

VALIDATION REPORT OF ASLANCIK HYDRO POWER PLANT PROJECT



Report No. 21219286

Project Title	Aslancık Hydro Power Plant Project
Version	Version 03

Report Title	Validation Report of Aslancık Hydro Power Plant Project
Client	Aslancık Elektrik Üretim A.Ş.
Pages	42
Date of Issue	19-06-2012
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Summary:

The validation team assigned by the DOE - TÜV Rheinland concludes that the VCS Project Activity “Aslancık Hydro Power Plant Project” in Turkey, as described in the VCS PD (version 02, 02/06/2012), meets all relevant requirements of the VCS Version 3 standard. The selected baseline/monitoring methodology ACM0002 (version 12.3.0) is approved CDM methodology and has been correctly applied to the proposed project. The DOE therefore requests the registration of the project as a VCS project activity.

The validation has been performed as described in Validation and Verification Manual as well as constitutes the following steps:

- Desk review of the VCS PD and the relevant documents
- On-site assessment (18/04/2012 – 19/04/2012)
- Issuance of Validation Report

The following requirements have been considered:

- Relevant regulations issued by VCS Association
- Policy Announcement from the VCS Association
- Host country criteria
- Criteria given to provide for consistent project operations, monitoring and reporting.

The project correctly applies ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” version 12.3.0. The project activity generates from a renewable hydropower plant electricity to be fed into the National Grid of Turkey replacing a fossil fuel mix of the underlying power plants. The project results in reductions of CO₂ emissions that are real, measurable and give 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 validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Turkey.

The total emission reductions from the project are estimated to be on the average 222,884 t CO₂e per year over the selected 10 year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount will be achieved, given that the underlying assumptions do not alter.

Adequate training and monitoring procedures have been implemented.

In summary, it is DOE’s opinion that the “Aslancık Hydro Power Plant Project” in Turkey, as described in the VCS PD (version 02, 02/06/2012), meets all relevant VCS Version 3 requirements and all relevant host country criteria. The baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 12.3.0, has been correctly applied. Thus, the DOE requests the registration of the project as a VCS project activity.

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Appendix A - Validation Protocol

Appendix B - Certificates of Competence

Abbreviations

ACM	Approved Consolidated Methodology
BE	Baseline Emission
BM	Build Margin
CAR	Corrective Action Request
CED	Çevresel Etki Değerlendirmesi (Turkish; = EIA)
CM	Combined Margin
CO ₂ e	Carbon Dioxide Equivalent
DOC	Document
DR	Document Review
DOE	Designated Operational Entity
DR	Desk Review
EIA	Environmental Impact Assessment
ER	Emission Reduction
EPDK	Enerji Piyasası Düzenleme Kurumu (Turkish; = Turkish Energy Market Regulatory Authority)
FAR	Forward Action Request
FSR	Feasibility Study Report
GHG	Greenhouse Gas
I	Interview
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IRR	Internal Rate of Return
KW	Kilo Watt
KWh	Kilo Watt Hours
L	Leakage
MW	Mega Watt
MWh	Mega Watt Hours
ODA	Official Development Assistance
O&M	Operation and Maintenance
OM	Operating Margin
PE	Project Emission
PD	Project Document
PTD	Proje Tanıtım Dosyası (Turkish; = Project Information File = FSR)
PP	Project Participant
SD	Sustainable Development
t	Tonne
TEIAS	Türkiye Elektrik İletim A.Ş. (Turkish; = Turkey Electricity Transmission Corporation)
TCOB	Türkiye Cumhuriyeti Çevre ve Orman Bakanlığı (Turkish; = Ministry of Environment and Forestry of Turkey)
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

1 INTRODUCTION

1.1 Objective

The purpose of a validation is to have an independent third party assessing the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS 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 Verified Carbon Units (VCUs).

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the VCS PD. The VCS PD is reviewed against the relevant criteria (see above) and decisions made by the VCS Association, including the approved baseline and monitoring methodology. Based on the recommendations given in the Validation and Verification Manual the validation team has employed an approach, focusing on the identification of significant risks for project implementation and the generation of VCUs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement on the project design.

1.3 Level of assurance

Requirements related to assurance level are set out by VCS v.3 to be reasonable. Therefore TÜV Rheinland has focused on providing a reasonable level of assurance that the emission reduction calculation methodology is appropriate and correctly applied, data has been correctly monitored and that emission reductions have been accurately calculated.

In order to comply with the requirements of VCS v.3 the validation shall be carried out selecting data and evidence to provide a reasonable level of assurance as stated in the VCS v.3 paragraph 5.3.1. item 1). In general it shall be adhered to the procedures as defined in ISO 14064-3.

1.4 Summary Description of the Project

By means of desk review of relevant documents, on-site assessment and follow-up interviews with the PP and local authorities, the validation team confirms the accuracy of the project's description given in the VCS PD (version 02, 02/06/2012). The table below summarises the key parameters of the project activity:

No.	Parameter	Description	Assessment by the validation team
1.	Location of the	The project activity is located in Doğankent and	By means of on-site

No.	Parameter	Description	Assessment by the validation team
	project activity	Tirebolu districts, Giresun province in Turkey. The GPS coordinates of project activity are as follows: Power House: 40°54'27.09"N 38°50'45.33"E Dam Axis: 40°49'7.32"N 38°54'47.90"E 40°49'6.70"N 38°54'38.38"E Tunnel: 40°49'4.20"N 38°54'38.26"E 40°54'41.26"N 38°50'45.56"E	assessment, the validation team confirms project location as described in the VCS PD to be correct. Furthermore, the coordinates of project facilities have been cross-checked by Google Earth (version 6.1.0.5001) to be accurate.
2.	Technical specification of turbine-generator set	- Unit: 2 - Turbine type: Vertical Francis - Nominal flow: 56 m³/s - Nominal power: 60 MW - Gross water head: 134.5 m	By means of reviewing signed equipment purchasing contract and the approved FSR the validation team confirms that the technical specification as indicated in the VCS PD is accurate.
3.	Installed capacity	93 MW	In total, 2 units with the same installed capacity of 60 MW will be installed in the project activity. By means of reviewing technical design of project and interviewing with technical personnel during the on-site assessment, the validation team confirms that both turbine-generator sets can't reach their full designed capacity due to seasonal water availability. The maximum output capacity of both turbine-generator sets is limited to be 93 MW.
4.	Amount of net annual electricity generation	418,170 MWh	The annual electricity generation was calculated based on historical hydrological data of the river. The validation team confirms that the value is consistent with the approved FSR.
5.	Reservoir area	175,000 m ²	The validation team confirms

No.	Parameter	Description	Assessment by the validation team
			that the value was sourced from the approved FSR.
6.	Power density	531.43 W/m ²	Based on installed capacity of the project and reservoir area, the value was correctly calculated.
7.	Training for the operation, maintenance and monitoring of the hydropower station	The technical training on operation and maintenance will be given by the manufacturer according to the signed turbine and generator purchasing contract. The training on the monitoring system will be developed by the PP.	By means of reviewing the signed equipment purchasing contract and interview with the PP, the validation team is convinced that the arrangement of training on operation and maintenance will be carried out.
8.	Starting date of the project	01/10/2013	According to current status of construction, the project is expected to start commissioning on 01/10/2013.
9.	Expected project operational lifetime	30 years	The value is consistent with the approved FSR. Based on validation team's sectoral expertise, it is confirmed that operation lifetime of the proposed project activity of 30 years is reliable and appropriate for the IRR calculation.
10.	Crediting period	01/10/2013 - 30/09/2023 for 10 years crediting period	Considering project implementation process, the starting date of crediting period is appropriate and is in line with VCS rules.

In summary, the VCS PD (version 02, 02/06/2012) reflects the actual and accurate information of the project activity. The validation team considers that the project description in the VCS PD is accurate and complete.

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation consists of the following three phases:

- I A desk review of the project design documents
- II An on-site visit and follow-up interviews with project stakeholders
- III The resolution of outstanding issues and the issuance of the final validation

The following sections outline each step in more detail

2.2 Document Review

No.	Date of issuance	Reference document
/DOC1/	02/03/2012	Approved baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.3.0
/DOC2/	25/11/2011	Methodological Tool "Tool for the demonstration and assessment of additionality", version 06.0.0
/DOC3/	29/09/2011	Methodological Tool "Tool to calculate the emission factor for an electricity system", version 02.2.1
/DOC4/	30/07/2010	Validation and Verification Manual, version 01.2
/DOC5/	07/09/2011	Construction permit or release of construction permit issued by the local authority
/DOC6/	01/02/2008	Environmental Impact Assessment
/DOC7/	02/04/2008	Approval of Environmental Impact Assessment or confirmation of EIA release
/DOC8/	20/03/2008	Generation license of the project activity
/DOC9/	25/08/2008	Evidence of project owner's decision to develop the project as carbon credit
/DOC10/	08/06/2011	Evidence of project owner's decision to develop the project as carbon credit
/DOC11/	21/07/2010	Signed construction contract of project activity (dam, tunnel and powerhouse)
/DOC12/	22/12/2010	Signed turbine and generator purchasing contract
/DOC13/	01/07/2011	Signed consultant contract for VCS development between the project owner and the carbon consultant
/DOC14/	13/04/2012	Declaration of non-ODA using in the project activity issued by project owner

No.	Date of issuance	Reference document
/DOC15/	24/01/2011	Signed loan contract between the project owner and bank
/DOC16/	17/10/2008	Approval of use of water resource issued by DSI
/DOC17/	06/12/2010	Contract for construction of transmission line signed between the project owner and contractor
/DOC18/	02/09/2008	Signed carbon purchase contract between the project owner and Camco
/DOC19/	15/06/2011	Termination letter for carbon purchase sent by Camco
/DOC20/	01/07/2008	Grid connection agreement signed between the project owner and TEIAS
/DOC21/	-	Spreadsheet of EF calculation
/DOC22/	-	Spreadsheet of ER calculation
/DOC23/	12/03/2012	VCS PD (version 01)
/DOC24/	02/06/2012	VCS PD (version 02)

2.3 Interviews

The following table outlines the persons having been directly in contact with the DOE within the validation process:

No.	Date	Name	Organization Function	Topic
/I1/	18/04/2012	Mr. Umut E. Kaya Mr. Nazmi Pinar Mr. Hakan Güney Mr. Mehmet Gencbay	Aslancık Elektrik Üretim A.Ş.	- Background information - Early VCS consideration - Investment decision making - Starting date of the project activity - Financial source - Training, maintenance and monitoring arrangements of the project - Approval procedure - Electricity tariff - ODA - Power load factor of hydropower plants - Local applicable laws and regulations on hydropower project

No.	Date	Name	Organization Function	Topic
				- Other similar project in the region - Sustainable development
/12/	18/04/2012	Mr. Süleyman Gökdemir Mr. Can Aslan	Eletcon Energy Legal & Technical Consulting	- Background information of the proposed project activity - Financial source
/13/	18/04/2012	Mr. Alexandros Cotanidis	Enveco GmbH	- CARs and CLs

2.4 Site Inspections

An on-site inspection was conducted with the purpose to clarify whether the project had been carried out as described in the VCS PD and validate project activity adequately. The site inspection was conducted from 18/04/2012 to 19/04/2012:

Time	Duration	Organization	Agenda / Topics / Objectives
09:00	2		Travel from Trabzon airport to the project site
11:00	1	Aslancık Elektrik Üretim A.Ş. Enveco Eletcon	Opening Meeting - Introduction of participants - Introduction of audit procedure and method
12:00	1	Lunch Break	
13:00	3	Aslancık Elektrik Üretim A.Ş. Enveco Eletcon	Visitation of project components that has been installed / constructed: - Powerhouse - Dam - Tunnel / Water diversion system - Transformer station - Installed turbine-generator set - Installed monitoring devices - Connected power grid
16:00		End of Audit Day	
09:00	3	Aslancık Elektrik Üretim A.Ş. Enveco	Documents review and interview with PP, especially on the topics: - Generation license - Approval of Environmental Impact Assessment or confirmation of EIA

		Eletcon	- release - Grid connection agreement - Evidence of VCS consideration - Financial source of the project - ODA funding - Equity/loan ratio - Plausibility of total investment expenditure - Common practice analysis - Fossil fuel fired for on-site generator - Training, maintenance and monitoring arrangements of the project - Actual status of the project activity - Project design - Signed carbon consultation contract - Signed construction contract
12:00	1	Aslancık Elektrik Üretim A.Ş. Enveco Eletcon	Closing Meeting - Presentation of audit results - Open issues and further procedure - Questions and answers
13:00	End of Audit		

2.5 Resolution of Any Material Discrepancy

The validation protocol was prepared following the site visit during which all issues identified during the desk review were discussed. All CAR/CLs have been resolved by PPs via provision of additional supporting evidence and appropriate changes to the VCS PD, as shown in Annex A.

3 VALIDATION FINDINGS

3.1 Project Design

The project activity involves generation of electricity from renewable hydropower energy sources. The purpose of the project activity is to generate power in an efficient, clean, reliable and sustainable way with utmost respect on social and environmental reflections and to reduce emissions by partially substituting the electricity supply of fossil fuel fired power plants in Turkey. The project's spatial boundaries are clearly described for the project installation and respective emissions reduction through electricity generation by renewable energy. The geographical coordinates have been correctly addressed in the VCS PD.

The crediting period will cover the period from 01/10/2013 to 30/09/2023 including both days. The technical description presented in the VCS PD shows a complete description of the project's system and gives sufficiently information about the project facilities. The employed technology

does reflect current good practice concerning the installation and operation of hydro power plants. The regular operational lifetime of the project activity has been designed to be 30 years.

The project is a newly built power unit. It consists of power house, penstock, regulator and transformer. The project leads to a water reservoir with 175,000 m² surface area. The turbines generator set has a total output capacity of 93 MWel. According to approved FSR, the net power supply to the grid was initially estimated to be 418,170 MWh per year. The generated power will be supplied to the national power grid via a transmission line. The correctness of the project description was confirmed by means of the site visit. The description is in line with the approved FSR, the license, the signed turbine generator purchase contract and the technical drawings reviewed on site.

The project is in line with local environmental laws. In addition, the project with regards to economic, social and environmental impacts has been assessed and has been checked by the validation team to be appropriate. The project location is clearly described in the VCS PD and in line with the information provided in the approved FSR.

Various laws and regulations are applicable prior and during implementation of hydropower projects in Turkey. The relevant applicable laws and regulations have been listed in the VCS PD. The project is owned by Aslancık Elektrik Üretim A.Ş. The ownership of the project has been verified by reviewing the business license and means of on-site assessment.

3.2 Application of Methodology

3.2.1 Title and Reference

The approved UNFCCC baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (version 12.3.0) has been applied by the project activity.

3.2.2 Applicability

The applicability of ACM0002 (version 12.3.0) was determined by the validation team by means of desk review and on-site assessment as follow:

Applicability criteria of ACM0002, version 12.3.0	Criteria fulfilled	Assessment by the validation team
"This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s)."	☒ Yes ☐ No	By means of desk review and on-site assessment, the validation team confirms that the proposed project activity is a green field renewable hydropower generation project which supplies the electricity to the National Grid of Turkey.

Applicability criteria of ACM0002, version 12.3.0	Criteria fulfilled	Assessment by the validation team
<i>"The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;"</i>	☒ Yes ☐ No	By means of on-site observation, the validation team confirms that the proposed project activity is new installation of a hydropower project with a run-of-river reservoir.
<i>"In case of hydro power plants, one of the following conditions must apply:</i> <i>o The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or</i> <i>o The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²; or</i> <i>o The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².</i>	☒ Yes ☐ No	A new reservoir will be caused by the project activity. The power density of the project activity was cross-checked by the validation team to be 531.43 W/m ² which is greater than 4 W/m ² .
<i>"The methodology is not applicable to the following:</i> <i>- Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;</i> <i>- Biomass fired power plants;</i> <i>- Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m²."</i>	☒ Yes ☐ No	By means of document review and on-assessment observation, the validation team confirms that - The proposed project activity is a green-field hydropower generation project and does not involve any switching from fossil fuels to renewable energy sources at the project site; - No biomass fired power plant is involved in the project activity - As mentioned above, the power density was correctly calculated to be 531.43 W/m² which is greater than 4 W/m².

In summary, the proposed project activity meets the applicability of ACM0002 (version 12.3.0), "Tool for the demonstration and assessment of additionality" (version 06.0.0) and "Tool to calculate the emission factor for an electricity system" (version 02.2.1).

3.2.3 Project Boundary

The geographical and physical project boundary of the project activity was checked by the validation team during the on-site assessment. The coordinates of the dam and the power house are correctly documented in the VCS PD. The sources and sinks of greenhouse gas identified in the VCS PD are deemed to be appropriate.

	<i>GHGs involved</i>	<i>Assessment by the validation team</i>
<i>Baseline emission</i>	CO ₂	Emissions from the generation of electrical power by fossil power plants in National Power Grid of Turkey
<i>Project emission</i>	-	The power density of the project is 531.43 W/m ² which is greater than 10 W/m ² . Therefore, project emission is neglected.
<i>Leakage</i>	-	Considered to be neglected as per ACM0002 (version 12.3.0)

In summary, the project boundary has been correctly identified in accordance with the ACM0002 (version 12.3.0). All greenhouse gas emissions occurring within the proposed project activity boundary as a result of the implementation of the proposed project activity have been correctly addressed in the VCS PD.

3.2.4 Baseline Scenario

As per ACM0002 (version 12.3.0), “if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following: 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”.

The validation team confirms that the proposed project activity is a new grid connected hydropower plant. Therefore, the baseline scenario as prescribed in the ACM0002 (version 12.3.0) is applicable to the proposed project activity.

The approved baseline methodology is applicable to the project with - explicit criteria - implicit criteria (e.g. available scenarios, applicability of formulas for BE/PE/LE calculations)	☒ Yes ☐ No	Please refer to details in section 3.2.2 of this report
The VCS PD includes all assumptions and data used by project participants	☒ Yes ☐ No	As per ACM0002, version 12.3.0
All references and documents used are relevant for establishing the baseline scenario	☒ Yes ☐ No	As per ACM0002, version 12.3.0

All references and documents used are correctly quoted and conservatively interpreted in the VCS PD	☒ Yes ☐ No	As per ACM0002, version 12.3.0
All relevant policies / regulations considered are listed in the VCS PD	☒ Yes ☐ No	As per ACM0002, version 12.3.0
Identified potential baseline scenarios reasonably represent what would/could occur in the absence of the proposed project activity	☒ Yes ☐ No	As per ACM0002, version 12.3.0
The baseline scenario selection is appropriate and determined according to the methodology	☒ Yes ☐ No	As per ACM0002, version 12.3.0
The approved methodology used is applicable to the identified baseline scenario	☒ Yes ☐ No	As per ACM0002, version 12.3.0

In summary, identification of the baseline scenario is in a correct manner according to ACM0002 (version 12.3.0).

3.2.5 *Additionality*

The project applies the “Tool for demonstration and assessment of additionality” version 06.0.0 to demonstrate additionality.

VCS Consideration

In the course of validation, all relevant signed contracts and project owner’s internal document were reviewed by the validation team. It is confirmed that the timeline of project’s development has been adequately and precisely reported in the VCS PD. Project owner’s decision to use carbon credit in the project activity and first signed carbon consultant contract were prior to the earliest commercial activity conducted by the PP – 21/07/2010 on which the construction contract was signed. It demonstrates that the VCS revenue was sufficiently and seriously considered at very beginning by the project owner.

Investment analysis

According to “Tool for demonstration and assessment of additionality” (version 06.0.0), three options are applicable for investment analysis:

Option I: Apply simple cost analysis

Option II: Apply investment comparison analysis

Option III: Apply benchmark analysis

Option I is not applicable as the project generates economic returns through the sales of electric power to the grid. Option II is not applicable as the project owner is not considering investing in the construction of the identified alternative. As mentioned in section 3.2.4 of this report, the realistic alternative 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, which is not an investment. As per § 19 of “Guidelines on the assessment of investment analysis (version 05, Annex 5 EB 62)”, if the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark

approach is considered appropriate. Hence, benchmark analysis is appropriate to the proposed project activity.

I. Selection of benchmark

Equity IRR after tax was selected as a financial indicator. The selected benchmark was assessed to be applicable to the type of IRR calculated as per the guidelines given in “Guidelines on the assessment of investment analysis (version 05, Annex 5 EB 62)”. The default values for the expected return on equity have been given in the Appendix of the guidelines; the default values are composed of four elements: (a) a risk free rate of return; (b) an equity risk premium; (c) a risk premium for the host country; and (d) an adjustment factor to reflect the risk of projects in different sectoral scopes. The proposed project activity is hydropower generation project which belongs to Group1. The Moody's rating of Turkey as of January 2012 was Ba2 which was valid at the time of investment decision making. Therefore, the return on equity after tax within Group 1 and Ba2 is 12.5%. According to the guidelines, in situations where an investment analysis is carried out in nominal terms, project participants can convert the real term values provided in the table below to nominal values by adding the inflation rate. The inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period. By means of reviewing the FSR, the validation team confirms that the input parameters used for IRR calculation are nominal terms. Hence, the inflation rate shall be considered for benchmark selection. According to the officially published information by Central Bank of Turkey, the inflation forecast for the duration of crediting period (=10 years) is 5%. Therefore, the benchmark for equity IRR after tax can be calculated as sum of expected return on equity (12.5%) and inflation forecast (5%) which equals to 17.5%.

II. Benchmark analysis

The validation team assessed the key input values used in the IRR calculation as follows:

- Equity investment

Value applied for the IRR calculation	53,997,000 USD
Source of the value	Approved FSR
Consistency of the value	The input value is consistent with the FSR.
Validity of input value at the time of investment decision making	Yes
Credibility check	By means of reviewing bank loan contract signed between the project owner and credit grantor, the validation team confirms that ratio of equity in the project activity constitutes approximately 25.2% to total investment. The input parameter used in the IRR calculation is considered to be

	plausible and reliable.
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Moreover, the validation team assessed unit investment of all registered VCS hydropower projects with accessible information in Turkey:

Reference No. of registered VCS projects	Unit investment (EUR/KW)
565, 535, 577, 554, 419, 363, 698, 533, 534, 762, 391, 713, 578, 771, 747, 753, 668, 536, 582, 752, 806	The range is 759 – 2,296 EUR/KW.
The proposed project activity	1,643 EUR/KW

Source: VCS Registry website, dated 10/06/2012

As illustrated above, compared with registered VCS hydropower projects in Turkey the unit investment is within an appropriate range. Hence, the validation team is convinced that the investment expenditure as per the approved FSR is not overestimated and the figure used for IRR calculation is reliable.

- Operation and Maintenance cost

Value applied for the IRR calculation	2,548,400 USD
Source of the value	Approved FSR
Consistency of the value	The input value is consistent with the FSR.
Validity of input value at the time of investment decision making	Yes
Credibility check	As described below

As per the approved FSR, the O&M cost is based on overhaul expense, wage and welfare, material cost, water resource fee, reservoir maintenance fee, insurance cost and other cost. The validation team investigated all registered VCS hydropower projects with accessible information in Turkey as follow:

Reference No. of registered VCS projects	Percentage of O&M cost to total investment (%)
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Reference No. of registered VCS projects	Percentage of O&M cost to total investment (%)
565, 535, 577, 554, 419, 363, 698, 533, 534, 762, 391, 713, 578, 771, 747, 753, 668, 536, 582, 752, 806	The range is from 0.4% to 3.7%.
The proposed project activity	1.2%

Source: VCS Registry website, dated 10/06/2012

As illustrated above, the unit O&M costs are comparable to other registered VCS hydropower projects in Turkey and also within an appropriate range. Therefore, the validation team is convinced that O&M cost of the project activity is reliable and appropriate.

- Electricity tariff

Value applied for the IRR calculation	0.12 USD/KWh
Source of the value	Approved FSR
Consistency of the value	The input value is consistent with the FSR.
Validity of input value at the time of investment decision making	Yes
Credibility check	As described below

The validation team investigated all registered VCS hydropower projects with accessible information in Turkey as follow:

Reference No. of registered VCS projects	Power tariff (EUR/KWh)
565, 535, 577, 554, 419, 363, 698, 533, 534, 762, 391, 713, 578, 771, 747, 753, 668, 536, 582, 752, 806	The range is from 0.04 – 0.055 EUR/KWh
The proposed project activity	0.086 EUR/KWh (= 0.12 USD/KWh)

Source: VCS Registry website, dated 10/06/2012

As illustrated above, the power tariff of proposed project activity is the highest one among all registered VCS projects in Turkey. Therefore, the validation team is convinced that power tariff of the project activity used for IRR calculation is appropriate and conservative.

Based on appropriate input parameters and transparent calculation as presented in spreadsheet, the equity IRR was correctly calculated to be 11.31%. The VCS PD reflects corresponding information correctly.

III. Sensitivity analysis

According to § 20 of the “Guidelines on the assessment of investment analysis” (version 05), only variables including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation and the results of this variation should be presented in the VCS PD and be reproducible in the associated spreadsheets. The validation team thus confirms that the following parameters

- Investment cost,
- Electricity tariff and
- Annual electricity supply

meet the requirement and these parameters have been subjected to made variations in a conservative range in the project activity: The result shows that equity IRR doesn't cross the benchmark in sensitivity analysis.

The benchmark analysis and sensitivity analysis are in accordance with the “Tool for demonstration and assessment of additionality” version 06.0.0 and the “Guidelines on the assessment of investment analysis” version 05. All input parameters used in the IRR calculation were valid at the time of investment decision making. The validation team confirms that the equity IRR after tax works out to be 11.31% which is below benchmark of 17.5%. It is clearly demonstrated that the proposed project activity without VCU revenues is financially unattractive.

Barrier analysis

“Barrier analysis” has been also carried out by the PP to demonstrate additionality. Barriers due to high country risk and legal framework for the promotion of different energy sources have been identified and assessed in the VCS PD. Based on the local and sectoral expertise, the validation team confirms that the identified barriers are realistic and barrier analysis has been adequately, correctly and transparent presented in the VCS PD.

Common practice analysis

According to “Tool for demonstration and assessment of additionality” (version 06.0.0), projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. The validation team conducted the assessment as follows:

No.	Criteria selected	Determination by the validation team	Criteria justified
1	+/-50% of capacity of the proposed project which is from 46.5 MWe to 139.5 MWe	As per the latest requirement in “Tool for demonstration and assessment of additionality” (version 06.0.0)	☒ Yes ☐ No

No.	Criteria selected	Determination by the validation team	Criteria justified
2	Giresun Province in Turkey	In Turkey, the regulatory framework, investment circumstances, water flow and availability of skilled staff differ from province to province. Thus, the identification of spatial area to be Giresun Province is appropriate.	☒ Yes ☐ No
3	Technology	Similar technology applied shall be compared. Hence, project applying hydropower technology for electricity generation is taken into consideration.	☒ Yes ☐ No
4	No VCS project	Other VCS projects can not be implemented without revenues from VCS program. Hence, they are excluded from further assessment.	☒ Yes ☐ No

Considering criteria set above, $N_{all} = 1$; $N_{diff} = 1$. The $F = 1 - N_{diff} / N_{all}$ works out to be 0. According to the "Tool for demonstration and assessment of additionality" (version 06.0.0), the proposed project activity is not common practice. In summary, the proposed project activity is additional.

3.2.6 Quantification of GHG Emission Reductions and Removals

The emission reductions of the project activity are ex-ante calculated according to the approved methodology ACM0002 (version 12.3.0). The proposed project activity applies the formula to calculate the emission reductions as follow:

$$ER_y = BE_y - PE_y$$

where:

ER_y = Emission reductions in year y (t CO₂e/yr)

BE_y = Baseline emissions in year y (t CO₂/yr)

PE_y = Project emissions in year y (t CO₂e/yr)

Assessment of BE_y :

The calculation of the baseline emission is based on the amount of electricity displaced from the National Grid of Turkey multiplying the emission factor of the grid. Amount of electricity of 418,170 MWh will be supplied to the grid per year. The actual amount of electricity supplied to the grid will be ex-post monitored by the PP during the project's implementation.

The emission factor of National Grid of Turkey has been calculated ex-ante by using "Tool to calculate the emission factor for an electricity system" version 02.2.1. The table below describes how the validation team determined the emission factor:

Step	Description	Assessment by the validation team	Justified
1	Identify the relevant electric power system	According to official published information by TEİAŞ, there is only one national grid in Turkey. Thus, the identification of electric power system is justified.	☒ Yes ☐ No
2	Choose whether to include off-grid power	The PP didn't choose to include off-grid power plants in the project electricity system.	☒ Yes

Step	Description	Assessment by the validation team	Justified
	plants in the project electricity system (optional).		☐ No
3	Selection of an OM method	Official published data by TEİAŞ demonstrate that low-cost/must-run resources constitute on average less than 50% of the total grid generation of the five recent years (from 2006 – 2010) in National Grid of Turkey. Thus, the simple OM option can be applied. The ex-ante option was used by the PP to calculate the OM. The validation team confirms that a 3-year (from 2008 to 2010) generation-weighted average, based on the most recent data available at the time of submission of the VCS PD to the DOE for the validation has been applied for the OM calculation. Hence, the selection of OM is justified.	☒ Yes ☐ No
4	Calculation of Operating Margin emission factor	The electricity generation, fuel consumption data, etc. for specific power plants/units serving the grid are not available to the public or to the PP. Hence, the Option B was applied to calculate the OM factor. The validation scrutinized the OM calculation and confirms that the parameters used in the calculation are fully consistent with Official published data by TEİAŞ. The calculation fully complies with the "Tool to calculate the emission factor for an electricity system". Hence, the OM = 0.653 t CO₂/MWh is justified.	☒ Yes ☐ No
5	Calculation of the Build Margin emission factor	According to the official published data by TEİAŞ, the set of power capacity additions in the electricity system that comprise 20% of the system generation and that have been built most recently have larger electricity generation. Hence, figures of set of SET≥20% have been taken into consideration for BM calculation. The ex-ante option was used by the PP to calculate the BM. The validation team confirms that the most recent information available has been used for calculation. Hence, the selection of the method of BM calculation is justified. The most recent information available has been	☒ Yes ☐ No

Step	Description	Assessment by the validation team	Justified
		used for BM calculation which fully complies with the "Tool to calculate the emission factor for an electricity system". Hence, the BM = 0.413 t CO₂/MWh is justified	
6	Calculation of Combined Margin emission factor	As per "Tool to calculate the emission factor for an electricity system", $w_{OM} = 0.5$ and $w_{BM} = 0.5$ are applied for the first crediting period. The calculation of CM = 0.533 t CO₂/MWh is justified.	☒ Yes ☐ No

By means of reviewing spreadsheet of calculation, the validation team confirms that the baseline emissions are correctly calculated to be 222,884 tCO₂e/yr.

Assessment of PE_y:

The proposed project activity will not encompass any project emission. The power density of the project activity was determined by the validation team to be 531.43 W/m², which is greater than 10 W/m². As per ACM0002 (version 12.3.0), the project emission is neglected.

In summary, the calculation of emission reductions was correctly demonstrated by the PP according to ACM0002 (version 12.3.0) and "Tool to calculate the emission factor for an electricity system" version 02.2.1:

All assumptions made for estimating GHG are listed in the VCS PD	☒ Yes ☐ No	As per the VCS PD
All data used by project participants are listed in the VCS PD	☒ Yes ☐ No	As per the VCS PD
Their references and sources are also listed in the VCS PD	☒ Yes ☐ No	As per the VCS PD
Formulas, parameters, values are complete, accurate, transparent and conservative	☒ Yes ☐ No	As per the VCS PD
All the references and documents used are correctly quoted and conservatively interpreted in the VCS PD	☒ Yes ☐ No	As per the VCS PD
Methodology has been applied correctly to calculate project emissions, baseline emissions, leakage emissions and emission reductions	☒ Yes ☐ No	As per the VCS PD
All the baseline emissions can be replicated using information provided in the VCS PD	☒ Yes ☐ No	As per the VCS PD

3.2.7 Methodology Deviations

The project activity's implementation is fully in accordance with ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 12.3.0 and hence deviation of methodology is not applicable.

3.2.8 Monitoring Plan

The monitoring plan is transparently presented in the VCS PD and is in accordance with the approved methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 12.3.0. The validation team confirms that the monitoring plan was correctly applied to the proposed project activity. The monitoring of emission reductions is based on measuring the net quantity of electricity supplied to the National Grid of Turkey.

Parameters determined ex-ante

The emission factor of the National Grid of Turkey was ex-ante calculated and transparently elaborated in the VCS PD. The validation team confirms that parameters used in EF calculation are consistent with the official data published by TEİAŞ.

In summary, the validation team confirms that all relevant parameters have been sufficiently considered and the values of the parameters are real, measureable and conservative.

Parameters monitored ex-post

According to the approved methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 12.3.0, the parameters - net electricity supplied to the grid ($EG_{\text{facility},y}$) will be monitored.

In summary, the validation team is convinced of compliance of the monitoring plan with the requirements of the monitoring methodology of ACM0002 (version 12.3.0). During the on-site assessment, the validation team interviewed the PP that the monitoring arrangements described in the monitoring plan are feasible within the project design. The emission reductions resulting from the proposed project activity can be reported ex post and verified.

Management system and quality assurance

The monitoring arrangement for the project has been described in the VCS PD:

- The accuracy of electric meter (0.5S) and record frequency have been identified appropriately.
- The operation and management structure of the monitoring have been described appropriately.
- The electric meters will be calibrated by a qualified third party according to the national standard in Turkey - TS EN 62053-22.
- The emergency procedure and the correctness action have been identified appropriately.
- The training on operation of project activity will be given by manufacturer as agreed in the contract. The training process of specific monitoring will be developed by the PP.

In summary, the validation team is convinced that the monitoring plan reflects good monitoring practice appropriate to the project type and the PP is able to implement the monitoring plan.

3.3 Environmental Impact

For the proposed project activity, an environmental impact assessment (EIA) is required according to Turkish law. The EIA was approved by the Ministry of Environment and Forestry of Turkey (TCOB) on 02/04/2008, it substantiates that the project activity complies with the relevant environmental law in Turkey. The EIA and its approval have been reviewed by the validation team to be effective.

3.4 Comments by stakeholders

The validation team assessed the adequacy of the local stakeholder consultation as follows:

Identification of local stakeholders

The local stakeholders involved in the proposed project activity have been appropriately identified. They are the local authorities and affected local residents. The validation team is convinced that identification of local stakeholders complies with national regulation in Turkey.

Timing of stakeholder consultation process

The local stakeholder consultation was processed during the EIA relief process which is the mandatory requirement. The approval issued by TCOB substantiates that the stakeholder consultation process was appropriately carried out by the PP.

Moreover, a local stakeholder consultation meeting was conducted on 13/12/2007 in Doğankent. The invitation and meeting records have been made available to the validation team. In addition to the meeting, a two-day opinion survey was conducted beforehand with the heads of the villages affected by the dam construction works, i.e. Aslancık, Ataköy, Eymür, and Dokuzkonak.

Summary of comments provided

By means of reviewing local stakeholder consultation meeting record and interview with local stakeholders, the validation team confirms that summary of comments provided has been addressed in the VCS PD appropriately and transparently.

How due to account was taken of the comments received

No negative comment from the local stakeholder was received by the validation team during the on-site interview from 18/04/2012 to 19/04/2012.

4 VALIDATION CONCLUSION

The proposed project activity “Aslancık Hydro Power Plant Project” in Turkey, as described in the VCS PD (version 02, 02/06/2012), meets all relevant VCS Version 3 requirements and all relevant host country criteria. The baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 12.3.0, has been correctly applied. The total emission reductions from the project are estimated to be on the average 222,884 t CO₂e per year over the selected 10 year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount will be achieved, given that the underlying assumptions do not alter. The DOE hence requests the registration of the project as a VCS project activity.

Appendix A

VALIDATION PROTOCOL

Table 1: Validation requirements (Based on VCS 2011 V.3 Program Guidance)					
Checklist question	Ref.	MoV ¹	Findings, comments, references, data sources	Draft conclusion	Final conclusion
1. VCS Project Description Document					
1.1. Is the VCS PD presented for validation based on the latest template available at the VCS website? Indicate Yes / No answer and describe all inconsistencies in the Table 2 accordingly.	PD	DR	The VCD PD template has been correctly applied.	OK	OK
1.2. Has the VCS PD been established in accordance with the VCS requirements for completing VCS PD issued by the VCS Association?	PD	DR	Yes, the VCS PD has been established in accordance with the VCS requirements.	OK	OK
2. Project Description					
2.1. Does the VCS PD contain a description, which provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation?	PD	DR I	By means of on-site assessment, the validation team confirms that VCS PD reflects project information according to its real implementation.	OK	OK
2.2. In the case of green-field project activity, is the project design described sufficiently by means of specifications, drawings and manuals? Provide Yes/No answer and indicate the documents which have been reviewed in relation to the issue.	PD	DR I	Corresponding information has been given in the VCS PD.	OK	OK
2.3. Does the project activity reflect current good practices, uses state of the art technology or would the technology result in a significantly better performance, than any commonly used	PD	DR I	The project activity applies hydropower technology to generate electricity which reflects good practice in Turkey.	OK	OK

¹ MoV = Means of Verification, DR = Document Review, I = Interview, www = internet search.

technologies in the host country? Provide the description of how validation has been carried out and what comparisons have been made.					
2.4. In cases where the project activity involves the alteration of an existing installation or process, does the VCS PD provide a clear description of the differences between the project and the pre-project scenario? Please, provide Yes/Now answer and update Table 2 if there is anything unclear in the provided description.	PD	DR I	N/A, the project is newly built	OK	OK
2.5. Does the project grouping apply for the proposed project? If yes, does the VCS PD include a description of one central GHG information system and controls associated with the project and monitoring?	PD	DR	N/A, the project is not grouped	OK	OK
2.6. Does the central GHG information system and controls include items identified in ISO14064-3:2006, clause 4.5?	PD	DR	N/A, the project is not grouped	OK	OK
2.7. How has the sampling been determined? Have any of the sub groups and associated activities within each sub group been considered? Does the sampling meet the requirement set out under IAF Guide to ISO/IEC 66/1999 at a minimum?	PD	DR	N/A, the project is not grouped	OK	OK
3. Project Start Date and Crediting Period					
3.1. Are the project's start date clearly defined and evidenced? Does the project start date meet the requirements as stated in VCS 2007.1 clause 5.2.1? If project grouping is applied, each grouped project shall meet the requirement of VCS 2007.1 clause 5.2.1.	PD	DR	The start date has been identified according to VCS guidelines	OK	OK

3.2. Is the start of the crediting period clearly defined and reasonable?	PD	DR	Yes, VCS PD reflects corresponding information correctly.	OK	OK
4. Baseline and Monitoring methodology					
4.1. General requirements					
4.1.1 Is the methodology used in the project activity an approved VCS Program methodology or a methodology from a VCS-approved GHG program? Is the selected methodology version still valid?	PD	DR	The valid version of UNFCCC methodology – ACM0002 has been correctly applied and reported in the final version of VCS PD.	OK	OK
4.2. Applicability of the selected methodology to the project activity					
4.2.1 Are all applicability conditions of the selected baseline and monitoring methodology and all tools involved satisfied by the project activity? Please indicate Yes/No answer. In case of positive conclusion provide details of the validation measures.	PD	DR	Applicability of methodology has been assessed by the validation team step by step in section 3.2.2 of this report.	OK	OK
4.2.2 Is the selection of the applied baseline and monitoring methodology justified?	PD	DR	Yes, refer to section 3.2.2 of this report	OK	OK
4.2.3 Is the selected methodology correctly quoted in all related documents?	PD	DR	Yes, refer to section 3.2.2 of this report	OK	OK
4.2.4 Does the VCS PD sufficiently describe all the GHG emission sources or sinks occurring as a result of project activity, which have not been accounted for under the selected methodology and are expected to contribute more than 1% of the overall expected average annual emission reductions? Provide Yes/No answer. Indicate the sources or sinks of GHG, which were proved to be negligible. Otherwise amend the Table 2	PD	DR	N/A, all GHG sources has been addressed.	OK	OK
4.3. Project boundary					
4.3.1 Does the VCS PD correctly describe the	PD	DR	Yes	OK	OK

project boundary? Provide Yes/No answer. And amend the Table 2 if needed.					
4.3.2 Does the VCS PD correctly indicate and describe the emission sources and sinks of GHG gases that are included in the project boundary?	PD	DR I	Yes, all GHG sources as per ACM0002 has been addressed in the project boundary	OK	OK
4.3.3 In cases where the methodology allows project participants to choose whether a source or gas is to be included in the project boundary, is the choice explained and justified by PPs?	PD	DR	N/A	OK	OK
4.4. Baseline identification					
4.4.1 Has the procedure contained in the selected methodology to identify the most reasonable baseline scenario been applied correctly and documented in the VCS PD?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
4.4.1.1 Is the identified baseline scenario plausible?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
4.4.1.2 Are all assumptions stated in a transparent and conservative manner?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
4.4.2 Does the selected methodology require the use of tools and does VCS PD reflects that correctly?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
4.4.2.1 Were all the tools applied correctly?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
4.4.3 In case the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, have all scenarios been considered and have no reasonable alternative scenario been excluded?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
4.4.3.1 Has the choice of the baseline scenario been done using conservative assumptions?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
4.4.4 Is the identified baseline scenario reasonable according to the assumptions, calculations and rationales used in the VCS PD	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK

and other reference sources? 4.4.5 Does the VCS PD describe how the national and sectoral policies relevant to the baseline scenario have been identified and considered in the VCS PD?					
4.4.6 Does the VCS PD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the project activity?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
4.5. Algorithm and/or formulae used to determine emission reductions					
4.5.1 Are all calculations applied and documented according to the selected methodology and in a complete and transparent manner?	PD	DR	Yes, all calculation has been applied according to ACM0002.	OK	OK
4.5.2 In case the methodology allows a selection between different options for equations or parameters, has adequate justification been given and have the correct equations and parameters been used, in accordance with the methodology selected?	PD	DR	N/A	OK	OK
4.5.3 In case some data and parameters will not be monitored throughout the crediting period, but have already been determined and fixed, are all data sources, assumptions and calculations correct, applicable to the proposed VCS project activity and conservative?	PD	DR	Yes, the figures have been checked by the validation team to be conservative.	OK	OK
4.5.4 In case data and parameters will be monitored on implementation and hence become available only after validation of the project activity, are the estimates provided in the VCS PD for these data and parameters reasonable?	PD	DR	Yes, the figures have been checked by the validation team to be reasonable.	OK	OK
4.5.5 Have the major risks and uncertainties, which can influence the emission reduction estimates, been identified and addressed in the VCS PD?	PD	DR	N/A	OK	OK

4.6. Leakage					
4.6.1 Has the leakage been identified and calculated according to the approved methodology?	PD	DR	N/A, no leakage in the project activity	OK	OK
4.6.2 Have the leakage been addressed in complete, conservative and substantiated manner?	PD	DR	N/A, no leakage in the project activity	OK	OK
4.6.3 Are uncertainties in the leakage emission estimates properly addressed?	PD	DR	N/A, no leakage in the project activity	OK	OK
5.3 Additionality					
5.1. Identification of alternatives					
5.1.1 What additionality tool has been selected in the VCS PD? Does it comply with the latest requirement of VCS standard	PD	DR	UNFCCC methodological tool to demonstrate additionality has been correctly applied.	OK	OK
5.1.2 Does the VCS PD identify and list credible alternatives to the VCS project activity in order to determine the most realistic baseline scenario, unless selected approved methodology prescribes/identifies the baseline scenario and no further analysis is required?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
5.1.3 Does the list of alternatives include as one of the options that the project activity is undertaken without being registered as a VCS project activity?	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
5.1.4 Does the list contain all realistic/credible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the project activity? Note: All alternatives listed in the selected methodology should be included, as well as those not covered by the methodology.	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK
5.1.5 Is the exclusion of the alternatives for legal reasons justified? Note: Some alternatives might be illegal,	PD	DR	ACM0002 prescribes baseline scenario.	OK	OK

according to the local regulations, but still widely practiced due to lack of enforcement. It should be verified.					
5.2. Investment Analysis					
5.2.1 Are all sources of revenues (including savings) have been considered in the VCS PD and all calculations?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.2.2 Is the type of investment analysis selected correctly in the VCS PD?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.2.3 Is the selected financial indicator chosen and applied correctly?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.2.4 Is the guidance on IRR calculation and assessment correctly applied? Note: Means of validation should be recorded.	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.2.5 In case project participants use values from Feasibility Study Reports (FSR) is it possible to verify that the period between the FSR date and investment decision was reasonably short and FSR values did not change materially?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.2.6 Are all the values consistent between FSR and VCS PD and are inconsistencies properly justified?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.2.7 Were all the values from FSR applicable and valid at the time of the investment decision?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.2.8 Is it reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants or some verifiable circumstances that have led to a change in the benchmark?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.2.9 Is the Investment Analysis prepared in compliance with the latest version of the "Guidance on the Assessment of Investment Analysis" as provided by the CDM EB?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK

5.3. Barrier analysis					
5.3.1 Are there any issues addressed in the barrier analysis that have a clear impact on the financial viability of the project activity and that shall be assessed by an investment analysis?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.3.2 Do the listed barriers exist and is their existence substantiated? Note: a) by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics and/or (b) by interviews with relevant individuals: including members of industry associations, government officials or local experts if necessary?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.3.3 Would any of the identified barriers prevent the implementation of the project activity but not equally prevent the implementation of the possible alternatives, in particular the implementation of the identified baseline scenario?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.4. Common practice analysis					
5.4.1 Does the additionality tool require common practice analysis for the project?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.4.2 If the PPs claim in the VCS PD that VCS project activity is the “first of its kind”, is it justified?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.4.3 Are the geographical scope of the project activity identified correctly?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.4.4 Does the VCS PD provide an explanation why this region was selected and deemed more appropriate and is this explanation traceable and reliable?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
5.4.5 Are there similar operational project activities, other than VCS activities, “widely observed and commonly carried out” in the	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK

defined region?					
Note: Use official sources and local and industry expertise.					
5.4.6 In case there are similar commercially operated project activities, other than VCS activities, already “widely observed and commonly carried out” in the defined region, are there essential distinctions between the VCS project activity and the other similar activities?	PD	DR	Please refer to section 3.2.5 of this report for more detail	OK	OK
6 Monitoring plan					
6.1 Are all parameters required by the selected approved methodology or tool identified and listed in the VCS PD?	PD	DR	Yes, all parameters required by ACM0002 and tools are listed in the VCS PD.	OK	OK
6.2 Is the measurement method clearly stated for each value to be monitored and deemed appropriate?	PD	DR	Yes, the measurement method clearly stated for each value to be monitored and deemed appropriate. QA/QC procedures have been provided in the monitoring plan.	OK	OK
6.3 Are values of the ex-ante parameters / monitoring parameters selected correctly and conservative in accordance to methodology or tools?	PD	DR	Yes, parameters have been chosen correctly and conservatively.	OK	OK
6.4 Is the measurement equipment for each parameter described and deemed appropriate?	PD	DR	Yes	OK	OK
6.5 Is the measurement accuracy addressed and deemed appropriate?	PD	DR	Yes, Measurement accuracy of equipment has been addressed in the VCS PD.	OK	OK
6.6 Are procedures in place on how to deal with erroneous measurements and are the corrective actions identified?	PD	DR	Yes, the procedure has been addressed in the VCS PD.	OK	OK
6.7 Is the frequency of measurement identified and deemed appropriate?	PD	DR	Yes, the measurement is continuous.	OK	OK
6.8 Is the monitoring plan documented according to the approved methodology and in a complete	PD	DR	Yes, the monitoring plan has been documented according to ACM0002.	OK	OK

and transparent manner?					
6.9 Are the sampling, measurement methods and procedures defined?	PD	DR	Yes, the procedure has been defined.	OK	OK
6.10 Are procedures identified for maintenance of monitoring equipment and installations?	PD	DR	PP shall identify maintenance procedure for monitoring equipments.	OK	OK
6.11 Are the equipment calibration intervals identified and justified?	PD	DR	Yes, electric meter will be calibrated annually.	OK	OK
6.12 Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	PD	DR	Yes, day-to-day records handling is identified in the VCS PD.	OK	OK
6.13 Are the monitoring arrangements described in the monitoring plan feasible within the project design?	PD	DR	Yes, monitoring plan is feasible with the project design.	OK	OK
6.14 Are the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, sufficient to ensure that the emission reductions achieved by / resulting from the project activity can be reported ex post and verified?	PD	DR	Yes	OK	OK
6.15 Do the PPs make provisions for personnel training needs?	PD	DR	By means of on-site interview with the project owner, the validation team confirms that training procedure has been established and implemented.	OK	OK
6.16 Is the authority and responsibility of overall project management clearly described?	PD	DR	Yes, the authority and responsibility of overall project management has been clearly described in the VCS PD.	OK	OK
6.17 Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	PD	DR	Yes	OK	OK
6.18 Are procedures identified for review of reported results/data?	PD	DR	Yes, procedure has been addressed in the VCS PD.	OK	OK
6.19 Is the data archiving period for this project activity stated in the VCS PD and appropriate?	PD	DR	Yes, data will be kept for at least two years after the end of the crediting period or the last issuance of VCUs.	OK	OK

Note: All archived monitoring data, required for verification and issuance, should be kept for at least two years after the end of the crediting period or the last issuance of VCU					
7 Monitoring of the leakage					
7.1 Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	PD	DR	N/A, No leakage in the project activity	OK	OK
7.2 Is the choice of project leakage indicators made according to selected methodology in a reasonable and conservative manner? Note: local knowledge and sectoral expertise shall also be considered.	PD	DR	N/A, No leakage in the project activity	OK	OK
7.3 Is the measurement method clearly stated and deemed appropriate for each leakage value?	PD	DR	N/A, No leakage in the project activity	OK	OK
8 Sustainable development					
8.1 If VCS PD indicates any additional environmental benefits of the project, other than GHG emission reductions, were those benefits properly substantiated?	PD	DR	Yes	OK	OK
9 Stakeholders' consultation and comments					
9.1 Were the stakeholders identified in appropriate and complete manner?	PD	DR I	Stakeholders have been identified as local authorities and local residents affected by the proposed project activity.	OK	OK
9.2 Are the identified stakeholders plausible?	PD	DR	Yes	OK	OK
9.3 Does VCS PD describe the means being used to invite local stakeholder's comments?	PD	DR	Yes	OK	OK
9.4 Were those means appropriate?	PD	DR	Yes, the means of invitation is appropriate.	OK	OK
9.5 Was the project presented to the stakeholders in unbiased manner?	PD	DR	Yes	OK	OK

9.6 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?	PD	DR	The stakeholder consultation process was carried out in accordance with Turkish regulations for EIA.	OK	OK
9.7 Is a summary of the stakeholder comments provided in the VCS PD?	PD	DR	Summary of stakeholders' comment has been provided in the VCS PD.	OK	OK
9.8 Has due account of any stakeholder comments been taken by PPs and reflected in the VCS PD?	PD	DR	No negative comment was received	OK	OK
10 Environmental impacts					
10.1 Is the documentation supplied by the PPs regarding environmental impacts relevant and accurately reflected in the VCS PD?	PD	DR	VCS PD indicates the information regarding environmental impacts.	OK	OK
10.2 Is an environmental impact assessment (EIA) required for the VCS project activity? Note: determine by using a review of relevant legislation and local expertise.	PD	DR	Yes, the EIA is required and approved by the Ministry of Environment and Forestry of Turkey (TCOB) on 02/04/2008.	OK	OK
10.3 In case an EIA is required, has the EIA been approved by local authorities and is the outcome accurately reflected in the VCS PD?	PD	DR	Yes, the EIA is required and approved by the Ministry of Environment and Forestry of Turkey (TCOB) on 02/04/2008.	OK	OK
10.4 Does the VCS PD include a brief description of the environmental effects of the project, including transboundary?	PD	DR	Yes, the VCS PD includes a brief description of the environmental effects.	OK	OK
10.5 Are those effects properly addressed in the design of the project activity?	PD	DR	Yes	OK	OK
10.6 Does the project comply with environmental legislation in the host country?	PD	DR	Yes, the EIA is required and approved by the Ministry of Environment and Forestry of Turkey (TCOB) on 02/04/2008. It substantiates that the project activity complies with environmental provision in Turkey.	OK	OK

List of Requests for Corrective Action (CAR)				
No.	CAR	Reference	Summary of project owner response	Validation team conclusion
1	As the power density is greater than 10 W/m ² and the project emission is zero, hence CH ₄ should not be main emission source within the project activity. Corrective action is requested.	Section 2.3	The VCS PD was revised accordingly.	OK The VCS PD has been revised accordingly and checked by the validation team to be appropriate. The CAR is closed.
2	Completion date of Feasibility Study Report is missing in the table 9 of VCS PD. Corrective action is requested.	Section 2.5	The table was revised accordingly in the VCS PD.	OK The completion date of the FSR has been correctly documented in the VCS PD. The CAR is closed.
3	The table 9 of VCS PD shall also reflect the timeline of carbon consultation development (e.g. When was the carbon consultation contract established etc.) to demonstrate continuing activity on VCS development carried out by the PP	Section 2.5	The table was revised accordingly in the VCS PD.	OK The project timeline has been completely and transparently presented in the VCS PD. The CAR is closed.
4	The VCS PD did not clearly indicate whether the benchmark for equity and equity IRR calculated are pre-tax or after tax. Corrective action is requested.	Section 2.5	The VCS PD was revised, and a post-tax benchmark was	OK The equity IRR after tax has been

List of Requests for Corrective Action (CAR)				
No.	CAR	Reference	Summary of project owner response	Validation team conclusion
			introduced.	calculated and appropriately presented in the VCS PD. The CAR is closed.
5	The common practice shall be assessed in accordance with the latest version tool of "Demonstration and assessment of additionality".	Section 2.5	The VCS PD was revised accordingly.	OK The common practice analysis has been done according to the latest version of tool - "Demonstration and assessment of additionality". The CAR is closed.

List of Requests for Clarification (CL)				
No.	CL	Reference	Summary of project owner response	Validation team conclusion
1	Please provide reliable and detailed clarification on the intention of 120 MW installation of turbine-generator set, whereas the output capacity is limited to 93 MW in the VCS PD.	Section 1.8	The system's technical and economic optimisation, e.g. regarding spare part availability and season-related part load operation, has led to this decision.	OK By means of on-site assessment, the validation team confirms that due to water availability the installed turbine-generator set is able to provide maximum 93 MWel output capacity. The CL is closed.
2	Please clarify whether the raw data used for emission factor has been updated up to 2011	Section 1.10 Section 3.1.2 Annex	No data for 2011 is available yet.	OK The generation data for year 2011 was not available at the time of submission of VCS PD to the DOE for validation. The CL is closed.
3	Please clarify why the Board decided to use carbon credits on 25/08/2008 and 08/06/2011 respectively	Section 2.5	The second decision only represents a confirming decision to proceed with developing the project for the carbon market after the unilateral termination of the initial carbon consulting contract	OK By means of reviewing internal documents of PP and on-site interview, the validation team is convinced that due to cancellation of previous carbon credit contract the PP made decision on

List of Requests for Clarification (CL)				
No.	CL	Reference	Summary of project owner response	Validation team conclusion
			by the initial carbon consultant.	08/06/2011 to continue developing the project as VCS. The CL is closed.
4	Please show the evidence of total investment and power tariff that used for the IRR calculation	Section 2.5	Total investment figure was revised due to timing of the initial data source. The new and valid data source is the loan term sheet, which was provided for validation. Evidence for power tariff figure is an electricity market expert study which was provided for validation.	OK The evidences have been made available to the validation team and checked to be effective. The CL is closed.
5	Please clarify how many water reservoirs are caused by the project activity	Section 3.2	The project activity causes only one reservoir which is described and specified correctly in the VCS PD.	OK Confirmed information by means of on-site observation. The CL is closed.

Appendix B

CERTIFICATES OF COMPETENCE

Qualification

Cui, You /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☐ yes
(Zusätzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 - Energy industries (renewable - / non-renewable
sources)
CDM 13 - Waste handling and disposal

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

04.09.2009

Valid to:
(Gültig bis)

03.09.2012