# VERIFICATION REPORT

# MEM ENERJİ ELEKTRİK ÜRETİM SAN. VE TİC. A.Ş

## VERIFICATION OF THE

# 7.11 MW BULAM HYDROELECTRIC POWER PLANT

## REPORT NO.BVC/TURKEY-VR/CER.TR1542889.13.C45/2014

REVISION NO. 03

## BUREAU VERITAS CERTIFICATION

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Report No: BVC/TURKEY-VR/CER.TR1542889.13.C45/2014 rev. 03

VERIFICATION REPORT

| | |
|---|---|
| Date of first issue:<br>30/01/2014 | Organizational unit:<br>Bureau Veritas Certification Holding SAS |
| Client:<br>MEM Enerji Elektrik Üretim San. Ve Tic. A.Ş | Client ref.:<br>Mrs. Sevgi ULUGÖZ |

Summary:

Bureau Veritas Certification has conducted the periodic verification of 7.11 MW Bulam Hydroelectric Power Plant, GS Registration Reference Number GS 642 owned by MEM Enerji Elektrik Üretim San. Ve Tic. A.Ş, which is located in Southeast Anatolia, within the borders of Adıyaman province, and applying the methodology of ACM0002 Version 11 on the basis of UNFCCC criteria for the CDM Methodology, Gold Standard v.2.2, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions, and consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in the validated and registered project design documents. Installed equipment being essential for generating emission reduction run reliably and are calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions. The GHG emission reductions are calculated without material misstatements, and the emission reductions verified totalize 76,466 tons of CO2e for the monitoring period.

Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the valid and registered project baseline, approved monitoring plan and its associated documents.

*Reporting period: 0108/2010 to 31/07/2015*

| | |
|---|---|
| Baseline emissions 2010 (01/08/2010 – 31/12/2010) | : 1,097 t CO2 equivalents |
| Baseline emissions 2011 | : 17,590 t CO2 equivalents |
| Baseline emissions 2012 | : 15,992 t CO2 equivalents |
| Baseline emissions 2013 | : 17,470 t CO2 equivalents |
| Baseline emissions 2014 | : 10,795 t CO2 equivalents |
| Baseline emissions 2015 | : 13,535 t CO2 equivalents |
| Baseline emissions (Total) | : 76,481 t CO2 equivalents |
| Project emissions (Total) | : 15 t CO2 equivalents |
| Leakage emissions | : 0 t CO2 equivalents |
| *Emission Reductions achieved up to 31/12/2012* | *: 34,668 t CO2 equivalents* |
| *Emission Reductions achieved from to 01/01/2013* | *: 41,798 t CO2 equivalents* |
| Emission Reductions ( Monitoring Period) | : 76,466 t CO2 equivalents |

| | |
|---|---|
| Report No.:<br>BVC-TURKEY/ VR/CER.TR1542889.12.C45/2014 | Subject Group:<br>GS-VER |
| Project title:<br>7.11 MW BULAM HYDROELECTRIC POWER PLANT | |
| Work carried out by:<br>Furkan SADIKOĞLU - Team Leader | |
| Internal Technical Review carried out by:<br>Mrs. Burcu Mutman / Mr. Onur YILMAZ | |

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**Indexing terms**

Work approved by:

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## Abbreviations

| | |
|---|---|
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CER | Certified Emission Reductions |
| CL | Clarification Request |
| CO2 | Carbon Dioxide |
| CO2e | Carbon Dioxide Equivalent |
| DOE | Designated Operational Entity |
| DRR | Daily Reading Record |
| ETN | Electricity Transaction Note |
| FAR | Forward Action Request |
| GHG | Green House Gas(es) |
| MoV | Means of Verification |
| MP | Monitoring Plan |
| MR | Monitoring Report |
| MRR | Monthly Reading Record |
| PDD | Project Design Document |
| PLF | Plant Load Factor |
| PP | Project Participant |
| PPA | Power Purchase Agreement |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VVS | Validation and Verification Standard |

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# 1. INTRODUCTION

MEM Enerji Elektrik Üretim San. ve Tic. A.Ş has commissioned Bureau Veritas Certification to verify the emissions reductions of its GS-VER project 7.11 MW Bulam Hydroelectric Power Plant (hereafter called "**the Project**") at Southeast Anatolia, within the borders of Adıyaman province.

This report summarizes the findings of the verification of the Project, performed on the basis of UNFCCC criteria, Gold Standard (GS) v.2.2 as well as criteria given to provide for consistent project operations, monitoring and reporting.

## 1.1. Objective

The objective of CDM verification is to conduct a thorough, independent assessment of the registered project activities.

In carrying out its verification work, the DOE shall ensure that the project activity complies with the requirements of paragraph 62 of the CDM modalities and procedures. In particular, this assessment shall:

(a) Ensure that the project activity has been implemented and operated as per the registered GS-VER-PDD or any approved revised GS-VER-PDD, and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;

(b) Ensure that the monitoring report and other supporting documents provided are complete in accordance with latest applicable version of the completeness checklist for requests for issuance of VERs, verifiable, and in accordance with applicable CDM and GS requirements;

(c) Ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan or any revised approved monitoring plan, and the approved methodology including applicable tool(s);

(d) Evaluate the data recorded and stored as per the monitoring methodology including applicable tool(s).

## 1.2. Scope

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions. The verification is based on the validated and registered project design document, the monitoring report, emission reduction calculation spreadsheet, and supporting documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC and GS v.2.2 rules and associated interpretations.

The verification is not meant to provide any consulting service towards the PPs. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

## 1.3. GHG Project Description

The Project consists of 2 sets of Horizontal Francis Type turbine with a unit installed capacity of 3.55 MWe, providing a total installed capacity of 7.11 MW. The annual expected electricity supplied to is 43,194 MWh and the annual estimated emission reductions are 22,019 $tCO_2e$. The expected emission reduction according to monitoring period is calculated and confirmed as 76,466 tCO2e.

| | |
|---|---|
| Project title: | 7.11 MW Bulam Hydroelectric Power Plant |
| GS ref number: | GS 642 |
| Registration Date: | 17/02/2011 |
| Crediting Period: | 01/08/2010 – 01/08/2017 (renewable) |
| Monitoring Period: | 01/08/2010 – 31/07/2015 |
| Project Participants: | MEM Enerji Elektrik Üretim San.ve Tic. A.Ş (Project Owner)<br>Global Tan Energy Ltd. (Project Developer) |
| Methodologies used | ACM0002 Version 011 |
| Location of the Project: | Southeast Anatolia, within the borders of Adıyaman province |
| Geo coordinates: | Longitude: 38°17′46.8″-15′02.7″ E, Latitude: 37°58′48.5″- 59′22.6″N |

The monitoring period and the crediting period start date is confirmed through the provisional acceptance of Bulam Hydroelectric Power Plant. /22/

No post registration changes have been requested.

***CAR01*** *has been raised by the verification team for the brief description of the project activity. Brief description of the installed technology and equipments is added under section A.1 through the references. It is confirmed that the provided brief description is line with the registered GS-VER-PDD and the corrective action request is closed.*

***CAR03*** *has been raised regarding to location of the project activity. Information of the location of the project activity is added under section A.2 of the monitoring report than CAR03 is closed.*

***CAR04*** *has been raised for the definition of the crediting period. The crediting period is defined as 7 years and renewable in line with the registered GS-VER-PDD.*

## 1.4. Verification Team

The assessment team and internal technical reviewer team consist of the following personnel:

| FUNCTION | NAME | TA 1.2 | TA XX | TASK PERFORMED* |
|---|---|---|---|---|
| **Team Leader** | Mr. Furkan SADIKOĞLU | ☒ | ☐ | ☒**DR** ☒**SV** ☒**RI** ☐**TR** |
| **Team Member (Trainee)** | N.A | ☐ | ☐ | ☐**DR** ☐**SV** ☐**RI** ☐**TR** |
| **Technical Specialist** | N.A. | ☐ | ☐ | ☐**DR** ☐**SV** ☐**RI** ☐**TR** |

| | | | | |
|---|---|---|---|---|
| **Internal Technical Reviewer (ITR)** | Mr. Onur YILMAZ | ☒ | ☐ | ☐**DR** ☐**SV** ☐**RI** ☒**TR** |
| **Specialist supporting ITR** | N.A. | ☐ | ☐ | ☐**DR** ☐**SV** ☐**RI** ☐**TR** |

*DR = Document Review; SV = Site Visit; RI = Report issuance; TR = Internal Technical Review

# 2. METHODOLOGY

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a verification protocol was customized for the project, according to the version 9 of the Clean Development Mechanism Validation and Verification Standard, issued by CDM Executive Board after its 4/CMP.10 on 15/02/2015 /6/. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification.

The completed verification protocol is enclosed in Appendix A to this report.

## 2.1. Review of Documents

The assessment of the project documentation provided by the project participant is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report (MR) version 04 dated 21/06/2016 /4/ and emission reduction calculation spreadsheet version 04 dated 21/06/2016 /4/. Qualitative information comprises information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

In addition to the monitoring documentation provided by the project participants, the DOE reviews:

(a) The registered PDD and the monitoring plan, registered GS Passport /1/;

(b) The validation report /2/

(c) Previous verification reports /3/;

(d) The applied monitoring methodology /5/;

## 2.2. Follow-up Interviews

On 09/10/2013, Bureau Veritas Certification performed a site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review.

Representatives of MEM Enerji Elektrik Üretim A.Ş and Global Tan Energy Ltd. were interviewed (see References). The main topics of the interviews are summarized in Table 1.

**Table 1** Interview topics

| Interviewed organization | Interview topics |
|---|---|
| MEM Enerji Elektrik Üretim A.Ş (the Project Owner) | ➢ Implementation of the project<br>➢ Review of the data flow for generating, aggregating and reporting the monitoring parameters<br>➢ Information the monitoring equipment<br>➢ The data for cross the values on the Monitoring Report<br>➢ PMUM records<br>➢ Training records<br>➢ Social Security Records (SGK) of the employees<br>➢ Water Quality and Quantity<br>➢ Biodiversity |
| Global Tan Energy Ltd. (the Consultant) | ➢ Monitoring Plan<br>➢ Monitored data and Monitoring Report<br>➢ GHG Calculations |

## 2.3. Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the verification is to resolve issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions prior to Bureau Veritas Certification's positive conclusion on the GHG emission reduction calculation.

Findings established during the verification can either be seen as a non-fulfillment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

A Corrective Action Request (CAR) is raised, if one of the following situations occurs:

(a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;

(b) Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;

(c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

(d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

A Clarification Request (CL) is raised, if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A Forward Action Request (FAR) is raised, for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.

## 2.4. Internal Technical Review

The verification report underwent an Internal Technical Review (ITR) before requesting issuance of VERs for the project activity.

The ITR is an independent process performed to examine thoroughly that the process of verification has been carried out in conformance with the requirements of the verification scheme as well as internal Bureau Veritas Certification procedures.

The Team Leader provides a copy of the verification report to the reviewer, including any necessary verification documentation. The reviewer reviews the submitted documentation for conformance with the verification scheme. This will be a comprehensive review of all documentation generated during the verification process.

When performing an Internal Technical Review, the reviewer ensures that:

- The verification activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.
- The review encompasses all aspects related to the project which includes project design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the verification exercise, review of sample documents.

The reviewer may raise Clarification Requests to the verification team and discusses these matters with Team Leader.

After the agreement of the responses on the Clarification Requests from the verification team as well as the PP(s), the finalized verification report is accepted for further processing such as uploading via the UNFCCC interface.

# 3. VERIFICATION CONCLUSIONS

In the following sections, the conclusions of the verification are stated.

The findings from the desk review of the original monitoring documents and the findings from interviews during the follow up visit are described in the Verification Protocol in Appendix A.

The Clarification, Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in Appendix A. The verification of the Project resulted in 09 CAR(s), 03 CL(s) and 01 FAR(s).

The CARs, CLs and FARs were closed based on adequate responses from the Project Participant(s) which meet the applicable requirements. They have been reassessed before their formal acceptance and closure.

The number between brackets at the end of each section corresponds to the VVS paragraph.

## 3.1. Remaining issues from validation or previous verification (213)

All CARs and CLs raised were successfully closed during the validation stage and previous verification of the Project, no remaining issues were left.

## 3.2. Compliance of the project implementation with the registered project design document (228)

Bureau Veritas Certification has performed a site visit and found that the Project has been put into operation and the electricity generated is supplied to according to the signed commissioning of the project activity. 2 sets of Kössler Horizontal Francis Type turbine with a unit capacity of 3.55 MWe, providing a total installed capacity of 7.11 MWe have been in operation during the monitoring period.

No changes to the project design have been identified during this verification. The implementation and operation of the project activity have been conducted in accordance with the description contained in the registered GS-VER- PDD.

**[Power System]**

As shown in the diagram of the power connection system and generation license of the project activity /9/, the electricity generated by the Project is delivered to the grid substation through an 34.5 kV line and then delivered to 33 kV Çelikhan substation.

***CAR05*** *has been raised regarding to single line diagram of the project activity. Single line diagram of the project activity is provided under Annex V of the monitoring report than CAR05 is closed by the verification team.*

**[Metering System]**

There are two meters installed for the Project.

The main meter was installed at the output of the on-site substation to measure the electricity exported to and imported from the grid by the Project.

Specifications of the metering devices have been confirmed as below;

| Manufacturer | Device Model | Serial Number | Accuracy Class | Last Calibration | Precision |
|---|---|---|---|---|---|
| ABB-ELSTER | A1500 | 00401677 | 0.5S | 17/11/2009 | < 0.05 % |

| | | | | | |
|---|---|---|---|---|---|
| (Main) | | | | | |
| ABB-ELSTER (Back-up) | A1500 | 00401678 | 0.5S | | < 0.05 % |

The backup meter was installed beside the main meter to measure the electricity exported to and imported from the grid by the Project.

**[Management and Operation]**

The PP has operated the Project as per the registered PDD. The monitoring organization has been set up and all monitoring staffs have been trained. Meter reading records of all the meters are based on continuously measurement and monthly recorded by the PP and TEIAS. Each month, an officer from TEIAS and the plant manager/electricity technician of the plant will record the reading and sign. Employment records of personnel /9/ and internal training records /10/ have been provided and verified by the verification team.

✌ Corresponding to the VVS version 09.0, Bureau Veritas Certification can confirm that:

- The implementation of the Project is consistent with the registered GS-VER-PDD.
- The Project is operated as per the registered GS-VER-PDD by the PP.

## 3.3. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s) (232)

The verification team has verified the monitoring plan, including the data and parameters required to be monitored, measurement procedures, monitoring frequency and QC/QA procedures as described in the registered GS-VER-PDD.

✌ Corresponding to the VVS version 09.0, Bureau Veritas Certification can confirm that the monitoring plan is in accordance with the approved methodology including applicable tool(s) applied by the Project.

## 3.4. Compliance of monitoring activities with the monitoring plan (235-236)

Monitoring has been carried out in accordance with the monitoring plan contained in the registered GS-VER-PDD.

**[Parameters and information flow]**

The parameters required by the monitoring plan and how Bureau Veritas Certification has verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters including the values in the monitoring report are described below:

***Parameters monitored:***

(1) $EG_{facility,y}$, net electricity supplied to the grid by the Project

The net electricity supplied to the grid by the Project is the electricity exported to the grid minus the electricity imported from the grid by the Project which is measured by the bidirectional main meter. Therefore EGy can be calculated as below:

$EG_y = EG_{export} - EG_{import}$

As described above, the meters have been installed in accordance with the registered GS-VER-PDD. The verification team has checked on-site the location of the meters against the diagram of power connection system and found them to be consistent.

The readings of the meters are continuously monitored and monthly recorded by the PP and the grid company. Each month, an officer from TEIAS and the plant manager/electricity technician of the plant will record the reading and sign. The records are published in the page of EPİAŞ are used as a source of data. After a cross-check with PMUM records for 2010 and 2015 vintage, the project owner provided the signed monthly reading records. EPİAŞ records are selected as a main source of electricity generation which is more conservative than the cross check source.

The verification team has verified the values provided in the monitoring report and ER spreadsheet against the relevant documented evidences EPİAŞ records /11/ and the PMUM screens /12/ and found them to be consistent with the evidences. The Monthly Reading Records and the PMUM screens can cover the monitoring period from 01/08/2010 and 31/07/2015.

(2) $Cap_{PJ}$, Installed Capacity of Hydro Power Plant

The value is the installed capacity of the hydro power plant after the implementation of the project activity. This is verified during the site visit by turbines plates.

(3) $A_{PJ}$, Area of the reservoir

The value of $A_{PJ}$ is equal to area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.

***CL02*** *has been raised regarding to reservoir area of the project activity. Reservoir maps of the project activity are provided to the verification team. Verification team checked and confirmed the reservoir area of the project activity as 18,670* $m^2$*.*

(4) $PE_{FF,y}$, Project emissions from fossil fuel consumption in year y

The value of $PE_{FF,y}$ is calculated according to total working hour of the diesel generator and fuel consumption of the diesel generator at peak load. In this monitoring period, 5,481.4 liters of diesel oil is calculated and confirmed to be consumed by all of the generators through the equipment guidelines. Finally, the $PE_{FF,y}$ parameter is confirmed as 15 ton CO2e for the monitoring period by the verification team.

(5) Air Quality: $SO_2$ and $NO_x$ emission reductions

According to total generation in 2012( SO2 emission per MWh is calculated as 0.70 kg/MWh and NOx emission per MWh is calculated as 1.35 kg.

For the monitoring period total electricity generation value is confirmed as 136,088 MWh. SO2 emission reduction and NOx emission reduction is calculated and confirmed as 95.40 tons and 184.28 tons through the total electricity generation.

Total generation in 2012 is confirmed through the UNFCCC statistics. (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php)

(6) Biodiversity

- *Impact on Aquatic Life*

Fish passage and environmental flows are determined on July 2012. In this report it was determined that fish passage was not appropriate for fish migration. According to this report a new examination was made for the fish passage on 17 June 2013. The new structural status of the fish passage is determined in the report. The following changes are applied on the fish passage;

- The base of the fish passage was filled with rough concrete and so the stairs structure of the bottom of the fish passage was made linearly flat with a certain angle.
- The orifices of the cross-walls are located at the bottom of the pool.
- The fish entrance from the lower side of the fish passage was filled with natural materials as advised in the literature.

The revised and previous status of the fish passage is determined in the report dd. 17 June 2013./13/. The distribution of the fish in the pools and the number of the fish passed the upper tools were determined. According to analysis the report confirms that the fish passage of the Bulam Hydroelectric power plant gained functionality after the structural revision. The report is prepared by Prof. Dr. Ahmet ALP from University of Kahramanmaraş Sütçü İmam. The verification team checked the determination report in detail and confirmed that the fish passage gained functionality after the structural revision.

- *Planting of trees around the project site*

According to tree planting record dd. 16/06/2011 /14/ It is confirmed that approximately 35,000 new saplings and young trees were planted in a 190ha area near the project site. Also during the site visit planted trees have been seen and photographed by the verification team.

(7) Quality of Employment, Number of the people trained

This parameter allows monitoring of qualitative employment through acquired certificates and provided trainings. Training records according to first aid and high voltage are provided to verification team. The provided training records are as below;

- Instruments and calibration training - 08-09/07/2013
- Employee representative and health safety representative training – 27/06/2013 and 28/06/2013

- Occupational health and safety risk assessment training – 05-06/06/2013
- Occupational health and safety risk assessment training – 03/12/2014
- Occupational health and safety risk assessment training – 11/03/2015
- Work accident causes and prevention methods – 05/06/2013
- Safety Management system training – 12/05/2013
- Environmental legislation and waste management – 19/04/2013
- PI System User and Server training – 24/04/2013
- Safety Management system awareness training – 15/02/2013
- Off the field work training – 14/02/2013
- Fire events and fire protection training – 23/01/2013
- Legal regulations training – 23/01/2013
- Chemical, Physical and Biological substances involved risks – 23/01/2013
- Environmental Legislation & Waste Management – 21/05/2015

Trained personnel list has been confirmed as below;

| Name | Certificates & Trainings |
|---|---|
| Tuncay KÖK | Instrumentation & Calibration (2013) |
| | Health & Safety (2013, 2014, 2015) |
| | Environmental Legislation & Waste Management (2013, 2015) |
| Erdihan DEMİR | Instrumentation & Calibration (2013) |
| | Health & Safety (2013, 2014, 2015) |
| | Environmental Legislation & Waste Management (2013, 2015) |
| | ISO9001, ISO14001 |
| Hasari TAYMAZ | Instrumentation & Calibration (2013) |
| | Health & Safety (2013, 2014, 2015) |
| | Environmental Legislation & Waste Management (2013, 2015) |
| Habip IŞIK | Instrumentation & Calibration (2013) |
| | Health & Safety (2013, 2014, 2015) |
| | Environmental Legislation & Waste Management (2013) |
| Abdurrahman ÇAVUŞ | Instrumentation & Calibration (2013) |
| | Health & Safety (2013, 2014, 2015) |
| | Environmental Legislation & Waste Management (2013, 2015) |
| Mehmet BAKIR | Instrumentation & Calibration (2013) |
| | Health & Safety (2013, 2014, 2015) |
| | Environmental Legislation & Waste Management (2013, 2015) |

Training records are checked and confirmed by the validation team.

(8) Quantitative Employment and Income Generation

People employed during the construction and phases are confirmed through the SGK records. The employees list is confirmed as below;

*Construction Phase;*

Tuncay Kök – 14/04/2010, Erdihan Demir – 15/04/2010, Hasari Taymaz – 10/05/2010, Ahmet Konaklı – 01/07/2010, Mehmet Bakır – 01/07/2010, Habip Işık – 21/07/2010

*Operational Phase;*

Tuncay Kök – 14/04/2010, Erdihan Demir – 15/04/2010, Hasari Taymaz – 10/05/2010, Abdurrahman Çavuş – 19/01/2012, Ahmet Konaklı – 01/07/2010, Mehmet Bakır – 01/07/2010, Habip Işık – 21/07/2010, Hamza Matur – 15/05/2013, Kemal Gucuk – 15/05/2013

The 5 employee are confirmed as Local though the records. On the other hand, the minimum wages of the employees are in accordance with the Turkish national regulations./15/. (*http://www.csgb.gov.tr/csgbPortal/cgm.portal?page=asgari*)

(9) Balance of Payments: Decrease dependency on fossil fuel through increasing use of local resources.

The balance of the payment calculation is checked and confirmed by the verification team. Calculations are based on the total natural gas usage, Turkey total electricity generation and electricity generation by the project activity. In 2014, about 25.426 bn $m^3$ natural gas been sued for about 120,576 GWh electricity generation and about 6.7 Euro bn has been spent. During monitoring period, about 28.697 million $m^3$ NG has been saved which approximately corresponds to 7.149 million Euro.

(10) Water Quality and Quantity

- *Flow rate of water released from the weir*

Flow rate of water released from the weir is evaluated in an expert report /16/ with title "Evaluation of the fish passage efficiency and environmental flows of Bulam HEPP dd. 02 October 2012. The report did not find any conflictions about the water quality and quantity. The analysis includes 4 methods which are Tennant method, 7Q10 method, Q95 method and Wet environment method. The average ecological flow and the minimum water level is determined as 0.704 $m^3/s$ and 0.35m according to analysis. A gauging station has been installed at a location is determined by DSI. The water level records/17/ are provided to the verification team. The records are provided that the minimum water level was not under the analysis during the monitoring period. Environmental flow depth was a little bit lower than the minimum flow depth determined by the report of the expert ("0.26 m" in between October and March and "0.27" m in between April and September) in April-December period of 2014 (varied between 0.15-0.25 m) and in July 2015 (varied between 0.19-0.26 m).

- *Change in amount of water available to Sogukpinar village*

During the site visit it is confirmed that the locals have no negative comment according to amount of water available to Sogukpinar village. The verification team discussed with the Ali Nevrus and Hasan Nergiz regarding to change in amount of water. The locals are selected who lives near the project site. Also Doğanlı Village Muhtar Mr. Ali Atay declared that there was a decreasing on amount of water in Soğukpınar water resources but during operation there is not a problem about the amount of water. Also the signed document is provided the verification team.

(11) Soil Condition

- *Soil Erosion within the project site*

During the site visit it is confirmed that no erosion has been observed due to project activity after implementation of the project started through the stakeholders' comments. Proper storage and use of aggregates from excavation Works at the Project site are provided by the pictures and also seen during the site visit. Planting trees helps to take precautions against erosion problem.

- *Sediment transport along the river*

During the site visit it is confirmed that no accumulation exist at the upstream and downstream of the weir. "The Supplementary Report About Bulam Hydroelectric Power Plant (Page 5)" dd. 17 June 2013 is also determined the sediment transport along the river. The report confirms that the sediment accumulation in the HPP area does not exist in Bulam HPP. Also stakeholders have no negative comment regarding to sediment transport along the river during the site visit.

(12) Other Pollutants: Waste Oil

The project activity is handled to waste oil in line with the national regulations. The waste oil disposal records/ref/ for 2010, 2011 and 2012 years are provided to the verification team. After 2012 there was not any waste oil existence to dispose. According to disposal records, the verification team is confirmed that the waste oil is handled in line with the national regulations.

(13) Livelihood of the poor

- *Trees planted/agricultural area created/donations for locals*

It is confirmed that the around 35,000 trees were planted near the project site through to tree planting record 16/06/2011. On the other hand donation invoices dd. 07/02/2011 to Burç Primary School by the project activity are provided to the verification team. During the site visit, stakeholders declared that new agricultural areas were created using the excavation materials.

- *Compensation payments made for expropriation*

According to expropriation documents /18/ and interview by locals it is confirmed that the full and fair payments made to the land owners by the project activity. Square meters unit prices of the lands are determined by Adıyaman Mayor Directorate of Revenue on 03/07/2008. No negative comments are raised from the stakeholders during the site visit. It is confirmed that no complaints about excavation materials were raised by local community.

FAR01 has been raised by the verification team for expropriation as below;

***FAR01***

*Verification DOE shall check expropriation documents during the second monitoring period whose lands have been expropriated.*

***CAR09** has been raised for the sustainable development parameters. Employee records, AGI records and the liminigraph records are completely provided to the verification team and corrective action request is closed.*

***CL02** has been raised for the inconsistency on QA/QC procedures between the monitoring report and the registered GS-VER-PDD. The parameters are revised in line with the registered GS-VER-PDD and the clarification request is closed.*

***Parameters determined ex-ante:***

(1) $EF_{grid,CM,y}$, emission factor of the grid

The emission factor of the 1st crediting period of the Project has been determined ex-ante in the registered GS-VER-PDD as ***0.562 tCO2e/MWh***. The emission factor used in the monitoring report has been verified against the GS-VER-PDD and found them to be consistent.

***CL01** has been raised by the verification team. Under section D.1 of the monitoring report, ex ante parameters are added through the registered GS-VER-PDD and clarification request is closed.*

✌ Corresponding to the VVS version 09.0, Bureau Veritas Certification can confirm that:

- The monitoring has been carried out in accordance with the monitoring plan contained in the registered GS-VER-PDD.
- All parameters required by the monitoring plan have been sufficiently monitored and correctly listed. The monitored data for required parameters have been verified by checking the whole information flow.

## 3.5. Compliance with the calibration frequency requirements for measuring instruments (243)

The registered monitoring plan requires that as the meters are sealed by TEIAS, MEM Enerji Elektrik Üretim San. ve Tic. A.Ş cannot intervene with the devices by themselves. TEIAS performs a regular maintenance on a regular basis. TEIAS is the main responsible for calibration and maintenance of the devices. TEIAS performs the necessary maintenance and calibration. Meters should not require calibration for a periodic of less than 10 years as per the regulations and be in compliance with the regulations. /19/ (*http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch=*)

The project activity consists by two metering devices. During this monitoring period, the installed measuring instruments have been operating well and did not require out of schedule calibration and the first periodic calibration has been made on 17/11/2009. /20/

**Table 2** The calibration records of the meters

| Meter ID | Serial number | Accuracy | Calibration date | Calibration entity |
|---|---|---|---|---|
| Main | 00401677 | 0.5S | 17/11/2009 | ELSTER |
| Back-up | 00401678 | 0.5S | 17/11/2009 | ELSTER |

***CAR06*** *has been raised for the first calibration dates of the meters. Calibration records dd. 17/11/2009 of the meters are provided to the verification team and the corrective action request is closed*.

***CL03*** *has been raised for the corrections serial numbers and accuracy classes of the meters. The serial number and the accuracy class of the meters are corrected through the site observations and the registered GS-VER-PDD than the clarification request is closed.*

During the site visit meters' consumption and generated values are recorded as follows;

**Main Meter**

**Brand:** ELSTER A1500

**Serial Number:** 00401677 2009

**2.8.0 (Generation):** 91,229.16 MWh

**1.8.0 (Consumption):** 7,231 MWh

**Backup Meter**

**Brand:** ELSTER A1500

**Serial Number:** 00401678 2009

**2.8.0 (Generation):** 91,198.29 MWh

**1.8.0 (Consumption):** 7,155 MWh

It is confirmed that there is no big difference between the main and back-up meters according to site visit records by the verification team.

**[Instrument accuracy]**

The verification team has verified the calibration records and TEIAS is the sole responsible. All the meters meet the rated accuracy level as described in the monitoring plan and are in compliance with the regulations/19/.

**[Calibration frequency]**

The calibration frequency fulfills the requirement as described in the monitoring plan and is in compliance with the regulations /19/.

✌ Corresponding to the paragraph 243 of VVS version 03.0, Bureau Veritas Certification can confirm that:

- The calibration is conducted at the frequency as specified by the methodology and the monitoring plan contained in the registered GS-VER-PDD.

## 3.6. Assessment of data and calculation of emission reductions (246)

A complete set of data for the specified monitoring period is available.

The critical parameter used for the determination of the Emission Reductions is the net electricity supplied to the grid by the Project. The data pertaining to the above parameter are maintained in the identified records. All the data are in compliance with that stated in the Monitoring Report version.

As per the methodology ACM0002 Version 11 and the registered GS-VER-PDD, the emission reductions for the Project are calculated as the baseline emissions minus the project emissions and leakage. Hence the emission reduction is determined by the following formula:

$ER_y = BE_y - PE_y - L_y$

Where,

$ER_y$: Emission reductions

$BE_y$: Baseline emissions

$PE_y$: Project emissions

$L_y$: Emissions due to leakage

**[Baseline emissions]**

The baseline emissions are the baseline emission factor times the net electricity supplied to the grid Therefore,

$BE_y = EG_y * EF_y$

Where:

BEy = Baseline Emissions in year y; t CO2
$EG_y$ = Net electricity delivered to the grid by the project activity in year y excluding transmission losses of the grid.
$EF_y$ = Emission Factor calculated according to selected methodology

$EF_{CO2}$: GHG emission factor of the Turkish national Grid, calculated ex-ante in the registered GS-VER-PDD as 0.562 $tCO_2e/MWh$.

The net electricity delivered to the grid ($EG_y$) can be calculated as:

$EG_y = EG_{export} - EG_{import}$

The verification team has cross-checked the values from the Monthly reading records /14/ with the PMUM screens /15/ for the period from. The conservative values are used for emission reductions calculation. The verified values are shown in the Table 3.

**Table 3** The verified electricity generation values (MWh)

| Period | Export (MWh) | Import (MWh) | Verified EGy (MWh) |
|---|---|---|---|
| August 2010 | 628,575 | 4,216 | 624,4 |
| September 2010 | 816,600 | 4,934 | 811,7 |
| October 2010 | 24,086 | 8,228 | 15,9 |
| November 2010 | 257,021 | 6,978 | 250,0 |
| December 2010 | 257,021 | 6,978 | 250,0 |
| | | ***TOTAL 2010*** | ***1,952*** |
| January 2011 | 2023,026 | 2,92 | 2020,106 |
| February 2011 | 2520,618 | 1,956 | 2518,662 |
| March 2011 | 4269,140 | 0,192 | 4268,948 |
| April 2011 | 4082,688 | 0,395 | 4082,293 |
| May 2011 | 4311,248 | 0,069 | 4311,179 |
| June 2011 | 3747,726 | 0,209 | 3747,517 |
| July 2011 | 2411,514 | 1,717 | 2409,797 |
| August 2011 | 1685,149 | 3,415 | 1681,734 |
| September 2011 | 1418,272 | 4,413 | 1413,859 |
| October 2011 | 1577,805 | 3,58 | 1574,225 |
| November 2011 | 1741,332 | 0,178 | 1741,154 |
| December 2011 | 1532,105 | 1,155 | 1530,95 |
| | | ***TOTAL 2011*** | ***31,300.424*** |
| January 2012 | 2119,492 | 0,317 | 2119,175 |
| February 2012 | 1466,062 | 2,042 | 1464,02 |
| March 2012 | 2688,704 | 0,601 | 2688,103 |
| April 2012 | 3927,081 | 0,078 | 3927,003 |
| May 2012 | 4181,245 | 0,042 | 4181,203 |
| June 2012 | 3650,313 | 0,057 | 3650,256 |
| July 2012 | 2059,056 | 0,077 | 2058,979 |
| August 2012 | 1142,803 | 0,445 | 1142,358 |
| September 2012 | 976,872 | 0,551 | 976,321 |
| October 2012 | 1456,135 | 0,19 | 1455,945 |
| November 2012 | 1672,672 | 0,021 | 1672,651 |
| December 2012 | 3121,902 | 1,085 | 3120,817 |
| | | ***TOTAL 2012*** | ***28,456.831*** |
| January 2013 | 1375,224 | 8,736 | 1366,488 |
| February 2013 | 4340,880 | 0,012 | 4340,868 |
| March 2013 | 4556,230 | 0,062 | 4556,168 |

| | | | |
|---|---|---|---|
| April 2013 | 4295,283 | 0,011 | 4295,272 |
| May 2013 | 4302,681 | 0,021 | 4302,66 |
| June 2013 | 3401,127 | 0,014 | 3401,113 |
| July 2013 | 2.311,853 | 0,015 | 2.311,838 |
| August 2013 | 1.526,474 | 0,020 | 1.526,454 |
| September 2013 | 1.199,477 | 0,691 | 1.198,786 |
| October 2013 | 1.433,920 | 0,048 | 1.433,872 |
| November 2013 | 1.236,831 | 0,353 | 1.236,478 |
| December 2013 | 1.117,697 | 1,245 | 1.116,452 |
| | | ***TOTAL 2013*** | ***31,086.449*** |
| January 2014 | 1.430,133 | 1,079 | 1.429,054 |
| February 2014 | 1.523,839 | 0,071 | 1.523,768 |
| March 2014 | 2.779,538 | 0,032 | 2.779,506 |
| April 2014 | 2.486,319 | 0,023 | 2.486,296 |
| May 2014 | 1.916,938 | 0,008 | 1.916,930 |
| June 2014 | 1.261,124 | 0,067 | 1.261,057 |
| July 2014 | 682,176 | 3,372 | 678,804 |
| August 2014 | 456,478 | 5,006 | 451,472 |
| September 2014 | 475,955 | 3,875 | 472,080 |
| October 2014 | 886,271 | 2,084 | 884,187 |
| November 2014 | 2.758,129 | 1,196 | 2.756,933 |
| December 2014 | 2.568,485 | 0,008 | 2.568,477 |
| | | ***TOTAL 2014*** | ***19,208.564*** |
| January 2015 | 3.348,958 | 0,019 | 3.348,939 |
| February 2015 | 3.434,133 | 0,021 | 3.434,112 |
| March 2015 | 3.813,740 | 0,041 | 3.813,699 |
| April 2015 | 3.695,336 | 0,035 | 3.695,301 |
| May 2015 | 3.723,971 | 0,074 | 3.723,897 |
| June 2015 | 3.391,363 | 0,059 | 3.391,304 |
| July 2015 | 2.676,883 | 0,031 | 2.676,852 |
| | | ***TOTAL 2015*** | ***24,084.104*** |
| **Total** | **136,173.709** | **85.368** | **136,088** |

EGy 2010 is calculated and confirmed as 1,952.000 MWh

EGy 2011 is calculated and confirmed as 31,300.424 MWh

EGy 2012 is calculated and confirmed as 28,456.831 MWh

EGy 2013 is calculated and confirmed as 31,086.449 MWh

EGy 2014 is calculated and confirmed as 19,208.564 MWh

EGy 2015 is calculated and confirmed as 24,084.104 MWh

The baseline emissions of the Project are calculated as:

$BE_{2010}$ = $EF_{1st\ CP}$* EGy,2010= 0.562 tCO2e/MWh* 1,952.000 MWh= 1,097.01 tCO2e

$BE_{2011}$ = $EF_{1st\ CP}$* EGy,2011= 0.562 tCO2e/MWh* 31,300.4 MWh = 17,590,84 tCO2e

$BE_{2012}$ = $EF_{1st\ CP}$* EGy,2012= 0.562 $tCO_2e$/MWh* 28,456.831 MWh = 15,992,74 $tCO_2e$

$BE_{2013}$ = $EF_{1st\ CP}$* EGy,2013= 0.562 $tCO_2e$/MWh* 31,086.449 MWh = 17,470,6 tCO2e

$BE_{2014}$ = $EF_{1st\ CP}$* EGy,2014= 0.562 $tCO_2e$/MWh* 19,208.564 MWh = 10,795,2 tCO2e

$BE_{2015}$ = $EF_{1st\ CP}$* EGy,2015= 0.562 $tCO_2e$/MWh* 24,084.104 MWh = 13,535.3 tCO2e

$BE_{1stMP}$ = $BE_{2010}$+$BE_{2011}$+$BE_{2012}$ + $BE_{2013}$ + $BE_{2014}$ + $BE_{2015}$ = 1,097.01 + 17,590,84 + 15,992,74 +17,470,6 + 10,795,2 + 13,535.3 = *76.481,6* tCO2e

Baseline emission for the project activity is rounded down to be in conservative side It is confirmed as BE1stMP= **76,481 tCO2e.**

***CAR08*** *has been raised regarding to providing baseline emission calculations under section E.1 of the monitoring report. Baseline emission calculations are presented for the 2010, 2011, 2012 and 2013 years and the corrective action request is closed after confirmation of the calculations.*

**[Project emissions]**

During the validation period project emission parameter is not described. During the site visit diesel generator total working hour is recorded by the verification team. The verification team requested to adding project emission to the emission reduction calculations to be in conservative side. According to "*Tool to calculate project or leakage CO2 emissions from fossil fuel combustion*" project emission is added to Emission reduction calculations.

The project emission is calculated and confirmed according to this formula;

$$PEFC,j,y = \sum FCi,j,y \times COEFi,y$$

Where:

$PEFC,j,y$ = Are the $CO_2$ emissions from fossil fuel combustion in process j during the year y ($tCO_2$/yr);

$FCi,j,y$ = Is the quantity of fuel type i combusted in process j during the year y (mass /volume)

$COEFi,y$ = Is the $CO_2$ emission coefficient of fuel type i in year y ($tCO_2$/mass or volume unit)

i = Are the fuel types combusted in process j during the year y

For calculating the $COEF_{i,y}$ option B has been used which is given as;

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$$

Where:

| | | |
|---|---|---|
| $COEF_{i,y}$ | = | Is the $CO_2$ emission coefficient of fuel type i in year *y* ($tCO_2$/mass or volun unit) |
| $NCV_{i,y}$ | = | Is the weighted average net calorific value of the fuel type *i* in year *y* (GJ/mass or volume unit) |
| $EF_{CO2,i,y}$ | = | Is the weighted average $CO_2$ emission factor of fuel type *i* in year *y* ($tCO_2$/( |
| i | = | Are the fuel types combusted in process *j* during the year *y* |

COEF for diesel fuel has been calculated and based on these parameters, PE due to diesel generator has been calculated for the monitoring period. Calculations and references are indicated in excel sheet.

The NCV (0.043 GJ/tonnes) is obtained from the IPCC 2006 Guidelines. The density of diesel is obtained from TUPRAS website.

The EF is calculated based on the carbon conversion unit (20 t C/TJ) given in the Turkey's National Inventory Report. $COEF_{i,y}$= [0.043 * (20* (44/12))*1000)] / ((1/845)*1,000,000))

$COEF_{i,y}$ = 2.646 kg CO2/lt

Thus, the project emission from the diesel generator is confirmed as:

$$PE_{FC,j,y} = \sum_{i} FC_{i,j,y} \times COEF_{i,y}$$

$PE_{FC,j,y}$= 800 Lt (between 31/06/2013 - 31/07/2015) + 4681.4 Lt (between 06/08/2010 - 31/06/2013) * 0.00246(t CO2)= 15.00 tones CO2

Finally, The PEFC,j,y is calculated and confirmed as **15 tonnes CO2e**.

**[Leakage emissions]**

No leakage needs to be considered according to ACM0002 Version 11.

**[Emission reductions]**

The emission reductions during the monitoring period from are calculated as:

$ER_y = BE_y - PE_y - L_y$= 76,481- 15 = 76,466 $tCO_2e$.

***CAR02*** *has been raised by the verification team to provide total GHG emission reductions during the monitoring period under section A.1 of the monitoring report. Total GHG emission reduction is added under section A.1 than CAR02 is closed.*

**[Comparison of ERs]**

The annual estimated emission reductions are 22,019 tCO2e as per the registered PDD. The actual operation days of the Project in the monitoring period are 1825 days. The corresponding estimate in the monitoring period are 110,095 (=22,019*1825/365) tCO2e. The actual emission reductions are **30,54%** less than the estimated value in the monitoring period.

The variation is due to season conditions on site and it is deemed to be reasonable. In Hydro power projects season conditions can changeable, therefore acceptable.

✌ Corresponding to VVS version 09.0, Bureau Veritas Certification can confirm that:

- Data used for the determination of the emission reductions are available and monitored in accordance with the monitoring plan contained in the registered GS-VER-PDD.
- Information and data provided in the monitoring report have been cross-checked with other sources such as plant logbooks, inventories, purchase records, laboratory analysis.
- Appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed.
- Assumptions, emission factors and default values that were applied in the calculations have been justified.

# 4. VERIFICATION OPINION

Bureau Veritas Certification has performed the periodic verification of 7.11 MW Bulam Hydroelectric Power Plant, GS Registration Reference Number GS 642 which is located in Southeast Anatolia, within the borders of Adıyaman province, and applying the methodology.

The verification was performed based on the requirements set by the CDM methodology, GS v.2.2 and relevant guidance provided by CMP and the CDM Executive Board.

The verification consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The management of Global Tan Energy Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of the project on the basis set out within the monitoring plan contained in the registered GS-VER-PDD.

The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the project.

Bureau Veritas Certification has verified the project Monitoring Report version dated for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as described in the validated and registered project design documents.

Installed equipment's being essential for generating emission reductions run reliably and are calibrated appropriately. The monitoring system is in place and the Project is generating GHG emission reductions as a GS-VER project.

Bureau Veritas Certification can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the validated and registered project baseline, monitoring plan and its associated documents.

Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas Certification confirms the following statement:

| | | |
|---|---|---|
| Reporting period | : 01/08/2010 to 31/07/2015 | |
| Baseline emissions 2010 (01/08/2010 – 31/12/2010) | : 1,097 | t CO2 equivalents |
| Baseline emissions 2011 | : 17,590 | t CO2 equivalents |
| Baseline emissions 2012 | : 15,992 | t CO2 equivalents |
| Baseline emissions 2013 | : 17,470 | t CO2 equivalents |
| Baseline emissions 2014 | : 10,795 | t CO2 equivalents |
| Baseline emissions 2015 | : 13,535 | t CO2 equivalents |
| Baseline emissions (Total) | : 76,481 | t CO2 equivalents |
| Project emissions (Total) | : 15 | t CO2 equivalents |
| Leakage emissions | : 0 | t CO2 equivalents |
| *Emission Reductions achieved up to 31/12/2012* | *: 34,668* | *t CO2 equivalents* |
| *Emission Reductions achieved from to 01/01/2013* | *: 41,798* | *t CO2 equivalents* |
| Emission Reductions ( Monitoring Period) | : 76,466 | t CO2 equivalents |

Mr. Onur YILMAZ
Internal Technical Reviewer
15/07/2016

Mr. FURKANSADIKOĞLU
Team Leader
15/07/2016

# 4. REFERENCES

**Documents reviewed:**

/1 Registered PDD version 10 dated, GS ref no. GS 642
Registered GS Passport dd. 29/02/2012
/2 Validation Report revision 06, dated 23/07/2012
/3 Monitoring Report version 04, dated 21/06/2016
/4 ER Calculation Spreadsheet version 04, dated 21/06/2016
/5 UNFCCC applied approved CDM Methodology
/6 Validation and Verification Standard Version 09
/7 EMRA Electricity Generation License dd. 31/05/2006
/8 Social Security Records of the Employee
/9 Internal Training Records and Qualification Certificate of Operation Staff
/1 Monthly Reading Records (06/08/2010 – 31/06/2013)
/1 PMUM Screens (06/08/2010 – 31/06/2013)
/1 The Supplementary Report About Bulam HEPP 17 June 2013
/1 Tree planting Record 16/06/2011
/1 *http://www.csgb.gov.tr/csgbPortal/cgm.portal?page=asgari*
/1 Evaluation of the Fish Passage Efficiency and Environmental Flows of Bulam HEPP 02 October 2012
/1 Liminigraph Records (06/08/2010 – 31/06/2013)
/1 Expropriation Records
/1 *http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch=*
/1 ELSTER Calibration Records 17/11/2009
/2 Diesel Generator Technical Specs.
/2 Bulam Provisional Acceptance Document – 06/08/2010
/2 Bulam 7.11 MW HPP, Turkey 8 Week Registration Review – 23 December 2010

**Persons interviewed:**

*AK Enerji Elektrik Üretim A.Ş*

- Ali Arıca – Plant Manager

*GTE Carbon*

- Zeren Erik – Consultant

*Stakeholders*

- Ali Atay – Muhtar of Doğanlı Village – +90 537 348 45 02
- Hasan Nergiz – Local - +90 533 63129 23
- Ali Nevrus – Local - +90 536 258 89 93

## 5. CURRICULA VITAE OF THE DOE'S VERIFICATION TEAM MEMBERS

| | | |
|---|---|---|
| Mr. Furkan SADIKOĞLU | Bureau Veritas<br>Certification, Turkey | Team Leader, Climate Change Lead Verifier,<br>Furkan Sadıkoğlu is an Electrical & Electronics engineer. He has an experience in renewable energy and LED lightning sectors and he has over 2 years' experience in energy sectors. He has participated online seminars in the Gold Standard Academy in 2012 and 2013 and is a lead verifier for GHG emission reduction projects. |

| | | |
|---|---|---|
| Mr. Onur YILMAZ | Bureau Veritas<br>Certification, Turkey | Technical Reviewer, Climate Change Lead Verifier.<br>Onur Yilmaz is a Mechanical Engineer and also Energy Manager as 5 years of consulting experience on energy efficiency. He has experience in conducting pre audits and audits in industrial and buildings establishments. He has also participated online seminars and trainings on Gold Standard. |

# APPENDIX A: CDM PROJECT VERIFICATION PROTOCOL

**Table 1** Verification requirements based on VVS version 09.0 (EB 82 Annex 14), PS version 09.0 (EB 82 Annex 13), PCP version 09.0 (EB 82 Annex 15), and Guidelines for completing the Monitoring Report Form version 05.1 (EB 70 Annex 11)

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| **Part I Cover Page** | | | | | |
| (a) Is the title of the project activity provided? | MR | | Title is given as "7.11 MW Bulam Hydroelectric Power Plant" in line with GS Registry. | **OK** | **OK** |
| (b) Is the reference number of the project activity provided? | MR | | GS project ID is given as GS 642. | **OK** | **OK** |
| (c) Is the version number of the monitoring report indicated? | MR | | 01 | **OK** | **OK** |
| (d) Is the completion date of the monitoring report provided in DD/MM/YYYY format? | MR | | 16/08/2013 | **OK** | **OK** |
| (e) Is the registration date of the project activity provided in DD/MM/YYYY format? | MR | | 17/02/2011 | **OK** | **OK** |
| (f) Are the monitoring period number and duration of this monitoring period (first and last days included in DD/MM/YYYY format) provided? | MR | | 1st Period 01/08/2010 – 31/07/2015 | **OK** | **OK** |
| (g) Are project participants indicated? | MR | | 1- MEMEnerji Elektrik Üretim A.Ş (MEM) (Private Entity, Project Owner)<br>2- Global Tan Energy Ltd. (Private Entity, Project Developer) | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| (h) Is the host party(ies) indicated? | MR | | Turkey | **OK** | **OK** |
| (i) Are the sectoral scope(s) and applied methodology(ies) indicated? | MR | | Sectoral Scope 1, Energy Industries (Renewable-/non – renewable sources). Applied methodology : ACM0002 v.05.2 | **OK** | **OK** |
| (j) Is the estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD indicated? | MR | | 110,095 tCO2 | **OK** | **OK** |
| (k) Are the actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period indicated? | MR | | 76,466 tCO2 | **OK** | **OK** |
| (l) Are the actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012 indicated (if applicable)? | MR | | N/A | **OK** | **OK** |
| (m) Are the actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards indicated (if applicable)? | MR | | N/A | **OK** | **OK** |
| **Part II Monitoring Report** | | | | | |
| **A. Description of project activity** | | | | | |
| **A.1 Purpose and general description of project activity** | | | | | |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| A.1.1 Is the description of the project activity to be presented in this section a brief summary of the detailed description given in the section B.1 Implementation status of the project activity? | MR | | Section briefly summarizes implemented project while B.1 points out to specific updates in the implementation during this monitoring period. | **OK** | **OK** |
| A.1.2 Does this description include: | | | | | |
| A.1.2.1 Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks? | MR | | The main goals of the project activity are provided under section A.1 of the monitoring report. | **OK** | **OK** |
| A.1.2.2 Brief description of the installed technology and equipments? | MR | | Under section A.1 a brief description of the installed technology and equipments is not provided. Please provide. | **CAR01** | **OK** |
| A.1.2.3 Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)? | MR | | Construction start date is given as 01/08/2008 which is line with the registered PDD. | **OK** | **OK** |
| A.1.2.4 Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period? | MR | | Under section A.1 total GHG emission reductions during the monitoring period is not provided. Please provide. | **CAR02** | **OK** |
| **A.2 Location of project activity** | | | | | |
| A.2.1 Is the information on the location of the project activity provided, including Host Party(ies), Region/State/Province, City/Town/Community, Physical/ | MR | | Under section A.2 the information on the location (Country, Region/State/Province, City/Town/community) of the project activity is not | **CAR03** | **OK** |

| CHECKLIST QUESTION | | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|---|
| | Geographical location etc.? | | | provided. Please provide. | | |
| **A.3** | **Parties and project participant(s)** | | | | | |
| A.3.1 | Is the Party(ies) and project participant(s) involved in the project activity listed in the provided table? | MR | | The project activity is listed under section A.3 of the monitoring report. | **OK** | **OK** |
| **A.4** | **Reference of applied methodology** | | | | | |
| A.4.1 | Is the exact reference (number, title, version) of the methodology(ies) indicated? | MR | | Approved consolidated baseline methodology ACM0002 " Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 09 | **OK** | **OK** |
| A.4.2 | Is the exact reference (number, title, version) of any tools and other methodologies to which the applied methodology(ies) refers indicated? | MR | | "Tool for the demonstration and assessment of additionality" version 05.2<br>"Tool to calculate the emission factor for an electricity sysem" version 01.1 | **OK** | **OK** |
| **A.5** | **Crediting period of project activity** | | | | | |
| A.5.1 | Are the type, start date and length of the crediting period corresponding to this monitoring period provided? | MR | | Crediting period of the project is 7 years which is twice renewable. Crediting period is not provided under section A.5. Please provide. | **CAR04** | **OK** |
| **B.** | **Implementation of project activity** | | | | | |
| **B.1** | **Description of implemented registered** | | | | | |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| **project activity** | | | | | |
| B.1.1 Is the description of the installed technology, technical processes and equipments provided, include diagrams where appropriate? | MR<br>PS | 191(a) | Under section B.1 of the monitoring report the description of the installed technology, technical processes and equipments is provided. Single line diagram of the project activity is not provided. Please provide. | **CAR05** | **OK** |
| B.1.2 Is the information on the implementation and actual operation of the project activity, including relevant dates (e.g. construction, commissioning, continued operation periods, etc.) provided? | PS | 191(b) | Relevant dates are provided under section A.1 of the monitoring report. The dates are line with the registered PDD. The commissioning dates after the validation period is provided. | **OK** | **OK** |
| B.1.3 Is the description of: (i) the events or situations that occurred during the monitoring period that may impact the applicability of the methodology (ii) how the issues resulting from these events or situations have been addressed provided? | PS | 191(c) | N/A | **OK** | **OK** |
| B.1.4 Have the project participants addressed the FARs identified during validation or previous verification(s)? | VVS | 213 | No FAR has been raised during the validation. | **OK** | **OK** |
| B.1.5 Have the implementation and operation of the project activity been conducted in accordance with the description contained in the registered PDD? | VVS | 226 | Operation has been conducted in accordance with the registered PDD. | **OK** | **OK** |
| B.1.6 Are all physical features of the project | VVS | 227 | All physical features were observed to be in place in | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| activity in the registered PDD in place? | | | line with the registered PDD. | | |
| B.1.7 Have the project participants operated the project activity as per the registered PDD or any approved revised PDD? | VVS | 227 | Project was operated in line with the registered PDD. | **OK** | **OK** |
| B.1.8 Was an on-site visit conducted? | VVS | 227 | An onsite visit was conducted on 09/10/2013 | **OK** | **OK** |
| B.1.9 If an on-site visit is not conducted, is the rationale of the decision justified? | VVS | 227 | N/A | **OK** | **OK** |
| **B.2 Post registration changes** | | | | | |
| B.2.1 Temporary deviations from registered monitoring plan or applied methodology | | | | | |
| B.2.1.1 Is it indicated whether any temporary deviations have been applied during this monitoring period? | MR | | N/A | **OK** | **OK** |
| B.2.1.2 Is a description of the deviation(s) in accordance with applicable provisions in the Project standard provided? | MR | | N/A | **OK** | **OK** |
| B.2.1.3 Are the reasons for the deviation(s), how it deviates from the monitoring plan and/or applied methodology(ies), the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach included in the description? | MR | | N/A | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| B.2.1.4 For deviation(s) that require prior approval by the Board, are the date of approval and reference number included in the description? | MR | | N/A | **OK** | **OK** |
| B.2.2 Corrections | | | | | |
| B.2.2.1 Is it indicated whether any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report? | MR | | N/A | **OK** | **OK** |
| B.2.2.2 In cases where the correction(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided? Otherwise, are the version number and the completion date of the revised PDD provided? | MR | | N/A | **OK** | **OK** |
| B.2.3 Permanent changes from registered monitoring plan or applied methodology | | | | | |
| B.2.3.1 Is it indicated whether any permanent changes from the registered monitoring plan or applied methodologies have been approved during this monitoring period or submitted with this monitoring report? | MR | | N/A | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| B.2.3.2 In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided? Otherwise, are the version number and the completion date of the revised PDD provided? | MR | | N/A | **OK** | **OK** |
| B.2.4 Changes to project design of registered project activity | | | | | |
| B.2.4.1 Is it indicated whether any changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring report? | MR | | N/A | **OK** | **OK** |
| B.2.4.2 In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided? Otherwise, are the version number and the completion date of the revised PDD provided? | MR | | N/A | **OK** | **OK** |
| B.2.5 Changes to start date of crediting period | | | | | |
| B.2.5.1 Is it indicated whether any changes to the start date of the crediting period | MR | | N/A | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| have been approved during this monitoring period? | | | | | |
| B.2.5.2 In cases where the changes and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, are the approval date and reference number provided? | MR | | N/A | **OK** | **OK** |
| B.2.6 Types of changes specific to afforestation or reforestation project activity | | | | | |
| B.2.6.1 Is it indicated whether any changes specific to afforestation or reforestation project activities have been applied during this monitoring period based on applicable provisions in the Project standard that do not require prior approval by the Board? | MR | | N/A | **OK** | **OK** |
| B.2.6.2 If changes were applied, are the version number and the completion date of the revised PDD provided? | MR | | N/A | **OK** | **OK** |
| **C. Description of monitoring system** | | | | | |
| **C.1 General requirements** | | | | | |
| C.1.1 Have project participants described the monitoring system and provided line diagrams (graphical schemes) showing all relevant monitoring points? | MR<br>PS | 193 | The project participant have described the monitoring system and provided (graphical schemes) showing all relevant monitoring points under section C.1 of the monitoring report. Please add the first calibration date | **CAR06** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | of the meters under section C.1 and in all related sections. | | |
| C.1.2 Does this description where appropriate include data collection procedures (information flow including data generation, aggregation, recording, calculations and reporting), organizational structure, roles and responsibilities of personnel, and emergency procedures for the monitoring system? | MR<br>PS | 193 | Data collection procedures, organizational structure, roles and responsibilities of personnel and emergency procedures for the monitoring system is provided. | **OK** | **OK** |
| C.1.3 Is the monitoring plan of the project activity in accordance with the applied methodology including applicable tool(s)? | VVS | 229 | Monitoring plan is line with the applied methodology. | **OK** | **OK** |
| C.1.4 For monitoring aspects that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency), are there any issues which may enhance the level of accuracy and completeness of the monitoring plan and should bring to the attention of the Board? | VVS | 231 | N/A | **OK** | **OK** |
| C.1.5 Has the monitoring plan been properly implemented and followed by the project participants? | VVS | 234(a) | The electricity generation main source is monthly reading protocols and PMUM records will be used for cross checking.<br>8 GS sustainability parameters were monitored. Please | **CAR09** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | see CAR09. | | |
| C.1.6 Have all parameters stated in the monitoring plan and relevant Board decisions been monitored and updated as applicable, including: | VVS | 234(b) | | - | - |
| C.1.6.1 Project emission parameters? | VVS | 234(b) | Project emissions are 0 in line with the applied methodology. | **OK** | **OK** |
| C.1.6.2 Baseline emission parameters? | VVS | 234(b) | EF has been fixed ex-ante for the crediting period and EG was monitored as defined. | **OK** | **OK** |
| C.1.6.3 Leakage parameters? | VVS | 234(b) | Leakage is 0 in line with the applied methodology. | **OK** | **OK** |
| C.1.6.4 Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan? | VVS | 234(b) | No discrepancies were observed. | **OK** | **OK** |
| **D. Data and parameters** | | | | | |
| **D.1 Data and parameters fixed ex ante or at renewal of crediting period** | | | | | |
| D.1.1 For “Purpose of data”, is one of the following options chose: (a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project | MR | | Under section D.1 ex ante parameters are not stated. The parameters under section D.1 should be used for the monitoring. Please clarify. | **CL01** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| emissions or actual net GHG removals by sinks; (c) Calculation of leakage? | | | | | |
| D.1.2 For "Value(s) applied", if applicable, is one table used to report multiple values referring to the same data and parameter? If necessary, are reference(s) to electronic spreadsheets used? | MR | | Please see CL01 | **CL01** | **OK** |
| D.1.3 Is the source of data provide and/or identified? | PS | 195(d) | Please see CL01 | **CL01** | **OK** |
| D.1.4 Is information about appropriate emission factors, IPCC default values and any other reference values that have been used in the calculation of GHG emission reductions or net GHG removals provided? | PS | 195(g) | Please see CL01 | **CL01** | **OK** |
| **D.2 Data and parameters monitored** | | | | | |
| D.2.1 For "Purpose of data", is one of the following options chose: (a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks; (c) Calculation of leakage? | MR | | The parameter is EGfacility,y and it will be used for baseline emission calculations. The QA/QC procedures are not line with the PDD. (please add last calibration date, cross check process transpatently). Capj and Apj paramters are not presented under section D.2 of the monitoring report which is defined in the PDD under monitoring plan. Please clarify. | **CL02** | **OK** |
| D.2.2 For "Value(s) of monitored parameter", if applicable, is one table used to report multiple values referring to the same data | MR | | The monitored value for the parameter is 85.74 GWh. | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| and parameter? If necessary, are reference(s) to electronic spreadsheets used? | | | | | |
| D.2.3 Are the values of the monitored parameter for the purpose of calculating GHG emission reductions or net GHG removals provided? Where data are measured continuously, are they presented using an appropriate time interval? For default values (such as an IPCC value), where it is ex post confirmed, is the most recent value applied? | PS | 195(a) | OSF forms are provided for the electricity generation values. Please check February 2011 value in the excel sheet. It is not line with the OSF Form February 2011. | **CAR07** | **OK** |
| D.2.4 Is the equipment used to monitor each parameter described, including details on accuracy class, and calibration information (frequency, date of calibration and validity), if applicable as per monitoring plan? | PS | 195(b) | The measured electricity is agreed with TEIAS and the measurements are the basis OSF records.Serial numbers of the meters are same under EGfacility,y parameter table. Please clarify and add accuracy class of the meters. | **CL03** | **OK** |
| D.2.5 Is the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per the manufacturer's specification? | VVS | 234(c) | Please see CL03. | **CL03** | **OK** |
| D.2.6 Is the calibration of those measuring equipments that have an impact on the claimed emission reductions conducted by the project participants at a frequency | VVS | 237 | Please see CL03. | **CL03** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| specified in the applied monitoring methodology and/or the monitoring plan? | | | | | |
| D.2.7 If, during verification of a certain monitoring period, the calibration has been delayed and the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available), is the following conservative approach adopted in the calculation of emission reductions: | VVS | 238 | This question will be closed after CL02 is closed. | **OK** | **OK** |
| D.2.7.1 Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error? | VVS | 238(a) | This question will be closed after CL02 is closed. | **OK** | **OK** |
| D.2.7.2 Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment? | VVS | 238(b) | This question will be closed after CL02 is closed. | **OK** | **OK** |
| D.2.8 Has the error has been applied: | VVS | 239 | - | **-** | **-** |
| D.2.8.1 In a conservative manner, such that the adjusted measured values of the | VVS | 239(a) | N/A | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| delayed calibration shall result in fewer claimed emission reductions? | | | | | |
| D.2.8.2 For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration. | VVS | 239(b) | N/A | **OK** | **OK** |
| D.2.9 In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, prior to finalizing verification, were the project participants requested to conduct the required calibration have the project participants calculated the emission reductions conservatively using the approach mentioned in item “D.2.7” above? | VVS | 240 | N/A | **OK** | **OK** |
| D.2.10 In cases where it is not possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan due to reasons beyond the control of PPs, are the requirements for post registration changes, in section 9.5 of the VVS, followed? | VVS | 241 | N/A | **OK** | **OK** |
| D.2.11 In cases where neither the monitoring methodology nor the monitoring plan | VVS | 242 | Frequency and requirements were determined by the national standards and were given in the PDD. | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| specify any requirements for calibration frequency for measuring equipments, are the equipments calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification? If neither local/national standards nor the manufacturer's specification are available, were international standards used? | | | | | |
| D.2.12 Is it described how the parameters are measured/calculated and the measurement and recording frequency? | PS | 195(c) | Please clarify the recording frequency under section D.2 of the monitoring report. | **CL02** | **OK** |
| D.2.13 Are monitoring results consistently recorded as per approved frequency? | VVS | 234(d) | TEIAS records will be used for the main source and PMUM records will be used for cross-checking. | **OK** | **OK** |
| D.2.14 Is the source of data (e.g. logbooks, daily records, surveys, etc.) provide and/or identified? | PS | 195(d) | TEIAS records will be used for the main source and PMUM records will be used for cross-checking. | **OK** | **OK** |
| D.2.15 Where relevant is the calculation method of the parameter provided? | PS | 195(e) | The net electricity of the facility is the difference of the electricity exported to the grid and imported from the grid. | **OK** | **OK** |
| D.2.16 Are the QA/QC procedures applied described (if applicable per monitoring plan)? | PS | 195(f) | Please see CL02 | **CL02** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| D.2.17 Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or the revised monitoring plan? | VVS | 234(e) | Please see CL02 | **CL02** | **OK** |
| D.2.18 Is information about appropriate emission factors, IPCC default values and any other reference values that have been used in the calculation of GHG emission reductions or net GHG removals provided? | PS | 195(g) | N/A | **OK** | **OK** |
| **D.3 Implementation of sampling plan** | | | | | |
| D.3.1 Is a description provided on how project participants implemented the sampling efforts and surveys for those data and parameters according to the sampling plan, Include: | MR | | No sampling plan is applicable to the project activity and hence N/A | **OK** | **OK** |
| D.3.1.1 Description of implemented sampling design? | MR | | N/A | **OK** | **OK** |
| D.3.1.2 Collected data (electronic spreadsheets may be attached and referenced)? | MR | | N/A | **OK** | **OK** |
| D.3.1.3 Analysis of the collected data? | MR | | N/A | **OK** | **OK** |
| D.3.1.4 Demonstration on whether the required confidence/precision has been met? | MR | | N/A | **OK** | **OK** |
| **E. Calculation of emission reductions or GHG removals by sinks** | | | | | |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| **E.1 Calculation of baseline emissions or baseline net GHG removals by sinks** | | | | | |
| E.1.1 Are the sample calculations for all formulae used and calculation of baseline emissions or baseline net GHG removals by sinks provided, applying actual values? | MR PS | 197(a) | Under section E.1 of the monitoring report baseline emission calculations are not presented for the year 2010, 2011 and 2013. Please add. | **CAR08** | **OK** |
| E.1.2 Are the electronic spreadsheets to present full calculations in the monitoring report attached? | MR | | Balıkesir Confidental Bulam Verification Calulations has been presented. | **OK** | **OK** |
| **E.2 Calculation of project emissions or actual net GHG removals by sinks** | | | | | |
| E.2.1 Are the sample calculations for all formulae used and calculation of project emissions or actual net GHG removals by sinks provided, applying actual values? | MR PS | 197(b) | Project emissions are 0 in line with the guidance of the applied methodology. | **OK** | **OK** |
| E.2.2 Are the electronic spreadsheets to present full calculations in the monitoring report attached? | MR | | N/A | **OK** | **OK** |
| **E.3 Calculation of leakage** | | | | | |
| E.3.1 Are the sample calculations for all formulae used and calculation of leakage provided, applying actual values? | MR PS | 197(c) | Leakage is considered 0 in line with the guidance of the applied methodology. | **OK** | **OK** |
| E.3.2 Are the electronic spreadsheets to present full calculations in the monitoring report | MR | | N/A | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| attached? | | | | | |
| **E.4 Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks** | | | | | |
| E.4.1 Are the results of above sections summarized and GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period presented, using the provided table? | MR PS | 197(d) | The results of above sections are summarized and GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period presented using the provided table. | **OK** | **OK** |
| E.4.2 Is a complete set of data for the specified monitoring period is available? | VVS | 245(a) | Complete set of data for the specified monitoring period is available. | **OK** | **OK** |
| E.4.3 Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis? | VVS | 245(b) | Cross-checking with other sources are applied. | **OK** | **OK** |
| E.4.4 Have calculations of baseline emissions, and project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document? | VVS | 245(c) | Yes. | **OK** | **OK** |
| E.4.5 Have any assumptions used in emission calculations been justified? | VVS | 245(d) | N/A | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| E.4.6 Have appropriate emission factors, IPCC default values and other reference values been correctly applied? | VVS | 245(e) | N/A | **OK** | **OK** |
| **E.5 Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD** | | | | | |
| E.5.1 Is a comparison of actual GHG emission reductions or net anthropogenic GHG removal of the project activity achieved during this monitoring period with the estimates in the registered PDD provided? | MR PS | 198 | Emission reduction is estimated in the registered PDD is 70,749 tCO2e and the achieved value in the monitoring period is 48, 152 tCO2e. | **OK** | **OK** |
| **E.6 Remarks on difference from estimated value in registered PDD** | | | | | |
| E.6.1 For any registered CDM project activity, except A/R project activities, have project participants explained the cause of any increase in the actual GHG emission reductions achieved during the current monitoring period (e.g. higher water availability, higher plant load factor, etc.), including all information (i.e. data and/or parameters) that is different from that stated in the registered PDD? | MR PS | 199 | The value in the registered PDD is calculated ex-ante for a duration of one complete year and assuming the plant is working at optimum output rate. Since the project is an HPP, seasonal effects are significant on the monthly generation rates and minor deviations from the calculated values are acceptable. In 2011 and 2012, the realised generation has been lower than the expected amount taking ground from uncertainties in water regimes and over estimation of annual gross output. | **OK** | **OK** |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| **E.7 Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards** | | | | | |
| E.7.1 If the monitoring period starts before 31 December 2012 and ends anytime thereafter, are actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved for the following two periods provided respectively?<br>(a) Up to 31 December 2012 (1st commitment period);<br>(b) From 1 January 2013 onwards. | MR | | It is provided under section E.7 of the monitoring report. | **OK** | **OK** |
| E.7.2 Is it ensured that the achieved GHG emission reductions or net anthropogenic GHG removals by sinks are calculated proportionally for each period? In cases where annual caps were applied in the calculations, is it ensured that the annual caps are pro-rated to each period? | MR | | It is provided under section E.7 of the monitoring report. | **OK** | **OK** |

**Table 2 Resolution of Corrective Action /Clarification / Forward Action Requests**

| Draft report clarifications and corrective action requests by verification team | Ref. to checklist question in table 1 | Summary of project participant response | Verification team conclusion |
|---|---|---|---|
| **CAR01**<br>Under section A.1 a brief description of the installed technology and equipments is not provided. Please provide. | | Added. | **Review 1:**<br>Brief description of the installed technology and equipments is provided under section A.1 of the monitoring report.<br>**The corrective action request is closed.** |
| **CAR02**<br>Under section A.1 total GHG emission reductions during the monitoring period is not provided. Please provide. | | Added | **Review 1:**<br>Total GHG emission reductions during the monitoring period are provided under section A.1 of the monitoring report.<br>**The corrective action request is closed.** |
| **CAR03**<br>Under section A.2 the information on the location | | Added | **Review 1:**<br>Information of the location of the |

| Draft report clarifications and corrective action requests by verification team | Ref. to checklist question in table 1 | Summary of project participant response | Verification team conclusion |
|---|---|---|---|
| (Country, Region/State/Province, City/Town/community) of the project activity is not provided. Please provide. | | | project activity is added under section A.2 of the monitoring report.<br>**The corrective action request is closed.** |
| **CAR04**<br>Crediting period of the project is 7 years which is twice renewable. Crediting period is not provided under section A.5. Please provide. | | Statement revised | **Review 1:**<br>The crediting period of the project activity is 7 years and renewable.<br>**The corrective action request is closed.** |
| **CAR05**<br>Under section B.1 of the monitoring report the description of the installed technology, technical processes and equipments is provided. Single line diagram of the project activity is not provided. Please provide. | | Added as Annex V. | **Review 1:**<br>Single line diagram of the project activity is provided under Annex V.<br>**The corrective action request is closed.** |
| **CAR06**<br>The project participant have described the monitoring system and provided (graphical schemes) showing all relevant monitoring points under section C.1 of the monitoring report. Please add the first calibration date of the meters under section C.1 and in all related sections. | | Added under C1.<br><br>Review 1 response:<br>Calibration of meters are provided to DOE .<br><br>Calibration test date has been revise according to the new document. | **Review 1:**<br>Please provide the calibration records of the meters.<br>**The corrective action request is still open.**<br>**Review 2:**<br>Calibration records of the meters are |

| Draft report clarifications and corrective action requests by verification team | Ref. to checklist question in table 1 | Summary of project participant response | Verification team conclusion |
|---|---|---|---|
| | | | provided to the verification team.<br>**The corrective action request is closed.** |
| **CAR07**<br>OSF forms are provided for the electricity generation values. Please check February 2011 value in the excel sheet. It is not line with the OSF Form February 2011. | | Net generation (2,521.398) and internal consumption (1.956 ) figures are in line with the OSF forms. | **Review 1:**<br>Net generation and internal consumption figures are line with the OSF Forms.<br>**The corrective action request is closed.** |
| **CAR08**<br>Under section E.1 of the monitoring report baseline emission calculations are not presented for the year 2010, 2011 and 2013. Please add. | | Reference to Section E 5 is provided. | **Review 1:**<br>Baseline emission calculations are presented of the year 2010, 2011, 2012 and 2013 are presented.<br>**The corrective action request is closed.** |
| **CAR09**<br>8 Sustainable development parameters are monitored during the monitoring period.<br>**Quantitative Employment and Income Generation:**<br>7 local employee records are provided to the validation team. During the site visit it is declared that more than 7 local people are working for the | | The employee records will be provided once obtained from the project owner.<br>The expert report and AGI records on flow rate is provided with this document.<br>Review 1 response: | **Review 1:**<br>Employee records are still not provided. On the other hand the AGI records and liminigraf records are not signed and the person who prepared is not clear. Also some of the months records under liminigraf records are not available. |

| Draft report clarifications and corrective action requests by verification team | Ref. to checklist question in table 1 | Summary of project participant response | Verification team conclusion |
|---|---|---|---|
| project activity. Please add and provide references.<br><br>**Water Quality and Quantity**<br><br>AGI records are provided for the water flow rates. Records dates are not clear. Please provide AGI records which includes the whole monitoring period. On the other hand expert report for the flow rate is not provided. | | In addition to the previous list, the 2 missing personnel's information provided to the DOE. One local personnel during the construction phase with the missing document has been deleted.<br><br>Limnigraf values are controlled and all months are complete for the monitoring period of 06/08/2010 and 31/06/2013. These values are obtained from the facilitiy's electronic system automatically during the site visit with the DOE. Nevertheless,signed vaşues will be submitted to the DOE as soon as obtained. | **The corrective action request is still open.**<br><br>**Review 2:**<br><br>Corrections have been done.<br><br>**The corrective action request is closed.** |
| **CL01**<br><br>Under section D.1 ex ante parameters are not stated. The parameters under section D.1 should be used for the monitoring. Please clarify. | | Section D1 is revised to be in line with the PDD. | **Review 1:**<br><br>Section D.1 is revised according to registered PDD.<br><br>**The corrective action request is closed.** |
| **CL02**<br><br>The parameter is EGfacility,y and it will be used for baseline emission calculations. The QA/QC procedures are not line with the PDD. (please add last calibration date, cross check process transpatently). Capj and Apj paramters are not presented under section D.2 of the monitoring report which is defined in the PDD under monitoring plan. Please clarify. | | The parameters are revised to be in line with the PDD.<br><br>Review 1 response:<br><br>1.The calibration test report indicates the main and back-up meters in line with the monitoring report. Added under D2 of the Monitoring Report. | **Review 1:**<br><br>Parameters are added under section D.2 of the monitoring report. Under EG parameter meters serial numbers are provided but which is the main and back-up meter is not clear. On the other under APj parameter reservoir area is provided as 18,670 m2. Please provide the reservoir |

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| | | 2. Reservoir maps are provided to DOE. | area map.<br>**The corrective action request is still open.**<br>**Review 2:**<br>Corrections have been done.<br>**The corrective action request is closed.** |
| **CL03**<br>The measured electricity is agreed with TEIAS and the measurements are the basis OSF records. Serial numbers of the meters are same under EGfacility,y parameter table. Please clarify and add accuracy class of the meters. | | The serial number is corrected.<br>Accuracy class is added. | **Review 1:**<br>Accuracy class of the meters is added.<br>**The corrective action request is closed.** |
| **FAR01**<br>Verification DOE shall check expropriation documents during the second monitoring period whose lands have been expropriated. | | | |