

VALIDATION REPORT

KEPEZKAYA HYDROELECTRIC POWER PLANT PROJECT, TURKEY



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Project Title	KEPEZKAYA Hydroelectric Power Plant Project
Version	2.0
Report ID	21220321

Report Title	Validation report for KEPEZKAYA Hydroelectric Power Plant Turkey, No. 21220321
Client	Selen Elektrik Üretim A.Ş.
Pages	49
Date of Issue	11/09/2012
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Summary:

TÜV Rheinland Energie und Umwelt GmbH is contracted for the validation of the Kepezkaya HPP with installed capacity of 28.00 MW against the VCS Standard version 3.2.0. The validation is performed by applying CDM methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” version 13.0.0 in combination with the “Tool to calculate the emission factor for an electricity system” version 02.2.1, the “Tool for the demonstration and assessment of additionality” version 06.0.0 and further CDM guidelines. During the desk review, VSC PD, ER workbook, investment analysis workbook and other supporting evidence were assessed and resulted in short list of Clarification and Corrective Action Requests (CL/CAR included as *Appendix*). On-site visit was conducted on 02/08/2012-03/08/2012, which provided clarification on project history, milestones and development. The respective responses to CLs/CARs and required revisions of project design document lead to issuance of validation report with positive opinion. GHG emissions data and information are fairly represented without material discrepancies and declared GHG emission reductions are materially correct

VVB identifies Kepezkaya HPP project to be eligible to VCS ver. 3.2 requirements and additional in accordance with the CDM methodology ACM0002 version 13.0.0.

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1 INTRODUCTION

The validation report summarises outcomes of the assessment of Kepezkaya HPP project, i.e. project description document, against the VCS standard version 3.2 criteria by means of CDM Methodology ACM0002 version 13 and belonging tools and guidelines as well as criteria given to provide for consistency in project operations, monitoring and reporting.

Name	Position	Scope	Location
Yuriy Lozynskyy	Technical Reviewer	CDM auditor for sectoral scopes 1, 7 and 13	Cologne/ Germany
Roland Wollenweber	Team Leader	Auditor for sectoral scopes 1	Cologne/ Germany
Denitsa Gaydarova-Itrib	Trainee		Cologne/ Germany

1.1 Objective

Validation of project documentation is the 2nd major step in development of VCS project cycle. It is PP responsibility to develop VCS PD and contract approved VVB for the validation process. The objective of a validation is to have an independent third party assessing project design, i.e. VCS PD, emission reduction calculations, monitoring plan and projects compliance with VCS version 3.2 as well as with relevant UNFCCC and host country criteria. In particular, VVB ensures that the PDD, including monitoring plan, additionality analysis and emission reduction calculations, is comprehensive, accurate and credible and meets the identified criteria.

Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of project's quality and intended amount of voluntary emission reductions (VERs) or so-called voluntary carbon units (VCUs).

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the project description (VCS PD), which includes among others the assessment of monitoring plan, emission reduction calculations and additionality analysis.

Validation is performed in compliance with VCS criteria stated in the VCS standard v3.2 and VCS program guide v3.3. In addition criteria stipulated by the approved methodology ACM0002 'Consolidated baseline methodology for grid-connected electricity generation from renewable sources' version 13.0.0 and the methodological tools 'Tool to calculate the emission factor for an electricity system' v02.2.1 and 'Tool for the demonstration and assessment of additionality' v06.0.0, since the mentioned are implemented in project description.

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

1.3 Level of assurance

The final validation is based on the latest project description, VCS PD v2, dated 24/08/2012, supporting documents made available to the validator, own background research and investigations and information collected through performing interviews and during on-site assessment. The validation opinion is assured throughout the credibility of the above mentioned sources of information.

The Validation Statement is made to a reasonable assurance level, and a materiality threshold of 5% is applied for identification of material omissions as required by VCS v3.2 paragraph 5.3.1 item 4. In general it shall be adhered to the procedures as defined in ISO 14064-3.

1.4 Summary Description of the Project

The proposed project is run-of-river hydroelectric power plant, constructed on Göksu River in the Eastern Mediterranean Region of Turkey, with installed capacity of 28.00 MWe. At the upstream basin of Kepezkaya HPP a large-scale irrigation project is conducted by General Directorate of State Hydraulic Works (DSİ) within which scope 3 dams (namely Bağbaşı, Afşar and Bozkır dams) and 1 conveyance tunnel (i.e. Mavi tunnel) will be constructed.

Kepezkaya HPP involves a 80 m long concrete weir (with geographic coordinates 36° 57'52.52"N 32°58'09.12"E), 3,610 m long conveyance tunnel with diameter of 4 m and average flow of 28.63 m³/s, a head pond, 2 penstocks and a power house (with geographic coordinates 36° 57'10.97"N 33°0'29.91"E). Two vertical Francis turbines (2x14.0 MWe) are utilized for electricity generation. The project is estimated to yield average annual electricity generation of 107,587 MWh/year over the first crediting period, taking into consideration the impact of the upstream large-scale irrigation project. Based on the combined emission factor of the Turkish national electricity grid, annual average emission reduction of 61,443 tCO₂/year is determined.

The hydroelectric power plant is commissioned and according to the PMUM database started supplying electricity to the Turkish national grid on 01/10/2010. Other important milestones are listed below.

Table 1: Milestone of Kepezkaya HPP

12/09/2006 ¹	Correspondences starts to seek consultancy to develop Carbon asset of the project
05/07/2007	EMRA granted electricity production licence to Selen Elektrik Üretim A.Ş.
02/10/2007	LSC in Karaman
28/01/2008 ²	Procurement and Construction Contract
06/02/2008	Loan Agreement
15/04/2008	Electromechanical equipment procurement agreement
June 2008	Revised FSR report was finalized
01/10/2010 ³	First date electricity is supplied to the grid

2 VALIDATION PROCESS

2.1 Method and Criteria

Validation of Kepezkaya HPP has been performed in accordance to the internal procedures of TÜV Rheinland Energie und Umwelt GmbH for validation of VCS projects, which strictly follow ISO 14046-3 and ANSI accreditation to ISO 14065⁴. During preparation stage following tasks are accomplished:

¹ Proves the early consideration of develop the an emission reduction project

² Time of investment decision as per UNFCC "Glossary of CDM terms", Version 5.0 and referred in Methodological tool "Tool for the demonstration and assessment of additionality" Version 06.0.0

³ As per VCS Standard v3.2 the date is identified as project start date, i.e. since the date the project contributes to emission reductions

- Selection of an appropriate validation team
- Development of the audit plan
- Preparation of project and standard specific validation protocol, which shows in a transparent manner, criteria and requirements, means of validation and the results from validating the different identified issues

The core validation consisted of the following phases:

- desk review of the project design documents
- on-site visit (site inspection) and follow-up interviews with project stakeholders
- resolution of outstanding issues including material discrepancies and the issuance of the draft validation report
- Internal technical review and issuance of final validation report.

The following sections outline each step in more detail.

2.2 Document Review

The desk review phase is characterised with the assessment of project description and emission reduction workbooks substantiated by additional supportive documents, all of which have been provided by the carbon consultant.

The following table outlines the documents reviewed as part of the validation process:

Ref No./Reference Document	Date
/1/ Project Description template, v3.0	08/03/2012
/2/ VCS Program Guide, v3.3	01/05/2012
/3/ VCS Standard, v3.2	01/02/2012
/4/ VCS Program Definitions, v3.3	01/05/2012
/5/ EB67 ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", v13.0.0	11/05/2012
/6/ EB63 Annex 19 "Tool to calculate the emission factor for an electricity system", v2.2.1	29/09/2011
/7/ EB65 Annex 21 "Tool for the demonstration and assessment of additionality", v6.0.0	25/11/2011
/8/ EB62 Annex 5 "Guidelines on the assessment of investment analysis", v05	15/07/2011
/9/ EB63 Annex 12 "Guidelines on Common Practice", v01.0	29/09/2011
/10/ EB66 Annex 63 "Glossary of CDM terms", Version 6.0	02/03/2012
/11/ VCS PD Kepezkaya HPP, Turkey	

⁴ TÜV Rheinland Energie und Umwelt GmbH was awarded a Certificate of Accreditation by ANSI on 22/06/2012.

i. Version 01 ii. Version 02	27/07/2012 24/08/2012
/12/ Financial analysis Kepezkaya HPP i. Version 1 ii. Version 2	27/07/2012 24/08/2012
/13/ Emission reduction calculation Kepezkaya HPP i. Version 1 ii. Version 2	27/07/2012 24/08/2012
/14/ Common practice analysis i. Version 1	27/07/2012
/15/ Extracts from the Loan Agreement	06/02/2008
/16/ Lump sum, Turnkey, Engineering, Procurement and Construction Contract for Kepezkaya HEPP	25/01/2008
/17/ Contract between the Employer and the Contractor for the Supply and Installation of Electro-Mechanical Equipment for Kepezkaya Hydro-Electric Power Plant	15/04/2008
/18/ Auction Announcement as response to Application for Generation Licence (in English and Turkish)	21/10/2005
/19/ Proof (e-mails) of first contact to carbon consultant	23/08/2006
/20/ Initial Proposal to the PO for development and realisation of the Greenhouse Gas Mitigation Project by the Company	18/10/2006
/21/ EMRA Generation Licence EÜ/1245-6/897 (in Turkish and English)	05/07/2007
/22/ Kepezkaya Meter Replacement Protocol	07/10/2010
/23/ Revised Feasibility Study Report	June 2008
/24/ The first indices reading records of the installed meters	20/09/2010
/25/ Mean electricity Sales Prices for the year 2008 by EMRA, Decision Nr. 1424/38	17/12/2007
/26/ (Licence Application and) Auction announcement by EMRA (in English and Turkish)	21/10/2005
/27/ Project summary (flyer) distributed in the LSC meeting	October 2007
/28/ Share Purchase Agreement between the Purchaser and the Seller	02/02/2007
/29/ Substantial Completion Protocol by the Ministry of Energy and Natural Resources	06/09/2010
/30/ Substantial Completion Protocol by Project Owner	30/09/2010
/31/ Data related to Diesel Generator provided by the plant coordinator per e-mail	23/08/2012
/32/ Map/Coordinate of Kepezkaya Weir	
/33/ Map/Coordinate of Kepezkaya Power house	

/34/	Electricity meters' details	14/08/2012
/35/	Preliminary Forestry Permits	06/02/2007
/36/	Ultimate Forestry Permits	24/04/2008
/37/	Single Line Diagram	14/10/2010
/38/	Notice to Proceed by Selen A.S.(The commencement/Construction Start Date)	17/03/2008
/39/	Water Usage Agreement	24/03/2006
/40/	Revised Water Usage Agreement	17/02/2010
/41/	TEIAS Connection Agreement	07/10/2009
/42/	Letter of Approval of Feasibility Study Report by DSI	22/09/2008
/43/	Notice of Substantial Completion	29/09/2010
/44/	Turkish Electricity Transmission Corporation; Research Planning and Coordination Department (2011) Turkish electrical energy 10-year generation capacity projection (2011-2020)	2011
/45/	Turkish National Grid Line Diagram (http://www.geni.org/globalenergy/library/national_energy_grid/turkey/turkishnationalelectricitygrid.shtml .)	
/46/	Turkish electricity transmission corporation research planning and coordination department (2009) Turkish electrical energy 10-year generation capacity projection (2009-2018)	2009
/47/	TEIAS Electricity generation & transmission statistics of Turkey 2012; Annual Development of Turkey's Gross Electricity Generation of Primary Energy Resources (1975-2010)	October, 2011
/48/	Turkish Constitutional Law, Materials in English by Kemal Gözler	
/49/	Labour Law, Law No: 4857	22/05/2003
/50/	Trade Unions Act, Law No. 2821	05/05/2003
/51/	Law on Protection of Cultural and Environmental Assets, Law No: 2863	21/07/1983
/52/	Communiqué Regarding the Meters to be used in the Electricity Market, TEIAS	
/53/	ELECTRICITY MARKET BALANCING AND SETTLEMENT REGULATION TEIAS	2004
/54/	Haselsteiner, R., Heimerl, St., Kohler, B., Recla, R., Bilmez, C., Mesci, Ü. and Arch, Al. (2009) Efficient Design, Construction and Maintenance of Hydropower Plants in Turkey.	2009
/55/	IEA ETSAP (2010) Technology Brief E12	May 2010
/56/	The Law on Utilization of Renewable Energy Resources	2005
/57/	The Environmental Law No 2872 (amendment No 5491)	11/08/1983

	(13/05/2006)
/58/ Screenshot of PMUM report for September 2010	31/07/2012
/59/ Screenshot of PMUM report for October 2010	31/07/2012
/60/ Project Introduction File	June 2007
/61/ "EIA Not-Required" Certificate	13/07/2007
/62/ TEİAŞ spreadsheets	
/63/ Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" Version 02	

2.3 Interviews

In the course of the site inspection, TÜV Rheinland validation team carried out interviews with project representatives, carbon consultant, and relevant project stakeholders.

Date	Name	Organisation	Topic
02-03/08/2012	Asli Sezer Özçelik (Carbon consultant)	Ekobil Ltd.	- Project start; - Project implementation; - Local permits and local requirements - Applied project technology - Physical conditions - Project history - Project barriers - Project status
02-03/08/2012	Murat Özçelik (Environmental Consultant)	Ekobil Ltd.	- Discussion on additionality, baseline scenario and emission reduction calculation; - Feasibility study; - Environmental and social impacts and/or community benefits; - Financial issues; Supporting <i>documents</i> ;
02-03/08/2012	U. Alp Demir (Engineering manager)		- General project perception; - Project history and implementation - Financial issues; - Supporting documents; - Substantiation of loan and loan conditions; - Clarification on high project cost - Contribution to the regional sustainable development; - Safety training of employees
02/08/2012	Mahmut Yanan	Selen A.S.	- Health and safety trainings. - Explanation on electricity meters
02/08/2012	Koray Keskin	Selen A.S.	

2.4 Site Inspections

The on-site inspection took place on 03/08/2012 in Konya, Turkey and on 02/08/2012 on the project site (Kepezkaya HPP) Karaman, Turkey. The objective of the on-site inspection is to acquire details on project development and operation, and prove validity and authenticity of delivered supporting documents. The audit plan was provided to the carbon consultant and PP and agreed upon. The site inspection was carried out by means of interviews with the persons indicated in section 2.3 (above).

2.5 Resolution of Any Material Discrepancy

The validation protocol, which comprises all issues identified during the desk review and discussed during the site inspection. All CAR/CLs have been resolved by PPs via provision of additional supporting evidence and appropriate changes to the VCS PD, as indicated in Annex B.

3 VALIDATION FINDINGS

3.1 Project Design

The outcomes of the thorough validation process and the VVB judgement on the Kepezkaya HPP are summarised below, as required per VCS Standard, v3.2./3/

- Project scope, type, technologies and measures implemented, and eligibility of the project

Proposed project activity is proved to refer to sectoral scope 1: Energy industries (renewable and non-renewable, by scrutinising the VCS PD v2 /11/ and additional project distinctive documents such as EMRA Generation Licence /21/, Project presentation document /27/, Revised Feasibility Study Report /23/, etc. In the mentioned documents and during the site inspection, validation team realized that the project is designed and operating as Hydroelectric Power Plant and delivers generated electricity to the Turkish national grid, i.e. proposed project activity belongs to the type electricity generation from renewable sources.

In the course of the site inspection, the validation team observed that Kepezkaya HPP is a run-of-river power plant with total installed capacity of 28.00 MW. In particular 2 Francis turbines with vertical axes (2x14.00 MW) /17/ are operated. The annual average electricity generation over the 1st crediting period is estimated to be 107,587 MWh/year. Mrs Asli Özçelik explained that besides hydrological and climatic conditions, the electricity generation is dependent on the water release by the irrigation mega project, developed upstream from the weir structure. Furthermore, she elaborated calculations of average annual electricity generation over a period, using specific data provided in the revised feasibility study report /23/.

PO's representative, Mr. Demir, declared as part of the follow-up interview that the hydroelectric power plant is not grouped⁵, but stand-alone project, since it consists of 1 generation unit (power plant) from single project activity. The visit to the project site and inspection of project component approved the statement.

In addition, the validation team witnessed that the proposed project activity fulfils VCS program specific issues⁶, namely:

- Handle CO₂, i.e. one of the six Kyoto protocol greenhouse gasses

⁵ As defined in the VCS Program Definition v3.3 /4/

⁶ Refer to the VCS Standard v3.2 section 2

- VCS project design and validation report are provided in English, site inspection and interviews are also conducted in English.
- PP claims real and measurable emission reduction credits.
- PP applies for 10 years crediting period
- Project is submitted to VCS registry within 2 years after operation

- Project proponent

Selen Elektrik Üretim A.Ş. is identified as project owner (PO) and project proponent (PP) within the VCS PD /11/, and Ekobil Ltd. – project participant (entity which prepared VCS PD), by reference to the EMRA generation licence /21/, Revised Water Usage Agreement /40/ and other permits and project-relevant documents.

- Project start date

The starting date of the proposed project is identified as 01/10/2010, which is the first date of delivering electricity generation to the Turkish national grid. The Substantial Completion Protocol by the Ministry of Energy and Natural Resources /29/ and the Substantial Completion Protocol by Project Owner /30/ reveal that the installation of the devices of the permanent ultrasonic flow-meter inside the penstock to allow taking water into the penstock was completed before the 30/09/2010 and the Screenshot of PMUM report for October 2010 /59/ proves the first date on which electricity is generated and delivered to the national grid. Taking into the VCS Standard v3.2 /3/ section 3.8 and the definition of project start date per VCS Program Definition v3.3 /4/ and the listed evidences, the project start date, which is indicated in the VCS PD /11/ is confirmed.

- Project crediting period

The selected project crediting period of 10 years, beginning from the 01/10/2010, is in compliance with the VCS Standard v3.2 /3/ section 3.9.1.

- Project scale and estimated GHG emission reductions or removals

In compliance with the VCS Standard v3.2 /3/ and substantiated by the emission reduction calculation, which are validated and proved accurate by the VVB in the subsequent sections, the proposed project activity is referred to as “project⁷”, since the expected annual GHG emission reductions are estimated to be 61,443 tCO_{2,eq}/year.

With regard to the CDM methodology, which is implied for the assessment of project activity, Kepezkaya HPP is classified as large scale project, i.e. project's installed capacity (28.00 MW) is higher than the 15 MW benchmark as defined in the Glossary of CDM terms v6.0 /10/

- Project activities

As observed during the site inspection, Kepezkaya HPP is run-of-river hydro power plant, which by means of concrete gravity weir (15.5 m height and 80m crest length) diverts water from the Göksu River into the 3,610 m long conveyance tunnel. The water is discharged via 2 penstocks (152 m long) into 2 turbines with vertical axes and eventually released back to the river. The latest amendment of EMRA generation licence /21/, which is approved on 05/07/2007, points out total installed capacity of 2x14.00 MW, which is accurately reflected in the Feasibility Study Report /42/ approved by the DSI and the pre-EIA report and accordingly denoted within the VCS

⁷ As per VCS Standard v3.2 section 3.10 – Projects: estimated average annual emission reductions or removal less than or equal to 1,000,000 tCO_{2,eq} per year.

PD /11/. The Initial Water Usage Agreement /39/ from the 24/03/2006 was awarded to the Kepezkaya HPP for an installed capacity of 16.2 MW, and modified to the Revised Water Usage Agreement /40/ from the 17/02/2010, which gives the right to utilise the water from the Göksu River for the hydroelectric power plant with installed capacity of 28.00 MW.

- Project location

Proposed project activity is located on the Göksu River in the Eastern Mediterranean region of Turkey, within the Karaman city borders. During the site inspection, geographic coordinates of the weir and the powerhouse are confirmed to be 36° 57'52.52"N 32°58'09.12"E /32/ and 36° 57'10.97"N 33°0'29.91"E /33/, respectively.

- Project compliance with applicable laws, statutes and other regulatory frameworks

Projects compliance with the regulation of the host country (i.e. the Republic of Turkey) was demonstrated within the VCS PD /11/, where Annex 1 lists all relevant legally binding regulation. Apparently the Environmental Law /57/, which was issued on 11/08/1983 and revised on 13/05/2006 (Law No.5491), provides the legislative framework for the regulations. The EMRA Generation Licence /21/, the EIA-Not-Required Certificate /61/ and the Water Usage Agreement /40/ are some of obligatory documents.

- Ownership and other programs

By reference to the EMRA generation licence /21/ and other legal document, validation team confirms that the project owner is accurately indicated in the VCS PD /11/ as Selen Elektrik Üretim Anonim .Şti.

The interviews with PO and Carbon Consultant during site inspection indicated that the project has not participated and is not registered under other GHG Programs and has not generated any other form of environmental credits.

3.2 Application of Methodology

3.2.1 Title and Reference

VCS standard allows the implementation of all approved UN CDM methodology for development of VCS project activity.

The latest version of the approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" Version 13.0.0 /5/ (hereafter ACM0002 v13.0.0) is used to develop the proposed project activity under VCS. Additionally methodology related tools and relevant guidelines are applied, namely

- "Tool for the demonstration and assessment of additionality" Version 06 /7/
- "Tool to calculate the emission factor for an electricity system". Version 02.2.1 /6/
- "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" Version 02 /63/
- "Guidelines on the assessment of investment analysis" Version 05 /8/
- "Guidelines on Common Practice" Version 01.0 /9/

3.2.2 Applicability

The selected approved methodology ACM0002 v13.0.0 /5/ covers large scale projects activities which occur as grid-connected electricity generation from renewable sources. The applicability of the methodology to the

proposed project activity is discussed in detail in the VCS PD /11/, following the applicability criteria listed within the methodology.

The validation team determined the applicability of ACM0002 v13.0.0 /5/ to the Kepezkaya HPP considering the methodology-specific conditions as follows:

Applicability criteria of the methodology ACM0002 v13.0.0	Criteria fulfilled	Determination by the validation team
This methodology is applicable to grid-connected renewable power generation project activities that	☒ Yes ☐ No	As per EMRA generation licence /21/, Project Introduction File (PIF) /60/ and Water Usage Agreement /40/ the project is developed as hydroelectric power plant, which delivers the generated electricity to the Turkish national grid. In addition during the site inspection it was experienced that the power plant is commissioned and supplies electricity to the grid.
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);	☒ Yes ☐ No	As per Feasibility Study Report /23/, the project was developed as a green field one. Mr. Demir confirmed that no renewable power plant was operated at the site before.
b) involve a capacity addition		N.A.
c) involve a retrofit of (an) existing plant(s)		N.A.
d) involve a replacement of (an) existing plant(s)		N.A.
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;	☒ Yes ☐ No	According to the EMRA generation licence /21/ and the Substantial Completion Report by the Ministry of Energy and Natural Resources /29/, proposed project activity is developed and operated as run-of-river hydroelectric power plant.
In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2: on page 10 to calculate the parameter EGPJ,y): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	☒ Yes ☐ No	N.A.

Applicability criteria of the methodology ACM0002 v13.0.0	Criteria fulfilled	Determination by the validation team
In case of hydro Power Plants one of the following conditions must apply: - The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of reservoirs; or - The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the project emissions section, is greater than 4 W/m²; - The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the project emissions section, is greater than 4 W/m²	☒ Yes ☐ No	Kepezkaya HPP is a green-field project, i.e. no power plant or reservoirs existed. Hence project activity resulted in new single reservoir, which was perceived during the site inspection. At the same time, Dr. Özçelik gave explanation on calculation of power density, and parameters, which were applied. Power density was confirmed to be 168 W/m², which is definitely greater than 4W/m².
In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m² all the following conditions must apply.	☒ Yes ☐ No	N.A. It was observed that the power plant uses only 1 reservoir with surface area of 166,258.40 m² at the maximum operation level.
The methodology is not applicable to the following: - 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; - Biomass fired power plants; - A hydro power plant that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the power plant is less than 4 W/m².	☒ Yes ☐ No	The proposed project does not involve switching from fossil fuel to renewable energy source, neither is it a biomass fired power plant, nor a hydropower plant (see above). It was already revealed that the power plant entails a new single reservoir with power density > 4 W/m².
In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	☒ Yes ☐ No	N.A. Proposed project activity is green-field one.

Provided that all applicability criteria defined within the approved methodology ACM0002 v13.0.0 are proved to be fulfilled, Validation team deduce that the selected methodology is applicable for the proposed project activity.

3.2.3 Project Boundary

According to the ACM0002 /5/, "the spatial boundary of the project activity includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

The TEIAS connection agreement /41/ states that the hydroelectric power plant is connected to the Kepezkaya Basin Transformer Station. In addition, during the site inspection, it was observed that electricity generated in Kepezkaya HPP is transmitted to the Kepezkaya Basin Transformer Station and supplied to the Turkish national grid. Thus, project boundary is accurately identified within the VCS PD /11/ as the “*net electricity generated and supplied to the Turkish national grid*”. Furthermore, emission sources and gasses included in or excluded from the project boundary are clearly identified.

3.2.4 *Baseline Scenario*

The baseline scenario for a new grid-connected renewable power plant is prescribed by the selected methodology ACM0002 v13.0.0 as

“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”.

and accordingly implemented within project description for Kepezkaya HPP, considering that the last was proved to be a new grid-connected renewable power plant.

Additionally, the carbon consultant specified that the “baseline scenario is the supply of the equivalent amount of annual power output by the existing Turkish national grid which is the continued operation of existing power plants and the addition of new sources to meet electricity demand”. Therefore, reported baseline scenario is consistent with the ACM0002 v13.0.0./5/

3.2.5 *Additionality*

According to the VCS standard v3.2 /3/ “Additionality shall be demonstrated and assessed in accordance with the requirements set out in the methodology applied to the project.” Consequently the selected methodology together with the methodological “Tool for the Demonstration and Assessment of Additionality” v6.0.0 /7/ and the “Guidelines on the assessment of investment analysis” v05 /8/ are used for the demonstration of additionality of Kepezkaya HPP. As per additionality tool v6.0.0 /7/ the assessment is performed in 3 steps, i.e. Step 1: Identification of alternatives to the project activity consistent with the mandatory laws and regulations; Step 2: Investment analysis and Step 4: Common practice analysis. Step 3: Barrier analysis is optional and is to be performed in case that the project activity deems unlikely to be financially attractive, which apparently is not the case.

The milestones of Kepezkaya HPP are listed in Table 1 (section 1.4 of the document). Project start date (i.e. date of investment decision), as in the sense of CDM methodology, is identified as 28/01/2008, i.e. the signing of Procurement and Construction Contract, which is the first actual commitment of the PO to the Kepezkaya HPP. It is worth mentioning that the consideration of possible carbon assets of the projects was initiated in noticeably early stage of project development. According to the e-mail correspondence of PO with the Carbon Consultant /19/ and the Initial Proposal to the PO for development and realisation of the GHG mitigation project /20/, the PO sought consultancy to develop the project regarding Carbon assets already in the year 2006.

- Step 1: Alternatives

One of the 3 alternatives, which are listed in the “Tool for the demonstration and assessment of additionality” v06.0.0/7/ and adopted for the assessment of additionality of Kepezkaya HPP, is determined to be credible and

realistic scenario. Upon the knowledge of the validation team and the competence of the carbon consultant, the continuation of current situation (without any project) is consistent with all relevant mandatory laws and regulations which are listed in Annex 1 to the VCS PD /11/ and thus recognised as plausible alternative to the proposed project activity.

- Step 2: Investment analysis

The investment analysis is based on the benchmark approach, which is determined to be the only applicable and most appropriate method. Default benchmark values per country and sector are provided in the “Guidelines on the assessment of investment analysis” v05 /8/. Since the republic of Turkey is not included in this table, carbon consultant adopted the benchmark determined for group 1 activity in a country with the same Moody's index (namely Ba2).

As per the guidelines v05 /8/, the expected return on equity is 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. Apparently, the only country dependent factor is (c) risk premium for the host country, which is estimated using the Moody's rating for the host country. In this case the estimated benchmark for IRR on equity for Turkey is the same as the benchmark for IRR on return for a country with the same Moody's index, i.e. Ba2. Thus the validation team confirms the correctness of the selected benchmark of 12.5% for proposed project activity in Turkey.

Detailed workbook on the financial analysis for the Kepezkaya HPP /12/ is provided to the validation team. The file demonstrates the calculation of the internal rate of return on equity, including all assumptions and intermediate calculations. The parameters are presented in transparent and traceable manner, so that the validation team was able to prove the correctness and credibility of any input data and assumption.

Confidential information such as the Contract for the supply and installation of electro-mechanical equipment /17/, the loan agreement /15/ and Procurement and construction contract /16/ were disclosed to the validation team in order to substantiate actual values and/or prove the accuracy of assumptions, which are employed in the investment analysis. In fact, the investment analysis is based on the Revised Feasibility Study Report /23/, which was completed in June 2008, and approved by DSI. In view of the fact that time between investment decision and FSR finalisation is comparably short, the validation team considers implementation of data provided within the FSR as reasonable and adequate.

The most important parameters, incl. source, value and substantiation are listed below.

Parameter 1	Total investment cost
Value applied for the IRR calculation:	61,684,214 USD
Source of the value:	Revised FSR /23/ used in the VCS PD /11/ and workbook on financial analysis /12/
Justification by the validation team according to §113 of VVM: (cross checking and comparison as applicable)	The value used for the calculation of equity IRR within the investment analysis is the expected investment cost at the time of decision-making (2008). The pointed figure $61,684,214 \text{ USD} / 28 \text{ MW} \approx 2,203,007 \text{ USD} / \text{MW}$ is comparable to the unit investment cost for large scale, green-

	field, hydro power plants estimated by the IEA ETSAP /55/ for the year 2008, namely 1.75 to 6.25 million USD/MW. It is also indicated that the unit cost is not country specific and very site-specific. The Values for investment costs in the Feasibility study are derived from the DSI Unit Prices, where value added tax (VAT) is not included. Additionally, PP calculated the VAT (18%⁸) on investment cost excluding those for electromechanical equipment, as per VAT Law No 3065⁹. Since the paid VAT on investment costs is refunded, PP presents it in the investment as income distributed over the following years.
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Parameter 2	Operation cost
Value applied for the IRR calculation:	768,881.21 USD /year
Source of the value:	Revised FSR /23/ used in the VCS PD /11/ and workbook on financial analysis /12/
Justification by the validation team according to §113 of VVM: (cross checking and comparison as applicable)	The O&M costs for the proposed project activity are coming up to 1.24%. Nevertheless, according to Haselsteiner et al (2009) /54/ "For O&M costs (including staff) 2.5% to 3.0% of the total investment is a rough but nevertheless reliable value for estimating costs or preparing cost calculations at the feasibility stage". Thus the O&M costs for the Kepezkaya HPP is lower than the referenced value, which is explained by the high investment costs (see parameter 1)

Parameter 3	Loan – to – equity ratio
Value applied for the IRR calculation:	66.6%
Source of the value:	Loan agreement /15/
Justification by the validation team according to §113 of VVM: (cross checking and comparison as applicable)	The value used for the investment analysis is the real one, adopted from the Loan agreement /15/

Parameter 4	Interest rate
Value applied for the IRR calculation:	XX % (confidential information)
Source of the value:	Loan agreement /15/
Justification by the validation team	The value used for the calculation of equity IRR within the

⁸ Value Added Tax No: 3065, Official Gazette No 18563, dated 02/11/1984; put into force on 01/01/1985

⁹ Full exemption of delivery of machine and equipment referred in Investment Incentive Certificates (Article 13)

according to §113 of VVM: (cross checking and comparison as applicable)	investment analysis is the actual interest rate as per loan agreement, which is defined as the margin + LIBOR rate. Thus the interest rate was fixed to the one estimated at the time of investment decision, reflecting the LIBOR rate for the year 2007. Validation team confirms the credibility of the interest rate value, applied for the investment analysis.
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Parameter 5	Repayment period
Value applied for the IRR calculation:	10 years
Source of the value:	Loan Agreement /15/
Justification by the validation team according to §113 of VVM: (cross checking and comparison as applicable)	The value used for the calculation of equity IRR within the investment analysis is the real repayment period stated within the Loan agreement with the Bank /15/ In addition the repayment period does not expand beyond the operational lifetime of the proposed project activity

Parameter 6	Electricity feed in tariff
Value applied for the IRR calculation:	0.073 USD/KWh
Source of the value:	The price guaranteed by the renewable energy law numbered 6094
Justification by the validation team according to §113 of VVM: (cross checking and comparison as applicable)	Constant electricity feed in tariff, which is guaranteed by EMRA Law on Utilization of Renewable Energy Resources /56/, is considered for the 20 years period of investment analysis. It has been justified as the only reasonable assumption, since electricity price is highly dependent on the market demand and supply and electricity generation for hydroelectric power plant is dependent on climatic conditions and river water regime. In particular higher electricity price is experienced in the summer months when the HPP experience lower electricity generation.

Parameter 7	Operational lifetime
Value applied for the IRR calculation:	20 years
Source of the value:	Assumption made by Carbon consultant
Justification by the validation team according to §113 of VVM: (cross checking and comparison as applicable)	The operational lifetime is of the Kepezkaya HPP is estimated to 20 years, which is substantiated with the need for replacement of major equipment already after 20 years of operation.

Parameter 8	Residual book value
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Value applied for the IRR calculation:	23.876,422.05 USD
Source of the value:	Calculation made by Carbon consultant
Justification by the validation team according to §113 of VVM: (cross checking and comparison as applicable)	Calculation of the residual book value is based on the assumption that 70 % of the long lasting assets are depreciated over 45 years and 30 % are to be renewed after 20 years as per FSR /23/

Parameter 9	Electricity generation
Value applied for the IRR calculation:	107,587 MWh/year for the first VCS crediting period 81,298 MWh/year for the second VCS crediting period
Source of the value:	Calculations based on the FSR /23/
Justification by the validation team according to §113 of VVM: (cross checking and comparison as applicable)	The expected annual electricity generation is calculated in credible and unbiased manner, considering the water availability. Calculations are based on the river water flow reported in the FSR /23/, where the influence of the upstream national irrigation project is taken into consideration.

By means of transparent calculations displayed in the workbook, it is demonstrated that the internal rate of return on equity for Kepezkaya HPP after taxation corresponds to 7.86%. As already discussed, the validation team examined the input parameters, assumptions and any relevant statement accordingly and confirm the accuracy of the calculated parameter. Furthermore, the IRR, which is established in the mentioned manner, for the proposed project activity is consistent with the benchmark, meaning both values are on Post tax basis.

Finally the proposed project activity is evaluated as financially unattractive since the estimated IRR, 7.86% is lower than the 12.5% benchmark, which is identified for investments in the energy sector in the republic of Turkey.

Sensitivity analysis was performed by the carbon consultant, showing that the deviation of the 3 key parameters¹⁰, in particular investment costs, operation costs and electricity revenues, by +/- 10% leads to IRR in the range from 6.3% to 11.0%. The detailed elaboration of parameters alteration and its effect on project's IRR is part of the Financial analysis workbook /12/. In addition, during the site inspection, Mrs Özçelik demonstrated the procedure for sensitivity analysis and IRR range acquisition.

- Step 4: Common practice analysis

The common practice analysis act as credibility check to complement the investment analysis and follows the sub-steps identified in the "Tool for the demonstration and assessment of additionality" /7/ and the "Guidelines on Common Practice" v01.0 /9/.

No.	Criteria selected	Determination by the validation team	Criteria justified
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¹⁰ Regarding the „Guidelines on the Assessment of investment analysis“ v05 /8/

No.	Criteria selected	Determination by the validation team	Criteria justified
1	Geographical scope	As per the additionality tool /6/, Basin of the Göksu River i.e. the Konya, Karaman and Mersin Provinces, is deemed to be plausible geographical scope for the common practice analysis. It was evidenced that the climatic regime for this region and the water availability are specific and region specific.	☒ Yes ☐ No
2	Technology	Following the “Guidelines on Common Practice”, only 1 project activity with similar technology (Pamuk HPP) was identified, namely hydroelectric power plants with installed capacity in the range 12.00 MW to 36.00 MW, which was commissioned before the start date of Kepezkaya HPP. Apparently HPP under construction or seeking VER revenues are not included.	☒ Yes ☐ No
4	Regulatory framework	There is to the knowledge of the Validation Team no regulatory framework in place which grants any kind of incentives for renewable energy projects, besides the Law on Utilization of Renewable Energy Resources /56/, which ensures the guaranteed feed-in tariff, or which stipulates a mandatory requirement to develop those.	☒ Yes ☐ No
5	Investment climate	The identified project faced different investment climate, in particular the project Pamuk HPP was commissioned in 2004 long before carbon finance was available in Turkey; and before the 2008 financial crisis. Thus, no project is developed in comparable investment climate.	☒ Yes ☐ No
6	Access to technology	Purchase contracts suggest that technology and implementation know-how are commonly purchased from foreign countries.	☒ Yes ☐ No

Therefore, the validation team deduces that Kepezkaya HPP is not a common practice activity.

- Conclusion

The validation team concludes that the proposed project activity deems financially unattractive, achieving an internal rate of return on equity after taxation of 7.86% whereas the benchmark for similar activities in the host country is 12.5%.

3.2.6 Quantification of GHG Emission Reductions and Removals

As it has been identified in section 3.2.1, emission reductions and removals resulting from Kepezkaya HPP are identified according to the selected CDM methodology ACM002 v13.0.0 /5/ and the relevant methodological tool “Tool to calculate the emission factor for an electricity system” v02.2.1 /6/.

- Quantification of baseline emissions

In order to determine the baseline emissions, the combined margin (CM) is calculated based on the “Tool to calculate the emission factor for an electricity system” v02.2.1 /6/. The described steps for identification of operating margin (OM) and build margin (BM) and all relevant assumptions are sufficiently documented within the VCS PD /11/ and displace. The choice of data vintage and calculation methods are justified in a readily comprehensible manner. All calculation on OM, BM and CM are performed by means of excel file and the

resulted workbook on emission reduction calculation /13/ was provided to the validation team for validation. The mentioned workbook is explored, data sources are examined and calculations are repeated in a separate workbook. Consequently, following issues are observed:

- All implemented data are referenced and based on reliable sources;
- Workbook cells are traceable and the calculations are presented in transparent and unbiased manner;
- The most recent available data are applied;
- Calculations are performed in complete accordance with the mentioned tool.
- The ex-ante data vintage has been selected for both the OM and BM calculation.

Finally the OM emission factor is determined as $EF_{grid,OMsimple} = 0.65613 \text{ tCO}_2/\text{MWh}$ and BM emission factor as $EF_{grid,BM} = 0.48608 \text{ tCO}_2/\text{MWh}$, which by applying the default values for weighting on OM and BM (i.e. $w_{OM}=0.5$ and $w_{BM}=0.5$) result in combined emission factor $EF_{grid,CM} = 0.571103 \text{ tCO}_2/\text{MWh}$. Upon the experience of the validation team on emission factor, the determined value is realistic and comparable to similar projects in the host country.

As per ACM0002 v13.0.0, baseline emissions (BE_y) are the product of net electricity generation that is produced and fed into the grid as a result of the CDM project ($EG_{PJ,y}$) and the combined margin CO_2 emission factor for the year y ($EF_{grid,CM,y}$), in particular $BE_y = EG_{PJ,y} * EF_{grid,CM,y} = 61,443 \text{ tCO}_2/\text{year}$ for Kepezkaya HPP.

- *Quantification of project emissions*

In general, but not always, renewable power generation project are considered to have no emissions, thus $PE_y=0$. The selected approved methodology ACM0002 v13 suggests that total project emissions are determined as following

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where

PE_y – project emissions in year y [$\text{tCO}_2,\text{eq}/\text{year}$]

$PE_{ff,y}$ – project emissions from fossil fuel consumption in year y

$PE_{GP,y}$ – project emissions from operation of geothermal power plant due to the release of non-condensable gases in year y

$PE_{HP,y}$ – project emissions from water reservoirs of hydro power plant in year y .

Since Kepezkaya HPP is run-of-river hydroelectric power with a single water reservoir, the project emissions from water reservoir has to be determined. The annual project emissions due to water reservoirs is based on the power density of project activity, which for the current project was estimated to $168 \text{ W}/\text{m}^2$, which is $> 10 \text{ W}/\text{m}^2$ benchmark. Thus, according to the approved methodology ACM0002 projects emissions for the proposed project is $PE_{HP,y} = 0$.

Validation team realized that power density is determined as per ACM0002 v13.0.0. Furthermore Mrs. Özçelik explained that the area of the reservoir is determined at maximum water flow.

In addition, it is necessary to mention that the 2 auxiliary diesel generators, placed on the top of each turbine, are available at Kepezkaya HPP. Nevertheless, according to the methodology “the use of fossil fuels for the back up or emergency purposes (e.g. diesel generators) can be neglected.”, i.e. $PE_{FF,y} = 0$

Thus the emissions from the proposed project activity, as estimated for the first crediting period, are assumed to be $PE_y = 0$. Nevertheless, the Project Emissions related to Diesel Generator usage are subject to monitoring (as indicated in the monitoring plan, section 4.3 of the Kepezkaya VCS PD v2).

- Quantification of leakage

The proposed project is a green field one, thus no leakage emission related to the project are expected and regarded.

- Summary of GHG emission reductions or removals

The Kepezkaya HPP deems to induce GHG emission reduction, which is estimated as per approved methodology ACM0002 v13.0.0 as

$ER_y = BE_y + PE_y$ (where ER_y = emission reductions in year y; BE_y = baseline emissions in year y and PE_y = project emissions in year y)

In the particular case the emission reduction corresponds to $ER_y = BE_y = 61,443 \text{ tCO}_2/\text{year}$.

The validation team confirms that the emission reduction calculation are performed properly, by applying approved CDM methodology ACM0002 v13.0.0, which is accepted by the VCS standard. The proposed project is proved to fulfil all eligibility criteria listed under the methodology. Furthermore, considering the experience of the validation team with renewable electricity generation projects, the estimated annual GHG emission reductions are assessed as reasonable.

- Uncertainties associated with the calculation of emissions

All data presented in the baseline calculations are provided from official sources. Therefore, uncertainties of data sets were not estimated. There are no uncertainties in the calculations.

3.2.7 *Methodology Deviations*

The validation team assessed the proposed project activity and related project description in detail and witnessed that the selected methodology and methodological tools are implemented accurately without any deviations.

3.2.8 *Monitoring Plan*

The monitoring plan for the proposed project activity is an essential part of the validation process and basis for the verification of the GHG emission reductions. For that reason, considerable part of the site inspection was focused on the project monitoring. The representatives of the PO and carbon consultant explained in depth the monitoring plan and provided the validation team with substantial details.

- Data and parameters available at validation

The following 6 parameters are used for the calculations of emission reduction created by the Kepezkaya HPP and are available at the time of project validation.

- $FC_{i,y}$ amount of fuel i consumed by relevant power plant in Turkey in years 2008, 2009, 2010
- $NCV_{i,y}$ – net calorific values for fossil fuel type i in years 2008, 2009, 2010
- $EF_{CO_2,i,y}$ - CO_2 emission factor of fossil fuel type i in year y

- EG_y - Net electricity generated in the project electricity system in year y
- $EG_{m,y}$ - Net electricity generated and delivered to the grid by power unit m in year y
- $\eta_{m,y}$ - Specific electrical efficiency for all relevant energy sources (natural gas, lignite, coal/anthracite, fuel/motor oil).

As it has been already mentioned, the operating emission factor and the build emission factor are calculated ex-ante. Therefore, the applied parameters are determined or/and monitored once per crediting period.

In line with the approved methodology ACM0002 /5/, the parameters are listed in the VSC PD /11/, together with the applied value, source of data and justification of data/description of measurement methods and procedures. The list is determined to be exhaustive, providing important information and guarantee on data consistency and reliability.

- Data and parameters monitored

The ex-post parameters, which are applied for the determination of the project emissions and the emission reductions, are subject to regular measurement, namely once per monitoring period. In the case of the proposed project, 4 parameters are included in the monitoring plan, i.e.

- $EG_{PP,net,y}$ – Net electricity generation by the power plant, where
 - o $EG_{PP,net,y} = EG_{PP-GROSS,y} - EG_{PP-self\ consumption,y}$,
 - o $EG_{PP-self\ consumption,y}$ - quantity of electricity imported by the power plant from the Grid for self-consumption, in year y ;
 - o $EG_{PP-GROSS,y}$ - quantity of electricity produced by the power plant, in y ,
- Cap_{PJ} - installed capacity of the hydropower plant after the implementation of the Project Activity;
- A_{PJ} - Area of the reservoir measured in the surface of the water, after the implementation of the Project Activity, when the reservoir is full.
- $FC_{i,y}$ - Quantity of fuel type i (diesel) combusted in process j during the year y .

Description of measurement for each of the identified parameters and procedures to be applied is included in the monitoring plan. The PO is aware of its obligation to archive the recorded data for at least 2 years after the last crediting period.

It is indicated in the VCS PD and confirmed during the site inspection by Mr. Koray Keskin that the net electricity generation is measured continuously by 2 main and 2 back up electricity meters and recorded on monthly basis. The installation, calibration and maintenance of monitoring devices is under the responsibility of the TEIAS., and is required to comply with The ICE/TSE 62053-22: Electricity metering equipment (a.c) – Particular requirements - Part 22: Static meters for active energy (Classes 0,2 S and 0,5 S) /52/. Records on electricity generation could be cross-checked with the PMUM database and the SCADA system, which delivers information only on the gross electricity generation.

In summary, the validation team is convinced of compliance of the monitoring plan with the requirements of the selected approved methodology ACM0002. During the site inspection, the validation team experienced that the monitoring arrangements described in the monitoring plan are feasible within the project design.

3.3 Environmental Impact

Environmental Law No. 2872 (Issued in 1983) /57/, Annex 2 of Environmental Impact Assessment (EIA) Regulation defines that run-of-river hydro power plant with installed capacity equal or less than 50MW is not

subject to complete EIA. Thus, the Kepezkaya HPP is required to prepare only project identification file (pre EIA report) /60/. No significant impacts on the environment were identified and the “EIA-not-Required” certificate /61/ was issued on 13/07/2007.

Possible environmental impacts during the construction and operating phases, which were discussed within the pre-EIA /60/ are summarised in the VCS PD. Furthermore it is emphasized that the minimum ecological flow of the river is maintained and fish passage is provided. The validation team attest that the constructed weir is equipped with appropriate fish ladders. Furthermore, Mr. Demir revealed that no fish farms exist between the weir and the power house. Nevertheless he emphasized that additional water flow of 0.2 m³/s is released in favour of the local people, who manage the agricultural land in the vicinity of the project. Thus an additional water release for irrigation, beside the ecological minimum water, is required and assured. What is more, the host country regulations suppose continuous measurement of water river flow after the weir and regular measurement of river conditions.

3.4 Comments by stakeholders

It is the validation team opinion that the local stakeholders were accurately identified and appropriate invited to the stakeholders' meeting which took place on 02/10/2007 in the meeting hall of Bucakkışla Köyü, Merkez ilçe, Karaman province. The validation team was provided with the Non-technical summary distributed for the LSC /27/. The last was analyzed and determined to provide sufficient information about the hydroelectric power plant and climate change.

Records of the LSC meeting show that 42 locals participated to the meeting and expressed their opinion on the project and concerns about its impacts on the river regime. It is observed that stakeholders' comments are accurately recorded and analyzed. Due response to the raised issues was provided. PO explained the concept of minimum water flow and assured the release of sufficient water quantity. Furthermore, PO assured that when hiring unqualified workers during construction and operation, priority will be given to local villagers.

During the site inspection, the validation team experienced high involvement of the PO to ensure good relationship to the local stakeholders and willingness to assist them in any reasonable manner. PO was glad to show the installation of the irrigation system providing water from the penstock to the upper agricultural land. This installation was the PO solution to the concern of the Mukhtar of Buckkışla Köyü village that the planned project activity would impact the locals agriculture. In fact, the installation improved the irrigation system and contributed to the welfare of the local population.

4 VALIDATION CONCLUSION

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Çetin Emeç Bul. 1364. sok.
(eski 65. sok.) No:4
Balgat, ANKARA
Türkiye

11/09/2012

RE: Validation Statement – Kepezkaya Hydroelectric Power Plant, Turkey under VCS, first crediting period from 01/10/2010 to 30/09/2020.

Selen Elektrik Üretim A.Ş. with registered office at Çetin Emeç Bul. 1364. sok. (eski 65. sok.) No: 4 Balgat ANKARA/Turkey, has contracted TÜV Rheinland to review and validate the VCS PD and all assertions related to the GHG project under VCS v.3.2. The GHG assertions, indicated in the VCS PD v2.0 /11/ issued on 24/08/2012 indicate average annual achievable GHG emission reductions of 61,443 t CO₂e per annum.

By generating electricity using renewable resources, the project results in reductions of GHG emissions by partially displacing the electricity that would have been generated using fossil fuels. Investment analysis demonstrates that the proposed project activity is neither the financially attractive nor 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. Given that the project is implemented and maintained as designed, the project is likely to achieve the estimated amount of emission reductions.

The validation of the GHG assertion is conducted in accordance with the requirements of the VCS standard v3.2, the standard ISO 14064-3 and the approved UNFCCC methodology ACM0002, v13.0.0 to a reasonable level of assurance by applying a materiality threshold of 5%. In the course of the validation process, VCS PD, substantiations and any additional supportive documents are reviewed and reflected in Chapter 2.2 in the validation report issued on 20/08/2012

The validation team came to the conclusion that based on our review and all available documentation the GHG assertion is made in accordance with the requirements of the VCS program and is material correct and fairly represents the GHG emissions data and information without material discrepancies.

Cologne 11/09/2012



Roland Wollenweber



Denitsa Gaydarova-Itrib

5 APPENDIX

Table 1: Validation requirements (Based on the VCS standard v3.2 and VCS Program Guidance v3.3)

Checklist question	Ref.	MoV[1]	Findings, comments, references, data sources	Substantiation/ means of validation	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?	VCS PD	DR	PD template version 3 has been applied for the composing the Project description document. The template is issued on 08/03/2011 and is still into application	VCS PD template on the VCS webpage	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?	VCS PD	DR	The template has been filled in accordance with the actual VCS requirements	VCS Standard, ver. 3.2; VCS Program Guide ver. 3.3 and VCS Program Definition ver. 3.3	ok	OK
2. Project Description						
2.1. Does the VCS PD contain a project title and project description, which provides the reader with a clear understanding of the project activity and the technical aspects of its implementation?	VCS PD 1.	DR/on-site visit	Project name appointed in VCS PD corresponds to project name assigned in other legal project related documents, such as EMRA generation licence, permits, etc. Section 1 of the PD provides details on the proposed project activity, incl. Description of the project, project scope and scale, project location, legal compliances and information on the VCS aspects.	EMRA generation licence, feasibility study, permits	ok	OK

Are names, roles and responsibilities of PP and any other entities involved in the project indicated?	VCS PD 1.3 & 1.4	DR	Project owner and carbon consultant are identified, where the complete entity name and address and is responsibilities is listed.		ok	OK
Is the correct type, scope and scale of project activity selected?	VCS PD 1.7 & 1.2	DR	Project is identified as sectoral scope 1, grid connected electricity generation from renewable sources and is identified as project, since it results in annual emission reduction of 44,292 tCO ₂ , which is much less than the identified benchmark of 1,000,000 tCO ₂ /year.	VCS standard, v3.2; spreadsheet on ER calculations; EMRA generation licence; Connection Agreement	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?	VCS PD 1.8 & 1.1 figure 3	DR	the proposed project activity is a green-field project and the design is described sufficiently by means of figures, tables and comprehensive explanation.		ok	OK
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?	VCS PD, Feasibility study	DR/on site visit	Proposed project activity is a green-field power plant. No power plant existed before the initiation of the project activity	interviews with PO and analyses of the projects feasibility study; observation during the on-site visit; interviews with responsible people	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?	VCS PD, Feasibility study	DR/on-site visit	Proposed project is not part of a grouped project activities	N.A.	ok	OK

2.6. Does the central GHG information system and controls include items identified in ISO14064-3:2006, clause 4.5?					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?	VSC PD, Generation Licence	DR/on-site visit	Since there is only 1 project activity, no further sampling procedure is required. On-site assessment of project activity took place on 02/08/2012 and 03/08/2012	N.A.	ok	OK
3. Project Start Date and Crediting Period						
3.1. Is the project's start date clearly defined and evidenced? Does the project start date meet the requirements as stated in VCS v3.2 clause 3.8?	VCS PD 1.5	DR	Project start date is identified in accordance with the VCS requirements, as the date on which project began generating GHG emission reductions or removals.	Certificate of Substantial Completion	ok	OK
3.2. Is the start of the crediting period clearly defined? Is it reasonable?	VCS PD 1.6	DR	Start of crediting period is immediately (2 days) after commissioning of the power plant. First crediting period is over 10 years, as prescribed by the VCS standard v3.2		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?	VCS 2.1 PD	DR	UN CDM methodology, tools and guidelines, which are identified as eligible for VCS project evaluation, has been applied for the assessment of the proposed project activity. The latest version of methodology, tools and guidelines has been used	ACM0002 ver.13, Tool for demonstration and assessment of additionality, ver.6; Tool to calculate emission factor for an electricity system, ver.2.2.1, etc.	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?	VCS 2.2 PD	DR/on-site visit	All applicability criteria referred in the selected methodology are fulfilled, as indicated and justified within the relevant section of PD. The correctness of PD specifications, such as number and size of reservoirs, etc. have been confirmed during the on-site visit.	ACM0002	ok	OK
4.2.2 Is the selection of the applied baseline and monitoring methodology justified?	VCS 2.2 PD	DR	The selection of the applied methodology has not been explicitly justified within PD. Nevertheless it is the common understanding, since the proposed project is large scale, generating grid connected electricity from renewable sources.	ACM0002	ok	OK
4.2.3 Is the selected methodology correctly quoted in all related documents?	VCS PD	DR	The selected approve consolidated baseline and monitoring methodology and all relevant tools and guidelines are correctly quoted in the VCS PD, indicating the relevant version.		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?	VCS PD 3	DR/ on-site visit	All GHG emissions, which according to the methodology could result from the project activity have been indicated and discussed in VCS PD. Emissions from reservoir and auxiliary diesel generators are lower than 1%		CL9: Please identify the usage and frequency of the auxiliary diesel generator and clarify why those emissions are not considered/ignored. According response (see Table 2 below)	OK
4.3 Project boundary						
4.3.1 Does the VCS PD correctly describe the project boundary?	VCS PD 2.3	DR	Project boundary is defined as per methodology ACM0002, so that the spatial extend of the project boundary incorporates all power plants physically connected to the grid to which the project is connected, i.e. turkish national grid		ok	OK
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?	VCS PD 2.3, table 4	DR	Project emission are summerized in a table, indicating source, gas and consideration and justification		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?			N.A.			
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?	VCS PD 2.4 VCS PD 3.1	DR	Baseline scenario is prescribed by the selected methodology and accordingly adopted for the proposed project, i.e. "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)."		ok	OK
4.4.1.1 Is the identified baseline scenario plausible?	VCS PD 2.4 VCS PD 3.1	DR	The identified baseline scenario is the only one prescribed by the selected approved methodology, and thus regarded as plausible and realistic		ok	OK
4.4.1.2 Are all assumptions stated in a transparent and conservative manner?	VCS PD 3	DR	the conservativeness principle was followed firmly and thus assumptions and calculations are transparent and stated in a conservative manner.		ok	OK
4.4.2 Does the selected methodology require the use of tools <u>and</u> does VCS PD reflect that correctly?	VCS PD 2.1	DR	Selected approved methodology refers to 3 methodology related tools which are accordingly listed and used for the assessment of the project		ok	OK
4.4.2.1 Were all the tools applied correctly?	VCS PD	DR	Tool to calculate the emission factor for an electricity system, version 02.2.1 has been followed to calculate combined factor (CM) emission factor. The tool was applied step - wise, whereas some calculation corrections are requested.		CAR 10; CAR 11; CAR 13 According response (see Table 2 below)	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 <u>and</u> have no reasonable alternative scenario been excluded?	VCS PD 3.1	DR	The baseline scenario is prescribed by the methodology and is evaluated as the most reasonable and credible one.		ok	OK
4.4.3.1 Has the choice of the baseline scenario been done using conservative assumptions?			N.A.			
4.4.4 Is the identified baseline scenario reasonable according to the assumptions, calculations and rationales used in the VCS PD and other reference sources?			yes		Ok	OK
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?	VCS PD 2.5, sub-step 1b	DR	Consistency of baseline scenario with mandatory laws and regulation was discussed. It was concluded that the baseline scenario is in compliance with all relevant national and sectoral policies.		ok	OK
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?	VCS PD 2.4 VCS PD 3.1	DR	Baseline scenario is sufficiently described.		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?	VCS PD 3	DR/on-site visit	selected methodology and tool are followed stepwise for the calculation of emission reductions. All applied data are presented in transparent and traceable manner. Nevertheless, estimation of Build Margin Emission Factor was performed in extremely conservative manner and required corrections in order to be in complete compliance with the calculation procedure define in the tool.		CAR 10: According to the tool to calculate EF, it is required to determine the AEG excluding power units registered as CDM project activities. Please revise BM calculations accordingly. CAR 11: Please make sure that the CDM power units are excluded from the SET 20% units identified to supply electricity to the grid most recently and comprise of 20% of AEG (which is revised as required). Revise the BM calculations accordingly. According response (see Table 2 below)	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?	VCS PD 3.1	DR	The selected methodology as well as the relevant tool, provide different options, and it is PP choice which is most appropriate and adequate for the proposed project activity. Nevertheless, each decisions is sufficiently substantiated. Thus the correct equations and parameters were adopted for the calculation of project's emission reductions, besides the ' <i>Net quantity of electricity generated and delivered to the grid by power unit m in year y</i> ', which is referred to as CAR		CAR 13: Please notice that for the calculation of the EF of BM, the total net electricity generation for the corresponding year has been used. Nevertheless the tool refers to the Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh). According response (see Table 2 below)	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?	VCS PD 3.1 Step 3 & 5; VCS PD 4.1	DR/on-site visit	Emission reduction calculations, i.e. OM & BM emission factors, are performed ex-ante, thus following parameters are determined once per monitoring period, i.e. FC(i,y), NCV(i,y), EF(co2,i,y), EG(y), EG(m,y) and $\eta(m,y)$. Applicability, source and description, etc. of each implemented parameter are listed in a table.		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?	VCS PD 4.2	DR/ on-site visit	4 parameters are identified to be demand monitoring, namely EG(pp-self consumption, y), EG(pp-gross, y), Cap(pj), AP(j). During the on-site visit it has been experienced that auxiliary generator could contribute significantly to project emissions, thus monitoring of the use of diesel generator is requested. FC(l,y).		CL 9: Please identify the usage and frequency of the auxiliary diesel generator and clarify why those emissions are not considered/ignored. Please include in the monitoring plan if necessary According response (see Table 2 below)	OK
4.6 Leakage						
4.6.1 Has the leakage been identified and calculated according to the approved methodology?	VCS PD 3.3	DR	As suggested by the selected methodology (ACM0002) leakage CO2 are determined by the relevant tool. However in the case of most renewable energy, incl. HPP. Leakage from fossil fuels can be neglected, since it is expected to result from diesel generators with back-up or emergency purpose.	ACM0002,ver.13; "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion", ver.2	CL 9: Please identify the usage and frequency of the auxiliary diesel generator and clarify why those emissions are not considered/ignored. Please include in the monitoring plan if necessary According response (see Table 2 below)	OK
5. Additionality						
5.1 Identification of alternatives						
5.1.1 What additionality tool has been selected in the VCS PD? Does it comply with the requirement of VCS ver.3.2 clause 3.15?	VCD PD 2.1	DR	Tool for the demonstration and assessment of additionality, ver.6 is the tool suggested by the selected methodology. The latest version of the tool is applied.	ACM0002, ver.13	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?	VCD PD 2.5 (p.18)	DR	Even though the baseline scenario is prescribed by the selected approved methodology, PP identified, discussed and evaluated 3 alternatives, with the outcome that the only plausible alternative "the supply of electricity by the existing grid with additional capacity" corresponds to the prescribed baseline scenario	ACM0002,ver.13; Tool for the demonstration and assessment of additionality, ver.6	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?	VCD PD 2.5 (p.18)	DR	The first alternative resembles the project activity without VSC revenues and is assessed as very unlikely since it is not financially attractive.	Tool for the demonstration and assessment of additionality, ver.6	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.)	VCD PD 2.5 (p.18)	DR/interviews	The tool prescribed alternatives are assessed for being realistic and credible and for consistency with laws and regulations	Tool for the demonstration and assessment of additionality, ver.6	ok	ok
5.1.5 Is the exclusion of the alternatives for legal reasons justified?	VCS PD 2.5 (p.18)	DR	The alternatives were excluded because 1 - financially unattractive & 2 - not realistic because of lack of required env. resources	Tool for the demonstration and assessment of additionality, ver.6	ok	ok

5.2 Investment Analysis						
5.2.1 Are all sources of revenues (including savings) considered in the VCS PD and all calculations?	VCS PD 2.5; investment analysis workbook	DR/on-site visit	Earnings from the electricity generation are expected to be the only revenue from the proposed project activity.	Feasibility study report, interviews with PO representatives	ok	OK
5.2.2 Is the type of investment analysis selected correctly in the VCS PD?	VCS PD 2.5 Step 2	DR	The benchmark analysis is selected and justified as an appropriate investment analysis method for the proposed project		ok	OK
5.2.3 Is the selected financial indicator chosen and applied correctly?	VCS PD 2.5 Step 2	DR	IRR on equity is selected as financial indicator and applied correctly. IRR on equity is determined on a post-tax base, which is also the assumption of the selected benchmark.		ok	OK
5.2.4 Is the guidance on IRR calculation and assessment correctly applied? (Means of validation should be recorded.)	VCS PD 2.5	DR	Latest version of guidance on IRR calculation is implemented for the calculation of the IRR and performance of analysis. In addition, the benchmark value listed in the Appendix to the guidance is used for the investment analysis and project attractiveness' assessment.		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?	VCS PD 2.5 table 5 investment analysis workbook	DR	Use of data from FSR for the investment analysis are proved to be reasonable and credible, since period between both is about 1 month, which is evaluated of insignificant.	FSR	ok	OK

5.2.6 Are all the values consistent between FSR and VCS PD and are inconsistencies properly justified?	VCS PD 2.5 table 5 investment analysis workbook	DR	Beside the loan agreement, all other data required for the investment analysis were adopted from the feasibility study.	FSR	ok	OK
5.2.7 Were all the values from FSR applicable and valid at the time of the investment decision?	VCS PD 2.5 table 5 investment analysis workbook	DR	Since the FSR was issued at the time of investment decision by independent body and validated by DSI, all values are considered to be realistic and applicable.	FSR	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 lead to a change in the benchmark?	VCS PD 2.5 table 5 investment analysis workbook	DR/on-site visit	Selected approach, benchmark analysis, identify the lowest level of return on equity for the energy sector, and since IRR on equity for the proposed project activity is lower than the benchmark it is reasonable to assume that the project is financially unattractive.	Guidelines assessment of investment analysis	ok	OK
5.2.9 Is the Investment Analysis prepared in compliance with the latest version of the "Guidelines on the Assessment of Investment Analysis" as provided by the CDM EB?	VCS PD 2.5 table 5 investment analysis workbook	DR	As already mentioned, investment analysis is based on the latest version of Tools for the demonstration and assessment on additionality and in compliance with the latest Guidelines on assessment of investment analysis		ok	OK
5.3 Barrier analysis N.A. as per Tool, since investment analysis identifies proposed project as financially unattractive						
5.4 Common practice analysis						

5.4.1 Does the additionality tool require common practice analysis for the project?	VCS PD 2.5 step 4	DR	Additionality tool requires the performance of common practice analysis for the proposed project. Thus the analysis is performed in accordance with Guidelines on Common Practice (version 01)		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?	VCS PD 2.5 step 4	DR/on-site visit	It is not claimed that the project is the "first of its kind"		ok	OK
5.4.3 Are the geographical scope of the project activity identified correctly?	VCS PD 2.5 step 4	DR/on-site visit	The Göksu river Basin (the river on which Kepezkaya HEPP is located) is identified as applicable geographical area for the performance of common practice analysis. River basin covers 3 provinces, namely Konya, Karaman and Mersin.		ok	ok
5.4.4 Does the VCS PD provide an explanation why this region was selected and deemed more appropriate <u>and</u> is this explanation traceable and reliable?	VCS PD 2.5 step 4	DR/on-site visit	The choice of geographical scope is substantiated by the dependence of project on water availability, and thus river basin is identified as most appropriate for the performance of common practice analysis		ok	OK
5.4.5 Are there similar operational project activities, other than VCS activities, "widely observed and commonly carried out" in the defined region? Note: Use official sources and local and industry expertise.	VCS PD 2.5 step 4	DR/ on-site visit	Only 3 comparable projects have been identified in the selected geographical scope, i.e. power plants with installed capacity between 8.21MW - 24.63MW (+/-50% range), using similar technology. Thus project is not widely observed and commonly carried out.		ok	OK

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?	VCS PD 2.5 step 4	DR	the identified power plants in the mentioned range face different investment climate, since one of the power plants is developed as a BOT project, the other is developed by government and the last is private licensed project, but falls under small scale projects, regarding CDM methodology.		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?	VCS PD 4	DR/on-site visit	All relevant parameters are recorded in the monitoring section, including their unit, description, source, monitoring frequency and justification of data's source.		CL 9 According response (see Table 2 below)	OK
6.2 Is the measurement method clearly stated for each value to be monitored and deemed appropriate?	VCS PD 4.2	DR/ on-site visit	Description, measurement method and frequency as well as identification of monitoring equipment and explanation of quality of assurance/control procedures are contained within the table. Measurement methods are clearly stated and deemed credible and applicable.		ok	OK
6.3 Are values of the ex-ante parameters / monitoring parameters selected correctly and conservative in accordance to methodology or tools?	VCS PD 4.1	DR	Values of ex-ante parameters are selected correctly. Implemented values are either default values, or ones obtained from reliable sources, such as the TEIAS webpage, etc. Most recently available data are used		ok	OK

6.4 Is the measurement equipment for each parameter described and deemed appropriate?	VCS PD 4.2	DR/ on-site visit	Measurement equipment is sufficiently described / identified. See 6.2		ok	OK
6.5 Is the measurement accuracy addressed and deemed appropriate?	VCS PD 4.2 & 4.3	DR	Measurement accuracy, as well as equipment calibration is addressed.		ok	OK
6.6 Are procedures in place on how to deal with erroneous measurements and are the corrective actions identified?	VCS PD 4.2 & 4.3	DR	It is pointed out, that TEIAS is responsible for calibration and maintenance of the meters.		ok	OK
6.7 Is the frequency of measurement identified and deemed appropriate?	VCS PD 4.2	DR	The frequency of measurement is clearly stated for each parameter in the respective section. Ex-ante data would be measured/ calculated once per monitoring period, whereas parameters which are subject to monitoring, would be monitored on specific time intervals		ok	OK
6.8 Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	VCS PD 4.3	DR	Monitoring plan follows methodology's requirements and assures transparent and unbiased monitoring of project emissions reductions		ok	Ok
6.9 Are the sampling, measurement methods and procedures defined?	VCS PD 4.3	DR	yes, see sections above		ok	OK
6.10 Are procedures identified for maintenance of monitoring equipment and installations?	VCS PD 4.3	DR	monitoring equipment for EG, i.e. meters, would be maintained by TEIAS		ok	OK

6.13 Are the monitoring arrangements described in the monitoring plan feasible within the project design?	VCS PD 4.3	DR	Monitoring arrangement and procedure are presented unambiguously within the relevant section of VCS PD and are considered to be feasible.		ok	OK
6.15 Do the PPs make provisions for personnel training needs?	VCS PD 4.3	DR	It deems that no specific personal trainings are required for adequate monitoring performance. Monthly reading of electricity meters is accomplished together with TEIAS representatives.		ok	OK
6.17 Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	VCS PD	DR	no unintended emissions are expected to result from the power plant, even during any emergencies		ok	OK
6.19 Is the data archiving period for this project activity stated in the VCS PD and appropriate? 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 CER.	VCS PD 4.3	DR	It is explicitly declared that all monitored data records would be kept for at least 2 years after the end of last crediting period		ok	OK
7. Monitoring of the leakage						
N.A						
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?		on-site visit	Proposed project activity ensures constant river water flow around the year. Besides the project contributes to sustainable development of the region, regarding social aspect, which would be discussed in details within the project validation for Social Carbon standard		ok	OK
9. Stakeholders' consultation and comments						
9.1 Were the stakeholders identified in appropriate and complete manner?	VCS PD 6	DR	Stakeholders were properly identified and included representatives of the Karaman Govership Provincial Environment and Forestry Directorship, Karaman Mayoralty, muhtars and residents of the near villages.		ok	OK
9.2 Are the identified stakeholders plausible?	VCS PD 6	DR	Obviously representatives different stakeholders' groups were accordingly invited and participated to the meeting		ok	OK
9.3 Does VCS PD describe the means being used to invite local stakeholder's comments?	VCS PD 6	DR	Physical meeting was organized by the PO in order to invite for local stakeholders' comments. The way of invitation is presented in the VCS PD and non-technical description document was delivered to the validation team as well. The LSC process is described in the PD, including the received questions and corresponding replies and undertaken actions.		ok	OK
9.4 Were those means appropriate?	VCS PD 6	DR	Local stakeholders were invited to physical meeting, which upon the opinion of the VVB is most appropriate, since village residents have restricted access to internet,		ok	OK

			etc. In addition, separate meeting with the Karaman Mayor was organized, since he was not able to attend the LSC meeting on 02/10/2007			
9.5 Was the project presented to the stakeholders in unbiased manner?	VCS PD 6	DR	The non-technical project descriptions gives neutral and general project information	Non-technical summary	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?	VCS PD 6		N.A.			
9.7 Is a summary of the stakeholder comments provided in the VCS PD?	VCS PD 6	DR	Summary of stakeholders comment as well as summarizing result from the LSC questionnaire are 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?	VCS PD 6	DR	PO response to the raised issued is included in the VCS PD		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?	VCS PD 5	DR	As per EIA regulations the proposed project activity is not subject to full EIA report, i.e. is assumed to pose no significant impact on the environment. Nevertheless, project developed identified possible environmental impacts within the preliminary EIA report (PIF). Summary of those possible impacts and their mitigation is included in the PD as well. Relevant for the operation phase is the minimum ecological river flow;		ok	OK

			this is to be secured by PO.			
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.	VCS PD 5	DR	As per <i>Environmental Law</i> No. 2872 (Issued in 1983), Annex 2 of <i>Environmental Impact Assessment (EIA) Regulation</i> (issued in 1993 and revised in 2001), full EIA is not required for the proposed project activity		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?			N.A.			
10.4 Does the VCS PD include a brief description of the environmental effects of the project, including transboundary?			N.A.			
10.5 Are those effects properly addressed in the design of the project activity?			N.A.			
10.6 Does the project comply with environmental legislation in the host country?	VCS PD 5	DR	The project complies with all relevant legislation of the host country, which are also listed in Annex 1 of the VCS PD.		Ok	OK

Table 2: List of Requests for Corrective Action (CAR) and Clarification (CL)

Nr	Observation (CAR/CL)	Reference	Summary of project owner response	Validation team conclusion
1	CL: Please explain why the loan/equity ration is as high as 78%. By forming the relation of loan to equity you came up with the value 66.6%?	financial analysis 'Commercial credit-USD' (G10)	One of the terms of the loan agreement states that the loan equity ratio cannot be higher than 78%. And in our case it is 66.6% which is less than 78%.	CLOSED
2	CL: please clarify how is the interest rate calculated and why is it referred as fixed, when in the loan agreement is calculated as margin+LIBOR	financial analysis 'Commercial credit-USD' (G9)	The interest rate calculation is made based on the LIBOR Rate that was available at the time of decision making, which is about the end of year 2007 when the LIBOR rate was about 5%. The investment decision date is considered to be the date when the joint venture was signed. (February 2007). The average 12 month maturity USD Libor rate in 2007 was around 5% as can be seen in the following link (http://www.global-rates.com/interest-rates/libor/american-dollar/2007.aspx). So to get an understanding of the payback schedule the interest rate was fixed to 7.5% considering the Libor values available at the time of investment decision making.	CLOSED
3	CAR: Please correct the inputs regarding the capital repayment. There is inconsistency regarding the repayment period. The identified amounts (5....) are corresponding to an annual repayment and not per 0.5 year as the table is structured.	financial analysis 'Finance' (G7:G12) & (C31:F31)	This is corrected in the financial analysis version 2.0 and the results of this change is reflected to the version 2.0 of the PD	CLOSED

4	CL: Please define what is meant by 'FinanceCharge'? It seems that part of the loan fees from 2008&2009 are included under this position. Please clarify and revise if necessary.	financial analysis 'CashFlow' (B27)	Finance charge are the sum of the commissions paid to the bank as part of the loan agreement. At the time of investment decision date the terms of the loan were known to the financial analysis team that prepared the loan re-payment schedule and therefore that was also included.	CLOSED
5	CL: In relation to CAR/CL 5 - Please explain why fees related to Loan are included as part of the debt principle payment as well. Revise if necessary.	financial analysis 'CashFlow' (B32)	These fees were envisaged to be paid within the first 2 and half years, and they have been included in the capital re-payment erroneously. Now they have been isolated and they are accounted for in their correct place in the cash flow.	CLOSED
6	CL: Please clarify why the amount of 'deductible VAT' does not equals the paid VAT as defined in the feasibility study	financial analysis 'CashFlow' (B31)	There was a calculation error this is updated in the second version of the financial analysis.	CLOSED
7	CAR: Please make sure that the correct guideline's number is referred. With regard to the context, it is assumed that EB62 is meant.	PD 2.5 (p.18)	This is corrected in the version 2.0 of the PD.	CLOSED
8	CL: Please explain why the generation license is granted only for the period of 48 years 2 months 15 days, including the 1.5 (36 months) years of construction.	PD 1.8 (p.11)	The licence is being granted by EMRA, and the time span including construction time is defined by the EMRA. The numbers provided in the PD is therefore based on the project specific terms indicated in the licence.	CLOSED
9	CL: Please identify the usage and frequency of the auxiliary diesel generator and clarify why are those emissions not considered/ignored.	PD 2.3, table 4 (p.17)	This is explained in the new version of the PD and PE related to diesel generator usage is added to the monitoring parameters and monitoring plan.	CLOSED

10	CAR: According to the tool to calculate EF, it is required to determine the AEG excluding power units registered as CDM project activities. Please revise BM calculations accordingly.	CM_2011_calculations 'BM calculation' (B1)	The Emission calculations are revised accordingly and the PDD is updated. Please see the revision 2.0 of the PDD and the Version 2.0 of the emission calculations.	CLOSED
11	CAR: Please make sure that the CDM power units are excluded from the SET 20% units identified to supply electricity to the grid most recently and comprise of 20% of AEG (which is revised as required). Revise the BM calculations accordingly.	CM_2011_calculations 'BM calculation' (B3)	The BM and thus the combined margin Emission factor are revised accordingly and the PDD is updated. Please see the revision 2.0 of the PDD and the Version 2.0 of the emission calculations.	CLOSED
12	CL: Please indicate the source of the generation efficiency	PD 3.4 (p.37) table 13; CM_calculation	The references of the generation efficiencies are explained in detailed in the new version of the PD (Version 2.0)	CLOSED
13	CAR: Please notice that for the calculation of the EF of BM, the total net electricity generation for the corresponding year has been used. Nevertheless the tool refers to the Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh).	CM_2011_calculations 'BM calculation' (H19)	The BM and thus the combined margin Emission factor are revised accordingly and the PDD is updated. Please see the revision 2.0 of the PDD and the Version 2.0 of the emission calculations.	CLOSED
14	CAR: please revise coordinates of the project, indicating only the power house and the regulator structure/weir	PD 1.9	Coordinates of the project are corrected to reflect the exact position of the KepezkayaWeir and the powerhouse and is given in the version 2.0 of the PD as table 4.	CLOSED
15	CAR: Please revise the indicated VCS version within the PD	PD 1.13	Revised in the PD version 2.0	CLOSED
16	CAR: please revise numbering of tables and figures	PD	Revised in the PD version 2.1	CLOSED