore, annual electricity productions of these facilities were calculated with the following formula unless the exact production figures are reached. The data used in the BM calculation is provided from the Turkey's Capacity Projection Reports published in years: 2009[49], 2008[50], 2007[51], 2006[52] and 2005[53].

$EG_{m,y}$= Full Load Working Hours x Installed Capacity

In addition to this, the efficiency rates for the fuel consumption of these facilities should be added to the calculation (as the thermal plants do not consume 100% of the fuel which they are fed with). Within the context of the calculation in this document, higher the efficiency figure means lower the CO_2 emissions (as the electricity calculation assumes that the electricity production is a function of the designed installed capacity not the efficiency. However, in theory the installed capacity of a plant increases with the higher efficiency).

Therefore, in the calculation of the $EF_{grid, BM, y}$, first $EF_{EL,m,y}$ values are calculated by using the formula (4) as suggestd in the tool. Also, to calculate the $EF_{EL,m,y}$ values, the default efficiency figures listed under the "Appendix-1: Default efficiency factors for power plants" of the tool are used.

49 http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf

50 http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf

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

52 http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202006.pdf

53 http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202005.pdf

Grid Power Plants		
Generation Technology	**Old Units (before and in 2000)**	**New units (after 2000)**
Coal	-	-
Subcritical	37%	39%
Supercritical	-	45%
Ultra-upercritical	-	50%
IGCC	-	50%
FBS	35,5%	-
CFBS	36,5%	40,0%
PFBS	-	41,5%
Oil	-	-
Steam turbine	37,5%	39%
Open cycle	30%	39,5%
Combined cycle	46%	46%
Natural Gas	-	-
Steam turbine	37,5%	37,5%
Open cycle	30%	39,5%
Combined cycle	46%	60%

Table 15*: Default Efficiency Factors for power plants (Appendix 1 of the tool)*

As seen in the table above, the efficiency figures of coal, oil and natural gas, for different generation technologies, are given in the tool. In Turkey, the generation technologies for natural gas and oil is "Combined cycle" and for coal "Subcritical". Since the default values for lpg and naphta are not given in the tool, to be on the conservative side, the efficiency factors of these fuel types are assumed as 60% (equal to the highest efficiency figure / Efficiency figure for Natural Gas-Combined Cycle).

As a result, in line with the tool, the efficiency factors for each fuel type are as in the table below:

Fuel Type	Generation Technology	Efficiency Factor
hard coal	Coal - Subcritical	39%
lignite	Coal - Subcritical	39%
fuel oil	Oil - Combined Cycle	46%
diesel oil	Oil - Combined Cycle	46%
natural gas	Natural Gas - Combined Cycle	60%
lpg	Natural Gas - Combined Cycle	60%
naphta	Natural Gas - Combined Cycle	60%

Table 16*: Efficiency Factors used for BM Emission Factor Calculation*

The Build Margin estimation is based on the emission factors calculated for each energy source.

Fuel Specific Emission Factors

Carbon content factors for each fuel type (tC/TJ) refer to the factors stated in "2006 IPCC Guidelines for National Greenhouse Gas Inventories" and the fuel specific CO2 emission factors were estimated from the same factors. To be on the conservative side, minimum emission factors were used in the calculation.

Electric Efficiency Rates

Default effficency factors given in the tool. (Please see ***Table 16)***
Equivalent Electricity Generation

The equivalent electricity generation for each fuel type j out of the most recent 20 percent plants is calculated as follow:

Average Running Hours (Hours): For each specific fuel type, average running hours of similar facilities in Turkey for the year 2008, 2007, 2006 and 2005. Relevant figures were calculated based on the installed capacity and electricity production figures. On the other hand EUAS announces the electricity production figures of its facilities in each year. For these facilities actual figures were used.

Installed Capacity (MW): Total installed capacities of facilities run by similar fuel types for the period between January 8th, 2004 and December 31st, 2008.

Electricity Production (GWh): The announced electricity production figures of the facilities which were commissioned in the period between January 8th, 2004 and December 31st, 2008. And, multiplication of running hours and installed capacity for each fuel type, unless the energy production figures are not reached.

The computations display a weighted Build Margin emission factor of 0.457 tCO_2 / MWh..

STEP 6- Calculate the combined margin (CM) emissions factor

The baseline emission factor is the weighted average of the Operating Margin Emission Factor and Build Margin Emission Factor. The ACM0002 / Version 10 guideline recommends equal weight values for hydropower projects as seen in the formula below:

$EF_{grid, CM, y} = EF_{grid, OM, y} \times wOM + EF_{grid, BM, y} \times wBM$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y (tCO2/MWh)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

The default values recommended by "Methodological tool (Version 01) Tool to calculate the emission factor for an electricity system" for wOM and wBM for activities other than wind and solar power generation projects are 0.5 and 0.5, respectively.

$EF_{grid, CM, y} = 0.661 \times 0.5 + 0.457 \times 0.5$

Therefore resulting $EF_{grid,CM,y}$ is 0.559 tCO_2/MWh

4.3 Quantifying GHG emissions and/or removals for the project:

According to the ACM0002, the generic equation for the calculation of emission reduction is:

$$ER_y = BE_y - PE_y$$

Where:

ER_y	Emission reductions for the year y (tCO_2)
BE_y	Baseline emissions for the year y (tCO_2)
PE_y	Project emission for the year y (tCO_2)

Project emissions
The project emissions shall be accounted using the following equation:

$$PE_y = PE_{EF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE_y	Project emissions in year y (tCO_2e/yr)
$PE_{FF,y}$	Project emissions from fossil fuel consumption in year y (tCO_2/yr)
$PE_{GP,y}$	Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO_2e/yr)
$PE_{HP,y}$	Project emissions from water reservoirs of hydro power plants in year y (tCO_2e/yr)

Fossil fuel consumption ($PE_{FF,y}$)
The project internal consumption is approximately 500 kVA, which can be considered negligible. This consumption will be satisfied from the electricity generation when the plant is in operation or from the grid when the plant is not in operation. Eventually, if there is no electricity available in the grid and the plant is not in operation the internal consumption will be satisfied from a diesel generator, but this would rarely occur. If diesel engines would be used, emissions associated would be calculated according to the *"Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"* and considered as project emissions. Therefore:
$PE_{FF,y} = 0$

Emissions of non-condensable gases from the operation of geothermal power plants ($PE_{GP,y}$)
Since the project activity does not involve the operation of a geothermal power plant,
$PE_{GP,y} = 0$

Emissions from water reservoirs of hydro power plants ($PE_{HP,y}$)
The project activity is a Greenfield run-of–river hydropower project. The water is diverted using a diversion wall structure to power canal and then to the powerhouse. The water will be fed back to river through the tailrace canal. The diversion structure result in a regulation pond with a surface area of 14 091 m^2, that does not affect in any way the volumes of existing reservoirs downstream of the project. (Please refer to ***Figure 4)***

The power density (PD) for this regulation pond is calculated as follows:

PD = 92 960 000 W/14 091 m^2
PD = 6 597 W/m^2
PD > 10 W/m^2
Therefore, $PE_{HP,y}=0$

Hence, $PE_y = 0$

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

Please refer to ***ANNEX 4*** for details of all baseline related calculations.

4.4 Quantifying GHG emission reductions and removal enhancements for the GHG project:

According to ***Section 4.3*** the emission reductions (ER_y) are equal to baseline emissions of the same year.

The following table shows the ex-ante emission reductions calculations:

Total installed capacity	92,96 MW
Net electricity delivered to the grid (EG_y)	335,030 MWh
Baseline emission factor (Combined Margin) of Turkish grid (EF_y) **$EF_y = W_{OM} * EF_{OM,y} + W_{BM} * EF_{BM,y}$**	**0,5*0,661+ 0,5*0,457 = 0,559 tCO_2/MWh**
Baseline emissions (BE_y)	**335,030 * 0,559=187.471,5 tCO_2/year**
Project emissions (PE_y)	0 tCO_2/year
Leakage emissions (LE_y)	0 tCO_2/year
Emission reduction (ER_y)	**187.471,5 tCO_2/year**

Table 17: *Ex-ante emission reductions calculations*[54]**.**

[54]Transmission & distribution losses are neglected in the emission reduction calculations as required by the methodology.

5 Environmental Impact:

According to the Turkish law, a comprehensive EIA report is required to the projects which have a 25 MW or more of installed capacity[55]. By its dimension, Cevizlik falls under the EIA requirement zone. Hence, an EIA report has been carried out and it has concluded that the project activity will not lead to significant negative impacts. Furthermore, it will contribute to improve the environmental situation in the region and in the country. Avoiding fossil fuel-based electricity will enhance the air quality and help to reduce the adverse affects on the climate. Renewable technologies for the electricity generation will be introduced and sustainable development will be promoted.

The EIA report did not only assess the environmental impacts but it also presented a monitoring plan to be implemented during construction and operation phases. Monitoring Forms will be prepared and presented to the Ministry within periods of three months.
A summary of the potential negative environmental impacts and measures to be taken by the project participant to mitigate them is presented as follows:

Possible impacts during the construction activities
According to the environmental impact studies, the implementation of the project activity is not considered to be present any significant risks for human health or the environment.

It is possible that the traffic increase due to transportation of the construction materials, access of personnel and heavy construction equipment causes traffic accidents. This will be prevented by training the personnel, speed limitation, putting traffic signs and periodical maintenance and control of the vehicles.

The emissions from all the machines used during the construction phase will be measured periodically and the machines will be maintained if required. The vehicles carrying the excavation material will be covered and the internal roads will be watered periodically.

To minimize the possible work accidents, qualified personnel will be hired and will be continuously trained for work safety. Also, the personnel will be equipped with personnel protection equipments required by Turkish Labour Safety Regulations and appropriate healthcare and labour safety conditions will be provided.

It is worth noticing that Cevizlik's civil contractor has been certified ISO 9001:2000. Therefore, a quality management system will be applied to all the activities to be held during the construction phase.

Impacts on the aquatic life
The impact on aquatic life will be managed by the installation of a fish passage to provide an upstream and downstream movement. Its design was based on the study of the fish species, their size, migration season and the river's annual flow rates.

Impacts on the landscape
In order to prevent erosion in the slopes and to form a security band, reforestation works will be carried out under the control of the Environment and Forestry Directorate and Operational Directorates. The species that will be used are local species.

Noise impacts
The noise will be negligible as the Cevizlik Power Plant will be constructed under the ground. However, to decrease the effect of noise, floor tile having vibration and sound absorbent property will be used in power station building. Also, the noise impacts from the studies on the surface will be minimized by limiting the activities to the daytime and by warning the local residents.
In addition, noise measurements will be conducted during specified periods in order to determine possible turbine and generator noise levels.

6 Stakeholder's comments:

The Article 9 of the EIA Regulation stipulates a public participation process in order to provide participation of the communities in EIA process, to inform the communities about the proposed facility and to gather their opinions.

In order to satisfy this requirement, announcements were published in two newspapers (Karadeniz Haber ve Vatan Gazetesi) –one national and one local- declaring the date, time, venue and topic of the meeting. (The mentioned announcements are presented in Annex 5)

[55] Turkish Environmental Impact Assessment Regulation entered into force on 17.07.2008 and the latest revision was published in Official Gazette N°26939, dated 17.07.2008.

The announcements, the meeting was held on March 16th 2006 in the conference room of the culture building in İkizdere district of Rize province. The meeting which started at 13:30 under the chairmanship of the Rize Provincial Directorate of Environment and Forestry received a broad participation. (***Please refer to Figure 12***).

Figure 11: *Scenes from the Community Meeting.*

The participants comprised representatives from the community, relevant municipalities, public institutions and organizations, members of Parliament, scientists and inhabitants of the surrounding villages. (Please refer to *ANNEX 5*)

All the aspects of the project including the socio-economic and environmental aspects were presented to the participants by a project developer representative and were discussed by the stakeholders. Clarifications were requested and the overall response to the project was encouraging and positive. All the hearings were held in Turkish.

The minutes kept regarding the concerns, opinions/suggestions and reviews of the participants is presented below:

T.C. GOVERNORSHIP OF RIZE
STATE DIRECTORATE OF ENVIRONMENT AND FORESTRY

CEVIZLIK HYDROELECTRIC POWER PLANT PROJECT

Cevizlik Project Public Participation Meeting Report

According to the 9th statement of EIA regulation, a public participation meeting was organized on the 16.03.2006 at 13.30 regarding Cevizlik Weir and HEPP and Quarries project of Akım Enerji Üretimi Sanayi ve Ticaret A.Ş, located in the İkizdere District of Rize province, .

Mr.Sabit Kandemir, the Director of State Environment and Forestry, started talking with an opening speech. Later İkizdere's Mayor, Mr.Hasan Köseoğlu, talked about the importance of energy generation without harming the environment. According to him, the best way to generate electricity without harming the environment is building hydroelectric power plants. Mr.Prof. Dr. Coşkun Yurteri, from Dokay Engineering and Consulting, who prepared the EIA report, indicated the specifications of the project, clarified the stages regarding the construction and operations, described the EIA studies and the socio-economical benefits of the project.

Kemal Köse, Mayor of Güzelce District, told that he would answer the questions in a way that enables the public to understand and he indicated the importance of the quantity of water released to the river and the amount of excavation materials for İkizdere's people. He also indicated that if the necessary amount of water is released to the river, the project will not harm or pollute the environment. He also said that there is a need for energy and that the cleanest way to meet this need will be the Hydroelectric Power Plant. All the work to be done will be energy production.

Mr. Halil Demircan, CHP (Republic and Public Party) District Chief, asked how many power plants the project owner is planning to build in İkizdere and he mentioned the possibility of harms of these activities. He said that environmentalists should be taking part in the meeting.

Mr.Abdulkadir Konukoğlu, Turkish Textile Sector Board's Chairman, indicated that only the Cevizlik project is planned. However, in case of an electricity shortage from Russia, what would happen if there is no hydro projects constructed should be carefully considered. Besides, things should be done according to what İkizdere's people want and considering the environment protection.

Emrullah Ekşi, Demirkapı's headman, presented a written report for the non-governmental organization. He indicated that he would appreciate the construction of the HEPP especially since employment will increase and environment will not be harmed or affected.

Mr. Halil Demircan said that the energy resources should be used to meet the energy needs. He said he does not think that the energy policy of the country is healthy enough. He also said the imported coal is used to meet the energy demand and that there is a dependency on natural gas exportations. He believes that the energy demand cannot be met by the hydroelectric power plants that are likely to decrease the number of fish or forests in İkizdere.

Mr. İlyas Çakır, a Parliamenter of Rize, said he will not talk politically. The Parliament has a strategic plan for Rize and he described the investment plans for the Ikizdere District. He also talked about hydroelectric power plant investments for the region and said that the projects will not harm the environment; instead, they will create job opportunities in the region. He also indicated that in order not to harm the environment, the power plant will be built underground even if increasing the costs. It is also important not to depend on other countries regarding energy so these opportunities must not be lost for İkizdere.

Mr.Kıyamettin Azaklı told that this project will not harm İkizdere and that its natural structure will be protected. He also said that İkizdere's people should be informed of the project.
Mr. Yılmaz Ekşioğlu, İkizdere Tozköy Beautification and Perpetuation Association's chairman, said that as a country Turkey is open to investments and he demanded a dam for Tozköy. He indicated that these projects will improve the natural condition and support tourism in the region. He said that there are serious employment issues and that the investment is supported by eight villages' headmen.

Mr. Resul Baş, a villager from Gündere Village, indicated that he is a seasonal worker in The General Directory of Tea Processing Plants and that he would be working in the project site and mentioned the investments to İkizdere. He wanted to know how many people from İkizdere will work in the project and he also mentioned environmental protection.

Water Resources Engineer Ms.Selma Kafalı of State Agricultural Directorate asked several questions such as the cooling and heating of water, the decrease of water levels, the pass of trouts and the release of water.

Mr.Prof.Dr.Coşkun Yurteri told that the technical details will be discussed in the meeting in Ankara and since the water will not be stored, it will only be transferred from one part to another.

Mr. Yılmaz Coşkun, Nature Association's chairman, wanted to learn about the positive impacts on the people of the region and he also indicated that he was looking forward to see more investments in the region.

Mr.Abdülkadir Konukoğlu told that the project has many benefits to İkizdere and offered to work with the people of İkizdere.

Mr.Tahsin Sancak, Tea Stock Market's chairman, indicated that everybody has responsibilities towards the environment and he highlighted the importance of employment opportunities: other job opportunities should also be assessed other than energy.

Mr.Prof.Dr.Hızır Ensoy wanted to answer Ms.Selma Kafalı' s questions and indicated that there will be no climatic changes but economical changes. The water should be operated and 50% of 13 billion tons water is in Trabzon, Rize and Giresun. However, only 2% of it is used. He also indicated that the investments have already been delayed for a long time.

Mr.Halil Bakırcı, Rize's Mayor, wanted to remind the Rize's economical structure. There are not enough investors and necessary areas for investment. He said this project is an important opportunity and there is only one tea factory in İkizdere. The power plant should be operating but not harming the environment.

Mr.Turan Okumuş, Dean of Science and Literature Faculty, indicated that Rize University works for scientific development. There is also a world out there, else than İkizdere, Rize. Everybody has to look at the event in a scientific way. He said he does not have any bias while talking and the investments are necessary for all the people living in the region and they have to work very hard for the good of the project. He also said that in order to compete with the developed countries, Turkey needs these technologies. Turkey has needs for every kind of energy, however, there should be minimum effect to the environment.

Mr. Sabit Kandemir had a closing speech for the meeting.

7 Schedule:

The project schedule is presented below:

Events and action	Date
First VER consideration	July 23rd 2004
Feasibility report	May 2005
Stakeholder consultation	March 16th 2006
EIA approval (by the Ministry of Environment and Forestry)	July 24th 2006
Contract signature for the electrical works	December 4th 2006
Contract signature for the equipments	December 5th 2006
Discussions with financial institutions started	February 2006
First contacts with PDD consultants	October 2007
Loan signature (considered as the starting date of the project activity)	January 2008
Contract signature for the construction works	January 2nd 2008
Contact with a PDD consultant	April 25th 2008
Contact with a DOE	June 12th 2008
Start of PDD elaboration	July 2008
Start of VER validation	October 2009
Expected commissioning of the power plant	May 2010
1 st Monitoring and Reporting	May 2011
2 nd Monitoring and Reporting	May 2012
3 rd Monitoring and Reporting	May 2013
4 thMonitoring and Reporting	May 2014
5th Monitoring and Reporting	May 2015
6 th Monitoring and Reporting	May 2016
7 th Monitoring and Reporting	May 2017
9th Monitoring and Reporting	May 2018
10th Monitoring and Reporting	May2019
11th Monitoring and Reporting	May 2020

Table 18: *Project's schedule*

8 Ownership:

8.1 Proof of Title:

The revised generation license is presented in ANNEX 7 as proof of title.
The ownership of the emission reductions will be Akım Enerji Üretimi Sanayi ve Ticaret A.Ş..

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

Not applicable.

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ANNEX 1

Copy of the letter of the Trabzon Regional Forestry Directorate Forest Operation Management, dated March 27th 2006, number B.18.1.OGM.1.23.Ş3.231-2753.

This letter also states that the Project area is not located at a seeding area, national park, hunting and wildlife area, hunting production area, tourism area, special protection area, military forbidden zone; there is no disadvantageous condition regarding forestry works and forest-public relation; there is no sensitive area for the forest fires where the facilities will exist. Field investigation form is presented as the attachment of the letter.

ÇED İNCELEME VE DEĞERLENDİRME FORMU

İli	: RİZE	ORMAN BÖLGE MÜDÜRLÜĞÜ	: TRABZON
İlçesi	: İkizdere	ORMAN İŞLETME MÜDÜRLÜĞÜ	: RİZE
Köyü	: Gürdere	ORMAN İŞLETME ŞEFLİĞİ	: İKİZDERE
Mevkii	: kumluk-fosa		

1- Müracaat Sahibinin
   a) Adı Soyadı : Akım Enerji Üretimi Sa.ve Tic. A.ş.
   b) Adresi : Atatürk Bulvarı No:211/22 Kavaklıdere/ANKARA
2- Seri Adı : İKİZDERE
3- Bölme Numarası : 1,2,3,4,5,6,7,8,9,10,11,12,13,83,84,85,86,87,88,92,153,157,160
4- Meşçerenin
   a)İşletme Şekli : Koru
   b) Ağaç Cinsleri : L,Kn,Ks,Kz,
   c) Meşçere tipi : Kndb2,KnKsc2,ÇBKn,ÇBKnKz,ÇBKzKn,BKnDy,Z-is
5-1/25000 ölçekli Memleket Haritası üzerinde ÇED Raporuna konu sahanın Sınırları : Santral binası Güneyce Beldesi Fosa Mahallesi sınırları içinde soğuksu deresine bakan yamaçta kurulacaktır.Regülatör Kumluk mevkiinde yapılacaktır.
6- Orman Tahdit ve Kadastro durumu : Yapılmamıştır.
7- İzin İstenen Alan :
   a) Orman Sayılan Alan :60.000 m2 (tahmini)
   b) Orman Sayılmayan Alan :20.000 m2
   c) Toplam Alan :80.000 m2 (Tahmini)
8- Talebin Amacı : Hidro Elektrik Santral Tesisi Yapımı
9- Talep Sahasına başka bir müracaatın yapılıp yapılmadığı : Yapılmamıştır.
10- Talep Sahasının 6831 Sayılı Orman Kanununun 18. maddesindeki Yangın görmüş orman alanı,Gençleştirmeye ayrılmış veya Ağaçlandırılan Sahalarla ,Baraj Havzalarında kalıp kalmadığı : Kalmamaktadır.
11- Talep Sahasının Tohum Meşçeresi,Milli Park,Av Yaban Hayatı,Av Üretme Sahası,Turizm Sahası,Özel Çevre Koruma Bölgesi,Askeri Yasak Bölge,SİT alanı içinde kalıp kalmadığı : Kalmamaktadır.
12-Ormancılık Çalışmaları,Orman-Halk İlişkileri açısından Mahsuru olup olmadığı :Sakıncası Yoktur.
13-Orman Yangınları açısından hassasiyet derecesi ve alınması gereken Tedbirler nelerdir : İzin istenen saha orman yangınları açısından hassas yörelerden değildir.Önlem olarak patlayıcıların kullanımlarında tekniğine uygun hareket edilmesi gerekmektedir.
14-Orman Emvalinin nasıl değerlendirileceği : İşletmesince değerlendirilecek.

15- Tesisin kurulacağı alan ve yakın çevresindeki orman köylerinin nüfusu ve hane sayısı ile tesisin en yakın köye olan mesafesi (Orman Köyü var ise tesisin İçmesuyuna,Halk Sağlığına,Tarım Alanlarına,Hayvancılığa vb. Olabilecek Etkisi) : Tesisin kurulacağı alan Güneyce Beldesi Fosa mahallesidir.Bu civarda başka yerleşim birimi yoktur.Santral binası Fosa mahallesine yaklaşık 1,5 km mesafededir.Regülatör ise kumluk mevkiinde kurulacaktır.

16- Tesisin kurulması durumunda yöredeki istihdam durumuna etkisi : İstihdam yaratır.

17- Faaliyet sahasında ve 1 km. yakın çevresinde ÇED olumlu belgesi verilen faaliyet bulunup bulunmadığı (Varsa cinsi,Firması ve Faaliyet Sahası) : Yoktur.

Bu inceleme ve değerlendirme formu tarafımızdan tanzim ve imza edilmiştir../../2006

BAŞKAN Aziz ALTINIŞIK Kadastro Mülkiyet Şb.Müdürü	ÜYE Abdi EKŞİ İşletme Müdür Yrd.	ÜYE A.Kerim YILDIZ İşletme Şefi

Ülkemizin enerjiye olan ihtiyacını karşılayacağı,katma değer ve istihdam yaratacağından kamu yararı bulunmaktadır.Ayrıca tesisin kurulması durumunda civar ormanlara ÇED Yönetmeliği kapsamında olumsuz etkisi bulunmadığı görüşünü arz ederim.

..../..../2006

ORMAN BÖLGE MÜDÜRÜ

T. R.
MINISTRY OF ENVIRONMENT AND FORESTRY
General Directorate of Forestry, Branch Directorate of Cadastral and Ownership

NUMBER: B.18. 1 OGM. 1.23. Ş 3.231 / 2753 27 / 03 / 2006
SUBJECT: HEPP

DOKAY MÜHENDİSLİK VE DANIŞMANLIK LTD. ŞTİ
Öveçler 4. Cadde No: 140 / A 06460
Dikmen / ANKARA

The Environmental Impact Assessment (ÇED) Review and Assessment Form for the HEPP of which establishment has been planned at Rize province, İkizdere County, Güneyce town, requested by your letter is herewith enclosed.

For your kind action.

Signature
Mehmet ÖZÇELİK
District Deputy Manager

ATTCH: 1 The Environmental Impact Assessment (ÇED) Review and Assessment Form

158
04.04.2006
Hakan

Dear Yılmaz
5 / 4 / 2006 (Initial)

İşbu Çevbri TÜRKÇE Aslından İNGİLİZCE Tercümesinden ve Aslının Sahih Fotokopisinden Yapılmıştır Yeminli Mütercim - Tercüman

ASLIL'dan - FAKS'dan - FOTOKOPİ'den TERÇÜMEDİR

THE ENVIRONMENTAL IMPACT ASSESSMENT (ÇED) REVIEW AND ASSESSMENT FORM

Province	: RİZE	: FOREST DIVISION DIRECTORATE	: TRABZON
County	: İkizdere	: FOREST OPERATION DIRECTORATE	: RİZE
Village	: Gürdere	: FOREST OPERATION CHIEFTAINCY	. İKİZDERE
Spot	: kumluk - fosa		

1 – Applicant's
a) Name and Surname : Akım Enerji Üretimi Sa. Ve Tic. A.Ş.
b) Address : Atatürk Bulvarı No: 211 / 22 Kavaklıdere / ANKARA
2 – Serial Name : İKİZDERE
3 – Division n umber : 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 83, 84, 85, 86, 87, 88, 92, 153, 157, 160
4 – Stand's
a) Operation manner : grove
b) Types of tree : L(Pisea),Kn (fagus orientalis),Ks(castaneum),Kz(alnus)c)
Type of Stand : Kndb 2,KnKsc 2,ÇBKn,ÇBKn Kz,ÇBKn Kz,Kn,BKn Dy,Z– is
5 - on the country map with 1 / 25000 scale
The borders which are the subject of the ÇED (The Environmental Impact Assessment) Report: The Plant's building shall be constructed on the slope facing to soğuksu creek at Güneyce town, Fosa Quarter boundaries. The Regulator will be built at Kumluk place.

6 – Forest restriction and Cadastral condition : was not made.
7 – The Area for which permission is requested :
a) The area considered forest : 60.000 m^2 (estimated)
b) The area not considered forest : 20.000 m^2
c) Total area : 80.000 m^2 (estimated)
8 – The objective of request : Construction of Hydro Electric Plant
9 – Is there any other application for the requested area : NA
10 – Whether the requested area has been stayed in the forest area which has been subjected to fire, reserved for rejuvenation or wooded areas and dam basin in the Article 18 of the Forestry Law no. 6831. : does not stay.
11 - Whether the requested area has been stayed in Seed stand, National Park, hunting wildlife , hunting production area, Tourism area, Special environment Preservation region, Military forbidden zone, archeological site, protected area : does not stay.
12 – Is there any disability in terms of forestry studies, Forest – Public relations : see no harm
13 – Sensitivity degree concerning of forest fires and what are the measures Have to be taken : The area for which Permission is requested is not sensitive against fire As precaution, technical aspects and rules have to be followed at the explosive substance usage and must be acted in accord with its technique.
14 – How the forest assets would be assessed : they would be evaluated by their exploitation

15 – The population and number of house of the forest Villages at the area where the plant would be constructed And its immediate surroundings, including the distance of plant To the nearest village (If there are forest villages, the possible effect of the plant on drinking water, public health Agricultural areas, stock rising, etc) : The area where the plant would be erected is Güneyce town, Fosa quarter: There is no other settlement area in the vicinity. The plant building is approximately 1,5 km away from Fosa quarter. The regulator will be set up at Kumluk place.

16 – In case of erection of the plant, its affect on employment at the town : provides employment

17 – Is there any activity to which ÇED positive certificate has been given at the activity area and its 1 km surrounding (if any, kind, Firm and Activity Field) : NA

This review and assessment form has been drawn up and signed by us. 22 / 03 / 2006

Signature	Signature	Signature
Department Head	Member	Member
Aziz ALTINIŞIK	Abdi EKŞİ	A. Kerim YILDIZ
Cadastral Ownership Branch Manager	Deputy of Operation Manager	Operation Chief

I kindly submitted that there is general public welfare due to that would satisfy the energy demand of our country, create added value and employment. Furthermore, should the plant has been set up; in my opinion, I believe that will not have any negative effect to surrounding forests within the scope of the ÇED (The Environmental Impact Assessment) Regulation.

… / … / 2006
Signature
FOREST REGIONAL MANAGER

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

Karar Tarihi: 20/02/2009
Karar No : 1657

ÇED OLUMLU BELGESİ

17.07.2008 tarih ve 26939 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin 14. maddesi gereğince; *"Cevizlik Regülatörü ve HES (95 MW)"* projesi hakkında *"Çevresel Etki Değerlendirmesi Olumlu Kararı"* verilmiştir.

Fevzi İŞBİLİR
Bakan a.
Genel Müdür

Proje Sahibi : Akım Enerji Üretimi Sanayi ve Ticaret A.Ş.
Projenin Yeri : Rize İli, İkizdere İlçesi

Republic of Turkey
Ministry of Environment and Forestry
General Directorate of Environmental Impact Assessment and Planning

Decision Date : 20/02/2009
Decision Number : 1657

POSITIVE EIA LETTER

In accordance with the 14th article of the Regulation on Environmental Impact Assessment (Official Gazette, Date: 17.07.2008, Number: 26939), Environmental Impact Assessment of the project "Cevizlik Weir and HEPP (95 MW)" is positively.

Fevzi İŞBİLİR
On behalf of the Minister
General Manager

Project Owner: Akım Enerji Üretimi Sanayi ve Ticaret A.Ş.

Project Location: Rize Province, İkizdere District

ANNEX 2

Demonstration that the project has not created another form of environmental credit

AKIM

Subject: Declaration that the project has not created another form of environmental credits.

To: Voluntary Carbon Standard

Aware of the necessity of avoiding GHG double counting, Akım Enerji Üretimi Sanayi ve Ticaret A.Ş. declares that :

1- The GHG reductions generated by Cevizlik HEPP Project has not been included in any emissions trading program other than the Voluntary Carbon Standard (VCS).

2- Cevizlik HEPP Project does not take place in a jurisdiction in which binding limits are established on GHG emissions, and therefore, the emission reductions will not be used for the purpose of demonstrating compliance with binding limits at the project site.

Sincerely yours,

ZEKERIYE KONUKOĞLU
17.09.2009

SANKO

AKIM Enerji Üretimi Sanayi ve Ticaret A.Ş.
Sani Konukoğlu Bulvarı PK:83 27110 ŞEHİTKAMİL/GAZİANTEP
Tel: (0342) 211 37 00 Faks: (0342) 211 37 26

ANNEX 3

Hereafter the translation of the Board of Director’ s decision Number 5, which states that the revenues obtained by selling the VERs has been one of the key issues encouraging the investment in the proposed project activity. The original will be provided to the DOE during the validation process.

AKIM ENERGY GENERATION INDUSTRY AND TRADE CO. BOARD OF DIRECTORS DECISION

DECISION NUMBER: 5
DATE OF DECISION: 23.7.2004
MEETING LOCATION: HEADQUARTERS OF COMPANY
PARTICIPANTS OF MEETING: Mehmet Faruk KOLUKISA
Osman ASILTURK
Alaaddin COSKUN

AGENDA OF MEETING: The objectives of our company and investments, feasibility of projects and about project applications.

DECISION: Our Company`s Board of Directors have met under the chairmanship of Mr. Mehmet Faruk KOLUKISA and took the decisions below.

Our country’s energy need has been increasing day by day as the rest of the world. Most of the energy generation in our country depends on the fossil fuels which have lower investment costs, but significantly harm the environment during generation according to the fuel type and generation techniques. However, both reducing our country’s dependence on energy from abroad and also making investments on energy that our country needs and for the purpose of showing environmental awareness, our current Renewable Energy resources have been investigated and despite all economic difficulties and long investment periods, and high initial investment costs, since it is understood if these environmentally friendly projects are supported by CER carbon credits and until CER carbon credits become available to be supported by additional incomes from VER credits;

As the result of our company’s research and studies, since it is believed that if Cevizlik HEPP, Yokuslu Kalkandere HEPP, Ispir HEPP and Gullubag HEPP projects will become feasible if supported by additional incomes from carbon credits (CER and VER); it is decided unanimously to apply for obtaining generation licenses for Cevizlik HEPP, Yokuslu Kalkandere HEPP, Ispir HEPP and Gullubag HEPP projects.

Mehmet Faruk KOLUKISA	Osman ASILTURK	Alaaddin COSKUN
Chairman of Board of Dir.	Vice Chairman of Board of Dir.	Member of Board of Dir.

YapıKredi

Yapı ve Kredi Bankası A.Ş.
Genel Müdürlük
Yapı Kredi Plaza D Blok
Levent 34330 İstanbul

Tel: (0212) 339 70 00
Faks: (0212) 339 60 00
www.yapikredi.com.tr

23/09/2009

"We as Yapı Kredi have considered the additional income to be generated from VER Carbon credits and possible utilization of CER Carbon credits in the future during our financial feasibility appraisal of CevizlikProject and our loan is granted under such consideration
This letter is issued without bearing any responsibility and engagement on our part."

Yapı ve Kredi Bankası A.Ş.
Gaziantep Branch

Koç UniCredit

ANNEX 4

Baseline Information

Electricity generation	2002	2003	2004	2005	2006	2007	2008
Gross Electricity Production	129.399,5	140.580,5	150.698,3	161.956,2	176.299,8	191.558,1	198.418,0
Net Electricity Production	123.726,8	135.248,3	145.065,7	155.469,1	169.543,1	183.339,7	189.761,9
Net/Gross	0,956	0,962	0,963	0,960	0,962	0,957	0,956
Net Electricity Production from Thermal Sources	91.207,7	101.003,0	100.459,1	117.228,4	126.634,4	148.333,3	156.768,3

Table 19: *Gross/Net Electricity Generation*

	kg CO_2/GJ			Default Carbon Oxidation Factor
	min	mid	max	
hard coal	92,8	96,1	100,0	1,0
lignite	90,9	101,0	115,0	1,0
fuel oil	75,5	77,4	78,8	1,0
diesel oil	72,6	74,1	74,8	1,0
natural gas	54,3	56,1	58,3	1,0
lpg	61,6	63,1	65,6	1,0
naphta	69,3	73,3	76,3	1,0

Source: *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 Introduction, Table 1.4*
http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

Table 20: *IPCC Values*

	Fuel Consumption (FC i,y) [Ton]						
	2002	2003	2004	2005	2006	2007	2008
hard coal	2.050.700	3.705.686	4.564.713	5.259.058	5.617.863	6.029.143	6.270.008
lignite	42.576.239	35.556.028	33.776.660	48.319.143	50.583.810	61.223.821	66.374.120
fuel oil	3.180.701	2.864.392	2.403.338	2.005.899	1.746.370	2.250.686	2.173.371
diesel oil	98.374	14.123	29.141	28.442	61.501	50.233	131.206
natural gas	10.330.564	11.982.991	12.957.446	15.219.275	17.034.548	20.457.793	21.607.635
lpg	9.521	759	12.673	12.908	33	0	0
naphtha	219.122	264.371	208.749	84.481	13.453	11.441	10.606

Table 21*: Fuel Consumption*

	Net Calorific Value (NCVi,y) [GJ/t]						
	2002	2003	2004	2005	2006	2007	2008
hard coal	17,6	21,0	22,5	21,1	22,0	22,3	22,2
lignite	7,5	7,5	7,6	5,9	6,9	6,9	6,8
fuel oil	40,1	40,1	39,9	40,2	40,2	39,9	39,7
diesel oil	42,9	43,3	42,4	42,8	42,7	43,1	42,4
natural gas	40,8	39,1	38,0	38,6	37,0	36,7	36,6
lpg	46,2	44,1	45,9	46,1	0,0	0,0	0,0
naphtha	45,0	40,0	44,1	44,4	43,9	43,2	44,6

Table 22: *Net Calorific Values*

	2002	2003	2004	2005	2006	2007	2008
$EFgrid_{OM,y}$ (tCO2/MWh)	0,721	0,657	0,672	0,638	0,657	0,663	0,664

EFGrid,OM (tCO2/MWh)	**0,66149**

Table 23*: Operating Margin Emission Factor*

Company	Facility	Index	Installed Capacity (MW)	Commissioning Date	Energy Production (MWh)*	CO_2 EF (ton/TJ)	tCO_2/MWh *	Facility Energy Efficieny	BM Emission Factor tCO2/MWh	CO_2 (tons)
MB Şeker Nişasta San. A.Ş. (Sultanhanı)	N.GAS	ANG	8,80	2008	60,0	54,3	0,20	60,0%	0,43	26,1
AKSA ENERJI (Antalya)	N.GAS	ANG	183,80	2008	1.290,0	54,3	0,20	60,0%	0,43	560,7
AKSA ENERJI (Manisa)	N.GAS	ANG	52,38	2008	370,0	54,3	0,20	60,0%	0,43	160,8
ANTALYA ENERJİ (ilave)	N.GAS	ANG	17,46	2008	122,3	54,3	0,20	60,0%	0,43	53,1
ATAÇ İNŞAAT SAN. A.S.B. (ANTALYTA)	N.GAS	ANG	5,40	2008	37,0	54,3	0,20	60,0%	0,43	16,1
BAHÇIVAN GIDA (LÜLEBURGAZ)	N.GAS	ANG	1,17	2008	8,0	54,3	0,20	60,0%	0,43	3,5
CAN ENERJİ (Çorlu - Tekirdağ) (İlave)	N.GAS	ANG	52,38	2008	304,2	54,3	0,20	60,0%	0,43	132,2
FOUR SEASONS OTEL (ATİK PASHA TUR A.Ş.)	N.GAS	ANG	1,17	2008	7,0	54,3	0,20	60,0%	0,43	3,0
FRITOLAY GIDA San. Ve TİC. A.Ş. (İlave)	N.GAS	ANG	0,60	2008	4,0	54,3	0,20	60,0%	0,43	1,7
ITC-KA Enerji Üretim A.Ş. (Mamak((İlave)	RENEW.+ WASTES	AR	14,13	2008	107,0	-	-	na	-	0,0
KARKEY (SİLOPİ-5) (154kV) (İlave)	F.OIL	AF	14,78	2008	103,2	75,5	0,27	46,0%	1,26	130,0
MELİKE TEKSTİL (GAZİANTEP)	N.GAS	ANG	1,58	2008	11,0	54,3	0,20	60,0%	0,43	4,8
MİSİS APRE TEKSTİL BOYA EN.	N.GAS	ANG	2,00	2008	14,0	54,3	0,20	60,0%	0,43	6,1

SAN.										
MODERN ENERJİ (LİLEBURGAZ)	N.GAS	ANG	13,40	2008	94,1	54,3	0,20	60,0%	0,43	40,9
ORTADOĞU ENERJİ (ODA YERİ) (Eyip/İST.)	RENEW.+ WASTES	AR	2,83	2008	22,0	-	-	na	-	0,0
POLAT TURZ. (POLAT RENAISSANCE İST.OT.)	N.GAS	ANG	1,60	2008	11,0	54,3	0,20	60,0%	0,43	4,8
SARAYKÖY JEOTERMAL (Denizli)	GEOTHER MAL	AH	6,85	2008	50,0	-	-	na	-	0,0
YILDIZ SUNTA (Uzunçiftlik-Köseköy)(Düzelt)	N.GAS	ANG	22,63	2008	146,5	54,3	0,20	60,0%	0,43	63,7
SÖNMEZ Elektrik (İlave)	N.GAS	ANG	8,73	2008	67,3	54,3	0,20	60,0%	0,43	29,3
ALP ELEKTRİK TINAZTEPE / ANTALYA	HYDRO	AH	7,69	2008	29,0	-	-	na	-	0,0
CANSU ELEKTRİK (Murgul/Artvin)	HYDRO	AH	9,18	2008	47,0	-	-	na	-	0,0
ÇELDERE ELK. (ÇALDERE HES)	HYDRO	AH	8,74	2008	35,0	-	-	na	-	0,0
DAREN HES ELEKTRİK	HYDRO	AH	49,70	2008	182,0	-	-	na	-	0,0
DEĞİRMENÜSTÜ EN. (Kahramanmaraş)	HYDRO	AH	25,70	2008	69,0	-	-	na	-	0,0
GÖZEDE HES (TEMSA ELEKTRİK) Bursa	HYDRO	AH	2,40	2008	10,0	-	-	na	-	0,0
H.G.M. Enerji (KEKLİCEK HES)	HYDRO	AH	8,67	2008	18,0	-	-	na	-	0,0
HAMZALI HES (TURKON MNG ELEKTRİK)	HYDRO	AH	16,70	2008	117,0	-	-	na	-	0,0
HİDRO KNT. (YUKARI MANAHOZ Reg. Ve Hes)	HYDRO	AH	22,40	2008	79,0	-	-	na	-	0,0
İÇ-EN ELK. (ÇALKIŞLA REG. Ve HES)	HYDRO	AH	7,66	2008	18,0	-	-	na	-	0,0
KALEN ENERJİ (KALEN II Reg. Ve Hes)	HYDRO	AH	15,65	2008	50,0	-	-	na	-	0,0
MARAŞ ENERJİ (FIRNIS Reg. Ve HES)	HYDRO	AH	7,22	2008	36,0	-	-	na	-	0,0
SARMAŞIK I HES (FETAŞ FETHİYE ENERJİ)	HYDRO	AH	21,04	2008	96,0	-	-	na	-	0,0
SARMAŞIK II HES (FETAŞ FETHİYE ENERJİ)	HYDRO	AH	21,58	2008	108,0	-	-	na	-	0,0
TORUL	HYDRO	EH	105,60	2008	322,0	-	-	na	-	0,0
YEŞİL ENERJİ	HYDRO	AH	0,82	2008		-	-	na	-	0,0

ELEKTRİK (TAYFUN HES)					5,0					
ZORLU ENERJİ (MERCAN)	HYDRO	AH	1,28	2008	4,9	-	-	na	-	0,0
BAKİ ELEKTRİK ŞAMLI RÜZGAR	WIND	AR	21,00	2008	104,0	-	-	na	-	0,0
DATÇA RES	WIND	AR	8,10	2008	24,0	-	-	na	-	0,0
ERTÜRK ELEKTRİK Çatalca RES	WIND	AR	60,00	2008	210,0	-	-	na	-	0,0
INNORES ELEKTRİK Yuntdağ RÜZG. (Aliağa)	WIND	AR	42,50	2008	161,0	-	-	na	-	0,0
LODOS RES (Taşoluk)	WIND	AR	24,00	2008	85,0	-	-	na	-	0,0
SAYALAR RÜZGAR	WIND	AR	30,60	2008	97,0	-	-	na	-	0,0
SEBENOBA (Deniz Elk.)	WIND	AR	31,20	2008	100,0	-	-	na	-	0,0
HABAŞ (Aliağa - İlave)	N.GAS	ANG	9,10	2007	72,8	54,3	0,20	60,0%	0,43	31,6
MODERN ENERJI	N.GAS	ANG	5,20	2007	38,7	54,3	0,20	60,0%	0,43	16,8
ARENKO	N.GAS	ANG	0,10	2007	0,8	54,3	0,20	60,0%	0,43	0,3
ALTINMARKA GIDA	N.GAS	ANG	0,10	2007	0,8	54,3	0,20	60,0%	0,43	0,4
TEKBOY ENERJI	N.GAS	ANG	0,10	2007	0,7	54,3	0,20	60,0%	0,43	0,3
VELSAN AKRILIK	N.GAS	ANG	0,10	2007	0,6	54,3	0,20	60,0%	0,43	0,3
Acıbaden Sağlık Hiz. Ve Tic. A.Ş. / Kadıköy	N.GAS	ANG	0,50	2007	4,0	54,3	0,20	60,0%	0,43	1,7
Acıbaden Sağlık Hiz. Ve Tic. A.Ş. / Kozyatağı	N.GAS	ANG	0,60	2007	5,0	54,3	0,20	60,0%	0,43	2,2
Acıbaden Sağlık Hiz. Ve Tic. A.Ş. / Bursa	N.GAS	ANG	1,30	2007	11,0	54,3	0,20	60,0%	0,43	4,8
AKATEKS	N.GAS	ANG	1,80	2007	14,0	54,3	0,20	60,0%	0,43	6,1
FLOKSER TEKSTIL / Poliser Tesisi	N.GAS	ANG	2,10	2007	17,0	54,3	0,20	60,0%	0,43	7,4
FLOKSER TEKSTIL / Süetser Tesisi	N.GAS	ANG	2,10	2007	17,0	54,3	0,20	60,0%	0,43	7,4
FRITOLAY GIDA	N.GAS	ANG	0,50	2007	4,0	54,3	0,20	60,0%	0,43	1,7
KIVANÇ TEKSTİL	N.GAS	ANG	3,90	2007	33,0	54,3	0,20	60,0%	0,43	14,3
KİL-KAN Kil San. Ve Tic	N.GAS	ANG	3,20	2007	25,0	54,3	0,20	60,0%	0,43	10,9
SÜPERBOY BOYA SAN.	N.GAS	ANG	1,00	2007	8,0	54,3	0,20	60,0%	0,43	3,5
SWISS OTEL	N.GAS	ANG	1,60	2007	11,0	54,3	0,20	60,0%	0,43	4,8
TAV Esenboğa	N.GAS	ANG	3,90	2007	33,0	54,3	0,20	60,0%	0,43	14,3
NUH ENERJİ-2	N.GAS	ANG	73,00	2007	514,0	54,3	0,20	60,0%	0,43	223,4
AKTEKS	F.OIL	AF	0,80	2007	5,4	75,5	0,27	46,0%	1,26	6,7
UŞAK ŞEKER	LIGNITE	AL	1,70	2007	10,3	90,9	0,33	39,0%	1,20	12,4
BOĞAZLIYAN ŞEKER	N.GAS+N APHTHA	ANG	16,40	2007	102,6	54,3	0,20	60,0%	0,43	44,6
KARTONSAN	N.GAS+N APHTHA	ANG	5,00	2007	40,0	54,3	0,20	60,0%	0,43	17,4
ESKİŞEHİR END. ENERJİ	N.GAS+N APHTHA	ANG	3,50	2007	26,8	54,3	0,20	60,0%	0,43	11,7

ESKİŞEHİR ŞEKER	N.GAS+N APHTHA	ANG	2,90	2007	18,1	54,3	0,20	60,0%	0,43	7,9
İGSAŞ	N.GAS+N APHTHA	ANG	2,20	2007	15,2	54,3	0,20	60,0%	0,43	6,6
DESA	N.GAS+N APHTHA	ANG	0,70	2007	5,6	54,3	0,20	60,0%	0,43	2,4
DENTAŞ	N.GAS+N APHTHA	ANG	0,30	2007	2,3	54,3	0,20	60,0%	0,43	1,0
SÜPER FİLMCİLİK	N.GAS+N APHTHA	ANG	0,10	2007	0,8	54,3	0,20	60,0%	0,43	0,3
ATAER ENERJİ	N.GAS+N APHTHA	ANG	0,10	2007	0,6	54,3	0,20	60,0%	0,43	0,2
BİL ENERJİ	N.GAS+N APHTHA	ANG	0,10	2007	0,7	54,3	0,20	60,0%	0,43	0,3
ITC-KA	RENEW.+ WASTES	AR	1,40	2007	11,1	-	-	na	-	0,0
BIS ENERJİ Bursa ilave	N.GAS	ANG	43,00	2007	354,8	54,3	0,20	60,0%	0,43	154,2
ALİAĞA ÇAKMAKTEPE	N.GAS	ANG	34,80	2007	278,0	54,3	0,20	60,0%	0,43	120,8
BİS ENERJİ Bursa DÜZELTİLME	N.GAS	ANG	28,30	2007	233,5	54,3	0,20	60,0%	0,43	101,5
BIS ENERJİ Bursa ilave	N.GAS	ANG	48,00	2007	396,1	54,3	0,20	60,0%	0,43	172,1
BOSEN ENERJİ	N.GAS	ANG	142,80	2007	1.071,0	54,3	0,20	60,0%	0,43	465,5
SAYENERJİ ELEKTRİK	N.GAS	ANG	5,90	2007	47,0	54,3	0,20	60,0%	0,43	20,4
T ENERJİ ÜRETİM A.Ş.	N.GAS	ANG	1,60	2007	13,0	54,3	0,20	60,0%	0,43	5,7
ZORLU ENERJİ Kayseri	N.GAS	ANG	7,20	2007	55,0	54,3	0,20	60,0%	0,43	23,9
SİİRT	F.OIL	AF	25,60	2007	190,0	75,5	0,27	46,0%	1,26	239,3
MARDİN KIZILTEPE	F.OIL	AF	34,10	2007	250,0	75,5	0,27	46,0%	1,26	314,9
KAREN	F.OIL	AF	24,30	2007	180,0	75,5	0,27	46,0%	1,26	226,7
İDİL 2 (PS3 A-2)	F.OIL	AF	24,40	2007	180,0	75,5	0,27	46,0%	1,26	226,7
BORÇKA HES	HYDRO	EH	300,60	2007	1.039,0	-	-	na	-	0,0
TEKTUĞ (KEBAN DERESİ)	HYDRO	AH	5,00	2007	32,0	-	-	na	-	0,0
YPM Ener. Yat. A.Ş. Altıntepe Hidro	HYDRO	AH	4,00	2007	18,0	-	-	na	-	0,0
YPM Ener. Yat. A.Ş. Beypınar Hidro	HYDRO	AH	3,60	2007	18,0	-	-	na	-	0,0
YPM Ener. Yat. A.Ş. Konak Hidro	HYDRO	AH	4,00	2007	19,0	-	-	na	-	0,0
KURTEKS Tekstil (KARASU HES - Andırın)	HYDRO	AH	2,40	2007	19,0	-	-	na	-	0,0
ISKUR TEKSTIL (SULEYMANLI HES)	HYDRO	AH	4,60	2007	18,0	-	-	na	-	0,0
ÖZGÜR ELK. AŞ. (K.MARAŞ) (Tahta)	HYDRO	AH	6,30	2007	27,0	-	-	na	-	0,0
ÖZGÜR ELK. AŞ. (K.MARAŞ) (Tahta) İlave	HYDRO	AH	6,30	2007	27,0	-	-	na	-	0,0
ANEMON EN: ELEK. ÜRETİM A.Ş.	WIND	AR	8,00	2007	24,2	-	-	na	-	0,0

ANEMON EN: ELEK. ÜRETİM A.Ş. İlave	WIND	AR	15,20	2007	46,0	-	-	na	-	0,0
ANEMON EN: ELEK. ÜRETİM A.Ş. İlave	WIND	AR	7,20	2007	21,8	-	-	na	-	0,0
BURGAZ RES (Doğal Enerji Üretim A.Ş.)	WIND	AR	4,00	2007	12,9	-	-	na	-	0,0
BURGAZ RES (Doğal Enerji Üretim A.Ş.)	WIND	AR	10,90	2007	35,1	-	-	na	-	0,0
DENİZ ELEK. ÜRETİM Ltd. Şti. (Karakurt)	WIND	AR	10,80	2007	28,0	-	-	na	-	0,0
MARE MMANASTIR RÜZGAR ENERJİ	WIND	AR	11,2	2007	36,9	-	-	na	-	0,0
MARE MMANASTIR RÜZGAR ENERJİ	WIND	AR	20,00	2007	65,8	-	-	na	-	0,0
EKOTEN TEKSTİL GR-I	N.GAS	ANG	1,93	16.02.2006	14,0	54,3	0,20	60,0%	0,43	6,1
ERAK GİYİM GR-I	N.GAS	ANG	1,37	22.02.2006	10,0	54,3	0,20	60,0%	0,43	4,3
ALARKO ALTEK GR-III	N.GAS	ANG	21,89	23.02.2006	158,3	54,3	0,20	60,0%	0,43	68,8
AYDIN ÖRME GR-I	N.GAS	ANG	7,52	25.02.2006	60,0	54,3	0,20	60,0%	0,43	26,1
NUH ENERJİ-2 GR II	N.GAS	ANG	26,08	02.03.2006	180,1	54,3	0,20	60,0%	0,43	78,3
MARMARA ELEKTRİK (çorlu) GR-I	N.GAS	ANG	8,73	13.04.2006	63,0	54,3	0,20	60,0%	0,43	27,4
MARMARA PAMUK (Çorlu) GR-I	N.GAS	ANG	8,73	13.04.2006	63,0	54,3	0,20	60,0%	0,43	27,4
ENTEK (Köseköy) GR IV	N.GAS	ANG	47,62	14.04.2006	391,3	54,3	0,20	60,0%	0,43	170,0
ELSE TEKSTİL (Çorlu) GR I-II	N.GAS	ANG	3,16	15.04.2006	25,0	54,3	0,20	60,0%	0,43	10,9
BARES IX GRUP	WIND	AR	13,50	20.04.2006	47,3	-	-	na	-	0,0
SÖNMEZ ELEKTRİK (Çorlu) GR I - II	N.GAS	ANG	17,46	03.05.2006	126,0	54,3	0,20	60,0%	0,43	54,8
DENİZLİ ÇİMENTO (DÜZELTME)	N.GAS	ANG	0,45	04.05.2006	3,2	54,3	0,20	60,0%	0,43	1,4
MENDERES ELEKTRİK GR I	GEOTHERMAL	AH	7,95	10.05.2006	56,0	-	-	na	-	0,0
KASTAMONU ENTEGRE BALIKSİR GR-I	N.GAS	ANG	7,52	24.05.2006	54,0	54,3	0,20	60,0%	0,43	23,5
BARES X. VE XX. GRUPLAR	WIND	AR	16,50	26.05.2006	57,8	-	-	na	-	0,0
BOZ ENERJİ GR-I	N.GAS	ANG	8,73	09.06.2006	70,0	54,3	0,20	60,0%	0,43	30,4
ADANA ATIK SU ARITMA TESİSİ	RENEW.+ WASTES	AR	0,80	09.06.2006	6,0	-	-	na	-	0,0
AMYLUM NİŞASTA (ADANA)	N.GAS	ANG	14,25	09.06.2006	34,0	54,3	0,20	60,0%	0,43	14,8
ŞIK MAKAS (Çorlu) GR-I	N.GAS	ANG	1,58	22.06.2006	13,0	54,3	0,20	60,0%	0,43	5,7
ELBİSTAN B GR-III	LIGNITE	EL	360,00	23.06.2006	2.340,0	90,9	0,33	39,0%	0,93	2.180,1
ANTALYA ENERJİ	N.GAS	ANG	34,92	29.06.2006	245,0	54,3	0,20	60,0%	0,43	106,5

GR I - II - III - IV										
HAYAT TEM. VE SAĞLIK GR I - II	N.GAS	ANG	15,04	30.06.2006	108,0	54,3	0,20	60,0%	0,43	46,9
EKOLOJİK EN. (Kemerburgaz) GR I	RENEW.+ WASTES	AR	0,98	31.07.2006	6,0	-	-	na	-	0,0
EROĞLU GİYİM (Çorlu) GR-I	N.GAS	ANG	1,17	01.08.2006	9,0	54,3	0,20	60,0%	0,43	3,9
CAM İŞ ELEKTRİK (Mersin) GR I	N.GAS	ANG	126,10	13.09.2006	1.008,0	54,3	0,20	60,0%	0,43	438,1
ELBİSTAN B GR II	LIGNITE	EL	360,00	17.09.2006	2.340,0	90,9	0,33	39,0%	0,93	2.180,1
YILDIZ ENT. AĞAÇ (Kocaeli) GR I	N.GAS	ANG	6,18	21.09.2006	40,0	54,3	0,20	60,0%	0,43	17,4
ÇERKEZKÖY ENERJİ GR I	N.GAS	ANG	49,16	06.10.2006	390,0	54,3	0,20	60,0%	0,43	169,5
ENTEK (Köseköy) GR V	N.GAS	ANG	37,00	03.11.2006	304,0	54,3	0,20	60,0%	0,43	132,1
ITC-KA EN. MAMAK TOP.M. GR I-II-III	RENEW.+ WASTES	AR	4,24	03.11.2006	30,0	-	-	na	-	0,0
ELBİSTAN B GRUP IV	LIGNITE	EL	360,00	13.11.2006	2.340,0	90,9	0,33	39,0%	0,93	2.180,1
MARE MANASTIR RÜZGAR (X GRUP)	WIND	AR	8,00	08.12.2006	25,0	-	-	na	-	0,0
ÇIRAĞAN SARAYI GR I	N.GAS	ANG	1,32	01.12.2006	11,0	54,3	0,20	60,0%	0,43	4,8
ERTÜRK ELEKTRİK Tepe RES GR I	WIND	AR	0,85	22.12.2006	2,0	-	-	na	-	0,0
AKMAYA (Lüleburgaz) GR I	N.GAS	ANG	6,91	23.12.2006	50,0	54,3	0,20	60,0%	0,43	21,7
BURGAZ (Lüleburgaz) GR I	N.GAS	ANG	6,91	23.12.2006	54,0	54,3	0,20	60,0%	0,43	23,5
SEYHAN I-II	HYDRO	EH	0,30	20.02.2006	1,7	-	-	na	-	0,0
ŞANLIURFA GR I-II	HYDRO	EH	51,80	01.03.2006	124,0	-	-	na	-	0,0
BEREKET ENERJİ GÖKYAR HES 3 Grup	HYDRO	AH	11,62	05.05.2006	43,3	-	-	na	-	0,0
MOLU EN. Zamantı Bahçelik GR I - II	HYDRO	AH	4,22	31.05.2006	16,7	-	-	na	-	0,0
SU ENERJİ BALIKESİR GR I - II	HYDRO	AH	4,60	27.06.2006	20,7	-	-	na	-	0,0
BEREKET EN. MENTAŞ REG. GR I - II	HYDRO	AH	26,60	31.07.2006	108,7	-	-	na	-	0,0
EKİN (Başaran Hes) (Nazilli)	HYDRO	AH	0,60	11.08.2006	4,5	-	-	na	-	0,0
ERE (Sugözü Reg. Ve Kızıldüz HES)	HYDRO	AH	15,43	08.09.2006	31,6	-	-	na	-	0,0
ERE (AKSU REG. VE ŞAHMALLAR HES)	HYDRO	AH	14,00	16.11.2006	26,7	-	-	na	-	0,0
TEKTUĞ (KALEALTI) GR I - II	HYDRO	AH	15,00	30.11.2006	52,0	-	-	na	-	0,0
BEREKET EN. MENTAŞ REG. GR III	HYDRO	AH	13,30	13.12.2006	54,4	-	-	na	-	0,0
BOSEN GR-III	N.GAS	ANG	51,02	30.12.2005	372,8	54,3	0,20	60,0%	0,43	162,0

KARKEY (SİLOPİ-4) GR-V	F.OIL	AF	6,75	23.12.2005	51,9	75,5	0,27	46,0%	1,26	65,3
AKÇA ENERJİ GR-III	N.GAS+NAPHTHA	ANG	8,73	14.12.2005	65,5	54,3	0,20	60,0%	0,43	28,5
KAHRAMANMARAŞ KAĞIT GR-I	IMPORTED COAL	AHC	6,00	08.12.2005	45,0	92,8	0,33	39,0%	0,76	34,1
PAK GIDA	N.GAS	ANG	5,67	07.12.2005	45,0	54,3	0,20	60,0%	0,43	19,6
KORUMA KLOR GR I-II-III	N.GAS	ANG	9,60	03.12.2005	77,0	54,3	0,20	60,0%	0,43	33,5
İÇDAŞ ÇELİK GR-I	IMPORTED COAL	AHC	135,00	30.11.2005	1.080,0	92,8	0,33	39,0%	0,76	818,2
KÜÇÜKÇALIK TEKSTİL GR I-II-III-IV	N.GAS	ANG	8,00	27.11.2005	64,0	54,3	0,20	60,0%	0,43	27,8
ZORLU ENERJİ YALOVA GR I-II	N.GAS	ANG	15,93	26.11.2005	122,0	54,3	0,20	60,0%	0,43	53,0
HABAŞ ALİAĞA GR-V	N.GAS	ANG	23,00	24.11.2005	184,0	54,3	0,20	60,0%	0,43	80,0
GRANİSER GRANİT GR-I	N.GAS	ANG	5,50	14.11.2005	42,0	54,3	0,20	60,0%	0,43	18,3
MOSB GR I-II-III-IV-V-VI-VII	N.GAS	ANG	84,83	11.11.2005	434,0	54,3	0,20	60,0%	0,43	188,6
AK ENERJİ(K.paşa) GR- III	N.GAS	ANG	40,00	09.11.2005	256,9	54,3	0,20	60,0%	0,43	111,7
ZORLU ENERJİ KAYSERİ GR-IV	N.GAS	ANG	38,63	26.10.2005	294,9	54,3	0,20	60,0%	0,43	128,2
ALTEK ALARKO GR I-II	N.GAS	ANG	60,10	14.10.2005	420,0	54,3	0,20	60,0%	0,43	182,5
AYKA TEKSTİL GR-I	N.GAS	ANG	5,50	24.09.2005	40,0	54,3	0,20	60,0%	0,43	17,4
HABAŞ ALİAĞA GR IV	N.GAS	ANG	44,62	21.09.2005	357,0	54,3	0,20	60,0%	0,43	155,1
EVYAP GR I-II	N.GAS	ANG	5,12	27.08.2005	30,0	54,3	0,20	60,0%	0,43	13,0
ÇEBİ ENERJİ BT	N.GAS	ANG	21,00	27.08.2005	164,7	54,3	0,20	60,0%	0,43	71,6
CAN ENERJİ GR-I	N.GAS	ANG	3,90	25.08.2005	28,0	54,3	0,20	60,0%	0,43	12,2
NOREN ENERJİ GR-I	N.GAS	ANG	8,73	24.08.2005	70,0	54,3	0,20	60,0%	0,43	30,4
ÇEBİ ENERJİ GT	N.GAS	ANG	43,37	23.08.2005	340,1	54,3	0,20	60,0%	0,43	147,8
YAMULA GRUP I-II	HYDRO	EH	100,00	31.07.2005	422,0	-	-	na	-	0,0
ZORLU ENERJİ KAYSERİ GR-I-II-III	N.GAS	ANG	149,87	22.07.2005	1.144,1	54,3	0,20	60,0%	0,43	497,3
BEREKET EN. (DALAMAN) GR XIII-XIV-XV	HYDRO	AH	7,50	15.07.2005	35,8	-	-	na	-	0,0
ETİ MAD.(BAN.ASİT)GR-I	RENEW.+WASTES	AR	11,50	15.07.2005	88,0	-	-	na	-	0,0
ZEYNEP GİYİM SAN. GR-I	N.GAS	ANG	1,17	07.07.2005	9,0	54,3	0,20	60,0%	0,43	3,9
KARKEY (SİLOPİ-4) GR-IV	F.OIL	AF	6,15	30.06.2005	47,2	75,5	0,27	46,0%	1,26	59,5
AKBAŞLAR GR-II(İZOLE)	N.GAS	ANG	9,00	24.06.2005	71,3	54,3	0,20	60,0%	0,43	31,0
MODERN ENERJİ (DG) GR-III	N.GAS	ANG	8,38	14.06.2005	61,1	54,3	0,20	60,0%	0,43	26,6
MODERN ENERJİ (DG+LPG) GR-II	N.GAS+LPG	ANG	7,68	13.06.2005	56,0	54,3	0,20	60,0%	0,43	24,4

MODERN ENERJİ (DG+LPG) GR-II (DÜZELTME)	N.GAS+LPG	ANG	4,50	13.06.2005	32,8	54,3	0,20	60,0%	0,43	14,3
MURATLI GR I-II	HYDRO	EH	115,00	03.06.2005	444,0	-	-	na	-	0,0
HABAŞ ALİAĞA GR III	N.GAS	ANG	44,62	02.06.2005	356,9	54,3	0,20	60,0%	0,43	155,1
HAYAT KAĞIT GR-I	N.GAS	ANG	7,53	27.05.2005	56,0	54,3	0,20	60,0%	0,43	24,3
TEZCAN GALVANİZ GR I-II	N.GAS	ANG	3,66	27.05.2005	29,0	54,3	0,20	60,0%	0,43	12,6
YONGAPAN(KAST. ENTG) GR-II	N.GAS	ANG	5,20	25.05.2005	35,8	54,3	0,20	60,0%	0,43	15,6
NUH ENERJİ-2 GR I	N.GAS	ANG	46,95	24.05.2005	319,7	54,3	0,20	60,0%	0,43	138,9
İÇTAŞ ENERJİ (Yukarı Mercan) GR I-II	HYDRO	AH	14,19	22.05.2005	44,0	-	-	na	-	0,0
AK ENERJİ(K.paşa) GR I-II	N.GAS	ANG	87,20	30.04.2005	560,1	54,3	0,20	60,0%	0,43	243,4
TEKTUĞ (Kargılık) GR I-II	HYDRO	AH	23,90	25.04.2005	83,0	-	-	na	-	0,0
SUNJÜT(RES) GR I-II	WIND	AR	1,20	23.04.2005	2,0	-	-	na	-	0,0
KAREGE GR IV-V	N.GAS	ANG	18,06	07.04.2005	141,9	54,3	0,20	60,0%	0,43	61,7
BİS ENERJİ GR VII	N.GAS	ANG	43,70	18.03.2005	287,6	54,3	0,20	60,0%	0,43	125,0
ÇAN GR I (EÜAŞ)	LIGNITE	EL	160,00	15.03.2005	1.040,0	90,9	0,33	39,0%	0,93	968,9
ÇAN GR I (EÜAŞ)	LIGNITE	EL	160,00	15.02.2005	1.040,0	90,9	0,33	39,0%	0,93	968,9
ELBİSTAN-B GR I (EÜAŞ)	LIGNITE	EL	360,00	15.02.2005	2.340,0	90,9	0,33	39,0%	0,93	2.180,1
ENTEK ELK.A.Ş.KOÇ ÜNİ.GR I-II	N.GAS	ANG	2,33	07.02.2005	19,0	54,3	0,20	60,0%	0,43	8,3
BAYDEMİRLER GR IV-V-VI	N.GAS	ANG	6,21	04.02.2005	49,3	54,3	0,20	60,0%	0,43	21,4
MERCEDES BENZ TURK GR I-II-III-IV	N.GAS	ANG	8,28	04.02.2005	68,0	54,3	0,20	60,0%	0,43	29,6
METEM ENERJİ (Hacışıramat) GR I-II	N.GAS	ANG	7,83	29.01.2005	58,0	54,3	0,20	60,0%	0,43	25,2
METEM ENERJİ (Peliklik) GR I-II-III	N.GAS	ANG	11,75	29.01.2005	89,0	54,3	0,20	60,0%	0,43	38,7
ALTINMARKA GIDA GR I-II-III	N.GAS	ANG	3,60	17.12.2004	28,8	54,3	0,20	60,0%	0,43	12,5
KARKEY-II 3+3 DGM	FUEL-OIL	AF	54,30	12.11.2004	370,0	75,5	0,27	46,0%	1,26	466,1
STANDART PROFİL 3 GM	N.GAS	ANG	6,74	22.10.2004	49,2	54,3	0,20	60,0%	0,43	21,4
HABAŞ ALİAĞA GRUP I-II	N.GAS	ANG	89,23	08.10.2004	713,7	54,3	0,20	60,0%	0,43	310,2
AYEN OSTİM ENERJİ ÜRETİM(BT)	N.GAS	ANG	9,89	01.10.2004	84,0	54,3	0,20	60,0%	0,43	36,5
KOMBASSAN KAĞ. MATBAA GIDA	N.GAS	ANG	5,50	24.09.2004	35,7	54,3	0,20	60,0%	0,43	15,5
BEREKET EN.(Feslek Hes) Gr-1-2	HYDRO	AH	9,48	05.08.2004	41,0	-	-	na	-	0,0
ÇELİK ENERJİ ÜR.ŞTİ. 2 GM	N.GAS	ANG	2,42	09.07.2004	19,0	54,3	0,20	60,0%	0,43	8,3
BESLER GR-2, BT	N.GAS	ANG	12,70	07.07.2004	95,3	54,3	0,20	60,0%	0,43	41,4

(5,2+7,5)										
ŞAHİNLER ENERJİ 1 GM	N.GAS	ANG	3,20	29.06.2004	24,9	54,3	0,20	60,0%	0,43	10,8
ENERJİ-SA ADANA 1 BT	NAPHTA	AN	49,77	23.06.2004	373,3	69,3	0,25	60,0%	0,77	286,3
BİS ENERJİ 2 GT	N.GAS	ANG	73,04	16.06.2004	602,6	54,3	0,20	60,0%	0,43	261,9
AYEN OSTİM ENERJİ ÜRETİM	N.GAS	ANG	31,08	11.06.2004	264,1	54,3	0,20	60,0%	0,43	114,8
KOMBASSAN KAĞIT GIDA VE TEKS	N.GAS	ANG	5,50	09.06.2004	38,1	54,3	0,20	60,0%	0,43	16,6
GÜL ENERJİ GR-II	FUEL-OIL	AF	12,50	03.06.2004	93,8	75,5	0,27	46,0%	1,26	118,2
TEKBOY TEKSTİL 1 GM	N.GAS	ANG	2,25	18.05.2004	16,0	54,3	0,20	60,0%	0,43	7,0
ÇOLAKOĞLU(KAP ASİTE ARTIRIMI)	IMPORTE D COAL	AHC	45,00	05.05.2004	347,8	92,8	0,33	39,0%	0,76	263,5
İSKUR TEKSTİL(SÜLEYMA NLI) GR I-II	HYDRO	AR	4,60	28.04.2004	17,9	-	-	na	-	0,0
ELTA ELK(DODURGA) GR-I-II-III-IV	HYDRO	AR	4,14	26.04.2004	12,3	-	-	na	-	0,0
TANRIVERDİ 4 GM	N.GAS	ANG	4,66	24.03.2004	38,7	54,3	0,20	60,0%	0,43	16,8
ERE(BİR KAPILI HES) GRUP-I	HYDRO	AR	48,50	11.03.2004	170,5	-	-	na	-	0,0
ATATEKS 2 GM	N.GAS	ANG	5,63	20.02.2004	45,0	54,3	0,20	60,0%	0,43	19,6
ENTEK GR-IV	N.GAS+N APHTA	ANG	31,13	12.02.2004	233,5	54,3	0,20	60,0%	0,43	101,5
ANKARA D.G.(BAYMİNA) GR-I-II-III	N.GAS	ANG	798,00	08.01.2004	6.500,0	54,3	0,20	60,0%	0,43	2.825,0
TOTAL					**45.670,2**			**Facility Energy Efficieny**		**24.853,8**

***Table 24**: Most Recently Comissioned Power Plants (2004 - 2008)*

	Total Electricity Generation (GWh)	**Net Electricity Generation (GWh)**	**Total CO2 Emissions (Ton)**	**BM Values for each year (tCO2/MWh)**
2008	4.835,6	4.624,6	889,9	0,192
2007	5.785,8	5.537,6	1.614,2	0,291
2006	11.218,1	10.788,2	7.019,7	0,651
2005	13.615,5	13.070,1	6.958,0	0,532
2004	10.215,2	9.833,4	3.587,7	0,365

BM Emission Factor :	0,45764

***Table 25**: Built Margin Emission Factor*

Parameter	SI Unit	Result
EFGrid,OM,y	tCO2/MWh	0,661
EFGrid,BM,y	tCO2/MWh	0,457
EFGrid,CM,y	tCO2/MWh	0,559

Table 26: *Summary of Grid Emission Factor Calculation*

ANNEX 5

Attendance list for the stakeholder consultation meeting:

Participant's name	Job/Position in the community/Organisation (if relevant)
Nihat Çolak	Mayor of Kalkandere
Tahsin Sancak	Director of Chamber of Commerce
Halil Bakırcı	Mayor of Rize
Hasan Kösoğlu	Mayor of İkizdere
Zekeriye Konukoğlu	İsko President
Kemal Köse	Mayor of Güzelce
Yılmaz Eksitoğlu	
K.Tayfun Güngör	President-İkizdere Association
Mustakim Çakır	Vice Predisent-İkizdere Association
H.Rahmi Düzenli	Mufti of İkizdere
Mustafa Bakır	Director of Revenue Department
Dursun Havuz	Tradesman
Ahmet İspir	Chief of TEDAŞ
Turgay Karagöz	City Director of MHP Party (Political Party)
Zeki Muratoğlu	Chairman of Board of Directors of TEDAŞ
Güven Aksoy	Member of Board of Directors of TEDAŞ
Salih Kotev	District Director of DYP Party
Emrullah Ekşi	Director of Kızılay Branch Office
Seyfettin Yılmaz	Director of Directorate of Public Works and Settlement
Galip Salman	Resident of Rüzgarlı Village
Cevahir Tevetoğlu	Rüzgarlı Village Mukhtar
Müfit Kaynar	Resident of Rüzgarlı Village
Osman Aksu	Ilıca Village
Mahmut Özgen	
Yakup Salman	
Halil Demircan	Director of CHP party İkizdere Branch
Tayyar Latifoğlu	Carpenter in İkizdere
Yılmaz Coşkun	Director of Nature Sports Association
Cemil Ekşi	Contractor
Mehti Akci	Tozköy Mukhtar (Indicates the project must be done)
Nail Taş	
Rıfat İslamoğlu	

Muhammet Kan	Director of Education of İkizdere District
İmdat Çakır	Vice Director of Public Education
Turgay Akyol	Mayor
Salih Çepnioğlu	Editor
Resul Baş	Resident of Derepazarı
Mustafa Hüseyinpaşaoğlu	Geology Engineer, Directorate of Public Works and Settlement
Nail Taş	Ziraat Bank
İsmail Köymen	
Güngör Yılmaz	İkizdere
Vedat Demir	
Tufan Kurt	
Keleş Demir	Ballıköy Mukthar
Orhan Baş	Director of Association
Şükri Bektaş	
Muzaffer Yıldız	
İlhan Muti	EÜAŞ İkizdere HEPP
İsmail Havuz	Meşeköyü
Yaşar Baş	HEPP İkizdere
Kasım Adalı	HEPP İkizdere Professional Mechanical Engineer
Hasan Çalık	Resident of Karma Village
Orhan Tatoğlu	Mechandiser
İlyas Topçakan	Driver
Sefer Cengiz	Director of Directorate of Forestry
Abdi Ekşi	Vice Director of Directorate of Forestry
Selma Kafalı	Director of Agriculture Directorate of Rize
Mehmet Uslu	Driver of Kalkandere Mayor
Yakup Yılmaz	Butcher, İkizdere
Hasan Alış	Tradesman, İkizdere
Ömer Tevetoğlu	Resident of Rüzgarlı Village
Mustafa Köymen	Resident of Rüzgarlı Village
H.Cahit Kılıç	Resident of Yeşilyurt Neighborhood
İbrahm Taşlı	
Seyit Çepni	
İsmail Çepni	
Rıza Taşlı	
Metin Cem	
Mustafa Kılıç	
Halil Yılmaz	Ihlamur Village Mukhtar
Mustafa Fındıkçı	Gündoğdu Neighborhood Mukhtar
Ibrahim Kuy	Zafer Neighborhood Mukhtar
Dilaver Aydın	Director of PTT
Yıldırım Küçük	Director of District Agriculture Directorate
Hasan Çınar	Directorate of 22nd region of DSI
Mustafa Yamıc	Directorate of 22nd region of DSI

Muharrem Atalar	Director of Directorate of DSI 24th region of DSI
Reşat Yılmaz	Dereköy
Y.Ziya Turhanoğlu	Yeşilyurt Neighborhood
Erdal Şallı	Environmental Engineer, Ministry of Environment and Forestry
Sonnur Sanal	Rize Directorate of Environment and Forestry
Firdevs Ayaz	Rize Directorate of Environment and Forestry
Şevket Vanlı	
Kemal İspirli	
Rahmi Ekşi	
Rasim Kose	
Menderes Atay	Güneyce Kurtuluş Neighborhood Mukhtar
Cevahir Yılmaz	Güneyce Çarşı Neighborhood Mukhtar
Mehmet Çiçek	Güneyce Yeşiltepe Neighborhood Mukhtar
Mehmet Yılmaz	Şimşirli Village
Osman Piroğlu	Şimşirli Village
Selahattin Taş	Çamlık Village Mukhtar
İbrahim Kösoğlu	
Kudret Tavukçu	Kirazlı Neighborhood
Halit Biber	Mukhtar Çağırankaya
Yaşar Albayrak	Gürdere Village
Süleyman Tanrıkulu	Çarşı Neighborhood
Muhittin Karagöz	Çağırankaya Neighborhood
D.Ali Aksu	Carpenter, İkizdere
Veysel Zehir	Şimşirli Village
Cemal Köseoğlu	(Indicated not against)
İshak Tavukçu	Güney Neighborhood Mukhtar, İkizdere
Abdullah	
Fahri	
Selamet Kaçaran	Yağcılar
İdris Avcı	Yağcılar
Abdurahman Hakyemez	Gürdere Village
Mehmet Ali Uzun	Acowind Company Worker
Abdulrezzak Uzun	Şimşirli Village
Necmi Şimşek	Şimşirli Village Mukhtar
Hamit Zehir	Şimşirli Village
İsmail Akyıldız	Director,Şimşirli Association
Abdurrahman Karavin	Tozköy Dam
Cihan Cil	Tozköy Dam
Hüseyin Er	Member of City Council
Orhan Aksu	Resident of Ilıca Village
Yılmaz Köseoğlu	Self Employed
Halil Aslanoğlu	Tozköy Dam

Table 27 *Attendance list for the stakeholder consultation meeting*

DUYURU

Rize ili, İkizdere İlçesi sınırları içerisinde: **Akım Enerji Üretimi San. ve Tic. A.Ş** tarafından,

"Cevizlik Regülatörü ve Cevizlik HES ve Malzeme Ocakları Projesi" nin yapılması planlanmaktadır.

Söz konusu faaliyet ile ilgili olarak 16.12.2003 tarih ve 25318 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği gereğince, aşağıdaki belirtilen yer, gün ve saatte **"ÇED Sürecine Halkın Katılımı Toplantısı"** düzenlenecektir.

Yer: İkizdere İlçesi Kültür Binası Konferans Salonu

Adres: Rize ili, İkizdere İlçesi RİZE

Tarih: 16.03.2006

Saat: 13.00

İlgili yönetmeliğin 9. maddesi gereğince

HALKIMIZA DUYURULUR.

AKIM ENERJİ ÜRETİMİ SAN. VE TİC. A.Ş

a.Karadeniz Haber (11.03.2006)

DUYURU

Rize İli, İkizdere İlçesi sınırları içerisinde;

Akım Enerji Üretimi San. ve Tic. A.Ş. tarafından,

"Cevizlik Regülatörü ve Cevizlik HES ve Malzeme Ocakları Projesi"nin yapılması planlanmaktadır.

Söz konusu faaliyet ile ilgili olarak, 16.12.2003 tarih ve 25318 sayılı Resmî Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği gereğince, aşağıda belirtilen yer, gün ve saatte **"ÇED Sürecine Halkın Katılımı Toplantısı"** düzenlenecektir.

Yer: İkizdere İlçesi Kültür Binası Konferans Salonu
Adres: Rize İli, İkizdere İlçesi RİZE
Tarih: 16.03.2006
Saat: 13:30

İlgili yönetmeliğin 9. Maddesi gereğince

HALKIMIZA DUYURULUR.

AKIM ENERJİ ÜRETİMİ SAN. VE TİC. A.Ş.

b. Vatan Gazetesi (11.03.2006)

Figure 12 : *Newspaper Announcements for the Community Meeting*

Pictures of the buildings that will be expropriated:

Figure 13: *General view of weir site*

Figure 14: *Number 1*

Figure 15: *Number 2.*

Figure 16: *Number 3 and 4.*

Figure 17: *Number 5 and 6*

Figure 18: *Soğuksu Bridge*

ANNEX 6

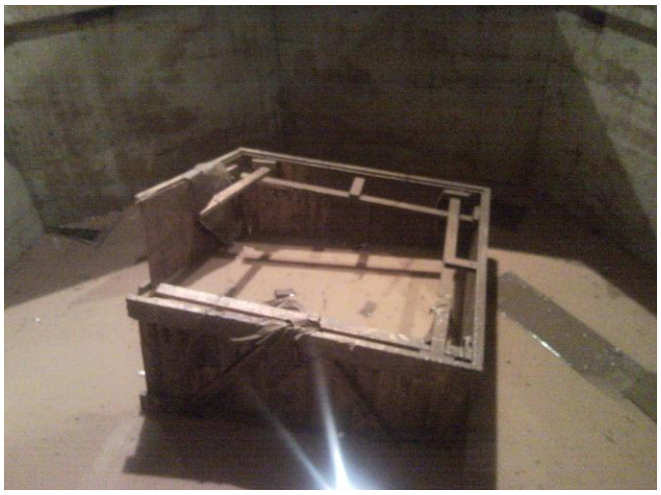


Figure 19: *Flood disaster*

Figure 20: *Flood disaster*

Figure 21 *Flood Disaster*

ANNEX 7

T.C.
ENERJİ PİYASASI DÜZENLEME KURUMU

EPDK

ÜRETİM LİSANSI

Lisans No : EÜ/1237-2/880

Tarih : 27/06/2007

Bu Lisans, **Akım Enerji Üretimi Sanayi ve Ticaret Anonim Şirketi**'ne, Rize İli'nde kurulacak olan **Cevizlik Hidroelektrik Santralı** üretim tesisinde 27/06/2007 tarihinden itibaren 48 yıl 4 ay (kırksekiz yıl dört ay) süreyle, üretim faaliyeti göstermek üzere 4628 sayılı Elektrik Piyasası Kanunu, 5625 sayılı Kanun ve ilgili mevzuat uyarınca Enerji Piyasası Düzenleme Kurulu'nun 27/06/2007 tarihli ve 1237-2 sayılı Kararı ile verilmiştir.

Yusuf GÜNAY
Başkan

Bu lisans, genel ve özel hükümleri ile ayrılmaz bir bütündür.

ÖZEL HÜKÜMLER

1- Üretim tesisine ilişkin bilgiler

Bu Lisans, **Akım Enerji Üretimi Sanayi ve Ticaret A.Ş.**'ne ait ve bilgileri aşağıda yer alan **Cevizlik HES** üretim tesisi için verilmiştir:

İli	: Rize
Bildirim adresi	: Sani Konukoğlu Bulvarı Üzeri PK 83 GAZİANTEP
Tesis tipi	: Yenilenebilir, hidrolik, nehir tipi
Ünite sayısı	: 2 adet
Ünite kurulu güçleri	: 46,48 MW_m/45,70 MW_e (bir ünite tek başına çalışırken 51,21 MW_m/50,34 MW_e)
Tesis toplam kurulu gücü	: 92,96 MW_m/91,40 MW_e
Yakıt türü veya türleri	: Hidrolik
Öngörülen ortalama yıllık üretim miktarı	: 330.000.000 kWh
Sisteme bağlantı noktası ve gerilim seviyeleri	: Kalkandere TM, 154 kV (Kalkandere TM tamamlanana kadar İyidere TM); - 154 kV, Yokuşlu (Kalkandere) HES şaltı - 154 kV, İkizdere HES şaltı
Tesis tamamlanma tarihi	: 27/12/2010 İnşaat öncesi 10 ay İnşaat dönemi 32 ay

2- Lisansın yürürlüğe girmesi

Bu lisans, 27/06/2007 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 (%)
- Sanko Enerji Üretim San. ve Tic. A.Ş.	99,99

Dolaylı Pay Sahibi Ortaklar	Hisse Oranı (%)
- Sanko Holding A.Ş.	74,99
- Abdülkadir KONUKOĞLU (Çocuklarının hisseleri dahil)	22,26
- Zekeriye KONUKOĞLU (Çocuklarının hisseleri dahil)	18,73
- Adil Sani KONUKOĞLU (Çocuklarının hisseleri dahil)	18,27
- Fatih KONUKOĞLU (Çocuklarının hisseleri dahil)	17,76
- Hakan KONUKOĞLU	17,67
- İnci KONUKOĞLU (çocuklarının hisseleri -oğlu Hakan KONUKOĞLU'na ait % 17,67 oranında hisse- dahil)	30,69

4- Lisansın süresi

Bu lisans, yürürlük tarihinden itibaren 48 yıl 4 ay (kırksekiz yıl dört ay) süreyle geçerlidir.

REPUBLIC OF TURKEY
ENERGY MARKET REGULATORY AUTHORITY

ELECTRICITY GENERATION LICENSE

License No. : EÜ/1237-27880
Date : 06/27/2007

This license grants **Akım Enerji Üretimi Sanayi ve Ticaret Anonim Şirketi** the right to generate electric power at the **Cevizlik Hydroelectric Power Plant** to be built in the city of Rize. This license is valid for 48 years and 4 months (fortyeight years and four months) starting on the twenty-seventh day of June 2007. This license is based upon the resolution of the Energy Market Regulatory Board no. 1237-2 dated 06/27/2007, in accordance with the Electricity Market Law no. 4628, and Law no. 5625 and its respective regulations.

signed

Yusuf GÜNAY
President

The general and special provisions are the integral part of this license.

SPECIAL PROVISIONS

1- Information regarding the power generation plant

This license is granted specifically for the **Cevizlik HEPP** belonging to **Akım Enerji Üretim Sanayi ve Ticaret A.Ş.**, the details of which is given below:

City	:	Rize
Correspondence address	:	Sani Konukoğlu Bulvarı Üzeri PK 83 GAZİANTEP
Type of the facility	:	Renewable, hydraulic, river type
Number of units	:	2 ea.
Installed power of units	:	46.48 MWm/45.70 MWe (51.21 MWm/50.34 MWe single unit running alone)
Total installed power of the facility	:	92.96 MWm/91.40 MWe
Type(s) of fuel	:	Hydraulic
Projected avarage annual generation amount	:	330.000.000 kWh
Point of connection to grid and voltage levels	:	Kalkandere substation, 154 kV (İyidere substation until the completion of Kalkandere substation); - 154 kV, Yokuşlu (Kalkandere) HEPP switchyard - 154 kV, İkizdere HEPP switchyard
Facility completion date	:	12/27/2010 pre-construction phase: 10 months construction phase: 32 months

2- License going into effect

This license shall go into effect on 06/27/2007. The rights and obligations of the licensee under this license shall be effective starting from the date of license going into effect.

3- Legal and natural allottees having 10% or higher direct or indirect shares as legal bodies

Direct shareholders	**Share percentage (%)**
Sanko Enerji Üretim San. ve Tic. A.Ş.	99.99

Indirect shareholders	**Share percentage (%)**
- Sanko Holding A.Ş.	
- Abdülkadir KONUKOĞLU (inc. children's share)	74.99
- Zekeriya KONUKOĞLU (inc. children's share)	22.26

HEPP PROJECT TRANSMISSION LINE SCHEDULE AND PHASES FOLLOW-UP TABLE

NO	WORKS TO BE PERFORMED IN NORMAL SCHEDULE
1	Receipt of interconnection agreement from TEİAŞ
2	Signing of interconnection agreement
3	Preparation of EIA (Environmental Impact Assessment) files of the line
4	Receipt of EIA approval report for PTL (Power Transmission Line)
5	Request TEİAŞ for deforestation for site delivery and project survey studies
6	TEİAŞ delivers site and site survey of the project completes
7	Submission of the site survey plan to TEİAŞ General Directorate
8	TEİAŞ approves site survey plan tower distributed plan
9	Determination of tower locations foot foundations, clearances and levels as per the Approved Tower Plan. Submission of the documents to TEİAŞ Gen. Dir.
10	TEİAŞ Gen. Dir. approval of the tower location foot foundations, clearances and levels
11	TEİAŞ submits one copy of the final plan to Group Directorate and two copies to our company
12	Submission of the nationalization file to TEİAŞ Group Dir.
13	Arranging for the urban planners to amend the development plans of each zoned areas (if any) along the route of the line and having those files approved by the municipalities
14	Having TEİAŞ send letters to the below listed institutions for the purposes of locating addresses of owners and inheritors listed in the nationalization files and/or determination of imputed sales values and/or minimum declaration values of the areas inside the land parcels and/or having made development plan amendments (if any) to be sent attached to the related authorities; - Neighborhood units (Locating addresses, real estate sales values) - Tax offices (Locating addresses) - Civil registries (Locating addresses) - Real estate registry offices (Locating addresses, real estate sales values) - District governors (Locating addresses) - Municipalities (Municipality announced minimum declaration value of lands, approval of development plan amendments (if any)) - Provincial Agriculture Directorates (for determination of Cropping Systems, Annual Net Incomes, Capitalization Interest Rates and Real Property Values) *(Letters sent to all the above institutions is required by the negotiations committee of TEİAŞ nationalization department and by the appraisal reports to be annexed to urgent expropriation lawsuit files)*
15	On receiving the information requested from the official authorities listed above in item 14, each of the owners listed in nationalization plans need to be entered into a module called IRS (Identity Recognition System) which is a part of the Netcad software TEİAŞ uses. This is a proprietary software program developed by Netcad company for TEİAŞ and it is not commercially available.

16	Submission of GPS reports to the Provincial Cadastre Directorates
17	Approval of GPS reports by the Provincial Cadastre Directorates
18	Finalization of cadastral bases
19	TEİAŞ Group Dir. reviews nationalization files and submits to Cadastre Directorates for checking.
20	Nationalization files are reviewed and approved by Cadastre Directorates
21	Issuing of ownership files (if any) and submission to and approval from TEİAŞ
22	Preparation of Soil Conservation Plans
23	TEİAŞ Group. Dir. sending a non-agricultural allotment request letter to Provincial Agriculture Directorate (based on rolled Nationalization Plan and prepared Soil Conservation Plan)
24	Preparation of forest permit files
25	Issuing of the plans regarding forested areas and submission to TEİAŞ
26	TEİAŞ Group Directorate makes a request to Regional Directorate of Forestry for permit
27	Permits are obtained
28	Sending a letter to Nationalization Department requesting the line to be declared in the public interest
29	Obtaining the resolution for declaration of public interest as approved by the minister
30	TEİAŞ Group Dir. completes all the paperwork related with the line (Plans, EIA, Nationalization, Forests, Agriculture) and makes a request to TEİAŞ Gen. Dir. for taking the resolution to commence nationalization procedure
31	TEİAŞ Gen. Dir. resolves to commence nationalization
32	Sending the file to TEİAŞ Group. Dir. for nationalization works
33	Mutually preparing urgent nationalization petitions and getting ready for the court appeal stage
34	Checking of urgent nationalization petitions and filing lawsuits
35	Appointment of experts by the court and start of survey
36	Preparation of expert's opinions reports
37	Obtaining urgent expropriation resolutions
38	Obtaining permits for tree cutting below the route of overhead lines and tower locations in forested land.
39	Completion of tree cutting in forested land
40	Manufacturing and installation company starts manufacturing according to the Approved Final Plan
41	Completion of installations

REPUBLIC OF TURKEY
ENERGY MARKET REGULATORY AUTHORITY
Electricity Market Regulation, Monitoring and Assessment Department

Our Ref : B.62.0.EPI\10.30.41-2782
Subject : Electricity generation license application

To: AKIM ENERJİ ÜRETİMİ SANAYİ VE TİCARET ANONİM ŞİRKETİ
Atatürk Bulvarı Gama Güriş İş Merkezi Kat:8 Daire:22 No:211 Kavaklıdere - ANKARA

Your Ref: Your electricity generation license application letter no. 20237, dated 05/27/2005.

Please be informed that your above referenced application for electricity generation license regarding the 90 MWm/85,5 MWe Cevizlik HEPP planned to be built in the city of Rize has been reviewed and assessed. Your company has been granted the license by the Energy Market Regulatory Board resolution no. 565-8, dated 10/20/2005.

We have been informed by the General Directorate of TEİAŞ with a letter no. 2158, dated 8/9/2005 regarding the interconnection and use of system, as per Article 38 of the Electricity Market License Regulation (Regulation), as quoted below:

"...interconnection through the 154 kV 500 m long 795 MCM PTL to 154 kV bus bar over the 154/MV substation planned to be built in 500 m distance to Cevizlik HEPP site has been deemed appropriate."

In this respect, you are kindly requested to provide us the below listed information in 90 days time following the receipt of this Board Resolution in order to complete the license procedure:

- Bank receipt indicating that the balance amount of YTL 20.892.400 and the VAT deduction over the YTL 20.892.600 amount has been deposited to our account,

- Written record indicating that the capital of your company has been raised to YTL 21.735.000 as required by Article 10, clause four of the regulation,

- Information regarding whether or not any procedure of nationalization, establishment of incorporeal rights on property, long term leasing are required for delivery of the site for the planned power plant,

- Layout plan indicating dispersed ownerships on 1/5.000 scale cadastral sheet (3 copies) if any procedure of nationalization, establishment of incorporeal rights on property, long term leasing are required,

- Completion time schedule of the planned power plant separately indicating the pre-construction phase and construction phase,

- Written record indicating that the Water Use Right Agreement has been signed.

Additionally, you are required to submit the final performance bond amount of YTL 20.842.650 as the balance of your initial performance bond in order to complement the offer made by your Company, in 10 (ten) days time following the receipt of this Board Resolution.

Please be informed that, except for cases of force major, failing to fulfill these commitments in prescribed times will lead to denial of your license by a Board resolution.

Yours sincerely,

(signed)

Murat H. ERENEL
acting Department Head

T.C.
E P D K ENERJİ PİYASASI DÜZENLEME KURUMU
Elektrik Piyasası Düzenleme, İzleme ve Değerlendirme Dairesi Başkanlığı

Sayı : B.62.0.EPİ.10.30.41_2282_ 19990 - 08.11.2005
Konu : Üretim lisansı başvurusu

AKIM ENERJİ ÜRETİMİ SANAYİ VE TİCARET ANONİM ŞİRKETİNE
Atatürk Bulvarı Gama Gür İş Merkezi Kat:8 Daire:22 No:211 Kavaklıdere-ANKARA

İlgi : 27/5/2005 tarihli ve 20237 sayılı üretim lisansı başvurunuz.

İlgi'de kayıtlı yazı ile, Rize İli kurulması planlanan 90 MWm/85,5 MWe gücündeki Cevizlik HES için yapmış olduğunuz üretim lisansı başvurunuzun inceleme ve değerlendirmesi sonucu, Şirketinize üretim lisansı verilmesi Enerji Piyasası Düzenleme Kurulunun 20/10/2005 tarihli ve 565-8 sayılı Kararı ile uygun bulunmuştur.

Elektrik Piyasası Lisans Yönetmeliğinin (Yönetmelik) 38 inci maddesine göre bağlantı ve sistem kullanımı hakkında TEİAŞ Genel Müdürlüğü 9/8/2005 tarihli ve 2158 sayılı yazı ile;

"... *Cevizlik HES'in santral sahasına yaklaşık 500 m. uzaklıkta tesisi öngörülen 154/OG TM nin 154 kV barasına 154 kV yaklaşık 500 m 795 MCM karakteristikli EİH ile bağlantısı mümkün görülmektedir.*"

şeklinde görüş bildirmiştir.

Bu çerçevede, Şirketinize üretim lisansı verilmesi için, Kurul Kararının Şirketinize tebliğ tarihinden itibaren 90 gün içerisinde;

- Lisans alma bedelinin kalan miktarı olan 20.892.400 YTL ve 20.892.650 YTL'nin KDV miktarının Kurum hesabına yatırıldığına ilişkin belgenin,

- Yönetmeliğin 10 uncu maddesinin dördüncü fıkrası gereği, Şirket sermayesinin asgari 21.735.000 YTL'ye artırıldığına ilişkin belgelerin,

- Kurmayı planladığınız üretim tesisi için yerleşim yeri temininde kamulaştırma, mülkiyetin gayri ayni hak tesisi veya uzun süreli kiralama işlemlerinin gerekip gerekmediği hususunun,

- Kamulaştırma, mülkiyetin gayri ayni hak tesisi veya uzun süreli kiralama işlemleri gerekli ise, 1/5.000 ölçekli kadastral pafta üzerinde mülkiyet dağılımının gösterildiği yerleşim projesinin (3 nüsha),

- Kurmayı planladığınız üretim tesisinin tamamlanma süresine ilişkin olarak, inşaat öncesi dönem ve inşaat dönemi olarak iki bölüm halinde hazırlanacak termin programının,

- Su Kullanım Hakkı Anlaşması imzalandığına ilişkin belgelerin,

Kurumumuza sunulması gerekmektedir.

09-NOV-2005 14:42 FROM EPDK EPI EPU TO 02247148021 P.02/02

Diğer taraftan, Kurul Kararının tebliğ tarihinden itibaren 10 (on) iş günü içerisinde başlangıç teminatının Şirketinizce verilen teklif miktarına tamamlanması için 20.842.650 YTL'lik farka ilişkin nihai teminatın da Kurumumuza sunulması gerekmektedir.

Mücbir sebepler dışında, öngörülen süreler içerisinde bu yükümlülüklerin yerine getirilmemesi halinde lisans başvurunuz Kurul Kararıyla reddedilecektir.

Bilgilerinizi rica ederim.

Murat H. ERENEL
Başkan a.
Daire Başkanı

İş Çevirı TÜRKÇE Aslından İNGİLİZCE Tarafımdan Aslına Sadık Kalınarak Yapılmıştır
Yeminli Mütercim - Tercüman

T. R.
MINISTRY OF ENVIRONMENT AND FORESTRY
General Directorate of State Hydraulic Works
Department Of Dams and HEPP

Number: B 18 1 DSİ 0 12 05 00 / 21 — 04TH January 2010
Subject: Cevizlik HEPP

AKIM Enerji Üretimi Sanayi ve Ticaret A.Ş.
Sani Konukoğlu Bulvarı PK: 83 27110 ŞEHİTKAMİL / GAZİANTEP

Ref: Your letter dated 18.12.2009 numbered 557 – 2009

With your Ref. letter, you have claimed for the confirmation on the Cevizlik HEPP with 92,96 MWm / 91,40 MWe installed capacity, of which construction has been realized by your company, is the Hydroelectric Power Plant having the biggest Installed capacity as the fully embedded underground, run off river type power plant that has been constructed in our country up to this point in time, without having Storage Dam Reservoir at the upstream thereof.

It is seen that the matter you have requested the confirmation pertaining to the said project is true when the booklet of The "Dams & Hydroelectric Power Plants in Turkey" that was published by our General Directorate and the HEPP Projects which have been submitted up to the present to our department are taken into consideration.

For your kind consideration.

Signature
Ergün ÜZÜCEK
Department Head

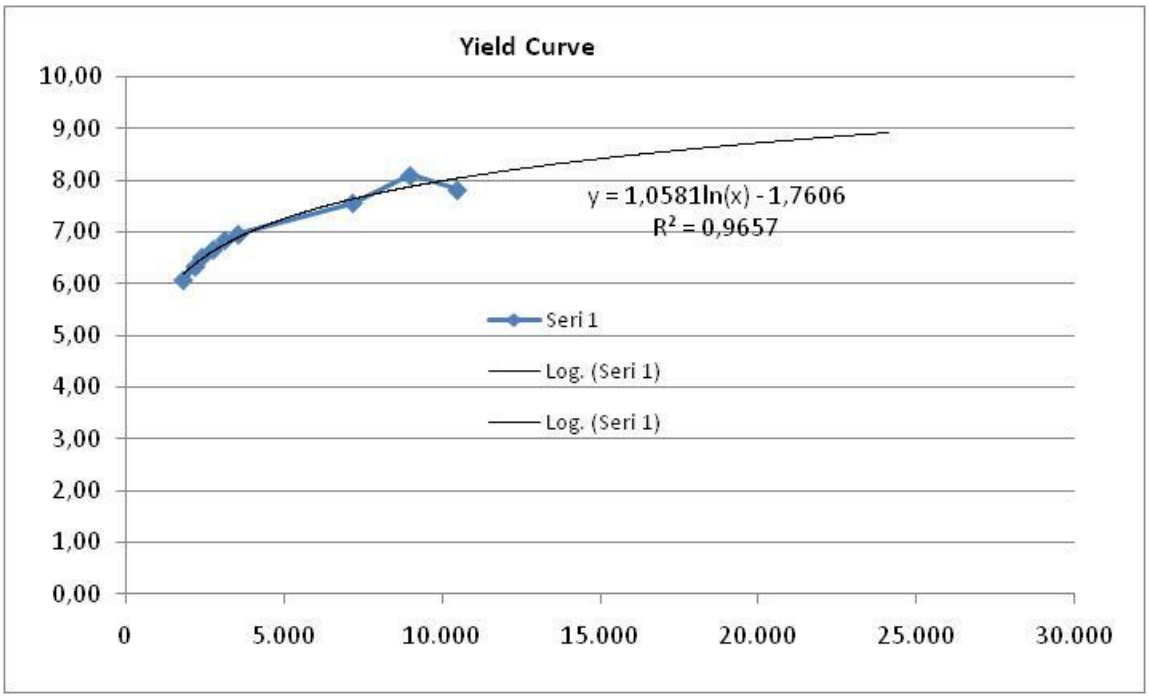
Deputy of Branch Director : V. ÖZKÖK (Initial)
Deputy of Department Head : T. DİNÇERGÖK (Initial)

Tax Number: 9255
DSİ General Directorate of State Hydraulic Works, Department Of Dams and HEPP
For detailed information contact to: Branch Directorate of River and Channel Plants
İnönü Bulvarı R / 7 Yücetepe 06100 ANKARA
Tel: (0312) 418 33 99 Fax: (0312) 418 34 13
e-mail: ozkok@dsi.gov.tr Electronic Network: www.dsi.gov.tr.

Letter from DSI about Cevizlik HEPP

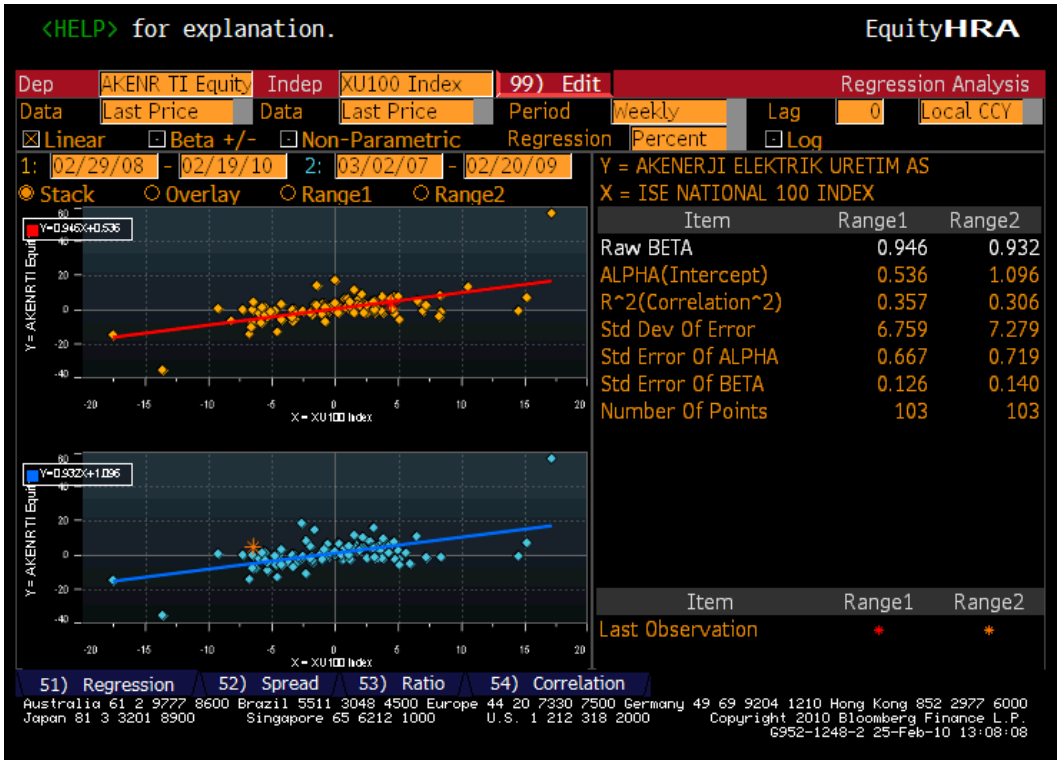
ANNEX 8

Yield curve



Beta Values of the energy companies traded in ISE 100 derived from Bloomberg:

AK ENERJI



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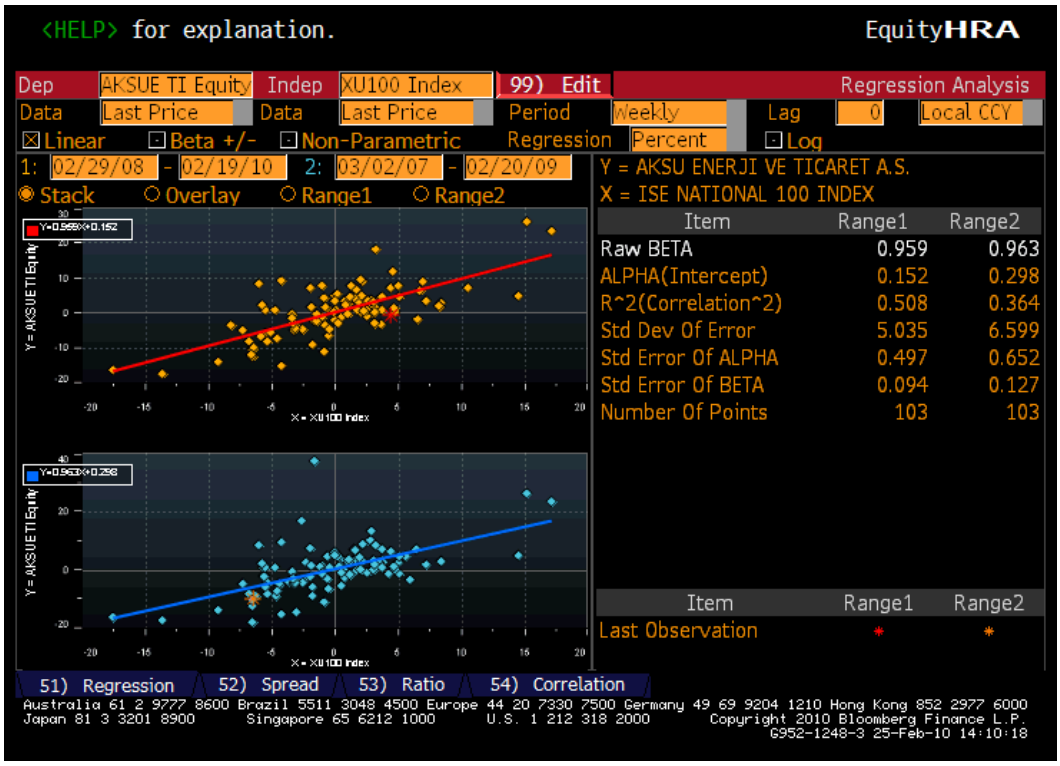
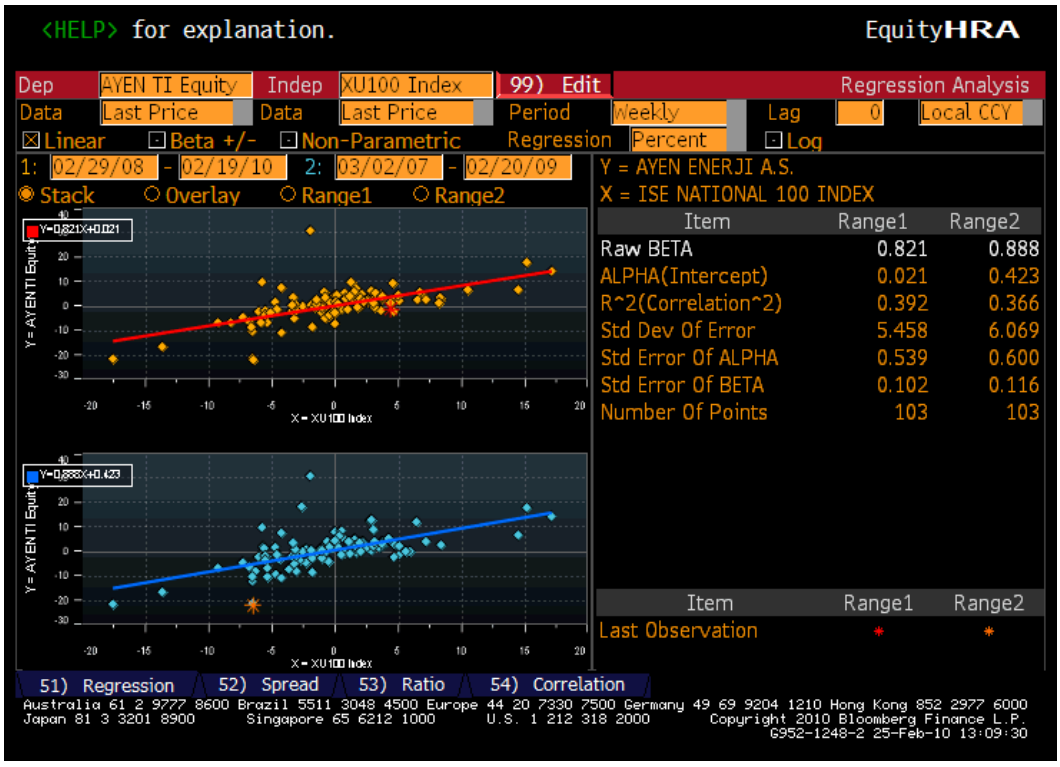


AYEN



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