MONITORING REPORT

Project Title	Grid connected electricity generation from renewable sources: Uzuncayir 82.0 MW Hydroelectric Power Plant Project, Turkey
Version	2.0
Date of Issue	22 December 2011
Project ID	
Monitoring Period	02 December 2009 to 31 October 2011 (Both Days Inclusive)
Prepared By	Ekobil Cevre Hizmetleri ve Danışmanlık Ltd. Sti.
Contact	Güneykent Sitesi 51. Cadde 116. Sokak No 56 Ahlatlıbel, 06805 Ankara, Turkey. Tel:+90 312 489 1338 e-mail: info@ekobil.com

Table of Contents

Table of Contents 2

1 Project Details 3
1.1 Summary Description of Project 3
1.2 Sectoral Scope and Project Type 3
1.3 Project Proponent 3
1.4 Other Entities Involved in the Project 3
1.5 Project Start Date 4
1.6 Project Crediting Period 4
1.7 Project Location 4
1.8 Title and Reference of Methodology 5

2 Implementation Status 5
2.1 Implementation Status of the Project Activity 5
2.2 Deviations from the Monitoring Plan 6
2.3 Grouped Project 6

3 Data and Parameters 6
3.1 Data and Parameters Available at Validation 6
3.2 Data and Parameters Monitored 11
3.3 Description of the Monitoring Plan 12

4 Quantification of GHG Emission Reductions and Removals 14
4.1 Baseline Emissions 14
4.2 Project Emissions 16
4.3 Leakage 17
4.4 Summary of GHG Emission Reductions and Removals 17

5 Additional Information 18

1 PROJECT DETAILS

1.1 Summary Description of Project

Uzuncayir HEPP consists of 3 units, each having an installed capacity of 27.33 MW. Total installed capacity of the project is 82.0 MWe and the expected electricity generation is 322,000 MWH per annum. The first unit of the project was started to produce electricity on December 2nd, 2009. After that, the second unit was commenced on 28/01/2010 and last, the project was commenced with full capacity on 12/04/2010, after the commissioning of the last unit. The crediting period of the project begins with the commissioning of the plant. The exact commencement date for the plant is the day of first documented supply to the grid with entire capacity. Therefore, the crediting period starts on December 2nd, 2009. Based on the VCS validated PD, the annual electricity production of the project is estimated to be 322,000 MWh. Accordingly, the expected annual average emission reduction is 151,211 tonnes.

1.2 Sectoral Scope and Project Type

The subject project is not a grouped project. According to domestic regulations, with an installed capacity of 82.0 MWe the Uzuncayir HEPP is qualified as a large scale project. The project comes under Type I – Renewable Energy Project as per Appendix B of the procedures for CDM project activities. The project is a 82.0 MWe HEPP and it uses renewable sources to produce electricity. Since the installed capacity of the planned HEPP larger than 15 MW; it is a large scale renewable energy project activity according to the Decision 17/ CP.7 Article 6.

1.3 Project Proponent

Name	Limak Yatirim Enerji Uretim Isletme Hizmetleri ve Insaat Anonim Sirketi
Organizational category	Private Company
Address	Hafta Sokak No:9 GOP 06700 Ankara
Main activities	Limak Yatirim Enerji Uretim Isletme Hizmetleri ve Insaat Anonim Sirketi is a group company of Limak Holding which is mainly involved with construction, tourism, energy, cement, food and aviation.
Contact	Mr. Taner Ercomert +90 312 446 88 00 tercomert@limak.com.tr
Role	Project Owner

1.4 Other Entities Involved in the Project

Name	GAIA Carbon Finance (GAIA)
Organizational category	Private Company
Address	GAIA Finansal Danismanlik Hiz. Tic. Ltd. Sti Halaskargazi Cad. Zafe Sok. Manuel Apt. No:11/4 34371 Sisli ISTANBUL – TURKEY
Main activities	Carbon asset identification, development in Turkey.
Contact	Mr. Gurkan Bayraktar +90 – 212- 224 04 50 gbayraktar@gaiacf.com
Role	Developed the PDD and baseline

Name	Ekobil Çevre Hizmetleri ve Danışmanlık Ltd. Şti.
Organizational category	Private Company
Address	Güneykent Sitesi 51. Cadde 116. Sokak No 56 Ahlatlıbel, 06805 Ankara, Turkey. Tel:+90 312 489 1338 e-mail: info@ekobil.com
Main activities	Environmental Consultancy, Carbon Asset development
Contact	Dr. Aslı Sezer Özçelik Tel:+90 312 489 1338 e-mail: asli.ozcelik@ekobil.com
Role	Preparation of the Monitoring Report

1.5 Project Start Date

Project Start Date is: 2 December 2009

1.6 Project Crediting Period

The project crediting period is 10 years: 2 December 2009 – 1 December 2019 (both days inclusive). The crediting period is renewable twice.

1.7 Project Location

Uzuncayir HEPP is located on Munzur river and it is 18 km away from Tunceli city center. The project has a dam and a 13.4 km² reservoir. The project is located in the Eastern Anatolia Region of Turkey, within the province of Tunceli. The project is on the Munzur River. The altitude is 845 m at power house location.

The project is located between the latitudes 39° 06”-39° 58”and longitudes 39° 28”-39° 36”.

The Following is a map showing the project location:

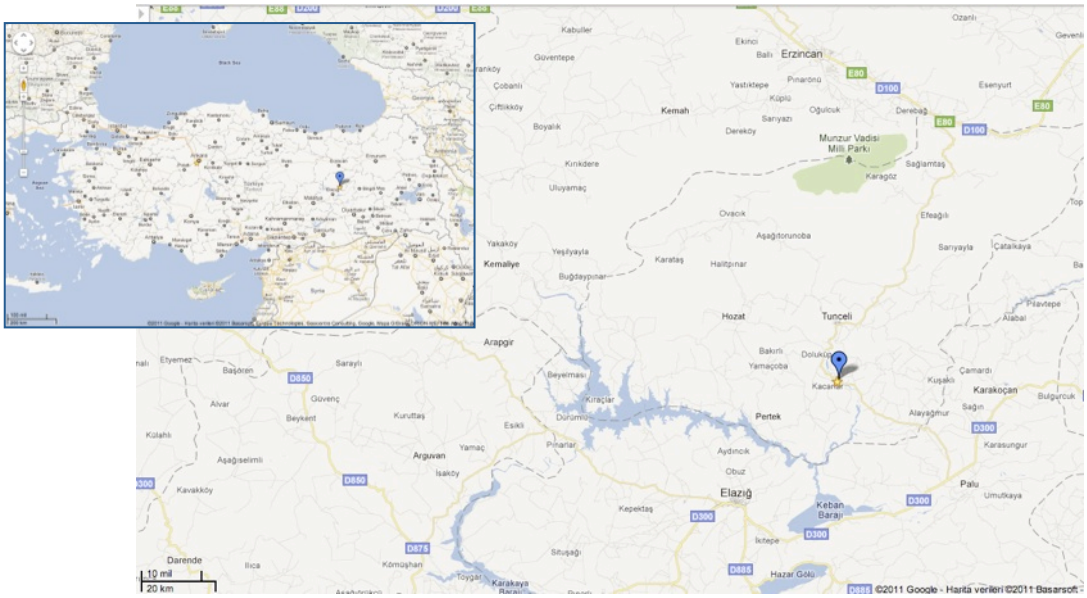

Figure 1: Location Map of the Project

1.8 Title and Reference of Methodology

The following UNFFCC methodology and its related tools are utilized:

Approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources.” Version 11.0.0.

The Approved Methodology refers to the following tools:

“Tool for the demonstration and assessment of additionality” (Version 05.2.0)

“Tool to calculate the emission factor for an electricity system”. (Version 02.2.0)

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The project start date is 2 December 2009. Since that date, there is no special event that may have impact on monitoring of GHG emission reductions. The following table summarizes the project milestones:

Table 1: Significant dates for the project monitoring period:

Date	Milestone
31.12.2011	Final Validation Report
02.12.2009	Date of commissioning of the plant /First Unit became operational
28.01.2010	Second unit became operational
12.04.2010	third Unit became operational
10.11.2009	Calibration date of meters
09.11.2019	End of Calibration validity
31.10.2011	End of the first monitoring period

2.2 Deviations from the Monitoring Plan

The following are the minor deviations from the monitoring plan:

- The electricity is measured by 3 sets of meters, each set is made up of one main meter and one control meter. And each set measures the electricity generated by one of the three turbines of the Uzuncayır HEPP. The position of these meters are indicated in the figure presented in Annex 1 of this report.
- The calibration of the meters are checked remotely by TEIAŞ by comparing the control meter readings to the main meter readings. Therefore control meter readings are not recorded and used in the QA/QC procedures.
- The electricity is invoiced according to the complex MFRC rules and the sold amount is not indicated on the invoice. Therefore it is not possible to use the invoices for QA/QC purpose to compare the electricity generation amount. This amount can be traced , however over the PMUM/MFRC[1] system where the project owner has an access via a specific user ID and Password. The amount of electricity supplied to the grid by the project activity can be observed and cross checked via screenshots of PMUM/MFRC system.
- The first monitoring period is longer than initially planned in the Validated PD and it is longer than 12 months.
- The emission reductions calculation excell sheet, that was presented as figure 4 in the validated PD, is not used for calculations as it was not taking into account the project emissions.

2.3 Grouped Project

N/A Project is not a grouped project activity.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

The following are the data and parameters available at validation:

Data / Parameter:	$FC_{i,y}$
Data unit:	Volume Unit (cubic meter)
Description:	Amount of fuel *i* consumed by relevant power plants in Turkey in years, 2007, 2008, 2009
Source of data:	Official publications at the Turkish Electricity Transmission Company (TEIAŞ) Web Site (http://www.teias.gov.tr/istatistik2009/44.xls)
Measurement procedures (if any):	-
Monitoring frequency:	once for each crediting period using the most recent three historical years for which data is available at the time of submission of the CDM-

[1] PMUM:Piyasa Mali Uzlastirma Merkezi/MFRC:Market Financial Reconciliation Centre

	PDD to the DOE for validation
Value applied:	Indicated in the validated PD
QA/QC Procedures	-
Justification of choice of data or description of measurement methods and procedures applied:	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to date and reliable data available for the Turkish grid.
Any comment:	Data used for the calculation of $EF_{grid,OM,Simple,y}$

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/Mass or Volume Unit
Description:	Net Calorific Values for fossil fuel type *i* in year *,for the years* 2007, 2008 and 2009
Source of data:	Regional or national average default values that are reliable and documented in national energy statistics of the Turkish Electricity Transmission Company Web Site (http://www.teias.gov.tr/istatistik2009/46.xls http://www.teias.gov.tr/istatistik2009/44.xls)
Measurement procedures (if any):	-
Monitoring frequency:	For Simple OM : Once for each crediting period using the most recent three historical years for which data is available at the time of submission of the CDM-PDD to the DOE for validation For BM: For the first crediting period, once for the *ex ante* and for the second and third crediting period, only once *ex ante* at the start of the second crediting period
Value applied:	Indicated in the validated PD
QA/QC Procedures	-
Justification of choice of data or description of measurement methods and procedures applied:	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to date and reliable data available for the Turkish grid.
Any comment:	Data used for the calculation of $EF_{grid,OM,Simple,y}$. As data on the NCV is not published directly on the TEİAŞ website, this data is calculated using the heating values of fuels and the volume or mass of fuels consumed for each year.

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:	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
Measurement procedures (if any):	-
Monitoring frequency:	For Simple OM : Once for each crediting period using the most recent three historical years for which data is available at the time of submission of the CDM-PDD to the DOE for validation For BM: For the first crediting period, once for the *ex ante* and for the second and third crediting period, only once *ex ante* at the start of the second crediting period
QA/QC Procedures	-
Value applied:	Indicated in the validated PD
Justification of choice of data or description of measurement methods and procedures applied:	According to the "Tool to calculate the emission factor for an electricity system" version 02.2.1 , if values provided by the fuel supplier of the power plants in invoices or regional or national average defaults values are not available the IPCC default values at the lower limit of uncertainty must be used.
Any comment:	Data used both for the calculation of $EF_{grid,OM,Simple,y}$ and $EF_{EL,m,y}$

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net electricity generated in the project electricity system in other words, 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
Source of data:	Turkish Electricity Transmission Company Web Site www.teias.gov.tr/istatistik2009/37(06-09).xls www.teias.gov.tr/istatistik2009/30(84-09).xls

Measurement procedures (if any):	-
Monitoring frequency:	For Simple OM : Once for each crediting period using the most recent three historical years for which data is available at the time of submission of the CDM-PDD to the DOE for validation For BM: For the first crediting period, once for the *ex ante* and for the second and third crediting period, only once *ex ante* at the start of the second crediting period
QA/QC Procedures	-
Value applied:	Indicated in the validated PD
Justification of choice of data or description of measurement methods and procedures applied:	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to-date and reliable data available for the Turkish grid.
Any comment:	Data used for the calculation of $EF_{grid,OM,Simple,y}$

Data / Parameter:	$EG_{m,y}$
Data unit:	MWh
Description:	Net electricity generated and delivered to the grid by power unit m in year y
Source of data:	Turkish Electricity Transmission Company Web Site (www.teias.gov.tr). Statistical Reports are taken for the years 2004 and 2005 and capacity projection reports are used for the years 2007, 2008 and 2009.
Measurement procedures (if any):	-
Monitoring frequency:	For Simple OM : Once for each crediting period using the most recent three historical years for which data is available at the time of submission of the CDM-PDD to the DOE for validation For BM: For the first crediting period, once for the *ex ante* and for the second and third crediting period, only once *ex ante* at the start of the second crediting period
QA/QC Procedures	-
Value applied:	Indicated in the validated PD
Justification of choice of data or description of measurement methods and procedures applied:	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to-date and reliable data available for the Turkish grid.
Any comment:	Data used for the calculation of $EF_{grid,BM,y}$

Data / Parameter:	$\eta_{m,y}$
Data unit:	-
Description:	Average net energy conversion efficiency of power unit m in year y
Source of data:	The default values provided at the Annex 1 of the "Tool to calculate emission factor for an electricity sector (Version 02.2.1)" are used
Measurement procedures (if any):	
Monitoring frequency:	Once for the crediting period
QA/QC Procedures	N/A as the default values provided in Annex 1 are used.
Value applied:	Please see Annex 1 of the "Tool to calculate emission factor for an electricity sector (Version 02.2.1)"
Justification of choice of data or description of measurement methods and procedures applied:	According to the "tool to calculate emission factor for an electricity system if documented manufacturer's specifications or data from the utility, the dispatch centre or official records are not available then the default values given in annex 1 of the tool shall be used. The first two options are not available for the power plants supplying the Turkish grid, therefore the default values are used.
Any comment:	Data used for the calculation of EFgrid,BM,y
Data / Parameter:	NCVi,y
Data unit:	GJ per mass or volume unit (GJ/ton)
Description:	Weighted average net calorific value of fuel type i in year y
Measured /Calculated /Default:	Default
Source of data:	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value(s) of monitored parameter:	43.3 GJ/ton
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data will be used for Project Emission Calculations. The project emissions are those that are related to the burning of the diesel (fossil fuel) in the auxiliary power generators that produce electricity in the absence of the electricity obtained from the grid for self consumption.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Default values are used
Measuring/ Reading/ Recording frequency:	Default IPCC value is used. Any future revision of the IPCC Guidelines will be taken into account
Calculation method (if applicable):	Not Applicable as default value of the IPCC guidelines is utilized
QA/QC procedures applied:	Not Applicable as default value of the IPCC guidelines is utilized
Comments	Applicable as option B of the Methodological tool "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (Version 02) is chosen.

3.2 Data and Parameters Monitored

Data Unit / Parameter:	**EGfacility,y**
Data unit:	MWh
Description:	Quantity of net electricity delivered to the grid
Source of data:	Monthly Electricity Meter Reading Records
Description of measurement methods and procedures to be applied:	Measurements are to be made by electricity meters. That belong to the grid operator TEIAŞ. The meters are in compliance with the collected data. There are 3 main meters that measure the electricity generation by each of the three turbines of the Uzunçayır HEPP.
Frequency of monitoring/recording:	Continuous measurement and at least monthly recording
Value monitored:	533, 571 MWh (during the first verification period)
Monitoring equipment:	Actaris SL761A Class 0,2 Serial Numbers of the main meters are: 53035201-Measures generation by turbine I 53035202- Measures generation by turbine II 53035203- Measures generation by turbine III
QA/QC procedures to be applied:	Meter readings will be cross checked with the PMUM/MFRC data obtained from the screen shots of the MFRAC System.
Calculation method:	N/A
Any comment:	N/A

Data Unit / Parameter:	**CapPJ**
Data unit:	MW
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data:	Project site
Description of measurement methods and procedures to be applied:	Turbine Supplier information on the equipment
Frequency of monitoring/recording:	Yearly
Value monitored:	82 MW
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Supplier information on the related equipment and existence of the equipment will be checked
Calculation method:	N/A
Any comment:	N/A

Data Unit / Parameter:	**APJ**
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Source of data:	Project site
Description of measurement methods and procedures to be applied:	Pre-calculated area figures in relation to the depth of the reservoir will be used. The graphic that exhibits the correlation between the depth of the reservoir lake and its area is determined based on the correlation between the topographic elevation contour lines and depth of the reservoir. The correlation graph is also presented in annex 6 (p.69) of the validated VCS-PD of Uzunçayır

	HEPP Project. A Hydrostatic Level Measurement device, with a Pressure sensor, measures the water depth at the reservoir. The device installed at the project reservoir is "Deltapilot S DB". The depth measurements are kept in the logbook as daily lake depth measurement. Later the maximum value obtained during the year is utilized to determine the maximum extent of the reservoir area.
Frequency of monitoring/recording:	Yearly
Value monitored:	13,400,000 m^2
Monitoring equipment:	N/A
QA/QC procedures to be applied:	The depth readings will be done on daily basis from
Calculation method:	N/A
Any comment:	N/A

3.3 Description of the Monitoring Plan

The following is the description of the monitoring plan as outlined in the validated VCS-PD. 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.

All relevant baseline emission factors are defined ex-ante. Please see the baseline estimations – Section 2.4-(of the validated PD) for Operating and Build Margin calculations. Hence, the only information to be monitored during the project activity is the amount of electricity fed into the grid.

All the data will be collected and stored by Limak not only during the crediting period but also two years after the last issuance of VERs to Uzuncayir HEPP project for that crediting period.

The emission factors are calculated ex-ante for the period of ten years. The combined margin will be recalculated through ACM0002 / Version 11, any time the crediting period is renewed. 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, 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 thisoperation 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 3* where the site organizational chart is presented.

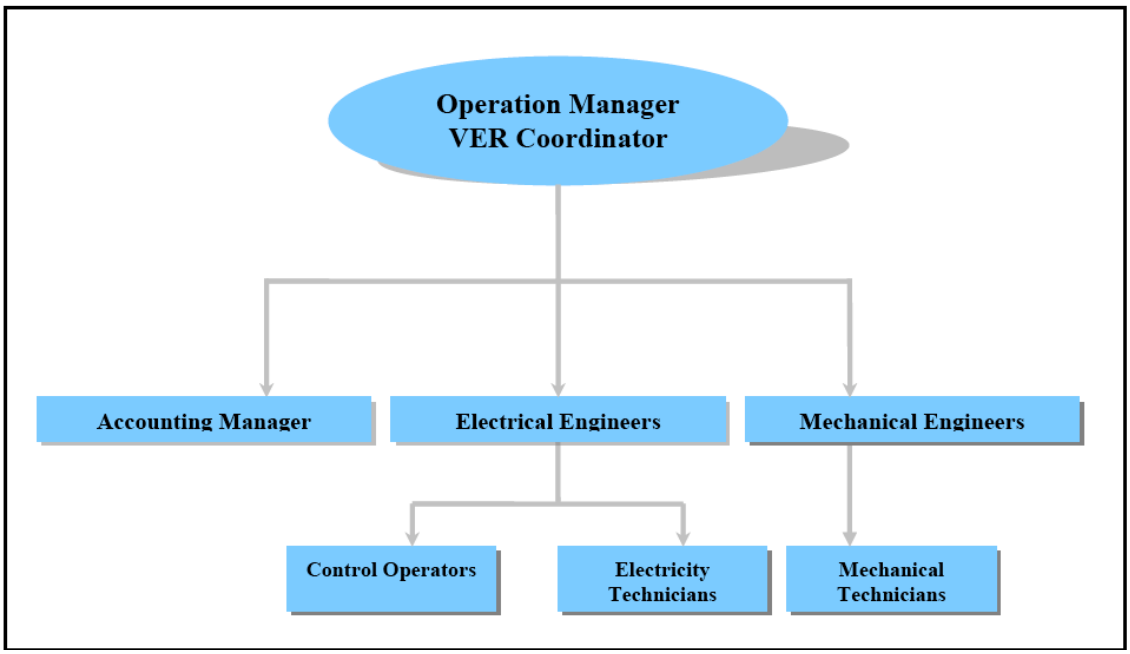

Figure 3*:* Site Organizational Chart

In order to verify the generated units of emission reductions, the VER coordinator, (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 tCO2e/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 gridconnected 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.

Measuring

The Electrical Engineers will obtain the readings from the meters, will report them in the spreadsheet (please refer to *Figure 4*) for measurement control and will store the data discharged from the meters electronically.

The project owner had not completed the selection process of the electricity measuring equipment but the so-told equipment should be in line with the EMRA requirements. The recalibration of these equipments will be done in line with the equipment requirements but re-calibration periods are defined

by national metrology institutes country by country and in Turkey this period is defined as 10 years[2].

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))52 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 readings 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.

Uzuncayir Run-of-River-Hydroelectric Power Plant

	MEASUREMENT AND CONTROL			VERs CALCULATION		
Year :	2010					
A	B	C	D	E	F	G
Month	Electricity generation data received from Monthly Measurement Records (MWh)	Electricity consumption data received from Monthly Measurement Records (MWh)	Net electricity delivered to the grid (MWh) (D=B-C)	Kalkandere electricity delivered to the gird (MWh) (data validated) (D)*	Emission factor ex-ante (tCO_2/MWh)	Emission reductions (tCO_2) E x F
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	0,560	0

* The monthly electricity generation is also to be cross-checked with the SCADA records

Figure 4: Spreadsheet dedicated to emission reductions monitoring

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The following table (table 2) is the Baseline emissions of the project calculated for the monitoring period (2 December 2009 to 31 October 2011 –both days inclusive). And the following table (table 3) exhibits the baseline emissions realized on a monthly basis.

[2] *http://www.mevzuat.adalet.gov.tr/html/21179.html*

Table 2: The Parameters to calculate the baseline emissions and the baseline emissions of the project for the monitoring period.

Symbol	***Units***	**2009**	**2010**	**2011**
$EG_{net,y}$	MWh	12.541,25	280.906,23	240.124,13
EF_{CM}	tCO_2e/MWh	0,5596	0,5596	0,5596
Symbol	***Units***	**2009**	**2010**	**2011**
BE1	tCO_2e	7.017,46	157.181,08	134.361,46

Table 3: The monthlybaseline emissions of the project for the monitoring period.

		A-Gross Electricity Production	B-Self Electricity Consumption	C-Net electricity production C=A-B	Baseline Emissions = $EG_{PP-net,y}$ * EF_{CM}	National Grid Emission Factor
	Symbol	$EG_{PP-gross,\ y}$	$EG_{PP-self\ consumption,\ y}$	$EG_{PP-net,\ y}$	BE1	EF_{CM}
YEAR	Units	MWh	MWh	MWh	tCO_2e	tCO_2e/MWh
2009	December	12568,74	27,49	12541,25	7017,456438	0,55955
					Total in 2009	7017
2010	January	15553,77	26,66	15527,11	8688,194401	
	February	28970,8	17,82	28952,98	16200,63996	
	March	28271,92	23,25	28248,67	15806,5433	
	April	32538,12	21,18	32516,94	18194,85378	
	May	38128,88	21,49	38107,39	21322,99007	
	June	36925,71	27,15	36898,56	20646,58925	
	July	28968,12	36,65	28931,47	16188,60404	
	August	21292,2	42,26	21249,94	11890,40393	
	September	16927,52	49,79	16877,73	9443,933822	
	October	13545,82	61,96	13483,86	7544,893863	
	November	9702,84	71,27	9631,57	5389,344994	
	December	10572,11	92,1	10480,01	5864,089596	
					Total in 2010	157,181
2011	January	11956,09	93,18	11862,91	6637,891291	
	February	9254,06	91,81	9162,25	5126,736988	
	March	31132,16	45,48	31086,68	17394,55179	
	April	38609,61	31,04	38578,57	21586,63884	
	May	41335,44	27,38	41308,06	23113,92497	
	June	33550,81	31,67	33519,14	18755,63479	
	July	26204,552	38,84	26165,712	14641,02415	
	August	20761,87	47,9	20713,97	11590,50191	
	September	13549,18	59,81	13489,37	7547,976984	
	October	14302,56	65,09	14237,47	7966,576339	
					Total in 2011	134361
					GRAND TOTAL	298.559

4.2 Project Emissions

The project has a reservoir area of 13,400,000 m^2.therefore the power density of the project calculates to be 6,12 W/m^2. Therefore the project has reservoir related project emissions, that calculates as shown in the following table (Table 4). The Project emissions on a monthly basis is shown in the next table (table 5).

Table 4: Project Emissions during the monitoring Period.

Symbol	***Units***	**2009**	**2010**	**2011**
TEGy	MWh	12.568,74	281.397,81	240.656,33
EF_{RES}	$kgCO_2e/MWh$	90,00	90,00	90,00
PE	tCO_2e	1.131,19	25.325,80	21.659,07

Table 5: Monthly Project Emissions during the monitoring Period.

		A-Gross Electricity Production	**Project Emissions (TEG_y*EF_{res})/1000**	**Emission Reduction Factor for the Reservoir EF_{res}**
	Symbol	TEGy	**PE**	
YEAR	**Units**	MWh	tCO_2e	$kgCO_2e/MWh$
				90
2009	**December**	12568,74	1131,19	
		Total in 2009	1,131	
	January	15553,77	1399,84	
	March	28271,92	2544,47	
	April	32538,12	2928,43	
	May	38128,88	3431,60	
	June	36925,71	3323,31	
	July	28968,12	2607,13	
	August	21292,2	1916,30	
	September	16927,52	1523,48	
	October	13545,82	1219,12	
	November	9702,84	873,26	
2010	**December**	10572,11	951,49	
		Total in 2010	25.325	
	January	11956,09	1076,05	
	February	9254,06	832,87	
	March	31132,16	2801,89	
	April	38609,61	3474,86	
	May	41335,44	3720,19	
	June	33550,81	3019,57	
	July	26204,552	2358,41	
	August	20761,87	1868,57	
	September	13549,18	1219,43	
2011	**October**	14302,56	1287,23	
		Total in 2011	21,659	
		GRAND TOTAL	48.115	

4.3 Leakage

According to the ACM0002, version 12.1.0 methodology no leakage is expected, as the energy generating equipment is brand new state of the art technology, and is not transferred from another activity. Therefore, the **leakage from the project activity is zero**.

4.4 Summary of GHG Emission Reductions and Removals

The following table (table 6) provides a summary of the emission reductions that result from the project activity during this monitoring period:

Table 6: The summary of the emission reductions for the project activity.

Symbol	*Units*	2009	2010	2011
$EG_{net,y}$	MWh	12.541,25	280.906,23	240.124,13
TEGy	MWh	12.568,74	281.397,81	240.656,33
EF_{CM}	tCO_2e/MWh	0,5596	0,5596	0,5596
EF_{RES}	$kgCO_2e$/MWh	90,00	90,00	90,00

Symbol	*Units*	2009	2010	2011
BE1	tCO_2e	7.017,46	157.181,08	134.361,46

Symbol	*Units*	2009	2010	2011
PE	tCO_2e	1.131,19	25.325,80	21.659,07

Symbol	*Units*	2009	2010	2011
LE	tCO_2e	0	0	0

Symbol	*Units*	2009	2010	2011
ER	tCO_2e	**5.886,27**	**131.855,28**	**112.702,39**

TOTAL ERs	250.443

5 ADDITIONAL INFORMATION

May include any raw data from monitoring, additional information used in the monitoring plan, documentation of activities conducted from the monitoring plan, diagrams, etc.