

FINAL VALIDATION REPORT OF MURAT HEPP PROJECT



Document Prepared By RINA Services S.p.A.

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Report Title	Final Validation Report of Murat HEPP Project in Turkey
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Summary:

Murat HEPP Energy Electricity Generation and Trade Inc. Co. has commissioned RINA to carry out the validation of the “Murat HEPP Project” project in Turkey. This report summarizes the findings of the validation of the project, performed on the basis of VCS Version 3.4 criteria, GHG program applied as well as criteria given to provide for consistent project operations, monitoring and reporting.

The purpose of the proposed project activity is to generate renewable electricity to be delivered to the National Power Grid by utilizing water resources. The project activity is located at the Sambayat village, Adiyaman Province, Turkey. The total installed capacity of the Project is 37.221 MW.

The starting date of the project activity/start date of the crediting period is 05/10/2012. It has been verified by RINA that the starting date represents the start date of generation of electricity and supply to the electricity grid. The start of operation of the project is 05/10/2012.

A crediting period of 10 years, renewable once, has been chosen for the project, starting from 05/10/2012, or the date of registration, whichever is later. The GHG emission reductions are estimated to be average 97,754 tCO_{2e} per year and 977,540 tCO_{2e} over the ten -year crediting period.

The objective of the Validation is to have an independent evaluation of a project activity by a designated operational entity against the requirements of the VCS Version 3.4 and GHG program applied, on the basis of the project design document. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS requirements, GHG program requirements and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Voluntary Carbon Units (VCUs).

The validation scope is to review the VCS-PD against the VCS criteria which refer to VCS Version 3.4 standard and all the GHG program requirements.

Validation 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 project design.

The level of assurance of the validation report is defined in this final report (the level of assurance shall be reasonable, with respect to material errors, omissions and misrepresentations).

In conclusion, it is RINA's opinion that the project activity “Murat HEPP Project”, in “Turkey”, as described in the VCS-PD version 4 of 19/02/2013, meets all relevant requirements for VCS activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology “ACM0002”, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 13.0.0 of 11/05/2012. Hence RINA requests the registration of the project as a VCS project activity.

Table of Contents	Page
1 Introduction	4
1.1 Objective	4
1.2 Scope	4
1.3 Level of assurance	4
1.4 Summary Description of the Project	5
2 VALIDATION PROCESS	5
2.1 Method and Criteria	5
2.2 Document Review	
2.3 Interviews	9
2.4 Site Inspections	9
2.5 Resolution and Findings	10
2.6 Forward Action Requests	10
3 VALIDATION FINDINGS	10
3.1 Project Details	10
3.2 Application of the methodology	11
3.3 Non-Permanence Risk Analysis	20
3.4 Environmental Impact	20
3.5 Comments by stakeholders	20
4 VALIDATION CONCLUSION	21
Appendix A: Validation Protocol	

1 Introduction

1.1 Objective

The objective of the Validation is to have an independent evaluation of a project activity by a designated operational entity against the requirements of the VCS Version 3.4 and GHG program applied, on the basis of the project design document. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS requirements, GHG program requirements and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Voluntary Carbon Units (VCUs).

1.2 Scope and Criteria

The validation scope is to review the VCS-PD against the VCS criteria which refer to VCS Version 3.4 standard and all the GHG program requirements.

Validation 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 project design.

1.3 Level of assurance

All the revisions of the validation report before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

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 validation team and the technical reviewers consist of the following personnel:

Role	Last Name	First Name	Country
Team Leader Validator	Degener	Sergio	Germany
Local Expert	Zor	Hasan	Turkey
Financial Expert	Van der Tak	Casper	Italy
Technical Reviewer	Menon	Rekha	India

Following the assessment performed, RINA considers the level of assurance as reasonable.

1.4 Summary Description of the Project

The purpose of the proposed project activities is to generate renewable electricity to be delivered to the National Power Grid by utilizing water resources. The project activities are located at the Besni Town, Adiyaman Province, Turkey. The project involves, two Greenfield run-of-river hydroelectric power plants, Murat I with an installed capacity 24.081 MW and Murat II with an installed capacity of 13.14 MW. The coordinates of the projects are:

- Diversion weir: 37°42'44.25"N, 38° 2'58.56"E

Power House:

- Murat I HEPP: 37°36'51.99"N, 38° 5'36.76"E
- Murat II HEPP: 37°34'18.92"N, 38° 6'43.81"E

The coordinates were crosschecked with google earth and can be confirmed as correct and in line with the locations visited during on-site assessment.

The total installed capacity of the Project is 37.221 MW, as confirmed by the provisional acceptance /42/.

The starting date of the project activity/start date of the crediting period is 05/10/2012 /42/. It has been verified by RINA that the starting date represents the start date of generation of electricity and supply to the electricity grid. The project is in operation.

A crediting period of 10 years, renewable once, has been chosen for the project, starting from 05/10/2012. The GHG emission reductions are estimated to be average 97,754 tCO_{2e} per year and 977,540 tCO_{2e} over the ten -year crediting period.

RINA was able to verify all the documented evidence listed above during the validation process and can confirm that data and considerations are complete and accurate.

RINA confirms that the description of the proposed VCS project activity, as contained in the VCS-PD sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the proposed VCS project activity.

2 Validation Process

2.1 Method and Criteria

Validation was conducted using RINA procedures in line with the requirements specified in the VCS Standard and all others GHG Programs Requirements.

The validation consists of the following three phases:

- Document review;
- Follow-up actions;
- The resolution of outstanding issues and the issuance of the final validation report.

The following sections outline each step in more detail.

2.2 Document Review

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

/01/	Suen Ltd.: VCS-PD for project activity “Murat HEPP Project” in Turkey, version 01 of 04/04/2011. Suen Ltd.: VCS-PD for project activity “Murat HEPP Project” in Turkey, version 02 of 06/08/2012. Suen Ltd.: VCS-PD for project activity “Murat HEPP Project” in Turkey, version 03 of 19/10/2012. Suen Ltd.: VCS-PD for project activity “Murat HEPP Project” in Turkey, version 04 of 19/02/2013.
/02/	RINA: Signed participant list of all stakeholders involved during site-visit, 24-25/07/2011
/03/	CDM Executive Board: Validation and Verification Manual, version 01.2 EB55 of 30/07/2010.
/04/	CDM Executive Board: Baseline and monitoring methodology “ACM0002”, version “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 12.3.0. of 02/03/2012. CDM Executive Board: Baseline and monitoring methodology “ACM0002”, version “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 13.0.0 of 11/05/2012.
/05/	Suen Ltd.: Emission factor calculations “EF CO2 2009 V01”, version 1, 04/04/2011 Suen Ltd.: Emission factor calculations “EF CO2 2010 master 25.06.2012”, version 2, 25/06/2012. Suen Ltd.: Emission factor calculations “EF CO2 2010 master 16 October 2012”, version 3, 16/10/2012.
/06/	UNFCCC, Guidelines for completing the Project Design Document (CDM-PDD) and, version 01.0 of 02/03/2012.
/07/	CDM Executive Board: Tool to calculate the emission factor for an electricity system, Version 02.2.1.of 29/09/2011 CDM Executive Board: Tool to calculate the emission factor for an electricity system, Version 03.0.0. of 23/11/2012
/08/	VCS: Project Description v3.2., 08/10/2013
/09/	CDM Executive Board: Glossary of CDM terms, version 07.0 of 23/11/2012
/10/	VCS: Voluntary Carbon Standard , v3.4., 08/10/2013
/11/	VCS: Voluntary Carbon Standard Program Guide, v3.5., 08/10/2013
/12/	VCS: Program definitions v3.5., 08/10/2013
/13/	Suen Ltd.: IRR calculation sheet “Murat IRR 06 nisan 2011”, version 1, 04/04/2011. Suen Ltd.: Murat IRR_calculation sheet version 2, 12/08/2012 Suen Ltd.: Murat IRR_16 OCTOBER 2012, version 3, 16/10/2012

/14/	Suen Ltd.: Spreadsheet “ctryprem06 risk free rate 2009”, version 1, country risk rate for 2009, utilized to calculate the project benchmark IRR.
/15/	Suen Ltd.: Spreadsheet “murat Interest market”, version 1, 30/09/2009, input values to calculate the project IRR benchmark.
/16/	UNFCCC: Guidelines for objective demonstration and assessment of barriers, version 1, 16/10/2009 EB50 Annex 13
/17/	UNFCCC: Guidelines on the assessment of investment analysis, version 5, 15/07/2011
/18/	UNFCCC: Guidelines for the reporting and validation of plant load factors, version 1, 17/07/2009.
/19/	Murat HES Enerji Elektrik Üretimve Tic. Ltd. Şti.; Murat project introduction, 26/03/2008
/20/	General Directorate of State Hydraulic Works: Water use right agreement, 17/10/2008.
/21/	Governorship of Adiyaman Provincial Directorate of Environment and Forestry: Confirmation of non requirement of EIA, 22/04/2009
/22/	Hangzhou Yatai Hydro Equipment Completing Co. Ltd.; Turbine purchase contract, November 2009.
/23/	Youlso Engineering Services; Revised Feasibility Study Report, June 2009.
/24/	Evidence of stakeholder invitation sent via post to Greenpeace Turkey, 13/05/2010.
/25/	Energy Market Regulatory Authority: Construction Licence for Murat HEPP Project, 29/01/2009
/26/	Murat HEPP Energy Electricity Generation and Trade Inc. Co; confirmation of non inclusion in other GHG programs and non use to demonstrate compliance, 13/01/2011
/27/	Adiyaman Sport Club: Receipt of donation to the Adiyaman Sport Club, 12/01/2010
/28/	Turkey National Social Security Institution: Confirmation on start date of construction, 10/06/2010
/29/	Teias; Interconnection Agreement 21/10/2010
/30/	UNFCCC: “Tool for the demonstration and assessment of additionality” version 7.0.0. 23/11/2012.
/31/	Murat HEPP Energy Electricity Generation and Trade Inc. Co.; list of hired employees during construction, 13/11/2010.
/32/	UNFCCC: “Tool to determine the remaining lifetime of equipment”, version 1, 16/10/2009.
/33/	Suen Ltd.: Evaluation forms completed by the stakeholders, dated 28/05/2010.
/34/	Loan Agreement with Ayrapa Yatirim Bankasi for the project activity, document dated 13/11/2009.
/35/	Turkish Renewable Energy Law, amendment of January 2011 (http://www.enerji.gov.tr/mevzuat/6094/6094_Sayili_Yenilenebilir_Enerji_Kaynaklarinin_Elekt

	rik Enerjisi Uretimi Amacli Kullanimina Iliskin Kanunda Degisiklik Yapilmasina Dair Kanun.pdf), website language is turkish, date of last retrieved: 14/04/2014.
/36/	Suen Ltd.: Murat HEPP common practice analysis, 06/08/2012
/37/	Suen Ltd.: MURAT IRR_10 TEMMUZ 2012, 06/08/2012.
/38/	International Energy Agency: Renewable Energy Essentials, Hydropower, published in 2010 (http://www.iea.org/publications/freepublications/publication/Hydropower_Essentials-1.pdf)
/39/	Turkish Income Tax Law, Number 5281 (20%), 01/05/2005
/40/	Murat HEPP Energy Electricity Generation and Trade Inc. Co.: progress payments for project construction, 15/11/2012.
/41/	Murat HEPP Energy Electricity Generation and Trade Inc. Co.: List of students with scholarship, provided on 16/10/2012.
/42/	Ministry of Energy and Natural Resources of Turkey: Provisional acceptance of the project activity, 17/10/2012.
/43/	Murat HEPP Energy Electricity Generation and Trade Inc. Co.: Surface area of the reservoir (CAD draw), 16/10/2012
/44/	Gold Standard: List of projects registered in Turkey, 19/06/2012.
/45/	Verified Carbon Standard: List of projects registered in Turkey, 19/06/2012.
/46/	UNFCCC: "Tool for the demonstration and assessment of additionality" version 7.0.0.; 23/11/2012.
/47/	Clean development mechanism validation and verification standard, version 5.0, 04/10/2013.
/48/	CDM Executive Board: Baseline and monitoring methodology "ACM0002", version "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 13.0.0. of 11/05/2012.
/49/	CDM Executive Board: Tool to calculate the emission factor for an electricity system, Version 04.0. of 04/10/2013.
/50/	UNFCCC: Tool to determine the remaining lifetime of equipment, version 1, 16/10/2009.
/51/	Teias statistical report 2001-2011: http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2011/istatistik%202011.htm to calculate the grid emission factor.
/52/	Turkish official Gazette Nr. 25318: Environmental Impact Assessment (EIA) regulation dated December 16/12/2003.
/53/	Newspaper Besni Ekspres: Stakeholder meeting invitation, 14/05/2010 and 25/05/2010.
/54/	Suen Ltd.: Participant list and evaluation forms from the stakeholder meeting, 28/05/2010.
/55/	Turkish Gazette 24319, requirements on meter calibration, 15/02/2001.

/56/	UNFCCC: Guidelines on Common Practice, version 02.0, 13/09/.2013
/57/	UNFCCC: Projects under validation: http://cdm.unfccc.int/Projects/Validation/index.html , accessed 13/11/2013.
/58/	Gold Standard: Projects listed (http://www.cdmgoldstandard.org/our-activities/project-pipeline), accessed on 13/11/2013.
/59/	The world bank: Project appraisal document on a proposed international bank for reconstruction and development loan, dated 01/05/2013.
/60/	USAID: Turkish electricity Price Curve Analysis (2010-2011), 09/03/2012
/61/	List of Power Plants delivering electricity to the national grid: http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202010.pdf , last accessed on 19/03/2014.
/62/	List of power plants being developed by government entity “State Hydraulic Works” can be found under www2.dsi.gov.tr .

2.3 Interviews

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

	Date	Name and Role	Organization	Topic
/a/	24 and 25/07/11	María Belen Migone VCS Consultant	Ecosur	VCS-PD development, financial analysis.
/b/	24 and 25/07/11	Serkan Baybo- VCS Consultant	Suen Ltd.	VCS-PD development, financial analysis.
/c/	24 and 25/07/11	Aynur Sezer - VCS Consultant	Suen Ltd.	VCS-PD Development, baseline scenario, project boundary, monitoring and ER calculations.
/d/	24 and 25/07/11	Kemal Binbir Project Owner	Murat HES	Project construction/approval, Technical description.
/e/	24 and 25/07/11	Mehmet Karadag Project Owner	Murat HES	Project construction/approval, stakeholder consultation.
/f/	25/07/11	BahieTaser Local Stakeholder	Muhtar (Head of Village)	Local Stakeholder / Environmental approval.

2.4 Site Inspections

On 24th and 25th of July 2011, RINA (Sergio Degener and Hasan Zor) visited the project site, which is located at Besni town, Adiyaman province, Turkey, to resolve questions and issues identified during the document review and to perform interviews with relevant stakeholders in the host country.

2.5 Resolution of Findings

The objective of this phase of the validation is to resolve any outstanding issues which need to be clarified for RINA's positive conclusion on the project design.

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

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions.
- The VCS/GHG Program requirements have not been met.
- There is a risk that the emission reductions cannot be monitored or calculate.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS/CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the VCS/GHG Program requirements for registration.

2.6 Forward Action Requests

No Forward Action Requests (FARs) have been raised during the validation process.

3 Validation Findings

The findings of the validation related to the project, as described in the VCS-PD version 01 of 04/04/2011/01/ and its latest version 4 of 19/02/2013 /01 (and its versions in-between 02 of 06/08/2012 and 03 of 19/10/2012 /01/), are stated in the following sections.

The validation requirements, the means of validation and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

3.1 Project Details

The purpose of the proposed project activity is to generate renewable electricity to be delivered to the Turkish National Grid by utilizing water resources. The project activity is located at the Besni town, Adiyaman province in Turkey. The project consists of 2 hydro power projects, Murat I with an installed capacity of 24.081MW and Murat II with 13.14 MW /22/. 6 horizontal axis francis turbines will be installed at the site (3 x 8.027 MW and 3 x 4.380 MW). The technology provider is HRC from China /22/.

The project belongs to sectoral scope 1, energy industries –renewable energy, applicable as the project will generate electricity using hydrologic sources.

The project owner is Murat HEPP Energy Electricity Generation and Trade Inc. Co. from Turkey. The VCS consultants are Suen Ltd. from Turkey and Ecosur America from Argentina.

The starting date of the project activity is 05/10/2012 when the plant started operation /42/. It has been verified by RINA that the starting date represents the starting date of the project following VCS requirements /10/.

The project crediting period is 10 years, renewable once. The start date of the first crediting period is 05-October-2012 ending on 31-September-2022.

Prior to the construction of the project activity, there was no other construction or water use at the project site, as confirmed in the feasibility report /23/. By assessing different official approvals obtained for the development of the project /29, 42/, it can be confirmed that the project owner is Murat HEPP Energy Electricity Generation and Trade Inc. Co.

The project location, confirm through GPS check during site visit and cross checked with google earth, is:

- Diversion weir: 37°42'44.25"N, 38° 2'58.56"E

Power House:

- Murat I HEPP: 37°36'51.99"N, 38° 5'36.76"E
- Murat II HEPP: 37°34'18.92"N, 38° 6'43.81"E

The project complies with all requirements of the host country Turkey, as confirmed by the provisional acceptance issued to the project developer /42/. The GHG emission reductions are estimated to be 97,754 tCO_{2e} per year and 977,540 tCO_{2e} over the ten year crediting period. The project is therefore a large scale project.

By checking the data base of UNFCCC /57/ and GS /58/, the audit team confirms that the proposed project has not participated nor it was rejected under any other GHG program. This was also confirmed from the statement provided by the PP /26/.

The expected operational lifetime of the project activity is 150,000 hours, in line with the default value as per the "Tool to determine the remaining lifetime of equipment" /50/. Taking into account the expected operational hours of the plant, the lifetime is 37 years. The water cooled generators have a default value of 30 years /50/, this value has been therefore taken as the lifetime of the project activity.

RINA was able to verify all the documented evidence listed above during the validation process and can confirm that data and considerations are complete and accurate.

RINA confirms that the description of the proposed VCS project activity, as contained in the VCS-PD sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the proposed VCS project activity.

3.2 Application of Methodology

3.2.1 Title and Reference

The CDM approved baseline and monitoring methodology ACM0002-Version 13.0.0: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" /48/ is correctly applied for the project activity.

The tools applied for the project activity were:

"Tool for the demonstration and assessment of additionality" /46/.

"Tool to calculate the emission factor for an electricity system" /49/.

3.2.2 Applicability

The proposed project activity meets the criteria defined in the baseline methodology as it ensures that:

- The project activity involves the installation of two new Greenfield run-of-river hydroelectric power plants at the Göksu River flowing through Besni, Adıyaman in Turkey's South-eastern Region with two power houses /22/. At this site no renewable power plant was operated prior to the implementation of the project activity, as could be observed during the site visit.

- The project involves the construction of a regulation pond with a surface of 640,471.91 m² /43/. The resulting power density is therefore 58.11 W/m². The power density is higher than 4 W/m² as required by the methodology.
- The project does not include any retrofit, capacity addition or replacement of an existing power plant /23/.
- The project activity does not involve any change from fossil fuel use to renewable or biomass power plant.

The project applies the “Tool for the demonstration and assessment of additionality” as:

- The use of the tool is not mandatory when proposing a new methodology. This does not apply for the project activity, as an existing methodology is being applied /48/.
- The use is mandatory, when applying an approved methodology which includes the tool. This is the case for the project activity, applying an approved methodology /48/.

The project applies the “Tool to calculate the emission factor for an electricity system” as:

- This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). This criteria applies for the project activity, the project will generate hydro power electricity and exported to the national grid /29/;
- Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. Only grid power plants are included in the EF calculations /05/.
- In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country. The project is not a CDM project and located in Turkey /23/.
- In case any biofuel is used in the calculations, it's value applied as CO₂ emission factor is zero.

RINA hereby confirms that the selected baseline and monitoring methodology has been previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein.

3.2.3 **Project Boundary**

- According to the approved baseline and monitoring methodology ACM0002 /48/, the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the VCS project power plant is connected to. Through assessing the Interconnection Agreement /29/, RINA validated that the project will generate electricity and it is connected to Turkey's National Power Grid.
- Emission Factor is calculated by Suen Ltd. based on the latest data available at the time of the start of validation /05/. The spatial extent of the project boundary is thus identified as the extent

of the National Power Grid including the power plants of the project. The information above is clearly described in section 3.1. of the VCS-PD /01/. It is validated that the delineation in the VCS-PD of the project boundary is correct and meets the requirements of the selected baseline methodology and tool.

Emissions sources included in the project boundary are shown in the table below:

	GHGs involved	Description
Baseline emissions	CO ₂	Emissions from power generation in fossil fuel fired power plants delivering electricity to the grid that are displaced due to the project activity
Project emissions	N/A	Since the power density of the project activity is 58.11 W/m ² /43/, which is greater than 10W/m ² , project emission is regarded as zero according to the approved methodology /48/
Leakage	N/A	No leakage is to be considered, since the project activity doesn't involve any transfer of energy generating equipment as per the signed equipment purchase agreement /22/

Emission sources which are not addressed by the applied methodology and which are expected to contribute more than 1% of the overall expected average annual emissions reduction have not been identified based on the physical site assessment.

By checking the information and physical site visit, RINA can confirm that the project boundary and emission sources described in the PDD are accurate and complete, and also that the selected sources and gases are justified for the proposed project activity.

3.2.4 Baseline Scenario

According to the approved baseline and monitoring methodology ACM0002 /48/, the baseline scenario for new installed power plants like the project validated herewith is:

“Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”/49/.

No other alternatives were identified for the project activity in line with the requirements of the approved methodology /48/ where the baseline for new power plants is set and no further assessment is required.

The ex-ante estimation methods was selected for the OM and BM emission factor based on the most recent information available at the time of start of the validation of the VCS-PD version 1.0 /01/, from the Turkish Statistical Reports 2008-2010 /51/ published in the TEIAS website.

Only grid connected power plants were taken into account in the calculations. Simple OM method (ex-ante option) calculation was used as per the “Tool to calculate the emission factor from an electricity system” /49/, as the share of “low cost/must run” are below 50% /05/.

RINA was able to verify the documented evidence listed above during the validation process and can confirm that the approved baseline methodology ACM0002 version 13.0.0. /48/ has been correctly applied in the VCS-PD and the confirmed baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

3.2.5 Additionality

Investment analysis is selected to demonstrate the additionality of the project.

The proposed project generates economic benefits other than CDM income from selling of electricity and the baseline scenario is the continuation of the current situation (electricity supplied by the grid) that does not involve any investment; based on that the simple cost analysis and the investment comparison analysis are not applicable for the project activity. A benchmark approach is considered appropriate thus the benchmark analysis has been correctly applied as per the requirements of the additionality tool /30/. Furthermore, the guidelines on the assessment of investment analysis have been followed.

Benchmark:

The project is calculating the equity IRR, an valid option as per the additionality tool /30/ and the guidelines on the assessment of investment analysis /17/ as the project has a debt component, therefore equity benchmark is used for comparison and assessment of the additionality. The applied benchmark is 15%, based on a document of the World Bank for a proposed loan from Clean Technology Fund /59/.

The time of the investment decision and used as basis for the assessment is the signature of the purchase contract for the electromechanical equipment in November 2009 /22/.

Parameters	Unit	Value	Source	Validation Assessment and cross checking
Capacity	MW	37.221	In line with the contract with the technology provider Hangzhou Yatai Hydro Equipment Co. Ltd. /22/, the data was available at the time of investment decision, as the contract information was known by the PP and discussed with the provider before signature.	The value is in line with the contract signed for purchasing the technology with Yatai Hydro /22/.
Plant Load Factor	%	46	The value is confirmed via letter by an external consulting company “Youlso Engineering Services” /23/.	In line with the guidelines for assessment of the plant load factor /18/, the value is considered correct as it was supplied by an external company to the PP and

				based on measured water flow in the project location.
Annual Electricity Generation	GWh	150.39	Confirmed based on the plant load factor above and the operational hours as calculated by Youlso Engineering Services in the FS report /23/.	Confirmed based on the plant load factor above.
Investment Cost	USD	75,391,877	The value is used for calculations and presented in the revised FSR prepared by Youlso Eng. Services /23/.	Verified against the translation of the cost estimate provided by Youlso Eng. Services /23/. This cost represent 1.5 million EURO per installed MW, by crosschecking with a paper published with the International Energy Agency (http://www.iea.org/publications/frepublications/publication/Hydropower_Essentials-1.pdf) /38/, the estimations provided in the paper for hydro projects are between 1.5 to 3.1 million EUR per MW (2-4 USD M/MW). The project costs can be therefore considered conservative and in line with the normal costs. Furthermore, the values are in line with electromechanical purchase contract /22/.
Equity	USD	41,641,877	Difference between the debt and the total investment as included in the calculations of the FS report /23/.	Difference between the debt and the total investment.
Debt	USD	33,750,000	Based on the agreement signed with the loan providing bank for the total amount of 27 million Euro /34/.	Based on the agreement signed with the loan providing bank for the total amount of 27 million Euro /34/.
Annual O&M costs	USD	924,604	Value calculated by Youlso Engineering /23/	The presented costs represent 6.15 USD per produced MWh, by crosschecking with a paper published with the International Energy Agency (http://www.iea.org/publications/frepublications/publication/Hydropower_Essentials-1.pdf)/38/, the operating and maintenance costs for hydro power projects are estimated to be between 5-20 USD, therefore the presented costs can be considered conservative and correct.
Electricity	USD/	0.076	Price based on the	The renewable energy law /35/

Price	Kwh		renewable energy law, where the price is fixed for renewable energy projects /35/.	fixes the price for hydro power plants at 7.3 USD cent/kwh. The PP used the value of 7.6 cent to assure conservativeness.
Corporate Tax	%	20	Income Tax Law number 5281, applicable for the project activity /39/.	Law 5281 is still applicable in Turkey, the income Tax of 20% is therefore correctly included in the UIRR calculations.

The assessment involves checking the data input taken from documents, adoption of correct accounting principle and arithmetical accuracy. We have checked the documents and ensured that right input has been taken in the project cost and projections. The accounting principles adopted with respect computation of interest during construction, block of assets, pro rata expenses and tax computation are found to be in order. The arithmetical accuracy is also found to be correct. The principle adopted by the project developer for computing equity IRR is in conformity with the "Guidance on the Assessment of Investment Analysis ". IRR has been computed for 40 years and the final book value of the project activity is taken as 0 (complete depreciated) after this period. Taken into account that in case of finalization of the project activity after 40 years, the dam and other constructions needs to be dissembled, the possible revenue for selling the old turbines will be lower as other costs. Calculations can be considered correct.

The equity IRR has been calculated to be 11.44%, below the defined benchmark of 15%.

Sensitivity analysis:

Parameter	Changes/variation		Probability of the situation				
Total investment cost	+10%	10.28%	The investment cost must decrease by 22% for the project to cross the benchmark The investment costs of the project (75,391,877 USD /22, 23/) are in line with the international costs per MW for similar projects /39/, so it can be assessed that the project costs to reduced more than 10% to make the project cross the benchmark. <table><tr><td>Cost per MW as per reference /39/</td><td>Costs of the project activity per MW installed</td></tr><tr><td>2-4 million USD/MW installed.</td><td>2,025,519 USD/MW</td></tr></table> The risk of the project costs to be reduced by 22% is therefore low.	Cost per MW as per reference /39/	Costs of the project activity per MW installed	2-4 million USD/MW installed.	2,025,519 USD/MW
	Cost per MW as per reference /39/	Costs of the project activity per MW installed					
	2-4 million USD/MW installed.	2,025,519 USD/MW					
	-10%	12.85%					
Electricity selling price	+10%	12.81%	The electricity price must increase by 27% for the project to cross the benchmark. As it was confirmed through actual electricity price report /60/. The price has decreased; therefore it can be assessed that the price will not increase more than 10% and will not reach 27% to make the project cross the benchmark.				
	-10%	10.06%					

Annual operational Cost	+10%	11.34%	The project would not cross the benchmark even if the O&M costs are reduced to 0. As the O&M can be considered conservative based on the comparison with international average values /39/, even if the O&M costs are reduced to 0, the benchmark would not be crossed.
	-10%	11.54%	
Electricity generation	+10%	12.81%	The electricity price must increase by 27% for the project to cross the benchmark. This is not expected to happen, as the generation was calculated by a third party company /23/ based on the historical flow river data.
	-10%	10.06%	

Common practice analysis:

As per the “Guidelines on Common Practice”, following steps has been assessed.

Step 1: Output range (+/-50%)

The range to analysis the project activity goes from 18.61 MW to 55.83 MW.

Step 2: Similar projects in the geographical area, same measure and energy source, same quality of output, within the range calculated in step 1 and which started operation before the proposed project activity.

Geographical area: The geographical area considered for the assessment is within the borders of Turkey. 447 Projects were defined /61/.

Step 3: Projects which are not under validation or registered under a carbon standard shall be defined as Nall. In This case, Nall is 64 /57/ /58/.

Step 4: Define the projects different to the project activity.

Only 6 plants are being developed by private companies and using hydro power technology without support from the government, therefore ndiff is 58 /62/.

Step 5: The factor $F=1-N_{diff}/N_{all}$ shall be calculated.

As per the requirements of the tool, the calculation is $1-58/64 = 0.09$

As the factor is under 0.2 and Nall-Ndiff, the project is not common practice in the defined geographical area.

Conclusion

RINA can confirm that all data, rationales, assumptions, justifications and documentation provided by the project participants to support demonstration of additionality are credible and reliable.

By assessing the evidences presented and cross-checking the information contained in, RINA considers the reasoning for the proposed project additionality demonstration is credible and reasonable, i.e. the proposed project has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the registered CDM project activity.

3.2.6 Quantification of GHG Emission Reductions and Removals

The emission reductions E_Y of the project activity during the crediting period is the difference between the baseline emissions B_{EY}, project emissions P_{EY} and emissions due to leakage L_{EY}, which are listed as follows:

1) Baseline Emissions (B_{EY}): (tCO₂e) are the product of the baseline grid emission factor (EF_{grid,CM,y} in tCO₂e/MWh) times the net electricity supplied by the project activity to the grid (EG_{BL,y} in MWh).

2) Project Emissions (P_{EY}): the project activity is a newly built hydropower project activity with no reservoir. The constructed regulation pound has a power density of 58.11 W/m² /23/, which is larger than 10W/m². As per the applied methodology ACM0002 version 13.0.0 /48/, the project emissions are Zero.

3) Leakage (L_{EY}): no leakage emissions are considered for the project activity. According to the signed turbines and generators purchase agreement /22/, no equipment is transferred from other activities. Thus, the emission reductions are calculated as the following formulae:

$$EY = BEY - PEY - LEY$$

The baseline grid emission factor for the project activity is determined ex-ante as a CM, consisting of the combination of OM and BM according to "Tool to calculate the emission factor for an electricity system" version 3.3.0. /49/. The VCS-PD version 04 of 19/02/2013 /01/, is correctly applied the most recent data vintage for the baseline emissions calculation /05/.

The following data were used for baseline emissions calculation:

- Country specific data for net calorific value and amount of consumption of each type of fossil fuel /51/;
- IPCC 2006 default values for emission factors of each type of fossil fuel;
- The total electricity generated by each power plant /51/.

According to the statistical data from Teias /51/, the low-cost/must-run resources in the last five years (from 2006 to 2010) constitute less than 50% of the total grid generation. Therefore, it is justified that the OM is calculated using the simple OM method. OM is calculated to be 0.657 tCO₂e/MWh as a generation weighted average for the year 2008, 2009 and 2010.

BM is calculated to be 0.643tCO₂e/MWh.

The CM grid emission factor of the grid is determined ex-ante for the 10 years crediting period following the applied methodology ACM0002 /48/, based on the most recent information available. It has been calculated as the weighted average (wOM=0.5, wBM=0.5) of OM emission factor and the BM emission factor. The combined margin emission factor is calculated as 0.65 tCO₂e/MWh.

The annual net electricity supplied by the project activity to the grid is estimated to be 150.39 GWh in the VCS-PD /01/.

Hence, the annual emission reductions generated by the project activity is calculated to be 97,754 tCO₂e/yr (=150.39 GWh*0.65 CO₂e/MWh) over the selected 10 years renewable crediting period.

The estimation of emission reductions, 97,754 tCO₂e, can be replicated using the data and parameter values provided in the VCS-PD version 04 /48/ and supporting file ER calculation spreadsheet /05/ submitted for registration;

RINA thus confirms that the GHG emission reduction calculations are complete and transparent, and the data accuracy has been verified. No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology has been found.

3.2.7 Methodology Deviations

The project activity does not deviate from the applicable methodology ACM0002 /48/.

3.2.8 Monitoring Plan

The approved baseline and monitoring methodology ACM0002, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 13.0.0. /05/ has been applied. The monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions.

RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology; no deviations relevant to the project activity have been found in the plan.

RINA confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.

The monitoring plan makes provisions for the measurement of the following parameters which will allow an ex-post assessment of emission reductions. The project activity will supply electricity to the turkish grid, thus, the project participants will monitor ex-post the following parameters:

- $EG_{PJ,y}$: net electricity supplied by the project activity to the grid in year y. The net electricity supplied to the grid will be measured by a bi-directional meter, a backup meter is available in case of failure of the main meter. The supplied to the grid will be continuously monitored, hourly measured and at least monthly recorded, through the meter installed at the connection point between the project activity and the power grid. The meters maintenance falls under the responsibility of TEIAS, which calibrates the equipment every 10 years, as per the national regulations /55/. A monthly invoice from TEIAS technician is available and serves as crosscheck for the parameter.
- CapPJ: Installed capacity of the hydropower plant after the implementation of the project activity. It is not foreseen to change the installed capacity of the project, but the audit team will be able to verify the situation on site during verification activities by checking the nameplate of the equipment.
- APJ: The water level will be monitored by a gauge level, the results will be reported annually. With the level of water is possible to calculate the surface area based on the known geographical conditions of the project area.

RINA checked these parameters described in Section 4.2. of the VCS-PD and confirmed that 1) the title, unit, description, source of data and value are correct and in line with the documentation prepared by the project consultants and physical site visit; 2) the measurement of the parameters are appropriately described and in line with the applied methodology.

The organizational and management structure, including the responsibilities for monitoring, data collection, reporting, staffs training and QA/QC procedures are clearly described in the VCS-PD version 04 of 19/02/2013 /01/.

RINA validated through physical visit, interviews with the relevant persons, cross check with the relevant national regulations /55/ and confirmed that the management arrangements described in the monitoring plan is feasible within the project design and the data management and QA/QC procedures are sufficient to ensure that the emission reductions can be reported ex post and verified.

It is RINA's opinion that the monitoring plan is in compliance with the requirements of the applied methodology and the project participants are able to implement the monitoring plan.

3.3 Non-Permanence Risk Analysis

3.4 Not applicable. Environmental Impact

According to the “Environmental Impact Assessment (EIA) regulation” published in the official Gazette dated 16.12.2003 /52/, run-off hydro power plants with an installed capacity of less than 25MW does not require an Environmental impact assessment. The project received an EIA exemption /21/ on 22/04/2009, the impacts of the project to the environment can be considered low as per national regulations.

3.5 Comments by stakeholders

Prior to the start of validation, a local stakeholder meeting was conducted on 28/05/2010 at the Sambayat Town, Adiyaman Province. The invitation was done per e-mail, letter and newspaper publication /53/ to local citizens, government and non-governmental organizations. A participant list, meeting minutes and comments were provided to the DOE /54/. During the site visit /02/, a local stakeholder (Muhtar) was consulted about his knowledge about the project. He was well aware and confirmed that the communication flow with the developing company and the neighbors is working properly.

A summary of the stakeholders' comments has been incorporated in the VCS-PD version 04 /01/ and has been verified by RINA, and it is noted that the local government and the residents agreed with the construction of the project activity, and it is the common view that the project activity will bring social and economic benefits to the local people. As per the stakeholder's comments, it can be concluded that the local population agree with the development of the project activity.

RINA can confirm that the process is adequate and credible for local stakeholder consultation.

4 Validation conclusion

RINA Services S.p.A (RINA) has performed validation of the project activity “Murat HEPP Project” in Turkey, with regard to the relevant requirements for VCS activities.

The review of the project design document and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the fulfillment of the stated criteria.

The project correctly applies the approved baseline and monitoring methodology “ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 13.0.0. /48/.

By generating renewable energy from hydropower plant, the project results in reduction of CO₂ emissions that are real measurable and giving long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the “Murat HEPP Project” are estimated to be on an average 97,754 tCO₂e per year over the selected 10 years crediting period, renewable once. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is RINA's opinion that the project participants are able to implement the monitoring plan.

In conclusion, it is RINA's opinion that the project activity "Murat HEPP Project" in Turkey, as described in the VCS-PD, version 04 of 19/02/2013, meets all relevant VCS requirements and all relevant host Party criteria and correctly applies the baseline and monitoring methodology "ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 13.0.0. /48/.

RINA thus requests registration of the project as a VCS project activity.

APPENDIX A

VALIDATION PROTOCOL

TABLE 1 REQUIREMENTS CHECKLIST

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
A Description of Project Activity						
A.1 Title of the project activity						
A.1.1.	Title of the project activity, revision number and date of VCS-PD. State the clearly identifiable title of the project activity, the version number and the date of the VCS-PD.	/01/	DR	The title of the project activity is "Murat HEPP Project". version 01 of 04/04/2011.		OK
A.1.2	Does the project comply with the applicable requirements for completing the VCS-PDs?	/01/ /11/	DR	The project complies with "VCS Program Guide", version 3.2. of 01/02/2012 for completing the VCS-PD. The VCS-PD version 01 does not include reference to the plant load factor and project development timelines. .	~~CAR 1~~	OK
A.2 Description of the proposed project activity						

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

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
A.2.1	Does the PDD contain an accurate description of the project activity and provide the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation? How was the design of the project assessed?	/01/ /11/ /23/	DR, I	The project activity consists of the construction of two Greenfield run-of-river hydroelectric power plants (HEPPs): Murat I and Murat II. They will both be located on Göksu River flowing through Besni, Adıyaman in Turkey's South-eastern Region. The rated capacity of the project is 24.081MW for Murat I and 13.14MW for Murat II. The generated electricity will be delivered to the Turkish Power Grid which is dominated by fossil-fuel fired power plant. The annual expected generation is 150.39GWh, /23/ which represents the emission reductions of 83,615 tons of CO₂ per year. As per the situation seen during the site visit, the project is under construction. In section 1.1 of the VCS-PD version 01 is not reported the source of the PLF in line with the guidelines for the reporting of plant load factor and the timeline for the construction of each of the hydro power plants.	CAR1	OK
A.2.2	Does the project activity involve alteration of existing	/01/	DR, I	As seen during site visit, the project is		OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
	installations? If yes, have the differences between pre-project and post-project activity been clearly described in the PDD?			being newly installed, no alteration of an existing project takes place.		
A.2.3	Does the project expect a “Grouped Projects”?	/01/ /10/	DR, I	The project consists of two hydro power plants installed as cascade in the same river basin. The total installed capacity of the projects is 37.221 MW, which falls under the large VCS scale project guidelines /10/. The project does not fall under “Grouped Projects”.		OK
A.3 Ownership and other programs (VCS Standard Version 3 § 3.12)-- Project eligibility (VCS Standard Version 3 § 3.4.1)						
A.3.1	Does the Proof of title is available and in accordance with the “right of use” of VCS requirements?	/01/ /25/ /28/	DR	Based on the information provided during site-visit, it can be confirmed that Murat HEPP Energy Electricity Generation and Trade Inc. Co. is the company approved to develop the project activity /25/ /28/.		OK
A.3.2	Does the project activity reduce GHG emissions from activities that are included in an emission trading program or take place in a jurisdiction or sector in which binding limits are established on GHG emissions?	/26/	DR	The issue was confirmed by the project owner through a signed statement.		OK
A.3.3	Does the project have created another form of GHG-related environmental credit?	/26/	DR	The issue was confirmed by the project owner through statement.		OK
A.3.4	Does the project is registered under another approved	/01/	DR	Through cross checked with other		OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
	GHG program?	/26/		common GHG programmes and the statement of the project owner, it can be confirmed that the project is not registered under other GHG programmes.		
A.3.5	Does the project is rejected under other GHG program?	/01/	DR	The audit team performed a cross check with other GHG programme information, no rejection of the project activity was found.		OK
A.4 Technical description of the project						
A.4.1	Is the project location clearly defined? (VCS Standard Version 3 § 3.11)	/01/ /12/	DR, I	Yes, the project location is clearly defined in the VCS-PD version 01.0. The location is the Adryaman province, Turkey. The project coordinates are not clear. The PP shall include the coordinates from the water intake and power house.	~~CAR2~~	OK
A.4.2	Does the project is categorized as “project” or “mega project”? <u>(VCS Standard Version 3 § 3.10)</u>	/01/ /10/	DR	The project will generate less than 1,000,000 tCO ₂ reductions, therefore it is categorized as a “project” activity/10/.		OK
A.4.3	Does the project design engineering reflect current good practices? Would the technology result in a significantly better performance than any commonly used technologies in the host Country?	/01/ /12/ /22/	DR, I	The project engineering reflects current good practice, the turbines are transferred from China, a country that demonstrated plenty of experience in the construction of hdro power turbines. The description of the technology is		OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				clearly included in the VCS-PD. The project consist in the installation of 6 Horizontal axis synchronized generator (3Xproject), which will generate and deliver electricity to the grid at AdıyamanÇimento 154 kV interconnection point, through a 10 km long transmission line. ∴		
B. Application of a baseline and monitoring methodology						
B.1 Methodology applied						
B.1.1	Does the project activity apply an approved methodology and the correct version thereof?	/01/ /04/	DR, I	The VCS-PDversion 01 has correctly applied the approved methodology “ACM0002-Version 12.3.0. <i>“Consolidated baseline methodology for grid-connected electricity generation from renewable sources”</i>. All applicability conditions as per methodology are included in the VCS-PD. The VCS-PD shall apply the latest version of the methodology and tools.	CAR3	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.2 Applicability criteria of the methodology/tools						
B.2.1	How was it validated that the project activity complies with the applicability criteria?	/01/ /04/ /23/	DR, I	The project activity, for energy generation component, meets the criteria of the approved methodology ACM0002-Version 12.3.0: <i>"Consolidated baseline methodology for grid-connected electricity generation from renewable sources"</i>, under the following conditions: Criteria 1: the project activity generates electricity using hydro resources and supplies electricity to the regional grid /23/; Criteria 2: The project will deliver the generated electricity to the Turkish Grid, as it could be confirmed with the project design. . Criteria 3: the project activity is a newly built hydropower plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity, as it could be confirmed during site visit as the project was under construction; Criteria 4: the project activity results in a new regulation pond with the power density of 58.11 W/m², which is greater than 4W/m²;	CL1	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				Supporting information on the surface area shall be provided. Criteria 5: The project does not involve the addition of renewable energy generation units to an existing renewable power generation facility, as the project consist in the installation of 2 new power plants, as confirmed during site visit and information of the FSR. Criteria 6: The project does not involve retrofit or replacement of any power unit. Criteria 7: The project does not involve the switch of fossil fuel to renewable energy sources, is not a biomass power plant or is not a hydro power plant with a new reservoir where the power density is less than 4W/m2.		
B.2.2	Is the selected baseline one of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/01/ /04/	DR, I	The baseline is defined by the methodology /4/ to be that the electricity delivered to the grid by the project would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources.		OK
B.3 Project boundary						

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.3.1	Is the project boundary are clearly defined and in accordance with the applied methodology?	/01/ /04/ /23/	DR	The boundary is defined as per the methodology /04/, as the spatial extent of the project in addition to all plants connected to the grid. The VCS-PD describes the connection point to the grid, in line with the FSR.		OK
B.3.2	What are the project's system boundaries (components and facilities used to mitigate GHGs)?	/01/ /04/ /05/	DR, I	As per the on-site visit, it is confirmed that the project boundary includes the project site and all power plants connected to the Turkish National Grid. The exact components as defined by the methodology /04/ are the power plant, in this case Murat I and II, and all power plant connected to the national grid, as included in the grid emission factor calculation sheet /05/.		OK
B.3.3	Which sources are identified for the project? Does the identified project boundary cover all possible sources linked to the project activity?	/01/ /04/	DR	Only CO ₂ is considered as the main source of baseline emission for the proposed project. This is in compliance with ACM0002-Version 12.3.0.		OK
B.3.4	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute by more than 1% to the estimated emission reductions of the project?	/01/ /22/	DR	There is no such emission source which should be included in the VCS.PD. It is not foreseen as per project design to install a backup generator that could consume diesel or other fossil fuel /22/.		OK
B.4 Baseline scenario identification						

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.4.1	Which baseline scenarios have been identified? Is the list of the baseline scenarios complete?	/01/ /04/	DR, I	Other baseline scenarios were described, The VCS-PD version 01 includes the alternative discussion, albeit the baseline is defined by the methodology and the additionality refers to ACM0002-Version 12.3.0: <i>"Consolidated baseline methodology for grid-connected electricity generation from renewable sources"</i> The PP is requested justification on why the alternative discussion is applied.	CAR4	OK
B.4.2	How have the other baseline scenarios been eliminated in order to determine the baseline?	/01/ /04/	DR, I	Please refer to Section A.4.1	CAR4	OK
B.4.3	What is the baseline scenario? Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/01/ /04/	DR	The baseline scenario is defined by the methodology. Please refer to section B.3.1.		OK
B.4.4	Has the baseline scenario been determined using conservative assumptions? Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/01/ /04/	DR	Not applicable.		OK
B.5 Additionality determination (VCS Standard Version 3 § 3.15)						

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.5.1	What tool does the project use to assess additionality? Is this in line with the methodology?	/01/ /04/ /30/	DR, I	In line with the applied approved methodology ACM0002-Version 12.3.0: " <i>Consolidated baseline methodology for grid-connected electricity generation from renewable sources</i> ", the PP demonstrate the additionality through the " <i>Tool for the demonstration and assessment of additionality</i> " - Version 6.0.0../30/		OK
B.5.2	What is the project additionality mainly based on?	/01/ /04/ /13/ /17/	DR, I	The project additionality has been conducted based on investment analysis and other barrier.		OK
B.5.2	Investment analysis					
B.5.2.1	What is the analysis method used to determine whether the proposed project activity is not (a) the most economically or financially attractive; or (b) economically or financially feasible, without the revenue from the sale of certified emission reductions?	/01/ /04/ 13/ /17/	DR	Since the proposed project activity generates economic benefits other than CDM income and the baseline scenario is the continuation of the current situation (the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources) that does not involve any investment, the benchmark analysis has been applied.		OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.5.2.2	What the financial indicator is used?	/01/ /13/ /14/ /15/	DR, I	The PP compared the IRR against a Benchmark. The benchmark was calculated based on country data The defined benchmark is 10.71%. Further information required, as it is not clear if the calculation is for equity/project IRR and the benchmark pre/post tax.	~~CAR 5~~	OK
B.5.2.3	Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the Host Country?	/01/ /13/	DR, I	Depreciation has been included in the calculations. Supporting document shall be provided for tax and depreciation values used.	~~CL2~~	OK
B.5.2.4	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is the working capital returned in the last year of the operation?	/01/ /13/ /17/	DR, I	The period of calculation is 20 years, in line with the recommendations of the investment analysis guidelines. Further information on the used salvage value and the working capital to be added at the last year of operation. Furthermore, the lifetime of the equipment is not provided, to further crosscheck the calculation period.	~~CAR5~~ ~~CL3~~	OK
B.5.2.5	Cross-check of main parameters used in the financial analysis: electricity generation, electricity tariff, investment costs, operating and maintenance costs, taxes, other costs. The main parameters can be changed for the different	/01/ /12/ /13/ /14/	DR, I	The main parameters can be cross checked as follows: - Investment costs: In line with the technology offer, for which the contract was also signed. The costs can be	~~CAR6~~	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
	project category.	/15/ /22/		considered appropriate and conservative. - For the electricity price, the value used shall be confirmed, as the value from the renewable energy law is the lowest that can be obtained in the host country. The market price is usually higher, and the PPs can sign, following experience in Turkey, contracts with direct consumers, obtaining the highest price, and option being actually used by the project owners. It is not clear if the value used can be therefore considered conservative. - The electricity generation was requested already as part of the CAR 1, regarding further information on the plant load factor. - The O&M costs shall be further justified with real values, taking into account that represent 9% of the investment costs. The O&M costs in hydro power projects are around 1.5-2.5% of the investment costs, with peaks of 5% in special occasions, as can be observed in hydro power projects registered under the CDM requirements. All input values used in the investment analysis needs to be supported with independent/real sources.		

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				The taxes applied in the investment analysis were not supported with evidences.		
B.5.2.6	Sensitivity analysis: have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified?	/01/ /12/ /13/ /14/	DR, I	The sensitivity analysis is included in the calculation sheet. Investment costs, O&M costs and Electricity sales revenues were included. As explained, taking into account the variations that the electricity price can have in Turkey, the electricity generation and electricity price shall be included in the investment analysis separately.	CAR7	OK
B.5.2.7	Sensitivity analysis: is the range of variations is reasonable in the project activity? The main parameters can be changed for the different project category.	/01/ /12/	DR, I	See CAR7	CAR7	OK
B.5.2.8	Have the key parameters been varied to reach the benchmark and the likelihood of this happening been justified to be small?	/01/ /12/	DR, I	The assessment of the variations in the input values to reach the benchmark can be only be done once the benchmark has been assessed as suitable.	CAR6	OK
B.5.3 Barrier analysis						

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.5.3.1	Are the barriers identified complimentary to a potential investment analysis?	/01/ /16/	DR, I	The technological barrier and financial barriers were presented. However, following the guideline for objective assessment of barriers /16/, the description of the barrier does not clearly specified how the VCS, apart from additional revenues presented in the investment analysis, will help the project to overcome the presented barriers.	~~CAR8~~	OK
B.5.3.2	How were the investment barriers assessed to be real? How does VCS alleviate the investment barriers?	/01/ /17/	DR	The additionality has been presented based on investment analysis.	~~CAR8~~	OK
B.5.3.3	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/01/ /04/	DR	No alternatives will be presented as the baseline is set by the used methodology.	~~CAR8~~	OK
B.5.3.4	How were the technological barriers assessed to be real? How does VCS alleviate the technological barriers?	/01/ /16/	DR	Please refer to sections B.53.1.	~~CAR8~~	OK
B.5.3.5	Is the project activity prevented by the technological barriers and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/01/ /16/	DR	Please refer to sections B.5.3.1.	~~CAR8~~	OK
B.5.3.6	How were the barriers due to prevailing practise	/01/	DR	N/A		OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
	assessed to be real? How does VCS alleviate the barriers due to prevailing practice?					
B.5.3.7	Is the project activity prevented by the barriers due to prevailing practice and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/01/	DR	N/A		OK
B.5.3.8	How were the other barriers assessed to be real? How does VCS alleviate the other barriers?	/01/ /16/	DR	See CAR8	CAR8	OK
B.5.3.9	Is the project activity prevented by the other barriers and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/01/ /16/	DR	N/A		OK
B.5.4 Common practice analysis						
B.5.4.1	What are the geographical scope and scope of technology of the common practice analysis?	/01/ /30/	DR	The proposed project activity is a large scale project that generates electricity based on hydrological sources. The region used is the river basin, and there is one similar project, run off river, located near to the proposed project. It should be clarified why the river basin is taken as geographical area, and not province (in case applicable) or the whole country, as recommended by the additionality tool. The project documentation does not	CAR9	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				apply the latest version of the additionality tool, taking into account the requirements on the common practice analysis.		
B.5.4.2	How many similar non-CDM-projects exist in the region within the scope?	/01/ /30/	DR	Please refer to section B.5.4.1.	~~CAR9~~	OK
B.5.4.3	How were possible essential distinctions between the project activity and similar activities assessed?	/01/ /30/	DR	The VCS-PD states that the similar project has a higher installed capacity as the proposed project. The audit team found the similar project to be smaller than the proposed project. Further information required, also taking into account the distinctions with the proposed project and the area of analysis taking into account the comments given in B.5.4.1..	~~CAR10~~	OK
B.5.4.4	What is the data source(s) used for the common practice analysis?	/01/ /30/	DR	Please refer to section B.5.4.4.	~~CAR10~~	OK
B.5.5 Conclusion on the additionality assessment						
B.5.5.1	What is the conclusion with regard to the additionality of the project activity?	/01/ /26/ /27/	DR, I, CC	Please refer to the sections related to additionality, i.e. section B.5.1 to section B.5.4.	~~CAR4~~ ~~CAR9~~ ~~CAR10~~	OK
B.6 Calculation of GHG emission reductions						

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.6.1 Baseline emissions						
B.6.1.1	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/01/ /04/ /06/ /07/ /08/	DR, I	According to the approved methodology ACM0002-Version 12.3.0, the baseline emissions are the product of electrical energy baseline expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor. The emission factor is a combined margin and according to the methodological tool to calculate the emission factor for an electricity system has been calculated as weighted average of OM and BM, which are selected for the first crediting period as 0.5. The emission factor shall be updated taking into account the latest tool to calculate the grid emission factor from the electricity system.	CAR11	OK
B.6.1.2	Have conservative assumptions been used when calculating the baseline emissions and are the uncertainty estimates properly addressed?	/01/ /07/	DR, I	The baseline emission factor is determined ex ante according to the methodological tool "Tool to calculate the emission factor for an electricity system" Version 02.2.1. as the weighted average of OM and BM. The weight of OM and BM are selected for the first crediting period as 0.5 as requested by the methodological tool. The combined margin emission factor	CAR11	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				is determined ex-ante. The combined grid emission factor of the Turkish Grid is calculated as 0.556tCO₂e/MWh. The calculation of the operating margin and build margin emission factors has been documented electronically in a spreadsheet and includes all data used to calculate the emissions factors as required by the methodological tool "Tool to calculate the emission factor for an electricity system" Version 02.2.1. The EF calculation is not done in accordance with the latest version of the methodological tool available on the UNFCCC website. Moreover the VCS-PD has to be updated with the latest version of the tool to calculate emission factor.		
B.6.2 Project emissions						
B.6.2.1	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/01/ /04/	DR, I	According to the project design, the power density is calculated as 58,11W/m², which is higher than the threshold of 10W/m², therefore, no project emissions need to be accounted with reference to the applicable methodology. Evidence on the surface area was not provided to the audit team.	~~CL1~~	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.6.2.2	Have conservative assumptions been used when calculating the project emissions and are the uncertainty estimates properly addressed?	/01/ /05/	DR, I	Please refer to section B.6.2.1		OK
B.6.3 Leakage						
B.6.3.1	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/01/ /04/ /22/	DR, I	According to the approved methodology, the equipments used in the proposed project activity is not transferred from another activity, which is confirmed through the purchase contract of the turbines and generators, so no leakage needs to be accounted.		OK
B.6.3.2	Have conservative assumptions been used when calculating the leakage and are the uncertainty estimates properly addressed?	/01/ /04/	DR, I	Please refer to section B.6.3.1		OK
B.6.4 Emission reductions						
B.6.4.1	Has the methodology been correctly applied to calculate the emission reductions and can this be replicated by the data provided in the PDD and supporting files to be submitted for registration?	/01/ /04/	DR, I	Please refer to section B.6.1 to B.6.3.	CAR11	OK
B.6.5 Data and parameters that are available at validation and that are not monitored						
B.6.5.1	How were the parameters available at validation	/01/ /08/	DR, I	The following default values have been	CAR12	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
	verified?	/06/		applied in the emission reductions calculation. The OM and BM are calculated ex-ante, so the CM Emission Fraction of the power grid is fixed over the first crediting period: 0.556 tCO ₂ e/MWh. CAP _{BL} and A _{BL} are not included in the PDD as required by the methodology.		
B.7 Monitoring plan						
B.7.1 Data and parameters monitored						
B.7.1.1	Does the monitoring plan described in the PDD comply with the requirements of the methodology?	/01/	DR, I	The monitoring plan is not in accordance with the approved methodology ACM0002-Version 12.3.0. Not all parameters to be monitored are included in the VCS-PD.	~~CAR13~~	OK
B.7.1.2	Does the monitoring plan contain all necessary parameters and are they clearly described?	/01/ /04/	DR, I	The only parameter monitored is the net electricity supplied to the grid. All parameters requested by the methodology shall be included in the VCS-PD.	~~CAR13~~	OK
B.7.1.3	Is the measurement equipment described? Is the accuracy of the measurement equipment addressed and deemed appropriate? Are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate?	/01/ /04/	DR, I	Information on the monitoring equipment are not available in the VCS-PD version 01. The monitoring frequency is available and in line with the methodology.	~~CAR14~~	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.7.1.4	Is the monitoring frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/01/ /04/	DR, I	Please refer to section B.7.1.3	CAR14	OK
B.7.1.5	Is the recording frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/01/ /04/	DR, I	Yes, hourly measurement and monthly recording.		OK
B.7.2 Monitoring of sustainable development indicators/environmental impacts						
B.7.2.1	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/01/ /04/	DR, I	According to the approved methodology ACM0002-Version 12.1.0., the sustainable development indicators need not to be monitored. The monitoring of sustainable indicators is not required.		OK
B.7.2.2	Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/01/ /21/	DR, I	DNA of Turkey does not require an Environmental Impact Assessment for projects with less than 25MW per power house. Therefore this is not applicable for the proposed activity.		OK
B.7.2.3	Are the sustainable development indicators in line with stated national priorities in the host country?	/01/ /04/	DR, I	Please refer to section B.7.2.2.		OK
B.7.3 Management, quality assurance and quality control						

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.7.3.1	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/01/	DR, I	At the date of the site visit, it was found that no monitoring arrangement was installed; anyway RINA can confirm that the monitoring arrangements described in the monitoring plan are feasible within the project design, taking also into account that the project owner has already plenty of experience in hydro installations.		OK
B.7.3.2	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/01/	DR, I	Data to be used for emission reductions calculation will be aggregated, summarized, calculated and recorded in both electronic and paper form every month.		OK
B.7.3.3	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?	/01/ /29/	DR, I	All the electricity meters will be calibrated according to national standard to assure the correctness of the readings from the meters, as the meter readings and maintenance is under responsibility of the National authorities. The readings from the meters will be cross checked with sales receipts. Please refer to section B.7.1.3.	CAR14	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
B.7.3.4	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 VCUs, for this project activity, whichever occurs later?	/01/	DR, I	All monitoring data and records will be kept at least for 2 years after the end of the crediting period.		OK
C. Duration of the project activity and crediting period.						
C.1 Start date of project activity						
C.1.1	What is the expected starting date of the project activity and how has been determined? When was the first construction activity?	/01/ /28/	DR, I	The starting date is 01/04/2012, date in which is expected to start operation. Construction started on 10/06/2010. Timeline needs to be provided, as requested.	CAR1	OK
C.1.2	What is the expected operational lifetime of the project activity? Is it reasonable?	/01/ /132	DR, I	Lifetime of the project is reported to be 35 years. Supporting document required. Furthermore, it shall be clarified why 49 years is defined as project lifetime.	CL3	OK
C.2 Start date of crediting period						
C.2.1	What is the expected starting date of the proposed project activity? Does the crediting period start eight week after the request for registration?	/01/	DR, I	Start of crediting period is in line with the starting date of the project, 01/04/2012.	CAR1	OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
C.2.2	What is the length of the crediting period? Is it clearly defined and reasonable?	/01/	DR, I	The crediting period is 10 years. Reasonable for the type of technology to be used for the project activity.		OK
D. Environmental Impact						
D.1.1	Has an analysis of the environment impacts of the project activity been undertaken? Is it clearly and sufficiently described in the PDD?	/01/ /21/	DR, I	No EIA is required as per national laws. The region where the project is being constructed has also other hydro power plants.		OK
D.1.2	Will the project create any adverse environmental effects? Are transboundary environmental impacts considered in the analysis?	/01/ /21/	DR, I	EIA is not required by national law. There are no impacts defined in the VCS-PD.		OK
D.1.3	Is the analysis of the environmental impacts required by the legislation of the host Country? If yes, has the EIA has been approved by local Government? Does the approval contain any conditions that need monitoring?	/01/ /21/	DR, I	Please refer to section D.1.1.		OK
D.1.4	Is it the project in line with the current environmental legislation in the host Country?	/01/ /20/ /25/ /29/	DR, I	The private company that develops the project has all necessary permits to develop the project.		OK
E. Local stakeholder consultation						

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
E.1.1	Are the local stakeholders being invited by the PP?	/01/ /24/	DR, I	The local stakeholder consultation was carried out by the VCS consultant. The sample may be appropriate since it includes local villagers and government officials. Local stakeholder consultation was performed on 28/05/10, before the start of validation.		OK
E.1.2	Area the stakeholders invited is considered as regards commenting the proposed project activity?	/01/ /24/ /33/	DR, I	By reviewing the evaluation forms, the stakeholders invited included the government officials, local residents with different sex, different occupation, different ages and different level of education. It is confirmed that the sample is adequate for commenting		OK
E.1.3	Is the summary of the comments received from the stakeholders, provided in the VCS-PD complete?	/01/ /24/	DR, I	The comments received from the stakeholders are provided in the VCS-PD and they are completed. This is also confirmed by carrying out interview with the local stakeholders during the on-site inspection.		OK
E.1.4	Has due account been taken by the project participants of any stakeholder comments received?	/01/ /02/	DR, I	Yes, the comments received from the stakeholder have been taken in to		OK

Checklist Question		Ref.	MoV ¹	Comments	Draft Conclusion	Final Conclusion
				account. Furthermore, the communication with the stakeholders continues, to further development of the community programs.		
E.1.5	If a stakeholder consultation process is required by regulations/laws in the host Country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/01/ /21/	DR, I	The stakeholder consultation process is not required by regulations of laws in Turkey.		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	Validation Conclusion
CAR1 The Plant Load Factor, in line with the guidelines for assessing the plant load factor, and project development timelines is not included in the VCS-PD.	A.2.1.	DOE 2nd request: Please respond in English. Important to mention which company, external to the project owner, defined the yearly electricity generation as per the guidelines. It has been shown into the PDD and the projection has been prepared by The YOL SU Engineering has been added to the IRR Excell sheet under the “Annual Energy Production” tab. Title has been written in English and highlighted red.	CAR 1 has been solved. The electricity generation is calculated by an independent entity to the project activity.
CAR2 The coordinates of the power house are not included in the VCS-PD.	A.4.1.	The coordinates are included in the PDD in section 1.9 – Project Location.	The coordinates of the power houses were clearly defined in the PDD, CAR closed.
CAR3	B.1.1.	Corrected in PDD. DOE 2nd request:	OK, document updated. CAR closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
The VCS-PD does not apply the latest version of the methodology and tools.		The methodology shall be updated to version 12.3 or 13. The describes 12.1, which is not available anymore. Re-corrected into the PDD DOE 3rd Request (Minor Issue) : The VCS-PD shall be updated to the latest form (v.3.1) Version 3.1 has been applied.	
CAR4 The PP shall define the description of the alternatives, taking into account that is not required by the methodology.	B.4.1.	Corrected in PDD. DOE 2nd request: As per the methodology, alternatives are only to be presented in the PDD if the project is retrofit or replacement. The project is new, therefore alternatives are not applicable. Response: Re-corrected into the PDD	OK, even tough is not require to present alternatives for this type of project activities as per the applicable methodology, the description of the alternatives applied comply with the requirements. CAR solved.
CAR5 Further information and inclusion of the salvage	B.5.2.4.	Corrected.	Ok, the parameters were included in the analysis. CAR closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
value and the working capital are not included in line with the guidelines for assessment of the investment analysis.			
sCAR6 Further information in relation to the investment analysis shall be provided: - is not included in the VCS-PD if the presented benchmark is a equity or project IRR benchmark, and pre- or post- tax. -electricity price: the price given by the renewable energy law in Turkey is considered the minimum value that a project can obtain. The standard market price is higher than the energy price set by law, and the PP is able to sell the electricity directly to final consumers via signature of bilateral contracts. The electricity price used for calculation shall be further supported, also the escalation of the electricity prices. - O&M costs: The calculations are performed with O&M costs that represent 9% of the investment costs. Similar projects present costs of about 1.5-2.5% of the investment costs, literature values define a maximum of 5% under special conditions. Further support on the calculated O&M costs shall be provided. - Salvage value are not included. Since project IRR is used, the terms of the actual debt availed	B.5.2.5.	- Project IRR has been added, benchmark has been described and explained. Electricity fees have been added and explained into the documents OM cost has been amended into the excel sheet. Loan payment schedule is added into the excel sheet. Salvage value also has been included. Related Tax Law (VUK) has been added for the depreciation. Ilgili yazı geldi. Water Usage Agreement also means that the feasibility report has been red and approved by the DSI. According to the process of the DSI there is not separate document which shows the feasibility approval. But it is also not possible to sign Water Usage Agreement without an approval by DSI. Mentioned Water Usage Agreement also presents an prove that the feasibility report has been	OK, the IRR calculations have been performed. CAR closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
for the project shall be provided. - Support for tax rates used and depreciation used was not provided. - It has not been confirmed that the project has not received any subsidy or tax benefits. - All input values of used for calculations (investment costs, electricity price, OPEX and debt assumptions) of the IRR shall be confirmed with third party/real values.		accepted and approved by the DSI: DOE 2nd request: The IRR sheet includes many scanned pages, please confirm to which document they belong. What is the source of the new O&M costs? An FSR cannot be the only source in a validation, please provide the turbine purchase contract, as major costs, to crosscheck the total investment. Please remember that the Technical Review of the DOE is performed in Italy/India/China. The name of the most important evidences shall be provided in English language, also to make it clear for the VCS reviewer. Response: Feasibility Report is the source of the O&M costs. It is presented as Turkish Liras into the FSR but we converted the currency as into the USD in IRR Excell sheet under the Operational Cost tab. The file has been scanned from the FSR and added into the Excell sheet under the Operational costs tab.	

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		Titles has been translated into the English. DOE 3rd request: The presented IRR values of the VCS PD are not in line with the values of the excel sheet (IRR with and without carbon credits). Furthermore, it is mentioned that the benchmark for the project is 15%, and the IRR calculations without carbon credits is already 15% in the excel sheet, making the project economically viable as per the presented calculations. The equity IRR shall be less than the presented benchmark to demonstrate the need of carbon credits. IRR calculation has been amended. Electric selling price has been taken as 7.6 \$cent but mistyped into the excel. This issue has been corrected. Can be seen on excel.	
CAR7 The sensitivity analysis present, electricity generation and electricity price as one input values, which makes it non assessable.	B.5.2.7.	Sensitivity analysis has been carried out for the stated costs and assumptions. It is important to mention that only	Sensitivity analysis has been correctly performed, CAR closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
Furthermore, variations that could occur as presented in CAR6 are to be taken into account. The variations needed to arrive at the breakeven point for each parameter and the justification about why the breakeven point will not be reached is not included in the VCS-PD.		in the cases where the total investment decreases by 26% or the electricity selling revenue increases by 29%, the IRR of the project without carbon credits exceeds the equity IRR benchmark of the project. However, both cases are very unlikely to occur.	
CAR8 It is not clear in the VCS-PD, how VCS will help to overcome the barriers presented, beyond the additional revenues related to it. The VCS-PD does not apply the latest version of the “Tool for the demonstration and assessment of additionality”	B.5.3.1.	- Barrier Analysis has been removed. - Latest version has been done DOE 2 nd request: The additionality tool still need to be updated. Response: Re-updated into the PDD.	OK, the version of the tool was updated trough the document.
CAR9 Common practice: Further information is required taking into account that the geographical area chosen is the river basin, not in line with the common practice guidelines.	B.5.4.1.	Common Practice has been performed according to the new guide.	The common practice analysis has been updated and complies now with the requirements. CAR solved.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		DOE 2nd request: In principle the common practice is correct. Please provide the list of plants which were taken out before calculating Nall due to commencement of carbon credit process. The DOE needs to assess the correctness of exclusion of those plants. The PDD refers to the lists, but there were not attached to the response. Response: Detailed tables and explanations are attached to the mail.	
CAR10 The description of the similar project in the river basin looks to be incorrect based on internet research of the audit team. The installed capacity of the other project seems to be lower than the proposed project.	B.5.4.3.	See the new common practice analysis DOE 2nd request: See above As stated above related tables and explanations can be seen into the attached file.	The common practice analysis has been correctly updated. CAR solved.
CAR11 The Grid emission factor is not calculated using the latest available tool.	B.6.1.1.	Corrected according to latest version. DOE 2nd request. The version was not updated in all	The latest version of the tool has been applied in the VCS-PD, CAR solved.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		chapters of the PDD. Response: Re-corrected into the PDD.	
CAR 12 A _{BL} and CAP _{BL} are not included in the VCS-PD as parameter available at validation as required by the methodology.	B.6.5.1.	Has been added	Both parameters are now included ion the PDD. CAR closed.
CAR12 The monitoring parameters included in the VCS-PD shall be in line with the requirements of the methodology.	B.7.1.2.	Has been added	All parameters are included in line with the requirements of the methodology. CAR closed.
CAR13 Further information on the monitoring equipment to be installed at the project is not included in the VCS-PD.	B.7.1.3.	Has been added	Further information on the electricity meters was provided. CAR closed.
CL1 Supporting documentation on the surface area was not provided to the DOE.	B.2.1.	Has been added as a map into the PDD. DOE 2 nd request A map has been added, which makes the area more visible. But the DOE needs to assess the presented value, therefore, documentary evidences are required to confirm 640,471 m ² .	Evidence was provided to demonstrate the surface area, CL solved.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		Response: General layout of the Murat Diversion Weir has been submitted for your information as a digital copy (.dwg). Elevation is 520.00m for the Murat Diversion Weir. This amount is also our operational elevation. When the diversion Weir commissioned the water will be risen backward till the elevation of 520.00m. And the excess water will be sluiced. The elevation of 520.00m has been rotated at the diversion weir level. Based on the the rotated elevation, risen water projected area behind the Weir specifies 640471.9167 m² according to the Autocad software. Mentioned Autocad drawing has been attached to the mail.	
CL2 Supporting requirements on national depreciation	B.5.2.3.	Related regulations have been explained and resources are	OK, supporting evidence to the tax values has been provided. CL closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
and VAT regulations was not provided.		added.	
CL3 Supporting documents to assess the lifetime of the installed equipment was not provided to the DOE. Furthermore, it shall be clarified why 49 years is defined as project lifetime.	C.1.2.	It is 49 years according to the BOT Law. 40 years lifetime provided upon the related legislation. Related legislation has been linked as footnote number DOE 2nd request. Please refer to the “Tool to determine the remaining lifetime of equipment”, where the lifetime should be one of: (a) Use manufacturer information on the technical lifetime of equipment and compare to the date of first commissioning; (b) Obtain an expert evaluation; (c) Use default values. The legislation value is not one of the options provided by the tool Response: we used default values according to the EB 50.	The lifetime of the project has been estimated based on the default value of the Tool and the expected operational hours of the power plant. CL closed-.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		According to the EB 50 the default value is 150,000 hours for the hydro turbines and that meets the 37 years for the Murat HEPP projects. The default value according to the EB 50 has been given as 30 years for the water cooled electric generators. As a result of the economic life time of the e/m unit has been taken 30 years to be conservative.	

TABLE 3 FORWARD ACTION REQUEST

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



RINA

CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

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

Sergio Alejandro Degener

è qualificato come¹:
is qualified as:

CDM (-TEC, -VAL, -VER, -TL)
VCS (-TEC, -VAL, -VER, -TL)
GS (-TEC, -VAL, -VER, -TL)
SCS (-TEC, -VAL, -VER, -TL)
JI-TEC

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

1.2, 13.1, 13.2, 15.2

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
13.2	Animal Waste Management	13
15.2	Animal Waste Management	15

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	04-04-2011	-
3	03-06-2013	Annual revision

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: Social Carbon 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 GHG GHG QUALIFICATION CERTIFICATE

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

Hasan Zor

è qualificato come¹:
is qualified as:

LOCAL EXPERT
(Turkish mother tongue)

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

-

AREA TECNICA TECHNICAL AREA	CODICE RINA RINA CODE	SCOPO SETTORIALE SECTORAL SCOPE	CODICE RINA RINA CODE
-	-	-	-

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	23-03-2011	-

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

¹ Legend:

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

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard:
GS: Gold Standard
SCS: Social Carbon 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, quale Validatore / Verificatore VCS, per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, quale Validatore / Verificatore GS, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute quale Validatore/Verificatore SCS, 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, as VCS Validator/Verifier, to carry out Validation and Verification of VCS Projects, by the GS Foundation, as GS Validator/Verifier, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, as SCS Validator/Verifier, 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:

Casper Van Der Tak

è qualificato come¹:
is qualified as:

CDM-TEC, VCS-TEC, GS-TEC, JI-TEC, SCS-TEC,
CDM-FIN-EXP, CDM-VAL, GS-VAL

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

1.2, 3.1, 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
3.1	Energy demand	3
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	26-10-2011	-
3	03-06-2013	Annual revision

Il Resp. QPT
Head of QPT

¹ Legend:

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

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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, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP,
VCS-TEC, VCS-VAL, VCS-VER, VCS-TL, VCS-FIN-EXP,
GS-TEC, GS-VAL, GS-VER, GS-TL, GS-FIN-EXP,
SCS-TEC, SCS-VAL, SCS-VER, SCS-TL, SCS-FIN-EXP
JI-TEC

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	06-03-2008	-
8	03-06-2013	Annual revision

Il Resp. QPT
Head of QPT

¹ Legend:

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

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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