

VERIFICATION REPORT

“78 MW AKOCAK HYDROELECTRIC POWER PLANT”



RINA

RINA Services S.p.A.

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Summary:

RINA Services S.p.A. (RINA), commissioned by Akenerji Elektrik Uretim A.S., has verified the greenhouse gas emission reductions reported for the project activity “78 MW Akocak Hydroelectric Power Plant” in Turkey, VCS Registration Reference N° 535, for the period 01/08/2012 to 31/12/2015, with regard to the relevant requirements for CDM and VCS activities.

The objective of the verification is to have an independent review ex post determination of the monitored reductions in GHG emission reductions, reported for the “78 MW Akocak Hydroelectric Power Plant” project in Turkey for the period 01/08/2012 to 31/12/2015.

Verification was conducted using RINA procedures in line with the requirements specified in the VCS Version 3 Requirements, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques. The verification consisted of desk review, on-site assessment and the resolution of outstanding issues and the issuance of the final verification report and certification.

The verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable VCS Version 3 requirements, which refer to CDM rules, in order to be certified.

In conclusion, it is RINA's opinion that the project activity “78 MW Akocak Hydroelectric Power Plant”, in “Turkey”, as described in the Monitoring Report version 04 of 24/05/2016, meets all relevant requirements for VCS and CDM activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology “ACM0002”, “Consolidated baseline methodology for grid-connected electricity from renewable sources”, version 10 of 28/05/2009. Hence, RINA is able to certify that the emission reductions from the project during the monitoring period 01/08/2012 to 31/12/2015 amount to 256,043 tCO₂e.

The emission reductions generated during the years 2012, 2013, 2014 and 2015 is given below:

2012	from 01/08/2012 to 31/12/2012: 2,715 tCO ₂ e
2013	from 01/01/2013 to 31/12/2013: 90,780 tCO ₂ e
2014	from 01/01/2014 to 31/12/2014: 69,165 tCO ₂ e
2015	from 01/01/2015 to 31/12/2015: 93,383 tCO ₂ e
TOTAL	from 01/08/2012 to 31/12/2015: 256,043 tCO ₂ e

TABLE OF CONTENTS

PAGE

1	Introduction	4
1.1	Objective	4
1.2	Scope and Criteria	4
1.3	Level of assurance	4
1.4	Summary Description of the Project.....	5
2	Verification Process	6
2.1	Method and Criteria.....	6
2.2	Document Review	6
2.3	Interviews.....	8
2.4	Site Inspections.....	9
2.5	Resolution of Findings	9
2.5.1	Forward Action Request	11
2.6	Eligibility for Validation Activities.....	11
3	Validation Findings	11
3.1	Participation under Other GHG Programs.....	11
3.2	Methodology Deviations	11
3.3	Project Description Deviations	11
3.4	Grouped Project.....	11
4	Verification Findings	12
4.1	Project Implementation Status.....	12
4.2	Accuracy of GHG Emission Reduction and Removal Calculations	12
4.3	Quality of Evidence to Determine GHG Emission Reductions and Removals .. Error! Bookmark not defined.	
4.4	Non-Permanence Risk Analysis	18
5	Verification conclusion	19

Appendix A: VCS Verification Protocol

1 INTRODUCTION

1.1 Objective

The objective of the verification is to have an independent review ex post determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered VCS project activity during a defined monitoring period. Certification is the written assurance by the DOE that, during a specific time period, a proposed VCS project activity achieved the reductions in anthropogenic emissions by sources of GHGs as verified.

The objective of this verification/certification was to verify and certify emission reductions and effective implementation of the monitoring of sustainable development indicators and mitigation measures, reported for the “78 MW Akocak Hydroelectric Power Plant” project in Turkey for the period 01/08/2012 to 31/12/2015.

1.2 Scope and Criteria

The verification scope is:

- to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- to evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;
- to verify that reported GHG emission data is sufficiently supported by evidence;
- to evaluate whether all the mitigation measures have been effectively put in place according to the monitoring plan and that all the sustainable development indicators have been correctly monitored.

Verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable VCS Version 3 requirements, which refer to CDM rules, in order to be certified.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

Verification is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

1.3 Level of Assurance

All the revisions of the verification report, before being submitted to the client, were subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent RINA instructions. All evidence had been confirmed during on site visit with the invoices of electricity generation. The level of assurance is reasonable.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for VCS and CDM validation and verification. The verification team and the technical reviewers consist of the following personnel:

Role/Qualification	Last Name	First Name	Country
VCS Team Leader – VCS Verifier – Technical Expert	Kiratli	Tugce	Turkey
Technical Reviewer	Menon	Rekha	India

1.4 Summary Description of the Project

Akenerji Elektrik Uretim A.S. has commissioned RINA to carry out the verification and certification of emission reductions reported for the registered “78 MW Akocak Hydroelectric Power Plant” project in Turkey, VCS Registration Reference N°53 5, for the period 01/08/2012 to 31/12/2015.

The project is hydroelectric power plant located in East Black Sea Region, Arakli District of the Trabzon Province, Turkey.

The project consists of two weirs. Erikli weir is located on Alcak Brook that is branch of Karadere River at 1,339 meters river elevation. Akocak weir is located on Karadere River at 1,328 meters river elevation. The water collected at Erikli weir is connected with a 3 meter diameter, circular section, derivation tunnel of 3,250 meters long to the upstream of Akocak weir. The Akocak weir transmits the collected waters to a surge tank through a 6,150 meters long transmission tunnel. The penstock extending from the surge tank to the powerhouse is 1,842 meters long, with an average diameter of 1.82 meters. In the power house, 2 vertical axis Pelton turbines are installed with a total capacity of 81 MWe. The generated electricity is transmitted to the National Electricity System through Arsin Substation, with a 154 kV and 32 km long energy transmission line.

Project Participant(s)	Akenerji Elektrik Uretim A.S. / Global Tan Energy Ltd.		
Project Title	78 MW Akocak Hydroelectric Power Plant		
Location of the project	East Black Sea Region, Arakli District, Trabzon Province of Turkey		
Methodology(ies)	ACM0002”, “Consolidated baseline methodology for grid-connected electricity from renewable sources”, version 10 of 28/05/2009 /6/		
Sectoral Scope(s)	1	RINA's Technical Area(s)	1.2
Registered VCS PD	Version 03 of 20/07/2010		
VCS Registration Reference No	535		
Starting date of the crediting period	01/07/2010 (as confirmed through the Temporary Acceptance Protocol /14/)		
Project's crediting period	01/07/2010 and 30/06/2020		
Monitoring period	01/08/2012 to 31/12/2015 (both days included)		
Project documentation link	https://mer.markit.com/br-reg/public/project.jsp?project_id=100000000000537		

2 VERIFICATION PROCESS

The project was validated by Bureau Veritas Certification Holding SAS on 26/07/2010 and it was registered under the VCS registration reference N° 535. This is the second verification assessment for the monitoring period 01/08/2012 to 31/12/2015 by RINA.

2.1 Method and Criteria

Verification was conducted using RINA procedures in line with the requirements specified in the VCS Version 3 Requirements, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The verification consisted of the following three phases:

- Document review;
- On-site assessment;
- The resolution of outstanding issues and the issuance of the final verification report and certification.

2.2 Document Review

The monitoring report, version 04 of 24/05/2016 [/2/](#), the emission reduction calculations provided in the form of a spreadsheet, “Akocak ver_cal_01 08 12 - 31 12 15_03 05 16_GTE_v.3.xlsx” version 03 of 04/05/2016 [/8/](#), the approved baseline and monitoring methodology ACM0002 version 10 [/6/](#) and all the documentation provided to support the monitoring period [/01 – 31/](#) were assessed as part of the verification. In addition, the VCS Project Description (VCS PD) [/1/](#), in particular as regards the baseline estimations and the monitoring plan, and the Validation Report of 26/07/2010 [/7/](#) for the project, were reviewed.

The following table lists the documentation that was reviewed during the verification.

/1/	Global Tan Energy Limited (GTE): VCS PD for “78 MW Akocak Hydroelectric Power Plant” in Turkey, version 03 of 20/07/2010
/2/	Global Tan Energy Limited (GTE): Monitoring report for “78 MW Akocak Hydroelectric Power Plant” in Turkey, version 04 of 24/05/2016 related to the monitoring period 01/08/2012 to 31/12/2015 Global Tan Energy Limited (GTE): Monitoring report for “78 MW Akocak Hydroelectric Power Plant” in Turkey, version 03 of 04/05/2016 related to the monitoring period 01/08/2012 to 31/12/2015 Global Tan Energy Limited (GTE): Monitoring report for “78 MW Akocak Hydroelectric Power Plant” in Turkey, version 02 of 03/05/2016 related to the monitoring period 01/08/2012 to 31/12/2015 Global Tan Energy Limited (GTE): Monitoring report for “78 MW Akocak Hydroelectric Power Plant” in Turkey, version 01 of 04/04/2016 related to the monitoring period 01/08/2012 to 31/12/2015
/3/	VCS Verified Carbon Standard: VCS Program Guide, VCS Version 03 of 01/05/2012
/4/	VCS Verified Carbon Standard: VCS Standard, VCS Version 03 of 01/02/2012
/5/	CDM Executive Board: Clean Development Mechanism Validation and Verification Standard, version 09.0 of 20/02/2015
/6/	CDM Executive Board: Baseline and monitoring methodology “ACM0002”, “Consolidated

	baseline methodology for grid-connected electricity from renewable sources”, version 10 of 28/05/2009
/7/	Bureau Veritas Certification Holding SAS: Validation Report for “78 MW Akocak Hydroelectric Power Plant” of 26/07/2010
/8/	Global Tan Energy Limited (GTE): Emission Reduction Calculation Spreadsheet “Akocak ver_cal_01 08 12 - 31 12 15_03 05 16_GTE_v.3.xlsx” version 03 of 04/05/2016 related to the monitoring period from 01/08/2012 to 31/12/2015 Global Tan Energy Limited (GTE): Emission Reduction Calculation Spreadsheet “Akocak ver_cal_01 08 12 - 31 12 15_03 05 16_GTE_v.2.xlsx” version 02 of 03/05/2016 related to the monitoring period from 01/08/2012 to 31/12/2015 Global Tan Energy Limited (GTE): Emission Reduction Calculation Spreadsheet “Akocak ver_cal for 01 08 12 - 31 12 15 v 1 04 04 15_GTE_v.1.xlsx” version 01 of 04/04/2016 related to the monitoring period from 01/08/2012 to 31/12/2015
/9/	VCS Verified Carbon Standard: VCS Verification Report Template Version 3.3 of 08/10/2013
/10/	CDM Executive Board: Methodological Tool “Tool to calculate the emission factor for an electricity system”, version 02 of 16/10/2009
/11/	Turkish Electricity Transmission Company (TEIAS): First Index Protocol of 27/05/2010
/12/	Turkish Electricity Transmission Company (TEIAS): Meter Test Report of Actaris Meter Serial Number 53064405, 53064406, 53064407, 53064408 of 08/12/2012 Turkish Electricity Transmission Company (TEIAS): Meter Test Report of Actaris Meter Serial Number 53064405, 53064406, 53064407, 53064408 of 11/12/2013 Dalya Enerji: Meter Test Report of Actaris Meter Serial Number 53064405, 53064406, 53064407, 53064408 of 10/10/2014 Dalya Enerji: Meter Test Report of Actaris Meter Serial Number 53064405, 53064406, 53064407, 53064408 of 16/10/2015
/13/	Energy Market Regulatory Authority: Generation License numbered EU/582-5/590 of 23/11/2005 (Amendment on 14/01/2010)
/14/	The Ministry of Energy and Natural Resources: Temporary Acceptance Protocol of 30/06/2010 (Unit 1)
/15/	The Ministry of Energy and Natural Resources: Temporary Acceptance Protocol of 29/07/2010 (Unit 2)
/16/	Voith Siemens Hydro Power Generation: Technical Specification of Turbines of Rev. 0 of 11/12/2008
/17/	Market Financial Conciliation Center (PMUM): All Monthly PMUM Records with in the Monitoring Period (from 01/08/2012 to 31/12/2015)
/18/	The Turkish Ministry of Trade and Industry: Regulation of Metering and Testing of Metering Systems of 24/07/1994
/19/	Turkish Energy Market Regulatory Authority: Communiqué for Measurement Devices used in the Electricity Market of 22/03/2003
/20/	Website: https://mer.markit.com/br-reg/public/project.jsp?project_id=100000000000537 Argument: Markit Database Language: English; Retrieved on: 29/04/2016
/21/	The Energy Market Regulatory Authority: Electricity Market Balancing and Settlement Regulation of 14/04/2009
/22/	CDM Executive Board: Methodological Tool “Tool for the demonstration and assessment of additionality”, version 05.2 of 26/08/2008
/23/	RINA: Final Verification Report “78 Mw Akocak Hydroelectric Power Plant” No. 2012-TQ-17-MD of 10/01/2014

/24/	Invoices of the Diesel Generator for the Monitoring Period from 01/08/2012 to 31/12/2015, submitted on 28/03/2016
/25/	Website: https://mer.markit.com/br-reg/public/project.jsp?project_id=100000000000537 Argument: VCS Database Language: English; Retrieved on: 05/05/2016
/26/	CDM Executive Board: Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion" version 02.0 of 02/08/2008
/27/	Intergovernmental Panel on Climate Change: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 1, Table 1.2 "Default Net Calorific Values (NCVs) and Lower and Upper Limits of the 95% Confidence Intervals"
/28/	Website: http://www.tupras.com.tr/detailpage.tr.php?strProductKey=403&RedirectPageID=145 Argument: Density of Diesel Oil Language: Turkish; Retrieved on: 05/05/2016
/29/	Turkish Statistical Institute: UNFCCC Turkey National Inventory Report 2010
/30/	Monthly Facility Reports for Electricity Generation for the Monitoring Period of 01/08/2012-31/12/2015
/31/	Ada Muhendislik: General Layout Plan of Akocak HEPP of June 2011

2.3 Interviews

The Plant Manager was interviewed during the site visit. To see how the monitoring procedures were implemented, the whole process was explained to the verification team during the site visit. The carbon consultant was interviewed about the monitoring report and related parameters. Whole process related emission reduction calculation was explained.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	13/04/2016	Zeynep CANSEVER <i>Carbon Consultant</i>	GTE Global Tan Energy Limited	Monitoring plan Monitoring methodology Monitoring data
/b/	13/04/2016	Engin KOC <i>Carbon Consultant</i>	GTE Global Tan Energy Limited	Implementation status of the project Monitoring equipment and operation
/c/	13/04/2016	M. Kubilay YURTSEVER <i>Maintenance Responsible</i>	Akenerji Elektrik Uretim A.S.	Calibration certificates Emission Reductions calculation

2.4 Site Inspections

On 13/04/2016, RINA visited the wind power plant located in Arakli District, Trabzon province of Turkey. During the on-site assessment of the project, all the equipment and the systems were accessible. RINA assessed the implementation and operation of the proposed project activity, reviewed the information flows for generating, aggregating and reporting the monitoring parameters, interviewed key personnel of the plant to confirm the operational and data collection procedures, cross-checked between information provided in the monitoring report and data plant, checked the monitoring equipment including calibration performance, reviewed calculations and assumptions made in determining the GHG data and emission reductions, checked the quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

The objective of this phase of the verification is to resolve any outstanding issues, which need to be clarified for RINA's positive conclusion on the monitoring report and emission reductions.

To guarantee transparency a verification protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of verification and the results from verifying the identified criteria. The verification protocol consists of three tables; the different columns in these tables are described in the figure below (see Figure 1). The completed verification protocol is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions;
- Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CR) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements, which refer to CDM rules, have been met.

CARs, CRs identified are included in the verification protocol in Appendix A of this report.

Figure 1 Verification protocol tables

Verification Protocol, Table 1 - Requirement checklist					
Checklist Question	Ref.	MoV	Comments	Draft Conclusion	Final Conclusion
Checklist questions organized in seven different sections.	Makes reference to documents where the answer to the checklist question or item is found.	Explain how conformance with the checklist question is investigated. Examples are document review (DR), interview or any other follow-up actions (I), cross checking (CC) with available information relating to projects, (N/A) means not applicable.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with checklist question so far.	For CAR, CR and FAR see the definitions above.	OK is used if the information and evidence provided is adequate to demonstrate compliance with VCS requirements which refer to CDM rules.

Verification Protocol, Table 2: Resolution of Corrective Action Requests and Clarification			
Corrective action requests and/or clarification requests	Reference to Table 1	Response by project participants	Verification Conclusion
The CAR and/or CRs raised in table 1 are repeated here.	Reference to the checklist question number in Table 1 where the CAR or CR is explained.	The responses given by the project participants to address the CARs and/or CRs.	The verification team's assessment and final conclusion of the CARs and/or CRs.

Verification Protocol, Table 3 - Forward Action Requests		
Forward action request	Reference to Table 1	Response by project participants Verification Conclusion
The FAR raised in table 1 is repeated here.	Reference to the checklist question number in Table 1 where the FAR is explained.	Response by the project participants on how forward action request will be addressed.

2.5.1 Forward Action Requests

According to the previous verification report [/23/](#), no FAR is raised.

2.6 Eligibility for Validation Activities

The project activity is registered under VCS registration reference Number 535 [/25/](#); hence this section is not applicable.

3 VALIDATION FINDINGS

In the registered VCS PD for “78 MW Akocak Hydroelectric Power Plant” in Turkey, version 03 of 20/07/2010 [/1/](#), the power density has been calculated based on the only reservoir area of Erikli weir. To be on the conservative side, the reservoirs both of Erikli and Akocak have been taken into consideration and power density is calculated accordingly in the Monitoring Report Version 04 of 24/05/2016 [/2/](#). The power density is still higher than 10 W/m²; therefore, project emissions are neglected.

In the registered VCS PD for “78 MW Akocak Hydroelectric Power Plant” in Turkey, version 03 of 20/07/2010 [/1/](#), the installed capacity is defined as 78 MW. However, the installed capacity is increased to 81 MWe as confirmed through the Generation License [/13/](#) and Temporary Acceptance Protocols [/14/](#) [/15/](#). The current annual generation is 257.440 GWh as per the Generation License [/13/](#), which is same with the registered VCS PD [/1/](#). The additionality of the project activity is demonstrated by applying investment analysis registered VCS PD [/1/](#). The annual electricity generation used in the investment analysis that is 257.440 GWh has remained same. Therefore, this change does not affect the additionality of the project activity.

These changes are permanent during the crediting period and have been assessed as per the “Clean Development Mechanism Validation and Verification Standard”, version 02.0 of 25/11/2011 [/5/](#) and “Project Standard”, version 01.0 of 25/11/2011 [/26/](#). The additionality of the project activity is demonstrated by applying investment analysis as per the validated VCS PD [/1/](#). Therefore, this change does not affect the additionality of the project activity. It has been confirmed that this change does not affect the applicability/application of baseline methodology. Also, the scale of the VCS project remains the same.

3.1 Participation under Other GHG Programs

Not applicable.

3.2 Methodology Deviations

There is not any deviation in the applied methodology to the project activity.

3.3 Project Description Deviations

There were no project description deviations during this monitoring period.

3.4 Grouped Project

This project is not a grouped project. Hence, this section is not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

It was verified during the site visit conducted on 13/04/2016 that the proposed project activity has been implemented and it is in operation in accordance to the project activity described in the registered VCS PD [/1/](#).

The project activity has been implemented in 2 phases. On 30/06/2010, the power plant has started operation with 1 turbine and on 29/07/2010 the remaining 1 turbine has been commissioned. Each commissioning date was confirmed through the Temporary Acceptance Protocols [/14/](#) [/15/](#). The carbon crediting period and therefore the monitoring starts when the plant commences electricity generation. Therefore, the crediting period starts on 01/07/2010.

The project activity consists of 2 vertical axis Pelton turbines, each with 40.5 MWe capacity and making the total installed capacity of 81 MWe as confirmed through the Technical Specification of Turbines [/16/](#) and Generation License [/13/](#). The project boundary in the registered VCS PD [/1/](#) is in line with the actual project boundary. The generated electricity is fed to the national grid. The generated electricity is transmitted to the National Electricity System through Arsin Substation, with a 154 kV and 32 km long energy transmission line. The geographic coordinates of the project activity is confirmed through the registered PDD [/1/](#).

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

The emission reduction calculations provided in the spreadsheet [/8/](#) have been verified to be correct and in line with the registered VCS PD [/1/](#).

According to the applied methodology "ACM0002", "Consolidated baseline methodology for grid-connected electricity from renewable sources", version 10 of 28/05/2009 [/6/](#), the emission reductions have been calculated based on the following formula:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

BE_y = Baseline emissions in year y (tCO_2e/yr)

PE_y = Project emissions in year y (tCO_2e/yr)

LE_y = Leakage emissions in year y (tCO_2e/yr)

Baseline emissions

The baseline emissions include the CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, multiplying the electricity supplied to the grid (MWh) with the combined margin CO_2 emission factor for grid connected power generation in year.

$$BE_y = EG_y \times EF_y$$

Where:

EG_y = Net electricity delivered to the grid by the project activity in year y excluding transmission losses of the grid (MWh)

EF_y = Combined margin grid emission factor (tCO_2/MWh)

Project emissions

Project emissions from reservoir has been assumed to be 0 since the power density is larger than 10 W/m² as per the ACM0002 version 10 of 28/05/2009 /6/ as defined in the validated VCS PD /1/. In the registered VCS PD for “78 MW Akocak Hydroelectric Power Plant” in Turkey, version 03 of 20/07/2010 /1/, the power density has been calculated based on the only reservoir area of Erikli weir. To be on the conservative side, the reservoirs both of Erikli and Akocak have been taken into consideration and power density is calculated accordingly in the Monitoring Report /2/. The power density is still higher than 10 W/m²; therefore, project emissions are neglected.

Project emissions from fossil fuel consumption is calculated as per the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” version 02.0 of 02/08/2008 /26/. CO₂ emissions from fossil fuel combustion for process are calculated based on the quantity of fuels combusted and the CO₂ emission coefficient of those fuels, as follows:

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

Where:

$PE_{FC,j,y}$: The CO₂ emissions from fossil fuel combustion in process j during the year y (tCO₂/yr)

$FC_{i,j,y}$: The quantity of fuel type i combusted in process j during the year y (mass/volume)

$COEF_{i,y}$: The CO₂ emission coefficient of fuel type i in year y (tCO₂/mass or volume unit)

i : The fuel types combusted in process j during the year y

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

Where:

$NCV_{i,y}$: The weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit)

$EF_{CO2,i,y}$: The weighted average CO₂ emission factor of fuel type i in year y (tCO₂/GJ)

$FC_{i,j,y}$ is verified through the fuel purchasing invoices of generators. The consumed fuel of generators during the monitoring period has been confirmed through the fuel purchasing invoices /24/. Total fuel consumption during monitoring period is 17,644 liter.

$NCV_{i,y}$ which is applied as 0.043 GJ/tonnes is confirmed through the “Default Net Calorific Values (NCVs) and Lower and Upper Limits of the 95% Confidence Intervals” of IPCC 2006 Guidelines /27/. The density (0.845) of the diesel oil is confirmed through the product information of Turkish Petroleum Refineries Co. /28/.

$EF_{CO2,i,y}$ is calculated based on the carbon conversion unit (20 t C/TJ) given in the Turkey's National Inventory Report /29/.

Project emissions during this monitoring period have been calculated as 47 tCO₂e.

Leakage emissions

The leakage emissions are assumed to be zero as per the ACM0002 version 10 of 28/05/2009 [/6/](#) as defined in the registered VCS PD [/1/](#).

The data presented in the monitoring report [/2/](#) were assessed by reviewing in detail project documentation, collection of monitored data, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. Sufficient evidence was presented and verified by RINA for the reported emission reductions.

Parameters Available at Validation and Data Fixed Ex-ante

DATA/PARAMETER	Source of data	Reported value for the project period	Assessment/Observation
EF _{grid,CM,y} Baseline emission factor	TEIAS statistics	562 tCO ₂ /GWh	According to the approved methodology ACM0002 version 10, the combined emission factor has been determined using the ex-ante option and so it is not requested to monitor and recalculate the emission factors during the crediting period. The combined emission factor is determined to be 562 tCO ₂ /GWh in the VCS PD /1/ and validation report /7/ .

Parameters and Data Monitored

DATA/PARAMETER	EG _{facility,y}
Data Unit	MWh
Description	Net Electricity generated and delivered to the grid by Akocak HEPP in year y
Source of data to be used	Monthly Facility Reports for Electricity Generation Monthly Meter Reading (OSF) Forms
Value data for the monitoring period	455,677 MWh
Measuring and reporting frequency; recording procedure	Continuously monitoring and monthly recording
Type of monitoring equipment and its accuracy	Two unit electricity meters (two main meters and two backup meters) are installed at the project site. The main meters are ACTARIS SL761 A071 with serial number 53064405 and 53064407. The backup meters are ACTARIS SL761 A071 with serial number 53064406 and 53064408. The meters have the accuracy of 0.5s as confirmed through the first index protocol /11/ and test reports /12/ . The accuracy class of the meters complies with the "Communiqué for Measurement Devices used in the Electricity Market" /19/ .
Calibration frequency/interval	TEIAS is responsible for calibration and maintenance of the meters as per the registered VCS PD /1/ . The project owner has no control on the meters since the meters are sealed by the TEIAS as confirmed during the site visit. If any major discrepancy occurs between the two meters, TEIAS performs necessary calibration. The meters were calibrated

	by the TEIAS on 27/05/2010 as confirmed through the first index protocol /11/. Also, the meters were tested by the electricity transmission company at the project site on 08/12/2012, 11/12/2013, 10/10/2014 and 16/10/2015 during this monitoring period. As per the "Regulation of Metering and Testing of Metering Systems" /18/, the meters shall be calibrated every 10 years, therefore the calibration of meters is deemed appropriate and in compliance with the national regulation. During on-site assessment, it was confirmed that the meters are in place and functions well. During the monitoring period, no brake down has been recorded.
How were the values in the monitoring report verified and cross-checked?	The electricity generation figures are based on the PMUM records /17/ and the Monthly Facility Reports for Electricity Generation /30/ are used for crosscheck.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	The electricity generation and consumption is measured in line with the TEIAS rules and requirements /21/. The electricity generation supplied to the grid and electricity consumption from the grid is stored by PMUM on the web site. The Project owner has an ID and password to access this data on the web site. The collected data during the monitoring period will be kept by the project owner at least two years after end of the last crediting period as stated in the registered VCS PD /1/ and monitoring report /2/ in line with the ACM0002 version 10 of 28/05/2009 /6/.
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	All the data were available for the whole monitoring period.

DATA/PARAMETER	Cap _{PJ}
Data Unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data to be used	- Labels on the equipment - Letter for approval of commissioning issued by Ministry of energy and Natural Resources
Value data for the monitoring period	81,000,000 W
Measuring and reporting frequency; recording procedure	Yearly
Type of monitoring equipment and its accuracy	The parameter is monitored through the Generation License and Letter for Approval of Commissioning;

	therefore, measurement equipment is not used.
Calibration frequency/interval	NA
How were the values in the monitoring report verified and cross-checked?	The parameter is monitored through the Generation License /13/ and Letter for Approval of Commissioning /14/ /15/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	NA
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	All the data were available for the whole monitoring period.

DATA/PARAMETER	A_{PJ}
Data Unit	m ²
Description	Area of the reservoir measured on the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data to be used	Technical drawing
Value data for the monitoring period	Erikli Weir: 33,877.016 m ² Akocak Weir: 38,543.722 m ²
Measuring and reporting frequency; recording procedure	Yearly
Type of monitoring equipment and its accuracy	The parameter is monitored through the technical drawing; therefore, measurement equipment is not used.
Calibration frequency/interval	NA
How were the values in the monitoring report verified and cross-checked?	The parameter is monitored through the technical drawing /31/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	NA
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been	All the data were available for the whole monitoring period.

applied or has a request for deviation been approved?	
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DATA/PARAMETER	FC _{i,j,y}
Data Unit	Mass or Volume unit per year
Description	Quantity of fuel type i combusted in Diesel power generator during the year y
Source of data to be used	Diesel generator
Value data for the monitoring period	17,644 liter
Measuring and reporting frequency; recording procedure	Yearly
Type of monitoring equipment and its accuracy	NA
Calibration frequency/interval	NA
How were the values in the monitoring report verified and cross-checked?	The consumed fuel of generators during the monitoring period has been confirmed through the fuel purchasing invoices /24/ . The calculation parameters such as NCV, Density and Emission factor are used as default from IPCC reference /27/ and the website of Tupras which means Türkiye Petrol Rafinerileri Anonim Şirketi (Turkey Petroleum Refineries Corporation) /28/ .
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	NA
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	All the data were available for the whole monitoring period.

Emission Reductions Achieved

The emission reductions calculation reported in the Monitoring Report version 04 of 24/05/2015 [/2/](#) and calculation spreadsheet "Akocak ver_cal_01 08 12 - 31 12 15_03 05 16_GTE_v.3.xlsx" version 03 of 24/05/2016 [/8/](#) have been verified to be correct.

The emission reductions from the project for the monitoring period from 01/08/2012 to 31/12/2015 as reported in the Monitoring Report version 04 of 24/05/2016 [/2/](#) is equivalent to 256,043 tCO₂e. According to the registered VCS PD [/1/](#), the estimated emission reductions are equivalent to 494,326 tCO₂e. The reported averaged emission reductions are 48% lower than the estimated emission reduction.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

The generated electricity monitored continuously by two unit meters that were sealed by TEIAS. Two unit electricity meters (two main meters and two backup meters) are installed at the project site. The main meters are ACTARIS SL761 A071 with serial number 53064405 and 53064407. The backup meters are ACTARIS SL761 A071 with serial number 53064406 and 53064408. The meters have the accuracy of 0.5s as confirmed through the first index protocol [/11/](#) and test reports [/12/](#). The accuracy class of the meters complies with the “Communiqué for Measurement Devices used in the Electricity Market” [/19/](#).

TEIAS is responsible for calibration and maintenance of the meters as per the registered VCS PD [/1/](#). The project owner has no control on the meters since the meters are sealed by the TEIAS as confirmed during the site visit. If any major discrepancy occurs between the two meters, TEIAS performs necessary calibration. The meters were calibrated by the TEIAS on 27/05/2010 as confirmed through the first index protocol [/11/](#). As per the “Regulation of Metering and Testing of Metering Systems” [/18/](#), the meters shall be calibrated every 10 years, therefore the calibration of meters is deemed appropriate and in compliance with the national regulation. The calibration frequency has been respected.

The electricity generation figures are based on the PMUM records [/19/](#) and the Monthly Facility Reports [/30/](#) are used for crosscheck from 01/08/2012 to 31/12/2015. The records and emission reduction calculation spreads sheet [/8/](#) are consistent.

4.4 Non-Permanence Risk Analysis

There is no non-permanence risk rating determined by the project proponent.

5 VERIFICATION CONCLUSION

RINA Services Spa (RINA) has performed verification of the emission reductions reported for the project activity “78 MW Akocak Hydroelectric Power Plant” in Turkey, VCS Registration Reference N° 535, for the period 01/08/2012 to 31/12/2015, with regard to the relevant requirements for CDM and VCS activities.

It is RINA's opinion that the GHG emission reductions stated in the Monitoring Report version 04 of 24/05/2016 for the “78 MW Akocak Hydroelectric Power Plant” project in Turkey for the period 01/08/2012 to 31/12/2015 are fairly stated. The GHG emission reductions were calculated correctly, on the basis of the approved monitoring methodology “ACM0002”, “Consolidated baseline methodology for grid-connected electricity from renewable sources”, 10 of 28/05/2009 and the monitoring plan contained in the registered VCS PD.

Hence, RINA is able to certify that the emission reductions from the project during the monitoring period 01/08/2012 to 31/12/2015 amount to 256,043 tCO₂e.

2012 (from 01/08/2012 to 31/12/2012) GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	2,719.6
Project Emissions	4.6
Leakage	0
Net GHG emission reductions or removals	2,715

2013 (from 01/01/2013 to 31/12/2013) GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	90,799.9
Project Emissions	19.9
Leakage	0
Net GHG emission reductions or removals	90,780

2014 (from 01/01/2014 to 31/12/2014) GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	69,175
Project Emissions	9.40
Leakage	0
Net GHG emission reductions or removals	69,165

2015 (from 01/01/2015 to 31/12/2015) GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	93,396
Project Emissions	13
Leakage	0
Net GHG emission reductions or removals	93,383

TOTAL (from 01/08/2012 to 31/12/2015) GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	256,090
Project Emissions	47
Leakage	0
Net GHG emission reductions or removals	256,043

APPENDIX A

VERIFICATION PROTOCOL

TABLE 1 REQUIREMENTS CHECK LIST

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
A.1 Monitoring Report						
A.1.1	Does the used project title clearly enable the reader to identify the unique VCS activity? Is there an indication of a revision number, the date of the revision and the monitoring period?	/1/ /2/ /7/ /20/	DR, CC	The title of the project activity is given as “81 MW Akocak Hydroelectric Power Plant” in the Monitoring Report version 0.1 dated 04/04/2016 /2/ , which is enable the reader to identify the unique VCS activity. The title is not in line with the registered VCS PD /1/ , Validation Report /7/ and also market registry /20/ . Please clarify. The version and issuance date of report are available at cover page of Monitoring Report /2/ . However, the version of the monitoring report is not correct. Please correct. The monitoring period dates should be given with a format of DD/MM/YYYY.	CR1	OK
A.1.2	Does the project comply with the applicable requirements for completing the Monitoring Reports (latest version available)?	/2/ /3/ /4/	DR	The project complies with the applicable requirements for completing the Monitoring Reports.	OK	OK
A.1.3	Does the MR comply with the template available (latest version)?	/2/ /3/ /4/ /9/	DR	The project does not comply with the applicable requirements for completing the VCS Monitoring Report Template /9/ . Please check all the titles and the format of the tables.	CR2	OK
A.2 Description of Project Activity						
A.2.1	Title of the project activity, revision number and date of Monitoring Report	/1/ /2/ /7/ /20/	DR, CC	The title of the project activity is given as “81 MW Akocak Hydroelectric Power Plant” in the Monitoring Report version 0.1 dated 04/04/2016 /2/ . The title is not in line with the registered VCS PD /1/ , Validation Report /7/ and also market registry /20/ . Please clarify.	CR1	OK
A.2.2	Is the actual implementation and operation of	/1/ /2/ /13/	DR,	The project activity consists of 2 vertical axis	OK	OK

¹ MoV: DR document review, I interview, CC cross checking

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
	the proposed project activity in accordance with the project activity in the registered VCS-PD?	/14/ /15/ /16/	CC	Pelton turbines, each with 40.5 MWe capacity and making the total installed capacity of 81 MWe as confirmed through the Technical Specification of Turbines /16/ and Generation License /13/. In the registered VCS PD /1/, the installed capacity is defined as 78 MW. However, the installed capacity is increased to 81 MWe as confirmed through the Generation License /13/ and Temporary Acceptance Protocols /14/ /15/. The project boundary in the registered VCS PD /1/ is in line with the actual project boundary. The generated electricity is fed to the national grid. The generated electricity is transmitted to the National Electricity System through Arsin Substation, with a 154 kV and 32 km long energy transmission line. The geographic coordinates of the project activity is confirmed through the registered PDD /1/.		
A.2.3	Methodology applied for the registered project activity	/1/ /2/ /6/	DR	The registered project activity applies the approved baseline and monitoring methodology ACM0002 version 10 of 28/05/2009 /6/ .	OK	OK
B Monitoring						
B.1 Monitoring Plan						
B.1	Is the actual implementation and operation of the proposed project activity in accordance with the project activity in the registered VCS-PD?	/1/ /2/ /13/ /14/ /15/	DR, CC, I	In the registered VCS PD for "78 MW Akocak Hydroelectric Power Plant" in Turkey, version 03 of 20/07/2010 /1/, - the power density has been calculated based on the only reservoir area of Erikli weir. To be on the conservative side, the reservoirs both of Erikli and Akocak have been taken into consideration and power density is calculated accordingly in the Monitoring Report Version 0.1 of 04/04/2016 /2/. The power density is still higher than 10 W/m²; therefore, project emissions are neglected. - the installed capacity is increased to 81 MWe	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				as confirmed through the Generation License /13/ and Temporary Acceptance Protocols /14/ /15/. The additionality of the project activity is demonstrated by applying investment analysis registered VCS PD /1/. The annual electricity generation used in the investment analysis that is 257.440 GWh has remained same. Therefore, this change does not affect the additionality of the project activity. Thus, the requirements of the VCS Standard Version 3 /4/ were satisfied and RINA confirms that the project conforms to the validation criteria for projects, in accordance with ACM0002 version 10 of 28/05/2009 /6/.		
B.2	In case of deviation between the registered project and the actual implementation/operation, do they comply with the requirements of the Project Standards?	/1/ /2/ /13/	DR	There some minor changes in the monitoring plan which does not affect the project design and implementation. - In the registered VCS PD /1/, the project participant is defined as "AKENERJI Elektrik Uretimi ve Ticaret A.Ş." in Section 1.1 of the monitoring report. This description is not in line with the generation license /13/. Please clarify. - Each turbine capacity is defined as 39 MW in section 1.1 of the monitoring report. Than the total capacity is equals to $39 \times 2 = 78$ MW. This value is not in line with the generation license /13/. - The annual estimated electricity generation and emission reduction values given in Section 1.1 of the monitoring report is not in line with the registered PDD /1/.	CR-3	OK
B.3	For project activity that consist of more than one site: - describe the status of the implementation and starting date of operation of each	/1/ /2/ /7/ /14/ /15/	DR, CC, I	The project activity consists of one site and has been implemented in 2 phases. On 30/06/2010, the power plant has started operation with 1 turbine and on 29/07/2010 the remaining 1	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
	site; For project activity with phased implementation: - describe the progress of the proposed project activity achieved in each phase number; - if the phased implementation is delayed, described the reasons and the expected implementation dates.			turbine has been commissioned. Each commissioning date has been confirmed through the Temporary Acceptance Protocols /14/ /15/ . The carbon crediting period and therefore the monitoring starts when the plant commences electricity generation. Therefore, the crediting period starts on 30/06/2010.		
B.4	Methodology and methodological tool applied for the registered project activity	/1/ /2/ /6/ /7/ /10/		The registered project activity applies the approved baseline and monitoring methodology ACM0002 version 10 of 28/05/2009 /6/ . Also, the following methodological tools are applied for the registered project activity: "Tool for the demonstration and assessment of additionality, Version 05.2 of 26/08/2008" /22/ "Tool to calculate the emission factor for an electricity system, Version 02 of 16/10/2009" /10/	OK	OK
C Compliance of the monitoring activities with the registered monitoring plan / Compliance of the monitoring plan with the monitoring methodology and methodological tool						
C.1 Monitoring plan						
C.1.1	Does the monitoring plan included in the registered VCS project activity comply with the applied methodology?	/1/ /2/ /6/	DR, CC	The monitoring plan of the registered VCS project activity complies with the applied methodology ACM0002 version 10 of 28/05/2009 /6/ .	OK	OK
C.1.2	Does the monitoring comply with the monitoring plan in the registered VCS-PD?	/1/ /2/ /7/	DR, CC	The monitoring complies with the monitoring plan presented in the registered VCS PD /1/ . The following parameters should be monitored as per the monitoring plan in the registered VCS-PD: - Net Electricity generated and delivered to the grid by the Akocak Hydroelectric Power Plant, EG_{facility,y} - Installed capacity of the hydro power plant after the implementation of the project	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				activity, Cap_{PJ} - Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full, A_{PJ} The necessary monitored parameters are included into the monitoring report. Also, emissions from diesel generator is included to the monitoring report.		
C.2 Data and parameters fixed ex-ante or at renewal crediting period						
C.2.1	Which parameters were available at validation and how were they verified?	/1/ /2/ /6/ /7/	DR, CC	As per the approved methodology ACM0002 version 10, the combined emission factor has been determined using the ex-ante option, therefore it is not requested to monitor and recalculate the emission factors during this crediting period. The combined emission factor is determined to be 562 tCO ₂ /GWh in the registered VCS PD /1/ and validation report /7/ .	OK	OK
C.2.2	What default data were selected and applied?	/1/ /2/ /6/ /7/	DR, CC	Please refer to Section C.2.1 of this protocol.	OK	OK
C.3 Data and parameters monitored ex-post						
C.3.1	Which parameters have been monitored during the monitoring period?	/2/ /8/ /13/ /14/ /15/ /17/ /19/ /23/	DR, CC, I	Net electricity generated and delivered to the grid by Akocak HEPP in year y ($EG_{facility,y}$): The parameter is measured in MWh and it is monitored by two units electricity meters that are located at the project activity. The net electricity generation is based on the PMUM records /19/. The net electricity generation during monitoring period is calculated as 455,677 MWh based on the PMUM records /17/. However, the value given for January 2014 is not correct. Please check. Installed capacity of the hydro power plant after the implementation of the project activity (Cap_{PJ}): The parameter is measured in	CAR-1	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				W. The installed capacity of the hydro power plant after the implementation of the project activity is 81.000 000 W as confirmed through the Generation License /13/ and letter for approval of commissioning /14/ /15/. Area of the reservoir measured on the surface of the water, after the implementation of the project activity, when the reservoir is full (A_{PJ}): The parameter is measured in m². The project activity includes two reservoir areas. The reservoir area after implementation of project activity when reservoir area is full is defined as 33,877.016 m² as confirmed through the previous verification report /23/ for Erikli weir. The reservoir area after implementation of project activity when reservoir area is full is defined as 38,543.722 m² as confirmed through the previous verification report /23/ for Akocak weir. Project emissions from fossil fuel consumption ($PE_{FF,y}$): The project emission from diesel oil consumption is monitored through the fuel purchasing invoices. However, according to the invoices, the given value is not correct. Please clarify.		
C.3.2	Is the measurement equipment described? Is the accuracy of the measurement equipment addressed and deemed appropriate?	/2/ /11/ /12/ /13/ /14/ /15/ /19/ /24/	DR, CC	Net electricity generated and delivered to the grid by Akocak HEPP in year y ($EG_{facility,y}$): Two unit electricity meters (two main meters and two backup meters) are installed at the project site. The main meters are ACTARIS SL761 A071 with serial number 53064405 and 53064407. The backup meters are ACTARIS SL761 A071 with serial number 53064406 and 53064408. The meters have the accuracy of 0.5s as confirmed through the first index protocol /11/ and test reports /12/. The accuracy	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				class of the meters complies with the “Communiqué for Measurement Devices used in the Electricity Market” /19/. Installed capacity of the hydro power plant after the implementation of the project activity (Cap_{PJ}): The parameter is monitored through the Generation License /13/ and letter for approval of commissioning /14/ /15/. Therefore, measurement equipment is not used. Area of the reservoir measured on the surface of the water, after the implementation of the project activity, when the reservoir is full (A_{PJ}): The parameter is monitored through the technical drawing issued by General Directorate Of State Hydraulic Works (DSI). Therefore, measurement equipment is not used. Project emissions from fossil fuel consumption ($PE_{FF,y}$): The project emission from diesel oil consumption is monitored through the fuel purchasing invoices /24/. Therefore, measurement equipment is not used.		
C.3.3	Is the measuring/reading/recording frequency adequate for all monitoring parameters? Is it in line with the registered monitoring plan?	/1/ /2/ /6/ /24/	DR, I	Net electricity generated and delivered to the grid by Akocak HEPP in year y ($EG_{facility,y}$): The electricity generation supplied to the grid and electricity consumption from the grid is monitored continuously by two unit meters and recorded monthly as verified during the site visit. Monitoring frequency is in line with the applied methodology /6/ and registered VCS PD /1/. Installed capacity of the hydro power plant after the implementation of the project activity (Cap_{PJ}): The parameter is monitored yearly in line with the applied methodology /6/ and registered VCS PD /1/.	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				Area of the reservoir measured on the surface of the water, after the implementation of the project activity, when the reservoir is full (A_{PJ}): The parameter is monitored yearly in line with the applied methodology /6/ and registered VCS PD /1/. Project emissions from fossil fuel consumption ($PE_{FF,y}$): The project emission from diesel oil consumption is monitored through the fuel purchasing invoices /24/. Therefore, measurement equipment is not used.		
C.4 Calibration requirements						
C.4.1	Are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate?	/1/ /2/ /11/ /18/	DR, CC	TEIAS is responsible for calibration and maintenance of the meters as per the registered VCS PD /1/. The project owner has no control on the meters since the meters are sealed by the TEIAS as confirmed during the site visit. If any major discrepancy occurs between the two meters, TEIAS performs necessary calibration. The meters were calibrated by the TEIAS on 27/05/2010 as confirmed through the first index protocol /11/. Also, the meters were tested by the electricity transmission company at the project site on 08/12/2012, 11/12/2013, 10/10/2014 and 16/10/2015 during this monitoring period. As per the "Regulation of Metering and Testing of Metering Systems" /18/, the meters shall be calibrated every 10 years, therefore the calibration of meters is deemed appropriate and in compliance with the national regulation. However, the calibration and the test dates of the electricity meters are not discussed in the monitoring report. Please clarify.	GR-4	OK
C.4.2	Does the calibration cover the monitoring period?	/2/ /11/ /18/	DR, CC	The meters were calibrated by the TEIAS on 27/05/2010 as confirmed through the first index protocol /11/. Also, the meters were tested by	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				the electricity transmission company at the project site on 08/12/2012, 11/12/2013, 10/10/2014 and 16/10/2015 during this monitoring period. As per the "Regulation of Metering and Testing of Metering Systems" /18/, the meters shall be calibrated every 10 years, therefore the calibration of meters is deemed appropriate and in compliance with the national regulation. The calibration of the meters covers the monitoring period.		
C.4.3	Has the calibration frequency been respected?	/2/ /11/ /18/	DR, CC	The meters were calibrated by the TEIAS on 27/05/2010 as confirmed through the first index protocol /11/. Also, the meters were tested by the electricity transmission company at the project site on 08/12/2012, 11/12/2013, 10/10/2014 and 16/10/2015 during this monitoring period. As per the "Regulation of Metering and Testing of Metering Systems" /18/, the meters shall be calibrated every 10 years, therefore the calibration of meters is deemed appropriate and in compliance with the national regulation. The calibration of the meters covers the monitoring period.	OK	OK
C.4.4	In case of delay, describe the applied maximum permissible error	/2/ /11/ /18/	DR, CC	Please refer to Section C.4.3 of this protocol.	OK	OK
C.5 Monitoring of the sustainable indicators						
C.5.1	Is the monitoring of sustainable development indicators/environmental impacts warranted by legislation in the Host Country?	/1/	DR	The monitoring of sustainable development indicators is not requested by the legislation in the Host Country. The project has Environmental Impact Assessment Positive certificate as confirmed through the registered VCS PD /1/.	OK	OK
C.6 Management system and quality control						
C.6.1	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project	/1/ /2/	DR, I	An on-site inspection has been performed on 13/04/2016 and it has been confirmed that the monitoring arrangements in the monitoring plan	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
	design?			are feasible within the project design.		
C.6.2	Are procedures identified for day-to-day record handling (including what records to keep, storage area of records and how to process performance documentation)? Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/ /2/ /6/ /21/	DR, CC, I	The electricity generation and consumption is measured in line with the TEIAS rules and requirements /21/ . The electricity generation supplied to the grid and electricity consumption from the grid is stored by PMUM on the web site. The Project owner has an ID and password to access this data on the web site. The collected data during the monitoring period will be kept by the project owner at least two years after end of the last crediting period as stated in the registered VCS PD /1/ and monitoring report /2/ in line with the ACM0002 version 10 of 28/05/2009 /6/ .	OK	OK
C.6.3	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/ /2/	DR, I	The generated electricity is measured by two meters that were sealed by TEIAS. The project owner has no control on the meters. The electricity generation supplied to the grid and electricity consumption from the grid is stored by PMUM on the web site. The Project owner has an ID and password to access this data on the web site. The project owner also archives a hardcopy of these protocols, scanned and stored electronically. Also, The collected data during the monitoring period will be kept by the project owner at least two years after end of the last crediting period.	OK	OK
C.6.4	Are the responsibilities and authorities for monitoring and reporting in accordance with the responsibilities and authorities stated in the monitoring plan?	/1/ /2/	DR, I	The responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan presented in the in the registered VCS PD /1/ as confirmed through the interviews. Plant Manager is responsible for running the HEPP plant and compliance with VER monitoring plan. Accounting Manager is responsible for keeping data about power sales,	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				invoicing and purchasing. Global Tan Energy is responsible for emission reduction calculations and preparing monitoring report.		
C.6.5	Does data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	/1/ /2/	DR, I	The data management (from monitoring equipment to emission reduction calculation) ensures correct transfer of data and reporting of emission reductions.	OK	OK
D.1 Assessment of data and calculation of emission reductions / Accuracy of emission reduction calculations						
D.1.1	How were the values in the monitoring report verified and cross-checked?	/2/ /8/ /13/ /14/ /15/ /17/ /23/		Net electricity generated and delivered to the grid by Akocak HEPP in year y ($EG_{facility,y}$): The parameter is measured in MWh and it is monitored by two units electricity meters that are located at the project activity. The net electricity generation is based on the PMUM records /17/. The monthly meter reading given in the operating report record for cross check is provided and confirmed. The PMUM record is used as main record for electricity generation: Installed capacity of the hydro power plant after the implementation of the project activity (Cap_{PJ}): The parameter verified through the Generation License /13/ and letter for approval of commissioning /14/ /15/. Area of the reservoir measured on the surface of the water, after the implementation of the project activity, when the reservoir is full (A_{PJ}): The parameter is verified through the previous verification report /23/.	OK	OK
D.1.2	If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	/1/ /2/ /6/ /8/	DR	The emission reduction calculations are based on the data measured using calibrated meters of adequate accuracy. Apart from the ex-ante emissions factor, no other assumption is used in these calculations in line with the ACM0002 version 10 of 28/05/2009 /6/ and registered VCS PD /1/.	OK	OK

Checklist Question		Reference	MoV ¹	Comments	Draft Conclusion	Final Conclusion
D.1.3	Emission reductions reported	/2/ /8/	DR	The emission reduction reported in the Monitoring Report could not be crosschecked. Please refer to C.3.1 of this validation protocol.	CAR-1	OK
D.1.4	Difference between the emission reductions estimated in the registered VCS PD and the emission reductions reported for the monitoring period.	/2/ /8/	DR	The emission reduction reported in the Monitoring Report could not be crosschecked. Please refer to C.3.1 of this validation protocol.	CAR-1	OK

TABLE 2 RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Verification Conclusion
CAR 1 Net electricity generated and delivered to the grid by Akocak HEPP in year y ($EG_{facility,y}$): The parameter is measured in MWh and it is monitored by two units electricity meters that are located at the project activity. The net electricity generation is based on the PMUM records /19/. The net electricity generation during monitoring period is calculated as 455,677 MWh based on the PMUM records /17/. However, the value given for January 2014 is not correct. Please check. Project emissions from fossil fuel consumption ($PE_{FF,y}$): The project emission from diesel oil consumption is monitored through the fuel purchasing invoices. However, according to the invoices, the given value is not correct. Please clarify.	C.3.1 D.1.3 D.1.4	Net electricity generated and delivered to the grid by Akocak HEPP in year y ($EG_{facility,y}$): The value for January 2014 and so the net electricity generation were revised in excel verification spread sheets and monitoring report. Project emissions from fossil fuel consumption ($PE_{FF,y}$): Project emission calculations and so the net emission reduction calculations were revised both in excel verification spread sheets and monitoring report in line with invoices. Respond 2: $FC_{i,j,y}$ value is revised in the monitoring report in page 14.	Review 1 (04/05/2016): Net electricity generated and delivered to the grid by Akocak HEPP in year y ($EG_{facility,y}$): The value given for January 2014 is now corrected and the net electricity generation during monitoring period is now re-calculated as 455,677 MWh based on the PMUM records /17/. Quantity of fuel type i combusted in Diesel power generator ($FC_{i,j,y}$): The given value is now corrected in the calculations. However, in the parameter of $FC_{i,j,y}$, the value is not revised in the monitoring report. Hence, CAR 1 is not closed. Review 2 (04/05/2016): Quantity of fuel type i combusted in Diesel power generator ($FC_{i,j,y}$): The given value is now corrected in the parameter of $FC_{i,j,y}$. Hence, CAR 1 is closed.
CR 1 The title of the project activity is given as “81 MW Akocak Hydroelectric Power Plant” in the Monitoring Report version 0.1 dated 04/04/2016 /2/, which is enable the reader to identify the unique VCS activity. The title is not in line with the registered VCS PD /1/, Validation Report /7/ and also market registry /20/. Please clarify. The version and issuance date of report are available at cover page of Monitoring Report /2/. However, the version of the monitoring report is not correct. Please correct.	A.1.1 A.2.1	- The title was corrected and the explanation was added to the “summary description of the project» section of the monitoring report”. The capacity of the plant is 81 MW actually; however, the capacity was increased after PDD and Passport documents were approved and market registry. In fact, this capacity increment does not affected the annual electricity generation. Moreover, capacity increment was also stated in previous monitoring report which was verified and approved in 2012. In detail, in previous	Review 1 (04/05/2016): The title of the project activity is now revised as “78 MW Akocak Hydroelectric Power Plant” in the Monitoring Report /2/, which is in line with the registered VCS PD /1/, Validation Report /7/ and also market registry /20/. The version of the monitoring report is now corrected. The monitoring period dates is now given with format of DD/MM/YYYY. Hence, CR 1 is closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Verification Conclusion
The monitoring period dates should be given with a format of DD/MM/YYYY.		verification report it was stated that “The annual electricity generation used in the investment analysis that is 257.440 GWh has remained same. Therefore, this change does not affect the additionality of the project activity.” and the title of the project activity was kept same. -Version of report and monitoring period dates were revised.	
CR 2 The project does not comply with the applicable requirements for completing the VCS Monitoring Report Template /9/. Please check all the titles and the format of the tables.	A.1.3	- Report was revised in line with template. Respond 2: All the titles and format of tables checked and revised	<u>Review 1 (03/05/2016):</u> The project does not comply with the applicable requirements for completing the VCS Monitoring Report Template /9/. Please check all the titles and the format of the tables. <u>Hence, CR 2 is not closed.</u> <u>Review 2 (04/05/2016):</u> The project now complies with the applicable requirements for completing the VCS Monitoring Report Template /9/. <u>Hence, CR 2 is closed.</u>
CR 3 - In the registered VCS PD /1/, the project participant is defined as “AKENERJI Elektrik Uretimi ve Ticaret A.Ş.” in Section 1.1 of the monitoring report. This description is not in line with the generation license /13/. Please clarify. - Each turbine capacity is defined as 39 MW in section 1.1 of the monitoring report. Than the total capacity is equals to $39 \times 2 = 78$ MW. This value is not in line with the generation license /13/.	B.2	- “AKENERJI Elektrik Uretimi ve Ticaret A.Ş.” sold the plant and transfer the generation licence to another company in January 2016. After 01/01/2016, generation licence has been belonged to another company. That is why this monitoring report included the electricity production data until end of the December 2015. In detail, the electricity generation license for Akocak HEPP has been awarded to “AKENERJI Elektrik Uretimi ve Ticaret A.Ş.” for a period of 49 years by the Turkish licensing authority named as Energy Market	<u>Review 1 (03/05/2016):</u> - In the registered VCS PD /1/, the project participant is defined as “AKENERJI Elektrik Uretimi ve Ticaret A.Ş.” in Section 1.1 of the monitoring report. This description is not in line with the generation license /13/. Please clarify. - Each turbine capacity is now revised as 40.5 MW in section 1.1 of the monitoring report. This value is now in line with the generation license /13/. - The annual estimated electricity

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Verification Conclusion
- The annual estimated electricity generation and emission reduction values given in Section 1.1 of the monitoring report is not in line with the registered PDD /1/.		Regulatory Authority (EMRA) in 2005. Moreover, "AKENERJI Elektrik Uretimi ve Ticaret A.Ş" was recognized as the project participant in the previous verification & validation reports and project design & passport documents. Respond 2: Definition of the project owner is revised as "AKENERJI Elektrik Uretimi A.Ş". in pages "3" and "5". - Capacity of each turbine is 40.5 MW and it was revised in the report. As it discussed before the first generation licence was based on 78 MW; however, then it was renewed to 81 MW and this change was recognized in the previous verification and monitoring report. - Annual estimated generation and actual generation in practice were revised in the «summary description of the project» section in the report in line with registered PDD. - Annual emission reduction is revised as 74,939 tCO₂ in Section 1.1	generation and emission reduction values given in Section 1.1 of the monitoring report is now in line with the registered PDD /1/. However, the value 74,946 tCO₂ given as emission reduction per year in this crediting period is not correct. Please check. Hence, CR 3 is not closed. Review 2 (04/05/2016): - The project participant is now defined as "AKENERJI Elektrik Uretim A.Ş." in whole report and it is in line with the generation license /13/. - The value 74,946 tCO₂ given as emission reduction per year in this crediting period is now re-calculated as 74,939 tCO₂. Hence, CR 3 is closed.
CR 4 The meters were calibrated by the TEIAS on 27/05/2010 as confirmed through the first index protocol /11/. Also, the meters were tested by the electricity transmission company at the project site on 08/12/2012, 11/12/2013, 10/10/2014 and 16/10/2015 during this monitoring period. However, the calibration and the test dates of the electricity meters are not discussed in the monitoring report. Please clarify.	C.4.1	- The discussion about calibration and the test dates of the electricity meters was added to the page 12 in this monitoring report. Respond 2: Calibration and test of meters are revised separately within related dates and definitions in page 14.	Review 1 (03/05/2016): The test of the electricity meters are now presented in the monitoring report. However, all the dates are defined as "calibration". Actually, the calibration date is 27/05/2010. Please add these definitions and also explain the calibration frequency for the electricity meters. Hence, CR 4 is not closed. Review 2 (05/05/2016): The test of the electricity meters are now presented in the monitoring report. Also, the

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Verification Conclusion
			calibration date is presented as 27/05/2010. <u>Hence, CR 4 is closed.</u>

TABLE 3 FORWARD ACTION REQUEST

Forward action request	Reference to Table 2	Response by project participants	Verification Conclusion
FAR 1			



RINA

**CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE**

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Tugce Kiratli

è qualificato come¹:
is qualified as:

**VCS/GS-TEC, VCS-VAL, VCS-VER, GS-VAL, GS-VER,
GS-TL, VCS-TL, SCS – TEC, SCS-VAL, SCS-VER, SCS-
TL**

per le seguenti aree tecniche:
for the following technical areas:

1.2, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable energy sources	1
13.1	Waste handling and disposal	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	26/11/2012	-
6	08/06/2015	Update qualification according new AS 6.0

Il Resp. QPT
Head of QPT

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS : Verified Carbon Standard:
GS: Gold Standard
SCS: SocialCarbon Standard
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports



RINA

CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Rekha Menon

è qualificato come¹:
is qualified as:

CDM-TEC, -VAL, -VER, -TL

per le seguenti aree tecniche:
for the following technical areas:

1.2, 2.1, 13.1, 13.2, 14.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Renewables	1
2.1	Energy Demand	2
13.1	Solid Waste and wastewater	13
13.2	Manure	13
14.1	Afforestation and reforestation	14

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	06-03-2008	-
10	22-12-2014	Update qualification according to AS ver.6.0

Il Resp. QPT
Head of QPT

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS : Verified Carbon Standard:
GS: Gold Standard
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