SOCIALCARBON REPORT

CONTENT

ATTACHMENTS

1. Identifying the Project

Basic Information	
Indicators	*Hydro Indicators version 1,4 adapted for Koyulhisar Hydro Electricity Power Plant Project, Turkey*
Project Name	Koyulhisar Hydro Electricity Power Plant *(Koyulhisar HEPP, hereafter)*
Year-Point of Project	*Point Zero*
Monitoring period (SOCIALCARBON)	*17/11/2009 to 31/10/2011 (both days inclusive)*
Version + Date of report completion	*v.2.0 - 22/12/2011*
Corresponding Monitoring Report (Carbon Accounting Standard)	*17/11/2009 to 31/10/2011 (both days inclusive) (VCS version 3.0)*
Location	*Koyulhisar - Sivas - Turkey*

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2. General description of the reduction of GHG emissions Project activity

2.1. Context and history of the reduction of GHG emissions project[1]

Bereket Enerji Üretim San. ve Tic. A. Ş. constructed Koyulhisar Hydro Electric Power Plant (HPP) on the Kelkit Stream, within the jurisdiction of Koyulhisar Town of Sivas Province. The purpose of the project is electricity production using the potential energy of Kelkit Stream as a renewable resource. Therefore, the electricity is going to be produced without causing airborne pollutants or Green House Gas (GHG) emissions. The construction and operation of the Koyulhisar Hydro Electric Power Plant (HPP) will be delaying the addition of conventional thermal power plants to the Turkish National Electricity Grid.

The set capacity of Koyulhisar HPP is 63 MW, with 3 turbines of 21 MW each . One of these three turbines is installed as a standby unit, intended to operate only whenever one of the other two turbines will not be operating for the purpose of maintenance and repair. Based on the available water and the capacity of the total capacity of the project, the project is indicated to be to produce 262,365 MWh of electricity per year, according to its feasibility report. The number indicated in the feasibility report is based on the average water availability of the past 50 years, and does not take into account the highly possible impacts of the climate change over the water availability. Such impacts are well documented in both the IPCC reports[2], Worldbank studies[3] and in the scientific articles published related to Turkey[4], and its water resources[5]. Based on these articles , we have estimated about 16% production loss, approximately one month loss in the dry season , due to water being spared for irrigation purposes at the upstream reservoir of the government owned Kılıçkaya Dam, and approximately one month loss during the relatively wet season due to the unexpected torrential rains that would trigger mass flows and cause the blockage of the open canals and halt the production. This is also reflected in the production's seasonality: the production is seasonal being relatively less in dry season (from late September to early spring) compared to the rest of the year. Also due to the active tectonic structure of the project area there are frequent mass flows that block the canals and hinder the continuity of the electricity production. Therefore summing up the peak season productivity and the low season productivity the annual average electricity production is expected to be a maximum of around 220,000 MWh. Based on Turkey's Combined Margin Emission Factor of 0.52826 tCO_{2e}/MWh, the project is expected to produce 116,217 tonnes of CO_{2e} GHG reductions each year.

The environmental impacts of the project will be kept at a minimum level and all the regulations that are in act in the host country, Turkey, will be obeyed during the construction

[1] *This section is prepared based on the validated VCS PD of the project.*

[2] Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof, Eds., 2008: Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva, 210 pp.© 2008, Intergovernmental Panel on Climate Change ISBN: 978-92-9169-123-4.

[3] Danilenko A., Dickson, E., Jacobsen, M.,Climate Change and Urban Water Utilities: Challenges & Opportunities, Water Working Notes, Note No. 24, April 2010,(Water Working Notes are published by the Water Sector Board of the Sustainable Development Network of the World Bank Group.) 84 pp.

[4] Mengü, G. P., Sensoy, S., Akkuzu, E., 2008, Effects of Global Climate Change on Agriculture and Water Resources, BALWOIS 2008 – Ohrid, Republic of Macedonia – 27, 31 May 2008.

[5] Tahmiscioğlu, M.S., Karaca, Ö., Özdemir, A.D., Özgüler, H., , 2006, Possible Effect of The Global Climate Change on Water Resources and Floods in Turkey, International Conference on Climate Change and the Middle East Past, Present and Future 20-23 November 2006, ITU, Istanbul/TURKEY.

and operation stages of the Koyulhisar HPP project. At the planning stage these impacts have been investigated and were presented to the Sivas Provincial Directorate of the Ministry of Environment and Forestry (MoEF), in the form of a project introductory file[6] (an equivalent to a Pre-EIA report). The report was examined by the Provincial Directorate of the MoEF and it was decided that a detailed Environmental Impact Assessment study was not needed for the project[7]. Considering that the project will be using the water resource that is also essential for the aquatic life in the area, there will be a fish ladder (fish passage way)[8] within the regulator for the downstream and upstream movement of the fish, to facilitate fish migration. The fish passage will be active at the end of 2011 (based on the blue prints dated 24 July 2009). Since the project is designed as a run off river type power plant, the minimum water (considered as $4m^3/s$ in the revised feasibility report) necessary for the sustainability of the aquatic life in the river will always be released.

The Major milestones at the project development history can be summarized as shown in the following table (Table 1):

Table 1: Major Milestones of Koyulhisar HPP

Date	Milestone	Reference
24/09/2003	The Project is acquired from State Water Affairs(DSI)	DSI WEB site[9]
28/06/2004	The initial Feasibility Approved by DSI	Approval letter of DSI
18/01/2005	Water Usage Agreement co-signed with DSI	DSI Water usage Agreement
02/10/2005	Electricity Production Licence issued by Energy Market Regulatory Agency (EMRA)	EMRA Licence
01/06/2005	EIA Exemption Certificate issued	See Annex-3
07/08/2006	Financial Closure and Investment Decision date	Credit Agreement(first Trench)
23/10/2006	Invitation letters sent to Village heads for a Local Stakeholders Meeting	Invitation Letters
13/11/2006	Stake Holder Consultation Meeting Held at Kılıçpınar Village	Meeting Minutes
05/01/2009	Carbon Finance considered	Board Decision
06/01/2009	Construction Started	NHS Record
03/09/2009	Application for the addition of the third unit and approval of revised feasibility	Application Letter to DSI
August 2009	Final version of Revised Feasibility released	Feasibility Report
17/11/2009	The First two units of the project became operational (Project Start Date)	Provisional Acceptance Protocol by MoENR
17/11/2009	Application for licence Revision to EMRA	Application Letter to EMRA
02/09/2011	Turkuaz Contracted for Carbon Finance	Contract
10/09/2011	Validating DOE Contracted	Mail Order
19/09/2011	PDD submitted to DOE	E-mail
5-6/10/2011	Site Visit for Validation	DOE Testimonial
Awaiting Approval	DSI Approval For Revised feasibility	Approval Letter

[6] The Project Introductory File (PIF) in the original language is presented to the validating DOE.
[7] The EIA Exemption certificate is presented to the validating DOE and can be found as Annex -3.
[8] The plans of the fish ladder are provided to the validated
[9] http://www2.dsi.gov.tr/skatablo/Tablo2.htm (please search for Koyulhisar the application date is indicated on the column before last column.)

The Koyulhisar HPP is to be constructed at the downstream of two state owned dams, namely: Kılıçkaya Dam (124 MW) and Çamlıgöze Dam (33MW)[10] that were constructed for irrigation and energy production purposes around 90s. The project will be collecting the water that leaves the spillway of Çamlıgöze Dam. The water will be collected and kept up to 5 hours behind the spill weir regulator of the Koyulhisar HPP. The water will then be transferred to a set of open canals and tunnels that will bring the water to a head pond from which it will be loaded to the penstock that will bring pass the water to the power house where it will reach the 3 vertical axis Francis turbines with 21 MW capacity each. The electricity will be produced by the two of these three turbines as one of the turbines is a stand-by unit. The spill weir regulator will be located at an altitude of 724m and the tail water of Koyulhisar will be at an altitude of 623 m. This will bring a head difference of approximately 101 m.

How the project activity will be operating is shown schematically below in Figure 1:

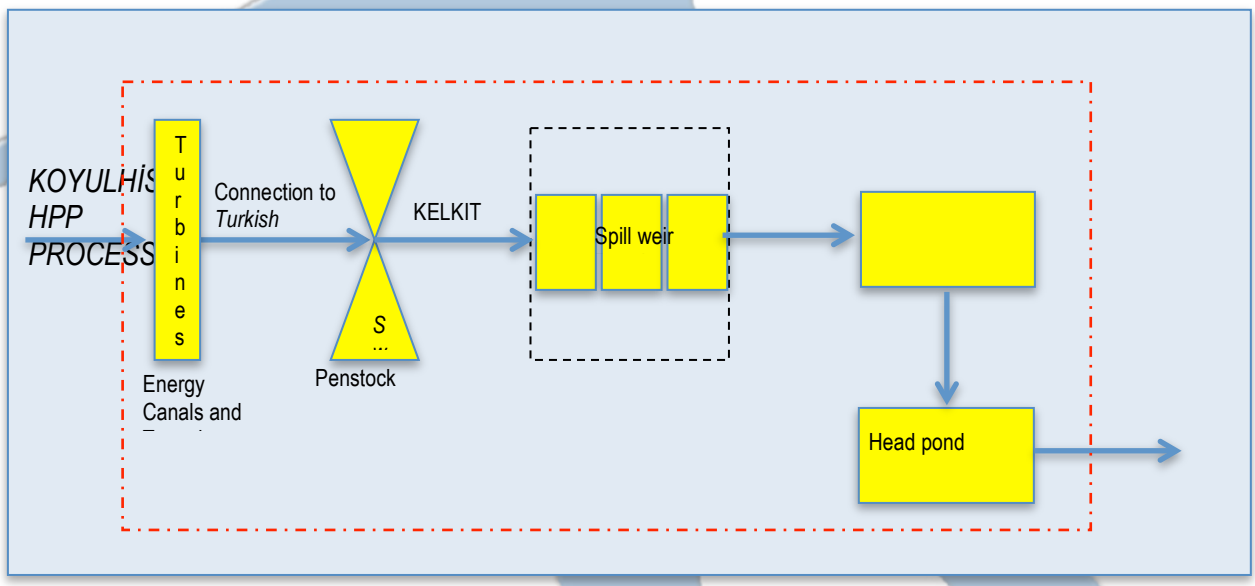

Figure 1: Flow chart showing the basic operational principles of the project activity.

- Location of project

The project is located at the Central Anatolian geographical region of Turkey at the Sivas Province. The coordinates of the power house is as follows and as indicated on the location Map below (Figure 2):

Coordinates of the Power House:
Latitude: 40°16”13,48’ North
Longitude: 37°50”55,58’ East

[10] http://www2.dsi.gov.tr/bolge/dsi19/sivas.htm#kilickaya

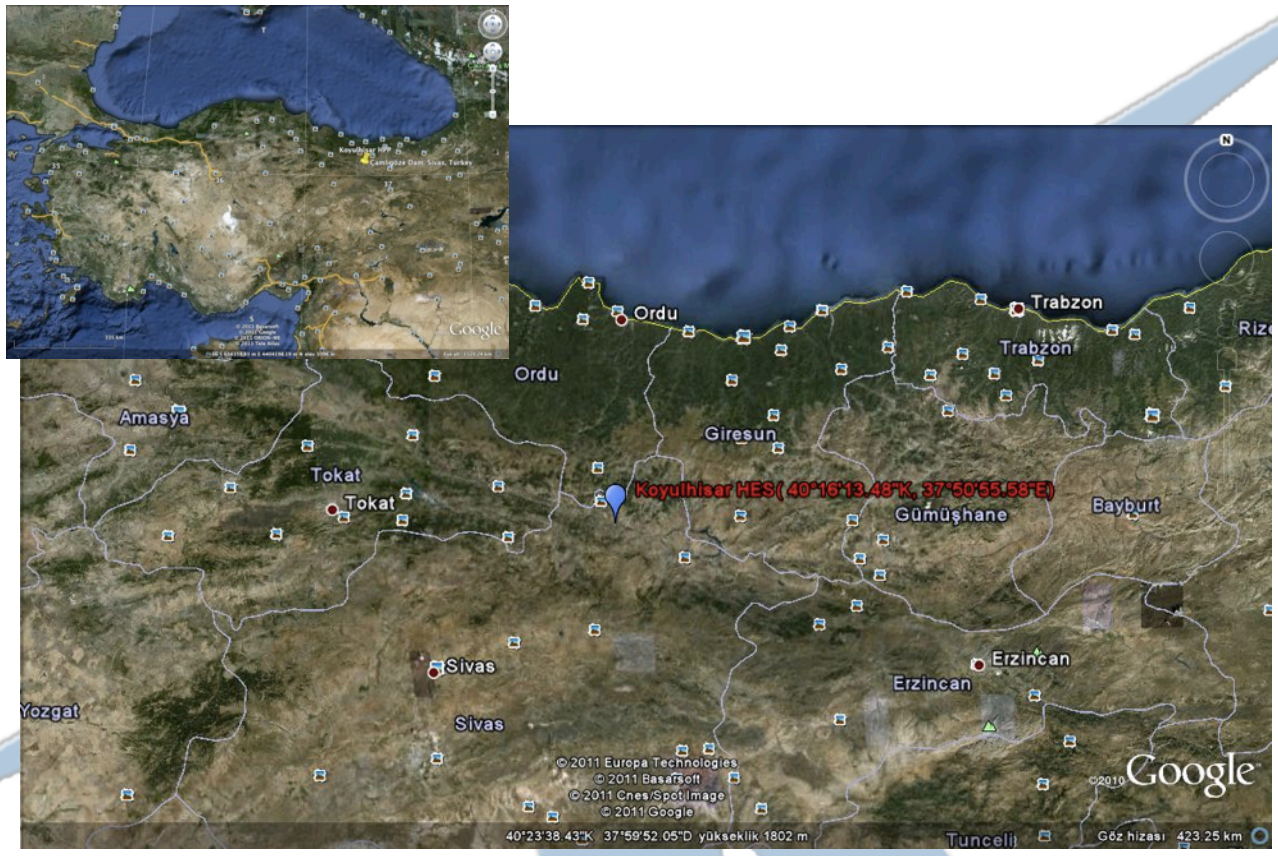

Figure 2: Google Earth Satellite imagery showing the location of the project area. Project is indicated

- *General characterization of project:*

  Koyulhisar HPP, will be on Kelkit Stream, which is a branch of the Yeşilırmak River. The catchment area of the lower Kelkit stream covers an area of about 9,914 km^2.

  The upstream Kılıçkaya and Çamlıgöze dams are operating as peak power plants with a maximum flow rate of 160 m^3/s. Based on this situation the conveyor canals of the project are designed for a flow rate of 84 m^3/s and the spill weir regulator is designed and placed upstream at a point where the water that can not be transferred can be held for maximum 5 hours time interval. The water will enter the regulator approximately at an elevation level of 724.00 m and the Koyulhisar HPP will be utilizing approximately (gross) 101 m of potential energy difference to produce electricity.

  Koyulhisar HPP with 63 MW installed capacity, will be connecting to the Turkish National Power Grid via one of Transformer Substations by 80 km long 154 kV transmission line, at the Köklüce HPP. As the project will be operational, a reliable, continuous, independent from imported fossil fuels, and an uninterrupted high quality power at 154 kV voltage level will be supplied to consumers in Turkey. Thus, the implementation of the project will positively affect both Turkey's and the region's economy.

The project will involve collecting of water, at the 724m level, by the help of a regulator and a water intake body. After that the water will be kept at the settling tanks and will pass to a set of open canals and tunnels that will be carrying the water to the head pond from which it will enter into the penstock and will be transferred to three turbine units, with 21 MW capacity each. The three turbines will be housed within the Hydroelectricity Power Plant (HPP) building. The water that will hit these three turbines, will then leave the turbines via the tail water canal and a spillway which is going to be located at a level of 623 m.

The following are the facilities to be constructed:

- Koyulhisar spill weir regulator, (equipped with a fish ladder) to be constructed at approximately 724 m elevation level
- Water intake body and the settling tank
- Conveyor canals and tunnels
- Head Pond
- Penstock
- Hydroelectricity Power Plant building
- Tail water canal and spillway
- The switch gear area and the transformer
- 80 km 154 kV transmission line

General technical characteristics of Koyulhisar HPP are given in Table 2.

Table 2 : General technical characteristics of Koyulhisar HPP

General Characteristics	
Water Source	Kelkit Stream
Drainage Area	9,914 km^2
Average Annual Natural Flow	1634,32 hm^3
Flood Flow Rates:	
Q_{10}	631,28 m^3/s
Q_{25}	695,10 m^3/s
Q_{100}	800,00 m^3/s
F_{lood}	3000 m^3/s
Characteristics of the Spill Weir Regulator	
Place	The Regulator will be located on the Kelkit Stream, at the close proximity of the Koyulhisar Town of Sivas Province.
Purpose	According to water flow direction, collecting water and diverting the Kelkit Stream's water to water intake structure.
Thalweg elevation	712.50 m
Crest elevation	724.00 m
Type	Uncontrolled - Roller Compacted Concrete Body
Height from the Thalweg elevation	11.50 m
Normative water level	724 m
Environmental Elevation	724 m
Operation Elevation	722.40 m
Maximum (Catastrophic) elevation	727 m
Q_{100} Water level (to be disposed of via spill weir)	724 m
Full Body Crest Length	195 m
Spill weir Capacity	2,200 m^3/s
Spillway Characteristics	
Type	With Radial Gates
Number of Gates	4
Gate Size	6.50 m to 7.70 m
Thalweg elevation	712.50 m
Crest elevation	718.00 m
Threshold elevation	5.50 m
Top elevation of the structure	727.70 m
Spillway capacity of the structure	800m^3/s
Gravel pass base level	712.50 m
Size of the gravel pass	2.50 m X 3.00 m
Water Intake Body	
Type	Frontal intake
Gate number	6
Gate Size	4.50 m X 3.00 m
Project Flow Rate	84m^3/s
Top elevation of the structure	727.70 m
Foundation top elevation	718.70 m

Water intake elevation	722.40 m
Sedimentation Pool	
Length	60.00 m
Width	5.00 m
Height	4.5 m
Water Level	4.0
Number of Sections	6
Grain size	0.3 mm
Conveying Canal -1(Trapezoid Canal)	
Type	Concrete coated trapezoid
Project flow rate	84 m^3/s
Base width	7.20 m
Freeboard	0.40 m
Slope gradient	1/1.50 (horizontal:1/vertical:1.50)
Coating thickness	15 cm
Hydraulic gradient	0.0003
Cumulative length	12,146.78 m
Conveying Canal -2 (Half Walled Canal)	
Type	Concrete coated half walled canal
Project flow rate	84 m^3/s
Base width	9.78 m
Freeboard	0.40 m
Slope gradient	1/1.50 (horizontal:1/vertical:1.50)
Coating thickness	15 cm (for the trapezoidal part)
Hydraulic gradient	0.0003
Wall thickness	60 cm (for the walled part)
Cumulative length	4,699.32 m
Conveying Canal -3 (Vertical Walled)	
Type	Rectangular cross sectioned, concrete walled canal
Project flow rate	84 m^3/s
Base width	12.36 m
Wall thickness	60 cm
Freeboard	50 cm
Hydraulic gradient	0.0003
Cumulative length	7,190.23 m
Tunnel	
Type	Concrete, Horseshoe cross sectioned unpressurized
Project flow rate	84 m^3/s
Wall thickness	50 cm
Internal radius	6.40 m
Total Length	2,884.125 m
Gradient	0.0007
Portico (Heading)	
Type	Concrete, Horseshoe cross sectioned unpressurized
Project flow rate	84 m^3/s
Wall thickness	50 cm
Internal radius	6.40 m
Total Length	2,001.255 m
Gradient	0.0007
SIPHON	
Type	Submerged to soil, radial sectioned concrete structure
Project flow rate	84 m^3/s

Wall thickness	50 cm
Internal radius	6.10 m
Total Length	652,52 m
Head Pond	
Type	Rectangular sectioned concrete canal
Entrance canal base elevation	705.51 m
Pool base elevation	696.35 m
Pool Length	85.74 m
Pool Width	13.00 m
Normative water level	709.061 m
Spill way crest elevation	709.16 m
Water Intake Structure (to the power house)	
Structure installation top elevation	710.60 m
Maximum water elevation	709.061 m
Water intake elevation (Q_D=84 m^3/s)	708.804 m
Water intake elevation (Q_D=56 m^3/s)	708.044 m
Water intake elevation (Q_D=28 m^3/s)	706.894
Number of grates	2 items
Grate base level	697.85 m
Water intake body base level	697.85 m
Total width	16 m
Total Length	20.55 m
Penstock	
Type	Radial sectioned steel pipe
Radius	5.25 to 3.20 m
Total Length	266.20 m (with gradually tightening at the last 68.50 m that is designed to be located in concrete housing.
Powerhouse	
Gross fall	101 m
Net fall (head difference)	86 m
Length	60,50 m
Width	17,20 m
Total Installed Capacity	63 MW
Project Flow Rate	84 m^3/s
Annual Energy Production: (Estimates from the Feasibility Report)	
Primer Energy	262.365 GWh/year
Secondary Energy	74,365 GWh/year
Total Energy	337,341 GWh/year
Turbines	
Number of Turbines	3
Type	Vertical Axis Francis
Head difference	86 m
Unit Flow Rate	28.00 m^3/s
Turbine capacity	21,750 kW

The project will be using Vertical Francis type turbines. The Francis type of turbine is a reaction type of turbine. In case of reaction turbines, the water approaches a set of curved blades mounted on a shaft and glides over them thereby changing direction and so imparting pressure on the blades due to centrifugal force, i.e. the force experienced by a passenger in a car when turning very fast. The water enters the blades nearly at a tangent and for the

highest efficiency leaves the blades radially and at a reduced velocity. Francis turbines was invented by an English engineer J.B.Francis (1815 – 1892) water is delivered into a volute casing which completely surrounds the runner and is under pressure as well as velocity. The water is guided through both fixed and adjustable veins in the casing and glides onto the runner blades at an angle. The water then turns in the runner to exit parallel with the axis of rotation. Load changes are catered for by the adjustable vanes. Sudden load changes are dealt with by a bypass valve or a surge tank. In a Francis turbine the entire wheel assembly is immersed in water and surrounded by a pressure casing. In a Francis turbine the pressure casing is spiral shaped and is tapered to distribute water uniformly around the entire perimeter of the runner. It uses guide vanes to ensure that water is fed into the runners at the correct angle. See the below Figure (Figure 3), for a schematic explanation of working principles of a Francis Turbine.

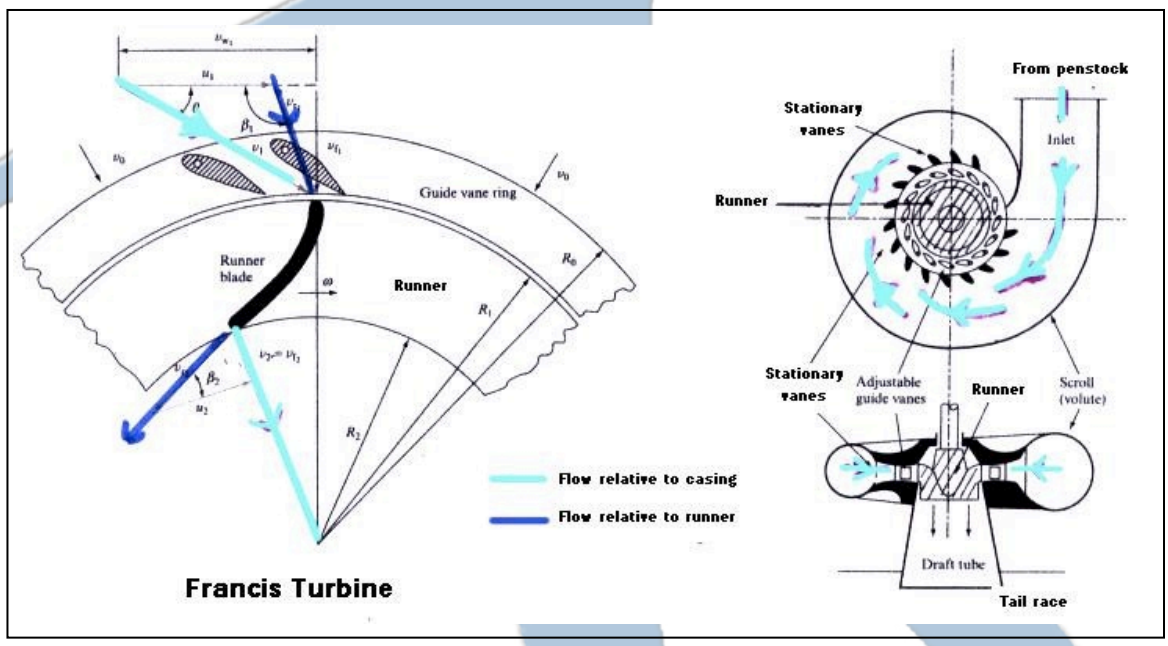

Figure 3: The working principle of a Vertical Axis Francis type turbine.

The project owner is granted a production license for 40 years[11]. The economic life time of a hydro power plant investment is assumed to be about 50 years, based on the experts' committee report[12] on energy under the 8th development plan published by the State planning organization. Even if the facility can last for 50 years the major equipment needs to be replaced in every 20 years[13]. As a result the project life time is estimated to be about **20 years**.

The project is expected to produce 220,000 MWh of electricity per year. The annual 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.

[11]

[12] http://ekutup.dpt.gov.tr/enerji/oik585.pdf page 4.25 (Last visited on 3/3/2011)

[13] http://ekutup.dpt.gov.tr/enerji/oik585.pdf page 4.26 (Last visited on 3/3/2011)

2.2. Activities and methodology used for reduction/capture of GHGs

The Emission Reductions that result from the project activity are determined using the following UNFFCC methodology and its related tools are utilised:

Approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources." Version 12.1.0.

The Approved Methodology refers to the following tools:

"Tool for the demonstration and assessment of additionality" (Version 05.2.1)

"Tool to calculate the emission factor for an electricity system". (Version 02.2.1)

"Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (Version 02)

ACM0002 methodology defines the baseline scenario for the proposed project as:

"Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations."

The choice of methodology ACM0002, Version 12.1.0, is justified as the project activity meets the following applicability criteria:

- The Koyulhisar HPP project activity is the Installation of a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant);

- The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section of the Methodology ACM0002/Version 12.1.0, is greater than 4 W/m^2.

The power density of the project activity is 52 W/m^2 which is greater than 4 W/m^2 as shown in the following calculation:

Project Activity	Installed Capacity	/	Reservoir Area[14]	=	Power Density
Koyulhisar HPP	63,000,000 W	/	1,204,040 m^2	=	52 W/m^2

Table 3 exhibits the gases included in the project boundary. CO_2 emission is included in the baseline but the project activity does not emit any of the gases listed, in Table 3.

Table 3: ***Gases included in the project boundary***

Source	Gas	Included?	Justification/Explanation

[14] A map showing the spatial extent of the reservoir is provided to the validating DOE.

Baseline	Electricity generation in baseline (Turkey's Grid)	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	N.A.	N.A.
Project	Emission from the reservoir of the proposed project	CO_2	No	Minor emission source
		CH_4	No	Minor emission source (Power density greater than 10W/m2)
		N_2O	No	Minor emission source
		Other	N.A.	N.A.
	Auxiliary Diesel Generator [15]	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	N.A.	N.A.

The project boundary includes net electricity generated and supplied to the Turkish national grid. The internal consumption and the GHG due to the temporary use and burning of the diesel fuel by the auxiliary power generators.

Since the proposed project activity is going to be connected to the Turkish national grid, the baseline scenario of the proposed project is the supply of the equivalent amount of annual power output by the existing Turkish national grid which is the continued operation of existing power plants and the addition of new sources to meet electricity demand.

Based on ACM002, baseline emissions are equal to power generated by the project activity that is delivered to the Turkish national grid, multiplied by the baseline emissions factor. This baseline emissions factor (EFy) is calculated as the Combined Margin (CM), of which the breakdown and detailed description is given in chapter 3 of the validated VCS-PD.

Combined Margin Emission factor of the project is calculated to be 0.52826 tCO_{2e}/MWh.

A summary of the estimated GHG removals by the project activity is given below (Table 4):

[15] CO_2 emissions from combustion of fossil fuels for electricity generation

Table 4: Estimated Amount of VCUs over the first Crediting Period

Years	Estimated baseline emissions or removals (tCO_{2e})	Estimated project emissions or removals (tCO_{2e})	Estimated leakage emissions (tCO_{2e})	Estimated net GHG emission reductions or removals (tCO_{2e})
2009 (16 November to 31 December)	0	14,090	0	14,090
2010	0	116.217	0	116.217
2011	0	116,217	0	116,217
2012	0	116,217	0	116,217
2013	0	116,217	0	116,217
2014	0	116,217	0	116,217
2015	0	116,217	0	116,217
2016	0	116,217	0	116,217
2017	0	116,217	0	116,217
2018	0	116,217	0	116,217
2019 (1 January to 16 November)	0	102,208	0	102,208
Total	0	1.162.170	0	1,162,170

3. Method of applying SOCIALCARBON Methodology

3.1. Elements considered in the application of the SOCIALCARBON Method for the sector

For the preparation of this report the "Approved Indicators for Hydroelectric Power Plants Version 4.1, June 2011" is being used, with the exception of indicator "APP (Permanent Protected Areas) and Legal Reservation" under the Biodiversity resource. This indicator was excluded, because as can be seen from the location map and as was also indicated in the validated VCS-PD, there is no PPAs around the project vicinity and therefore this indicator is not applicable. Also the indicator related to technology transfer is excluded as there is no technology transfer aspect of the project. Therefore the indicators used for this project are referred to as "the *Hydroelectric Power Plants Version 4.1* Indicators Adapted for the Koyulhisar HEPP Project"

3.2. Social, economic and environmental impacts of the emission reductions project

According to the rules and regulations at the time of licence application for electricity production the project was given a certificate of Exemption for the EIA process, by the Sivas Provincial Directorate of Environment and Forestry. Because, at the time of licence application the Hydro Power Plants that had installed capacity lower than 50 MW[16] was considered to be out of scope according to EIA regulation that was active during the period of application. This letter can be seen in Annex 3 of the validated VCS-PD.

Although there was no significant environmental impacts determined, the following is the summary of the impacts and the mitigation actions outlined in the Project Presentation Report submitted to the authorities:

Air Quality: Necessary precautions, such as watering roads, careful loading and unloading and covering the top of loaded trucks by tarpaulin; will be taken in order to minimize the dust formed during excavation.

Water & Wastewater Management: Water for domestic use will be supplied by tankers to the site and wastewater will be collected in septic tanks which will be emptied regularly. The wastewater will be discharged in accordance with Water Pollution Control Regulations.

The waste oil: Any kind of waste oil that may result during construction or operation stages, will be collected in impermeable containers and transferred to recycling centres in accordance with Hazardous Waste Control Regulations and Waste Oil Control Regulations.

Solid Waste: Solid waste will be collected and recyclables will be separated to be sent to recycling centres. The rest will be disposed to the nearest landfill site in coordination with Koyulhisar Municipality.

Biodiversity: The region is defined to include some of species under conservation by international conventions. Necessary precautions will be taken if any seen on the site. Also a

[16] The Project is first designed to be 42 MW, and the licence upgrade and a revised feasibility to add a third unit is implemented later on.

fish passage/ladder will be constructed to ease up and down stream movements of the fish living in Kelkit Stream.

The project description also summarizes the rules and regulations that the project has to comply with. These can be seen at Annex-1, to the validated VCS-PD.

3.3. Method used for obtaining information

The data for the above mentioned approved indicators is collected by:

1. *semi-structured interviews with key stakeholders on the project site,*
2. *based on the questionnaires that are sent to the project owner and each indicator is discussed with the project owner, and*
3. *based on the documents related to the project activity such as the validated VCS-PD and the validation report.*

3.4. Actors involved

The stakeholders of the project are determined based on their relation to either the project itself or their relation to the location of the project. The following table provides a list of the stakeholders involved in the diagnostics, with their job/title and an explanation of why they were chosen to be a stakeholder.

Name	Contact Info	Job/Title	Reason Involved
İhsan Şeker	iseker@bereketenerji.com.tr	Plant Manager	Responsible from the operation of the power plant
Adnan Alemdar		Member of the district council of Aşağı Alemdar	Local stakeholder
Enver Kılıç		Head of the Kalebaşı village	Local stakeholder
Erhan Şahin		Electricity technician	Koyulhisar HEPP Staff
Engin Can		Electricity technician	Koyulhisar HEPP Staff
Serkan Tuncer		Electricity technician	Koyulhisar HEPP Staff
Ahmet Veli Aygül	+90346 311 43 18	DSI Officer/Civil technician	Represents DSI major party that holds the water utilization rights.
Mehmet Yılmaz	+90346 341 30 04	Principal clerk at the district governorship of Koyulhisar	To collect information about the social resource
Kazım Karadeniz	+90346 3413011	Forestry Operations	To collect information about

		manager at Koyulhisar	the Natural resources and biodiversity
Hüseyin Özer	+90346 3413011	Forestry Operations manager at Koyulhisar	To collect information about the Natural resources and biodiversity
Mesut Kayalı	+90346 3413011	Forestry Operations manager at Koyulhisar	To collect information about the Natural resources and biodiversity
Özgün Gül	ogul@bereketenerji.com.tr	Forestry and Environmental Management Coordinator	
Emre Özer	eozer@bereketenerji.com.tr	Deputy CFO of Bereket Energy	Information about Financial Performance of the Project

4. Results

The results are presented by using the names of each indicator as they are demonstrated in the original "hydro indicators version 4.1". The name, description of each indicator is given, the comments on present situation, the score of the indicator determined based on the present situation and the future target for the considered indication is also provided. The targets are tried to be kept to the most realistic level, in order not to increase expectation for the future. The achievability of some of these targets depends on the availability of the human and financial resources, whereas some of the targets are relatively easier to achieve since these are to improve the present situation by implementing a recording and reporting system.

4.1. Social Resources

Name of Indicator	***Population Displacement***
Description of Indicator	Evaluates if the project requires people, activities or services to be displaced due to the implementation of the project, as well as the measures adopted during the planning and implementation stages, in order to minimize negative impacts or maximize positive impacts.
Comments on present situation	The project didn't cause people to leave their houses, but only at some places people lost some part of their land where they were using for crop or fruit growing, but these people are compensated. There was a need to extend the borders of the expropriation , along the canals, these lands are also undergoing the official expropriation process, with which the land owners are compensated fairly enough.
Score of the Indice	6-There is no need to displace families or other activities
Future Targets	The project owner will do its best to fairly compensate effected people at the secondary expropriation process.

Name of Indicator	***Communication With Stake Holders***
Description of Indicator	Evaluates the process for contacting stakeholders in the planning, implementation and operation stages.
Comments on present situation	The project owner is open to dialogue with stakeholders. They communicate regularly with the village heads, and the district governorship and welcome the visitors. A bar controls access to the power plant. This is to make sure that the visitors are met at the entrance and necessary precautions for their safety are taken. In addition to this the mobile numbers of the technical staff, including the construction site manager is made available to the village heads and to the local authorities. In summary they have an unstructured but warm relations with the stakeholders.
Score of the Indice	3- During the planning and operation stages, the entrepreneur has communication with local stakeholders.
Future Targets	The project owner is communicating with the stakeholders on an irregular basis. For the following years they target to establish a systematic information forum, where the communication of information will be more systematical.

Name of Indicator	***Acceptance***
Description of Indicator	Evaluates the level of support or acceptance from the

	neighbouring population in regard to the project construction or management of the reservoir.
Comments on present situation	In general the public acceptance of the project is good. However, there were some doubts from the local stakeholders since they were worried that the project would effect the quantity of irrigation water, and some of the inhabitants that have houses located at levels below the canal that conveys water from reservoir to powerhouse have concerns about a failure that may result to flooding of their houses. These concerns have legally and scientifically addressed by the project management.
Score of the Indice	4-Support from local stakeholders, but some opposition still exists
Future Targets	The project owner will improve communication with local stakeholders to show them that based on the water usage agreement the quantity of water they use will not be reduced. And they will scientifically investigate the risks for the neighborhoods below the conveying canal.

Name of Indicator	***Social Demands***
Description of Indicator	Social Demands may be understood as institutional or civil society interests: demands made by institutions, agencies, NGOs, municipalities or other institutions which aim to improve the human development and/or the environment near the project. This item evaluates which social demands the entrepreneur addresses.
Comments on present situation	The social demands reach to the construction site manager via the village or district heads or the members of the city council. In general the village heads request construction materials, the site manager supplies these needs to a certain extend. Also the village and district heads confirmed that the project owner recovered places that they needed to destroy during the construction to a better state than the original.
Score of the Indices	4-The entrepreneur takes actions that surpass compulsory activities.
Future Targets	The entrepreneur is developing a policy, that will cover the rules and other criteria to address voluntary social actions. Within one year the project owner is going to prepare an internal code of conduct that will outline these rules.

Name of Indicator	***Social Programs***
Description of Indicator	Evaluates the quality and results of additional social programs, such as: - Social and Environmental Communications Program - Community development / income generation - Ethnic integration (Not Applicable in this case) - Other social areas (women's involvement in family income generation)
Comments on present situation	The entrepreneur gives great importance to such issues; and therefore they have planted caper bushes to help control slope stability and left the fruits to the local stakeholders who may collect and sell them for extra income, however the shrubs are too young that their impact is not yet possible to have any significance.
Score of the Indice	4- Some programs were held successfully, but with limited

	impacts on the beneficiaries were observed.
Future Targets	The Entrepreneur is going to be identifying such activities together with the local stakeholders. They will assess the situation taking into account socio economical characteristics of the area.

Name of Indicator	***Social Benefits***
Description of Indicator	Evaluates the additional benefits to local stakeholders, when these benefits are measurable or evident. These benefits may include: • Improvements in health system (new installations, enhanced water and electricity systems, support for health programs, and others) • Additional economic activities (industry, commerce, and others) • Improvements in the infrastructure (roads, energy provision, leisure spaces, and others)
Comments on present situation	The project owner, supplied construction materials to the neighboring villages and neighboring districts and they have helped the paving of the road in Kalebaşı village. They also send earth movers when the town or village needs them.
Score of the Indice	4- Project delivers benefits in more than one of the major areas to a limited number of local stakeholders.
Future Targets	The project owner will identify the social needs together with the stakeholders and local authorities and will determine actions that will benefit more people.

The rate of the critical indicators: 0 %
The rate of satisfactory indicators: 83 %
The rate of sustainable indicators: 17 %
The total of the 6 social indicators is: 25
The average score for the social resource is:4,17

4.2. Human Resource

Name of Indicator	***Human Resource Availability Capacity Building Initiatives***
Description of Indicator	Level of experience and capacity of people involved in the operation and maintenance of the project.
Comments on present situation	The employee is qualified for the job and they are receiving regular trainings to keep them up to date.
Score of the Indice	5- Employees of the project have experience and have participated in training or courses for intervals of one year or less.
Future Targets	The project owner will continue in house trainings to maintain the high qualification level of their employee.

Name of Indicator	***Health & Safety***
Description of Indicator	Evaluates if a comprehensive employee safety program is in place and its effectiveness can be demonstrated by the absence of life-threatening accidents
Comments on present situation	The project has its Occupational health and safety system in place. They have an occupational H&S booklet. Yet, there were

	two people that lost consciousness during a clean up duty at the tunnel.
Score of the Indice	2-Occurrence of accidents (nonlife threatening) related to the project in the last year.
Future Targets	The project owner will improve their H&S program in order not to have any accidents.

Name of Indicator	***Benefits***
Description of Indicator	***Evaluates existence of additional benefits to workers regarding the following:*** *- Education (support for studies)* *- Health (medical and hospital assistance)* *- Retirement assistance* *- Other (leisure, sports, and meal vouchers, among others).* *In cases where the services for implementation, operation and maintenance are outsourced, the indicator evaluates the outsourced employees also.*
Comments on present situation	The project employee are provided with free lunch and dinner depending on their shift, with free transfer to their house and some bonus. In addition to this they are offered trainings to improve their capacity. Therefore, they benefit in education and other category. All employees benefit in two of the areas.
Score of the Indice	4- Benefits are offered to all employees involved in the project in two of the areas.
Future Targets	The project owner will measure employee satisfaction.

Name of Indicator	***Involvement of Employees in the Project***
Description of Indicator	Evaluates internal communication process of the entrepreneur in relation to project emissions reductions.
Comments on present situation	The project management is aware of the carbon project but the employee at the project site have no idea about the climate change and carbon project related concepts.
Score of the Indice	2. Only management and employees directly involved in the carbon project are aware.
Future Targets	The project management will include in house trainings addressing climate change and the contribution of renewable energy projects to tackle the climate change issue. This will ensure the involvement of employees to the carbon project

The rate of the critical indicators: 50 %
The rate of satisfactory indicators: 25 %
The rate of sustainable indicators: 25 %
The total of the 4 Human Resources Related indicators is: 13
The average score for the Human Resource is: 3,25

4.3. Financial Resource

Name of Indicator	***Economic Performance***
Description of Indicator	Evaluates if the economic performance of the project met the expectations of the shareholders and directors regarding, for example, goals for energy generation, stated periods for executing jobs, and operational and maintenance costs. It evaluates if the goals were met or if they did not meet the expectations for the given period.
Comments on present situation	The feasibility reports were suggesting higher electricity production numbers for the project, but due to the geological setting of the project area, the construction costs of the canals realized higher than expected and the energy productions were lower than estimated in the initial feasibility reports. However, the project owner claims that they are satisfied as they have lowered their expectations.
Score of the Indice	4- Adequate Performance. Goals and expectations established with shareholders have been accomplished.
Future Targets	To be able to improve the efficiency of the project maximum care will be spent for the maintenance of the canals.

Name of Indicator	***Market***
Description of Indicator	Evaluates eligibility of credits to CDM Market or to other voluntary markets as well as their attractiveness to potential buyers.
Comments on present situation	The carbon asset of the project is developed considering the CDM rules and the project is validated to the Voluntary Carbon Standard and can only reach to the voluntary markets.
Score of the Indice	3. Project activities are eligible for the voluntary market.
Future Targets	The project owner is hoping to have an opportunity to bring the project into compliance market. However, this depends mainly on the change of the status of Turkey. So the project owner will actively contribute to the lobbying activities to support improvement of Turkey's status in global carbon markets.

Name of Indicator	***Sale of Credits***
Description of Indicator	Evaluates uncertainties regarding the value of commercialized credits generated by the project
Comments on present situation	The project owner started to probe potential buyers by the help of their carbon finance consultant.
Score of the Indice	2- Carbon credits are being negotiated, with little uncertainty regarding its commercialization.
Future Targets	The project owner is targeting to differentiate the project activity form the similar projects in the market and is targeting to increase the value of the VCUs.

The rate of the critical indicators: 67 %
The rate of satisfactory indicators: 33 %
The rate of sustainable indicators: 0 %
The total of the 3 financial indicators is: 9
The average score for the financial resource is: 3,00

4.4. Natural Resource

Name of Indicator	***Sustainability Principles***
Description of Indicator	Evaluates the existence of specific policies and programs geared toward project sustainability and the applicability of the principles, values and objectives regarding sustainability.
Comments on present situation	The sustainability concept and principles are appreciated and practiced as environmental protection, improved working environments, in-house trainings and improving the quality of life in the vicinity of the project area. These are applied as common sense and as part of the company culture.
Score of the Indice	3. Incorporation of sustainability in the values, strategy and principles of the project owner.
Future Targets	The project owner will write an internal code of conduct to incorporate sustainability principles and will set sustainability goals and monitor achievement towards these goals.

Name of Indicator	***Environmental Management***
Description of Indicator	Evaluates environmental management procedures adopted by the project, including organization, coordination of actions, and documentation of impacts identification, monitoring, and periodic emissions reporting, as well as existence of regular certification.
Comments on present situation	The project is implementing an environmental management system based on the best practice approach. The management system is not written anywhere and it have some gaps and needs to be adjusted. In addition to this the reporting system is missing.
Score of the Indice	2. Environmental management system does not exist
Future Targets	The project owner will improve its environmental management system by outlining a written management system and by making annual performance checks.

Name of Indicator	***Environmental Legislation***
Description of Indicator	Evaluates accordance of the project with environmental laws and norms, including agreements with public authorities, such as environmental licenses, requested authorizations for installation, etc.
Comments on present situation	The project complies with the Turkish environmental regulations and rules. All the environmental permits and licenses are valid and up to date.
Score of the Indice	5. Environmental licenses routinely issued; determined obligations are fulfilled.
Future Targets	The project owner will integrate the systematic control of the licensing process to their environmental management system.

Name of Indicator	***Legal Procedures***
Description of Indicator	Evaluates if the project was involved with any lawsuit or administrative sanctions executed by public organs, person or people, aiming the environment and human health protection or repair.

Comments on present situation	In the past one year there was no such complaints nor there were any judicial actions related to the project. However some of the citizens that perceived the canal structure to be risky have applied to the governors office and the governorship set up an investigation committee and issued a warning to the project owner to make sure that project owner makes sure that the canal system is safe and is not posing any risks to nearby settlements.
Score of the Indice	5. The project: - Suffered public civil action or judicial action or received a warning in the last year due to potential risk or effective damage to human health or the environment- Was not convicted.
Future Targets	The project will keep carefully obeying the rules and regulations to avoid any public lawsuit. Also they will do their best to clarify the situation related to the safety aof the of the canals.

Name of Indicator	***Environmental Impacts***
Description of Indicator	*Evaluates magnitude of environmental impacts of the project, existence of environmental impact statements/studies, and maintenance of environmental evaluation procedures.*
Comments on present situation	The project has submitted a project description file to the Sivas Province General Directorate of MoEF. The file is studied and the project received an EIA exemption certificate.
Score of the Indice	5. Studies show insignificant environmental impact.
Future Targets	The project owner will ensure to keep the impacts at a minimal level

Name of Indicator	***Environmental Risk Management***
Description of Indicator	Evaluates the definition, implementation and maintenance of procedures relevant to potential emergencies and accidents related to the project, as well as those relevant to the preparation of answers for such situations, in case of emergency.
Comments on present situation	The company culture of the project owner has the cincere perception of the environmental risk management concept. Therefore although we can say that the project has its environmental risk management plans, these are not in the written form. Yet, there were no environmental risk or emergency situations during the specified validation period.
Score of the Indice	4. There were no environmental emergency situations during the specified period.
Future Targets	The project owner is going to iimprove their Environmental Risk Management system to include Periodic evaluations of environmental risks and they are going to record, document and monitor encountered environmental risks and emergencies. In the future, they are also planning to conduct internal evaluations.

Name of Indicator	***Reservoir and marginal areas management***

Description of Indicator	Measures the effectiveness of the Reservoir and marginal areas management, considering: existence of invasions in the marginal and adjacent areas and mitigation measures adopted b) existence of plan or program for use of the reservoir and surrounding areas, considering its coverage and efficacy for assurance of the planned uses.
Comments on present situation	There is no intrusion to the project area, .
Score of the Indice	3. There are no invasions or inadequate uses of project owner' areas around the reservoir.
Future Targets	The project owner is developing a plan for the management of the reservoir and marginal areas.

Name of Indicator	***Erosion, landslides, silting and floods***
Description of Indicator	Evaluate the current stage of erosion and silting of the reservoir and if the operations are a major cause of the problem and the existence of programs to manage these risks, such as monitoring, and erosive processes control (ex: protection and reforestation programs for reservoir protection zone).
Comments on present situation	The project is located within North Anatolian Fault Zone (NAF) where the rocks and formations are not stable and are prone to land slides and mass flows. Major land slide and erosion related problems occur along the canal that conveys water to the powerhouse. The area surrounding the reservoir is also prone to erosion, but both along the canals and around the reservoir area, the project owner has already started measures such as three plantations.
Score of the Indice	3-Operations cause major ongoing sedimentation or erosion problems in Reservoir or downstream areas. Corrective actions demonstrate efficiency during its execution.
Future Targets	Programs to avoid mass flows will be improved and new ones will be developed in cooperation with the local inhabitants, forestry department and DSI.

Name of Indicator	***Water Resources***
Description of Indicator	Evaluate the current stage of water quality of the reservoir or downstream water and if the operations are a major cause of the problem and the existence of programs to manage these risks, such as monitoring data and measures of control implemented (ex: sewage treatment station eventually implemented in local communities due to construction of the hydroelectric plant, actions taken for sanitary vigilance, etc).
Comments on present situation	The project has no negative impact on the water quality and quantity. The project increases the oxygen content of the river water at the down stream site that the fish populations are observed to improve at the tail water stream of the project.
Score of the Indice	4. Operations either enhance or cause minimal deterioration to Reservoir or downstream water quality.
Future Targets	The project owner is planning to prepare a program that will determine preventive actions that will protect the water

	quality of the river water. Including basic awareness programs that will inform local inhabitants on how to protect their river.

The rate of the critical indicators: 11 %
The rate of satisfactory indicators: 56 %
The rate of sustainable indicators: 33 %
The total of the 9 natural resource indicators is: 34
The average score for the natural resource is: 3,77

4.5. Biodiversity/Technology Resource

Name of Indicator	***Recovery of Degraded Areas***
Description of Indicator	*Evaluates existence of reforestation projects in marginal areas of the reservoir, procedures for planting, maintenance, control measures and surveillance. It also evaluates extent of actions: limited legal obligations, areas of the company, riparian forest in the incremental basin, and so on.*
Comments on present situation	The project has relatively small footprint compared to power plants with similar capacity. However, there were some areas that were disturbed to construct the canal or other project structures. These areas are being reclaimed and the project management is working to improve the project landscape. In addition to this The project owner is trying to improve the surrounding areas to improve the slope stability and avoid landslides.
Score of the Indice	4. Voluntary recovery of degraded areas but only in areas of project ownership.
Future Targets	The project owner is planning to implement a tree planting campaign together with the local inhabitants of the area, thus improving areas that are outside the project borders.

Name of Indicator	***Biodiversity Conservation***
Description of Indicator	Evaluates actions of biological monitoring developed in surrounding environmental areas and influence of the power plant; assesses specific programs developed for flora and fauna on the banks of the reservoir or in surrounding areas for conservation and research.
Comments on present situation	The project owner is safeguarding the project boundaries and watching for illegal hunters and fishers. This way they are supporting the local wildlife.
Score of the Indice	3-Limited to legal obligation.
Future Targets	The project owner will coordinate with the forestry department and DSI to find ways of supporting local wildlife.

Name of Indicator	***Ichthyofauna***
Description of Indicator	***Evaluates existence of procedures for monitoring the Ichthyofauna, partnerships for research, and management actions (restocking, culture in ponds, net)***
Comments on present situation	The project is supporting the fish life by preventing illegal fishing in the project area. They have an active fish ladder at their spill way and they have observed fish activity in that

	fish passage. Also they planned to construct a fish passage in the body of the weir to help support fish migration.
Score of the Indice	5. The project is implementing a program for preventive actions
Future Targets	The project owner is going to complete the fish passage at the body of the weir and ensure its maintenance and operation.

The rate of the critical indicators: 0%
The rate of satisfactory indicators: 67 %
The rate of sustainable indicators: 33 %
The total of the 3 Biodiversity indicators is: 12
The average score for the biodiversity resource is: 4,00

4.6. Carbon Resource

Name of Indicator	***Additionality***
Description of Indicator	Consists of reduction of greenhouse gas emissions or increase in removal of CO2 beyond what would occur in absence of project activity. This item evaluates tools used for assessing additionality and compliance with national and international standards.
Comments on present situation	The project is validated to the VCS version 2007 standard and implementing CDM Approved tools to demonstrate additionality the project is under VCS version 3.0 Verification.
Score of the Indice	6. The project is considered additional according to criteria stated in the ACM0002 version 10 methodology approved by the CDM Executive Board. The project is developed to the rules of the VCS .
Future Targets	The project is targeting to comply with the VCS rules and will be monitored and verified to be in compliance with CDM approved emission reduction methodology.

Name of Indicator	***Emissions Reductions Calculations & Monitoring***
Description of Indicator	Evaluates methodologies used to calculate emissions and monitor compliance with national and international standards.
Comments on present situation	The projects emission reductions are to be calculated and monitored based on CDM approved Methodology "ACM0002 version10: Grid-connected electricity generation from renewable sources"
Score of the Indice	6. The project has a methodology to calculate emissions reductions and a monitoring plan based on a methodology approved by the CDM Executive Board.
Future Targets	The project owner is targeting to keep complying with the VCS and CDM rules.

Name of Indicator	***Validation & Verification***
Description of Indicator	Evaluates existence of total or partial validation/verification of project by a third party, if third party is accredited by UNFCCC, and compliance procedures for validation/verification with national and international standards.
Comments on present situation	The project is validated by a UNFCCC accredited DOE, and an other UNFCCC accredited DOE is assigned for the verification of the project..
Score of the Indice	6. Validation and Verification are conducted by a Designated Operational Entity according to UNFCCC specifications.
Future Targets	The project owner is targeting to keep complying with the VCS and CDM rules.

Name of Indicator	*Project Performance*
Description of Indicator	Evaluates performance of project, verified by comparison with estimates of emissions reductions under the PDD.
Comments on present situation	Comparing the project performance to the corresponding vintage year estimates provided in the validated VCS-PD we observe that the project underperformed about 38 % for the first months, and performed lightly more than expected (about 3% more) for year 2010, and again underperformed 30 % less than estimated for the first 10 months of year 2011. However comparing the overall performance it is observed that the project performed only about 11 % less than that estimated in the validated PDD.
Score of the Indice	5-Good: 76% to 95% of carbon credits predicted for the period were effectively generated.
Future Targets	For the next monitoring period, the project is targeting to produce at least 95% of the amount of VERs estimated in the validated PDD.

The rate of the critical indicators:0%
The rate of satisfactory indicators: 0%
The rate of sustainable indicators: 100%
The total of the 4 carbon resource indicators is: 23
The average score for the carbon resource is: 5.75

5. Analysis of results

To analyze the situation of the project, it is important to consider what is represented by the score obtained for each of the resources. The indicators are established to express the following relationship between the scores obtained and the situation of the project:

Scores 1 and 2:

Situation: Critical.

Characteristics: existence of irregularities; high socio-environmental risk; significant levels of social and environmental degradation; or situation of extreme hardship, which significantly compromises the quality of life of the population.

Scores 3 and 4:

Situation: Satisfactory.

Characteristics: meets all the legal requirements relating to its activities; surpass them through the adoption of good practices and voluntary actions in some cases; or a quality of life that reaches the minimum acceptable standard, but which requires improvement.

Scores 5 and 6:

Situation: Sustainable.

Characteristics: exceeds its legal obligations and/or common practice in the market, in many cases adopting the best-possible practices for the sector; or communities have reached a sustainable livelihood, with adequate access to material and social goods, are capable of recovering independently from situations of stress, and are not causing the deterioration of basic environmental resources through their activities.

In order to obtain an analysis of the Resources average, an equal distribution is adopted between the decimal intervals from 1 to 6, expressing the following relationship amongst the indexes obtained and the project performance.

Average index obtained for the Resource	Decimal interval	Situation
Interval from 1 to 2,6	1,7	Critical
Interval from 2,7 to 4,3	1,7	Satisfactory
Interval from 4,4 to 6	1,7	Sustainable

5.1. General performance

Based on the above explanation the sustainability performance of the Koyulhisar Hydro Electric Power Plant Project can be summarized as follows (Table 5):

Table 5: Sustainability Performance of Koyulhisar Hydro Electric Power project - Point Zero (2.December 2009-31 October 2011)

Resource	Critical	Satisfactory	Sustainable	Average Score	General Performance
Social	83%	0%	17%	4,17	Satisfactory
Human	50%	25%	25%	3,25	Satisfactory
Financial	33%	67%	0%	3,00	Satisfactory
Natural	11%	56%	33%	3,77	Satisfactory
Biodiversity	0%	67%	33%	4,00	Satisfactory
Carbon	0%	0%	100%	5,75	Sustainable
Overall Assessment	29,63%	35,65%	34,72%	3,99	100,0%

Based on the above table (Table 5) that summarizes the general state of the Koyulhisar HEPP, the project is performing satisfactorily based on the overall assessment. However, to reach the ideal performance the project needs to improve its performance on all the resources. However there are some resources like the financial resource, where the project performance is not only dependent to the project it self but also to the improvements in the global carbon markets. Therefore it is difficult to hope for the project to improve its performance in this area where there are elements that cannot be controlled. But the project is expected to improve its score in time.

The carbon resource of the project is the strongest aspect of the project, as it was developed using UNFCCC approved methodologies and tools and since it was validated by UNFCCC accredited DOE.

The lowest average performance point of the project is related to the financial resource. The project is observed to score at the lower band of the satisfactory level with a score of 3,00. This is as a result of projects position with respect to NAF that increases the project running costs due to the frequent maintenance that needs to be carried out due to the open canal system that is blocked frequently due to landslides.

The biodiversity resource and natural resources are observed to get scores within the satisfactory range, this is due to lack of systematic programs that document the entrepreneur's willingness to protect environment and support biodiversity. Similarly the social resource is just as little away from scoring sustainable due to the lack of social programs that will be identified and put in place in the next years.

5.2. Performance by resource

As explained above the overall performance of the Koyulhisar HEPP is satisfactory, with the best performance, sustainable, for the carbon resource and satisfactory performances for social, human, financial, natural and biodiversity resource.

5.2.1. Performance of Social Resource

To assess the social resource, 6 indicators are evaluated. The average performance regarding the social resource is satisfactory (Average mark 4.17<4.4 and >2.7, indicating satisfactory range). The analysis of this resource in detail shows that the project is accepted by the local stakeholders, with some doubts about the water resource. This acceptance is established as a result of the good communication between the project and the local community, but the communication is not systematic and the effect of this communication is not measured. In addition to the acceptance, an other strength of the project is that it didn't cause displacement of any body or any economic activity.

The studied indicators to assess the social resource have shown that the project owner has surpassed the compulsory actions to satisfy social demands of the community. There are initiatives for the social programs that would improve the quality of life for the immediate vicinity of the project, by creating extra income, but the results are not yet observed. Alternative or additional such programs are planned to be identified and implemented at the project site.

The social resource related indicators obtained marks indicating satisfactory for 83% of the indicators and sustainable for the remaining 17% with an average mark of 4.17 indicating a satisfactory performance.

5.2.2. Performance of Human Resource

To assess the human resource, 4 indicators are evaluated. The average performance of the project regarding the human resources is 3.25, indicating a satisfactory performance. The project gets sustainable marks for the indicator that diagnoses the capacity building initiatives and the benefits for the employee. However, although the project have a satisfactory health and safety system in place, due to the minor accident that happened at the tunnel, the indicator related to health and safety scored critical. However, the working conditions are satisfactory. It is revealed on the site visit that employees were not aware of climate change and the contribution of the project to tackle this challenge. This indicator will be improved in the near future by in-house trainings that will provide information to the employees about the carbon project.

5.2.3. Performance of Financial Resource

To assess the performance of the project against the financial resource, 3 indicators are evaluated. The average performance of the project for this resource is 3.00, although this is the lowest score amongst other resources, this score is still within the satisfactory performance range. The reason for this low score is the lack of certainty in selling the VCUs and the overall state of the reduced carbon prices. As the indicators that scored low are in general independent of the efforts of the project owner, these two indicators are the ones that are most challenging to improve.

5.2.4. Performance of Natural Resource

To asses the performance of the project against the Natural Resource, 9 indicators are evaluated. The average performance of the project scored 3.77, indicating a satisfactory performance. The project showed that it is sustainable for 3 out of the 9 evaluated indicators, because, the project complies to the Turkish regulations and environmental laws,

and proved that it has minimum impact to the environment by a government approved Environmental Impact Assessment exemption certification. However, regarding the other 6 indicators the project scored relatively less because, although the project owners have a decent understanding of the sustainability concepts, they do not have a monitoring system, and performance targets regarding sustainability. Similarly the Environmental Management system and the Risk management and reporting systems need to be improved.

5.2.5. Performance of Biodiversity Resource

To asses the performance of the project against the Biodiversity Resource, 3 indicators are evaluated. The average performance of the project scored 4.00, indicating a satisfactory performance. The project scored 4- a satisfactory performance regarding the recovery of the degraded areas as they are going to be performing tree plantation within the project boundaries. The program scored 5 since it will have a fish passage within the body of the regulator. The project owners are willing to improve their status to be fully sustainable by implementing tree planting campaigns to improve degraded areas outside their jurisdiction and by developing supportive programs that would encourage biodiversity protection in their region.

5.2.6. Performance of Carbon Resource

To asses the performance of the project against the Carbon Resource, 4 indicators are evaluated. The project scored 6, a full score indicating a sustainable performance for the first 3 of these indicators. The reason for this is that the project's carbon assets were developed according to a UNFCCC CDM executive board approved methodology. The additionality, the emission reduction calculations and the validation and verification (under progress) of the project are all performed by UNFCCC accredited DOEs, based on UNFCCC approved methodologies, and tools.

Since the overall project performance is calculated to be 89 % of the amount estimated in the validated VCS PD (Considering the entire monitoring period under assessment), and since this is within 76% to 95% range, which is considered to be a good performance, this indicator scored 5, sustainable. The average score obtained for this resource was 5,75 and the results are within the sustainable range.

5.3. Historic performance and comparative analysis

Since the assessment period between January 1st, 2010 and December 31st, 2011 (both days inclusive), is the first assessment period (Point Zero) based on the Social Carbon Standard criteria. There is no historical performance and comparative analysis is being made.

5.4. The Graphic performance of the project

Based on the above-explained scores, the graphic performance of the Koyulhisar Hydro Electric Power Plant project is as shown in Figure 4.

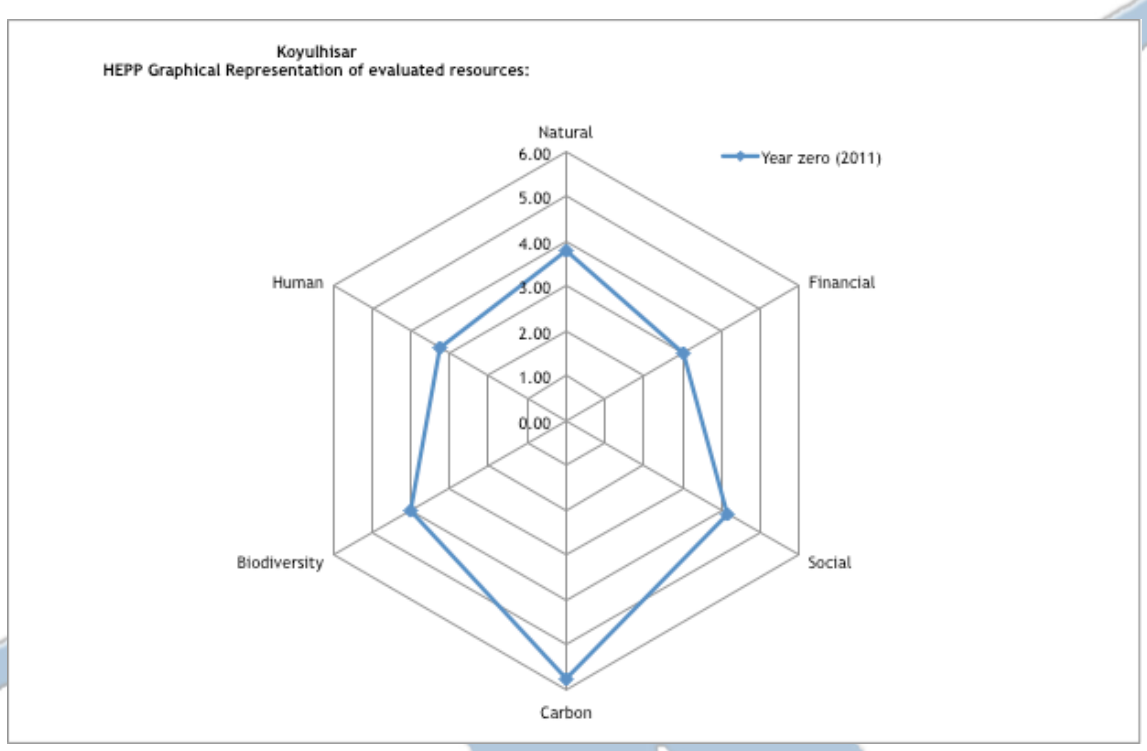

Figure 4: The hexagonal graphic with the results of application of Social Carbon Methodology, for the point zero year of Koyulhisar HEPP project.

6. Perspectives

The following is a compilation of the immediate actions and the future activities that the project owner is intending to implement in order to:

1. Make sure the situation will be improved to sustainable for the critical indicators,
2. Sustain the situation for the indicators that acquired a score ≥ 5.
3. And improve the situation for the satisfactory indicators so that they will become sustainable.

The immediate actions cover mainly the issues the project owner will solve only by implementing some more monitoring and recording procedures, and those that they have already planned and started to do some activities. The others are future perspectives and targets that they are willing to achieve along the continued improvement of the project, but these targets need some more research to understand the resources needed for their realizations.

Below Table 6 provides a list of the immediate and future actions, and the relationship of each action with the selected indicators. The immediate actions are indicated as high priority at the last column and the others as normal priority.

Table 6: Future perspectives, list of the immediate and future actions, and the relationship of each action with the selected indicators

Resource	*Indicator Name*	*Score*	*Target*	*Action*	*Who*	*When*	*Priority*
Social Resource	Population Displacement	6	The project owner will do its best to fairly compensate effected people at the secondary expropriation process.	Make sure that the secondary expropriation process is completed at fair grounds.	Central Management	Continuous action	High
	Communication with stakeholders	3	The project owner is communicating with the stakeholders on an irregular basis. For the following years they target to establish a systematic information forum, where the communication of information will be more systematical.	Establishment of a platform to collect the opinions of different stakeholders about the project.	Central Management	within the first half of 2012	High
	Acceptance	4	The project owner will improve communication with local stakeholders to show them that based on the water usage agreement the quantity of water they use will not be reduced. And they will scientifically investigate the risks for the neighborhoods below the conveying canal.	Communicate the reason why the water quantity of the locals will not be effected. Study risks of a canal failure scientifically and publish the results openly	Central Management	Continuous action	High
	Social Demands	4	The entrepreneur is developing a policy, that will cover the rules and other criteria to address voluntary social actions. Within one year the project owner is going to prepare an internal code of conduct that will outline these rules.	Draft a code of conduct on how to address social demand from local stake holders	Central management	within the first half of 2012	High
	Social programs	4	The Entrepreneur is going to be identifying such activities together with the local stakeholders. They will assess the situation taking into account socio economical characteristics of the area.	Identify social programs and implement one that will help a significant number of people (such as an arboriculture course for the local stakeholders)	Central management	within 2012	High

Resource	*Indicator Name*	*Score*	*Target*	*Action*	*Who*	*When*	*Priority*
	Social benefits	4	The project owner will identify the social needs together with the stakeholders and local authorities and will determine actions that will benefit more people.	identify social needs of the local stakeholders	Site management	within 2012	High
Human Resources	Capacity Building Initiatives	5	The project owner will continue in house trainings to maintain the high qualification level of their employee.	organize regular trainings for the staff.	Central Management	Continuous action	Normal
	Health & Safety	2	The project owner will improve their H&S program in order not to have any accidents.	Improve the H&S system to avoid any accidents	Central Management	within 2012	High
	Benefits	4	The project owner will measure employee satisfaction.	Implement a questionnaire that measures employee satisfaction	Site Manager and staff	Continuous action	Normal
	Involvement of Employees in the Project	2	The project management will include in house trainings addressing climate change and the contribution of renewable energy projects to tackle the climate change issue. This will ensure the involvement of employees to the carbon project	Organize in-house trainings to ensure involvement of project employees to the carbon project	Central Management	within 2012	High
Financial Resources	Economic Performance	4	To be able to improve the efficiency of the project maximum care will be spent for the maintenance of the canals.	Maintain the canals to improve project efficiency	Site Manager and staff	Continuous action	Normal
	Market	3	The project owner is hoping to have an opportunity to bring the project into compliance market. However, this depends mainly on the change of the status of Turkey. So the project owner will actively contribute to the lobbying activities to support improvement of Turkey's status in global carbon markets.	contribute Turkey's climate change lobbying activities actively	Central Management	Continuous action	High

Resource	*Indicator Name*	*Score*	*Target*	*Action*	*Who*	*When*	*Priority*
	Sale of Credits	2	The project owner is targeting to differentiate the project activity form the similar projects in the market and is targeting to increase the value of the VCUs.	Improve the marketability of the project by emphasizing its strengths to the offset buyers.	Central Management	Continuous action	High
Natural Resources	Sustainability Principles	3	The project owner will write an internal code of conduct to incorporate sustainability principles and will set sustainability goals and monitor achievement towards these goals.	Prepare an Internal code of conduct to set sustainability targets	Central management	In the first half of 2012	High
	Environmental Management	2	The project owner will improve its environmental management system by outlining a written management system and by making annual performance checks.	Improve environmental management system to include annual performance checks	Central Management	Continuous action	Normal
	Environmental Legislation	5	The project owner will integrate the systematic control of the licensing process to their environmental management system.	Integrate a system that checks the periodical licenses and permits related to environmental issues	Central Management	Continuous action	Normal
	Legal Procedures	5	The project will keep carefully obeying the rules and regulations to avoid any public lawsuit.	maintain the existing situation	Central Management	Continuous action	Normal
	Environmental Impacts	5	The project owner will ensure to keep the impacts at a minimal level	maintain the existing situation	Central Management	Continuous action	Normal
	Environmental Risk Management	4	The project owner is going to improve their Environmental Risk Management system to include Periodic evaluations of environmental risks and they are going to record, document and monitor encountered environmental risks and emergencies. In the future, they are also planning to conduct internal evaluations.	Improve the Environmental risk management system to include risk management plans, set goals and achievement monitoring	Central Management	Continuous action	Normal

Resource	*Indicator Name*	*Score*	*Target*	*Action*	*Who*	*When*	*Priority*
	Reservoir and marginal areas management	3	The project owner is developing a plan for the management of the reservoir and marginal areas.	Coordinate with the forest authority and DSI to develop a plan for the management of the reservoir and the marginal areas	Project Management	Continuous action	High
	Erosion, landslides, silting and floods.	3	Programs to avoid mass flows will be improved and new ones will be developed in cooperation with the local inhabitants, forestry department and DSI.	Develop programs to avoid mass flows together with DSI and Forestry department	Central Management	Continuous action	High
	Water Resources	4	The project owner is planning to prepare a program that will determine preventive actions that will protect the water quality of the river water. Including basic awareness programs that will inform local inhabitants on how to protect their river.	Organize an awareness campaign for the protection of the river water quality, involve primary school teachers and students	Site Management	Continuous action	Normal
Biodiversity Resources	Recovery of Degraded Areas	4	The project owner is planning to implement a tree planting campaign together with the local inhabitants of the area, thus improving areas that are outside the project borders.	Organize tree planting campaign with the forestry department and involve primary schools	Central Management	To be implemented in Spring or Autumn of 2012	High
	Biodiversity Conservation	3	The project owner will coordinate with the forestry department and DSI to find ways of supporting local wildlife.	Coordinate with forestry department to identify ways of supporting local wildlife	Central Management	First half of 2012	High
	Ichthyofauna	5	The project owner is going to complete the fish passage at the body of the weir and ensure its maintenance and operation.	Complete the fish passage at the regulator body	Central Management	First half of 2012	High
Resources	Additionality	6	The project owner is targeting to keep complying with the VCS and CDM rules.	maintain the existing situation	Project Directors	Continuous Action	High

Resource	*Indicator Name*	*Score*	*Target*	*Action*	*Who*	*When*	*Priority*
	Emissions Reductions Calculations & Monitoring	6	The project owner is targeting to keep complying with the VCS and CDM rules.	maintain the existing situation	Project Directors	Continuous Action	High
	Validation & Verification	6	The project owner is targeting to keep complying with the VCS and CDM rules.	maintain the existing situation	Project Directors	Continuous Action	High
	Project Performance	5	For the next monitoring period, the project is targeting to produce at least 95% of the amount of VERs estimated in the validated PDD.	Look for ways of improving project efficiency	Site Manager and Central Management	Continuous Action	High