

VERIFICATION REPORT OF AYDIN SALAVATLI DORA-1 GEOTHERMAL POWER PLANT



Document Prepared By TÜV Rheinland (China) Ltd.

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Summary:

The verification team assigned by the VVB (TÜV Rheinland (China) Ltd.) has performed the verification of the VCS Project “Aydin Salavatli Dora-1 Geothermal Power Plant” (hereafter called “the project”) on the basis of VCS 3.5 as well as criteria given to provide for consistent project operations, monitoring and reporting. The verification team concludes that the project as described in the VCS Monitoring Report (version 02, 21/01/2015) meets all relevant requirements of the above-defined criteria. The VVB therefore issues a positive verification opinion to the project.

The project is a renewable geothermal power generation project, which is located in the West of the village Salavatli, near the city of Aydin in Turkey. The project consists of a 7.9MW geothermal power plant. By displacing fossil fuel based grid power generation with renewable geothermal energy the project activity results in reductions of greenhouse gas (GHG) emissions that are real, measurable and give long-term benefits to the mitigation of climate change.

The host country is Turkey, and the project proponent from Host Country is: Menderes Geothermal Elektrik Uretim A.S. (MEGE), which is also the project owner of the project. The VER credit buyer for the project is South Pole Carbon Asset Management Ltd. (SPC).

The verification has been executed in the following steps so far:

- Desk review of preliminary VCS monitoring report, Version 01, 24/01/2015;
- Registered VCS PD dated on 14/05/2008; validation report dated 15/01/2009;
- Applied baseline methodology of AMS-I.D. Version 13;
- On-site visit with stakeholder interviews;
- Issue of checklist with corrective action requests (CARs) and clarification requests (CLs) and the draft verification report;
- Desk review of revised VCS monitoring report (version 02 of 21/01/2015);
- Issue of the final verification report;

Based on the assessment carried out, the verifier confirms that the project has been completely implemented and operated in accordance with the description given in the monitoring plan and the applied methodologies.

The verification team confirms that the installed equipment runs reliably and the meters are calibrated appropriately. The GHG emission reductions are calculated without material misstatements. It is verification team’s opinion refers to the project’s GHG emissions and resulting GHG emission reductions reported, both determined due to the valid and verified project’s baseline, its monitoring plan and its associated documents.

Based on the information seen and evaluated the verification team confirm that the implementation of the Project resulted in 89,997 tCO₂e of emission reductions during the current verification period 01/09/2011 to 31/12/2014.

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1 INTRODUCTION

1.1 Objective

The South Pole Carbon Asset Management Ltd. has commissioned TÜV Rheinland (China) Ltd. to verify the emission reductions of its voluntary emission reduction (VER) project, Aydın Salavatlı Dora-1 Geothermal Power Plant (hereafter called “the project”), is located in the West of the village Salavatlı of the Northeast of the city of Aydın, Turkey for the monitoring period from 01/09/2011 - 31/12/2014. TÜV Rheinland (China) Ltd. is the verification body of the project that has been accredited as a VVB by UNFCCC and also meets the competence requirements as set out in ISO 14065:2007. This report describes the verification process and the findings of the verification performed on the basis of Voluntary Carbon Standard (VCS) Version 3.5 as well as criteria to provide for consistent project operations, monitoring and reporting.

1.2 Scope and Criteria

The verification comprises an independent and objective review of the monitoring report over the monitoring period from 01/09/2011 – 31/12/2014 based on the registered VCS PD in part of the project design, monitoring parameters, monitoring plan, emission reduction calculation, monitoring methodology and all related evidences provided by project participant. Those documents have been reviewed and verified against VCS Version 3.5 requirements and associated interpretations. On-site visit and stakeholders interviews are also performed as part of the verification process.

1.3 Level of Assurance

The validation and verification of the project is assured reasonable by the verification team on the basis of documentation review, on-site assessment & interview and background investigation on the internet.

The verification team consists of the following personnel:

Role	Full name	Appointed for Sectoral Scopes	Affiliation
Team leader	Mr. JIN Hua	1.2, 13.1, 13.2	TÜV Rheinland (China) Ltd.
Team member	Mr. ZHU Jiang	1.1, 1.2, 4.5	TÜV Rheinland (China) Ltd.
Local expert	Mr. Baris Ergun	N/A	Interpreter from Turkey
Technical Reviewer	Ms. SUN Na	1.2, 13.1	TÜV Rheinland (China) Ltd.
Technical Reviewer	Mr. Walter Tang	1.1, 1.2, 2.1, 2.2, 3.1, 4.3, 4.5, 13.1	TÜV Rheinland (China) Ltd.

1.4 Summary Description of the Project

The project activity is a renewable energy project, which consists of the generation of electricity with a 7.9 MW geothermal power plant. The Geothermal Power Plant Dora-I consists of one site, covering a total area of 25,000 square meters. It is located in the West of the village Salavatlı, near the city of Aydın in Turkey. The geographical location of the Project is 37°53'22.85 N and 28°06'33.50 E.

Following the implementation of this project, Menderes Geothermal Elektrik Uretim A.Ş. was able to sell electricity to the Turkish national electricity grid displacing the same amount of electricity partially produced by fossil-fuelled thermal plants supplying electricity to this electricity grid.

The Aydın Sultanhisar-Salavatlı geothermal field is a liquid dominated reservoir. Electricity is generated from geothermal energy at a temperature ranging from 78° C to 170° C. The installed technology is the Ormat Energy Converter (OEC). The employed Organic Rankine Cycle & Binary technology is designed for the specific conditions of a wide variety of heat sources and therefore provides increased efficiency for the geothermal power plant. It is an outdoor installation that consists of a vaporizer/pre-heater, turbo generator, air-cooled condenser, feed pump and controls. The Generator has an installed capacity of 7.9 MW and is fed by two production wells, AS-1 and ASR-2. While AS-1 is connected to the electricity generation facility through 900 meter long isolated tubes, the distance for the connection between ASR-2 and the generation facility is 100 meters. The hot brine is pumped from the production wells and directed to the generator through isolated transmission lines. The thermal fluid is passed through a heat exchanger, and the heat from the fluid is transferred to a secondary fluid, a hydrocarbon (pentane). The pentane is vaporized to generate electricity via two turbines (with 4MW of nameplate capacity each), which are both connected to a power generator. After having passed the heat exchanger, the geothermal fluid drops to 78°C and is re-injected back to the reservoir via a re-injection well. The re-injection well named AS-2 is located right at the generation facility.

The production cycle is closed due to complete re-injection of the geothermal brine into the reservoir. This system serves both to sustain the reservoir and avoids adverse environmental impacts. The inhibitor and the dosing pump installed at the re-injection well prevent the fluid from causing corrosion and silica sediment deposits.

The secondary fluid is used in a closed cycle as well. After passing the generator the fluid is cooled down at the ventilation area and again directed to the heat exchanger. The applied technology is state-of-the-art and the project is therefore first of its kind in Turkey. The project reflects good practice.

It is noteworthy that while conventional geothermal energy in Turkey has been previously used for district heating, the Aydın Salavatlı Geothermal power plant is the first private investment in geothermal power in Turkey.

All electricity generated by Dora I power plant is exported to the national grid of Turkey.

The crediting period of the VCS-project is 10 years, which can be renewed twice. The first crediting period starts on 2008-07-01.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The verification consists of the following three phases:

1. Desk review of the monitoring plan, monitoring report, project design document and other relevant documents;
2. On-site visit (including follow-up interviews with project stakeholders, when deemed necessary);

3. Resolution of outstanding issues and the issuance of the final Verification report and Certification statement.

The criteria of this verification include the relevant rules and steps as set out in the VCS Version 3.5.

2.2 Document Review

The following table outlines the documentation reviewed during the verification:

Ref no.	Reference Document
/1/	South Pole Carbon Asset Management Ltd., VCS Monitoring report, version 01 Of 24 December 2014 and version 02 of 21 January 2015.
/2/	South Pole Carbon Asset Management Ltd., VER calculation spreadsheet
/3/	South Pole Carbon Asset Management Ltd., Registered VCS PD of 14 May 2008.
/4/	TÜV Rheinland Japan Ltd., Registered Validation Report of 15 January 2009.
/5/	VCS Association, Voluntary Carbon Standard Version 3.4, 8 October 2013, v3.4.
/6/	CDM Executive Board, Clean Development Mechanism Validation and Verification Manual, Version 07.0.
/7/	CDM Executive Board, AMS-I.D. version 13, Grid connected renewable electricity generation.
/8/	VCS Association, Monitoring Report Template Form Version 3.3.
/9/	VCS Board, VCS Program Guide v3.5, 8th October 2013.
/10/	International Organization for Standardization, ISO 14064-2:2006, ISO 14064-3:2006 and ISO 14065:2007 (ISO, www.iso.org).
/11/	Official records (PMUM) for the electricity delivered to the grid for the period from 01/09/2011 to 31/12/2014
/12/	Diesel consumption records for the period from 01/09/2011 to 31/12/2014
/13/	Electricity meter calibration records
/14/	Training records and certificates
/15/	Daily operation Logs

2.3 Interviews

From 13/01/2015 to 14/01/2015, the Validation Team of TÜV Rheinland has performed personal interviews with representatives of the project owner and local authorities. The main topics of the interviews were:

- Project's implementation
- Project monitoring structure
- Project monitoring implementation
- Monitoring equipment installation and calibration
- Monitoring data collection and archive

	Date	Name	Organization	Topic
/i/	2015-01-13	Haluk Tufekcioglu	General manager of Menderes Geothermal Elektrik Uretim A.S.	- Project background - Local geothermal power development - Investment barriers - Project finance - Environmental impact - Sustainable development - Project management - Monitoring issues
/ii/	2015-01-13	Erol Tufeleueglu	Assistant manager of Menderes Geothermal Elektrik Uretim A.S.	
/iii/	2015-01-13	Fatih Bozkurt	Operation manager of Menderes Geothermal Elektrik Uretim A.S.	
/iv/	2015-01-13	Selim Tuna	Electrical engineer of Menderes Geothermal Elektrik Uretim A.S.	
/v/	2015-01-13	Yang Xuan	Project manager of South Pole Carbon	
/vi/	2015-01-13	Li Liyong	Project manager of South Pole Carbon	

2.4 Site Inspections

From 13/01/2015 to 14/01/2015, TÜV Rheinland performed a physical site inspection to:

- Confirm the implementation and operation of the project,
- Review the data flow for generating, aggregating and reporting the monitoring parameters,
- Cross-check the information provided in the MR documentation and other relevant information against the requirements of the monitoring plan
- Review the calculations process to obtain the emission reductions
- Identify if the monitoring management system is in place to and adequate training has been provided to the CDM team members.

2.5 Resolution of Findings

The DOE shall raise a corrective action request (CAR) if one of the following occurs:

- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- (b) The CDM requirements have not been met;

(c) There is a risk that emission reductions cannot be monitored or calculated.

The DOE shall raise a clarification request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

The wording of CAR/CL shall clearly address nonconformity or seek clarification, and avoid instructive / consultative language in order to prevent actual or perceived consultancy.

List of Requests for Corrective Action (CAR) and Clarification (CL)		
Observation (CAR/CL)	Summary of PP's response	Validation Team conclusion
CL 1 The project participant is requested to clarify whether or not the project emissions due to the diesel consumption contribute to more than 1% of baseline emissions of the project activity, which shall be justified clearly in the section 4.2 of the monitoring report.	The diesel consumption is much less than 1% of baseline emissions, and the calculation result has already been added into the monitoring report	OK, based on relevant calculations in the section 4.2 of this report, the carbon emissions ($PE_{FF,y}$) due to combustion of diesel is 16 tCO_{2e}, which is much less than 1% of baseline emissions (i.e. 89,997 tCO_{2e}), therefore according to the registered PD, the project emission is deemed as zero i.e. $PE_y = 0$ tCO_{2e}. Therefore CL 1 is closed.

2.5.1 Forward Action Requests

There is no outstanding forward action requests raised during the current verification, for the benefit of subsequent project audits.

2.6 Eligibility for Validation Activities

The VVB of “TÜV Rheinland (China) Ltd.” commissioned by the project participant is one of eligible VVBs listed on the VCS website (<http://www.v-c-s.org/tuev-rheinland-china-ltd>), and it holds the accreditation for validation/verification for the sectoral scope: “1. Energy (renewable/non-renewable)”, to which the project activity belongs. Therefore “TÜV Rheinland (China) Ltd.” is eligible for the validation/verification of the project activity.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The Verification Team has checked the official website of other GHG Programs like CDM, GS VER, and is able to confirm that the project activity is not included in any GHG programs or any other mechanisms that include GHG allowance trading. The net GHG emission reductions generated by the project activity during the current monitoring period have not been used for compliance under any emission trading programs or mechanisms. The project have not sought or received any other form of GHG-related environmental credit during this monitoring period.

The project has been registered as a VCS project, and it did not apply for any other approved or not approved GHG programs.

Therefore the Verification Team confirms that the project is eligible to participate under the VCS Program.

3.2 Methodology Deviations

There is no methodology deviations applied to the project activity.

3.3 Project Description Deviations

Through on-site interviews and document review, the Verification Team confirms that there are no project description deviations according to the registered PD.

3.4 Grouped Project

The project activity is not a grouped project, and therefore there is no inclusion of new project activity.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The verification of the project implementation was carried out by means of on-site physical inspection, stakeholders interview and document review.

Through on-site physical inspection, the Verification Team is able to confirm that the project activity consists of one site only, located in in the West of the village Salavatlı in the Northeast of the city of

Aydın. The geographical coordinates are: latitude (ϕ): 37°53'22"N & longitude (λ): 28°06'33"E, which is consistent with the registered PD. Therefore the Verification Team is able to confirm that the location of the project activity is consistent with the registered PD.

During on-site assessment, the Verification Team has physically observed that the project activity involves the installation of Organic Rankine Cycle System with two sets of steam turbine and one set of 7.9MW generator unit, which is consistent with the registered PD. The Verification Team has checked the nameplate of steam turbine and generator, and is able to confirm that the key technical specifications of steam turbine and generator employed by the project activity are fully consistent with the relevant information described in the registered PD.

The electricity power generated by the project activity is supplied to National Electricity Grid of Turkey, which has been verified by on-site physical inspection and document review/11/. Moreover, the Verification Team has verified the location of the installed equipment and also checked the metering system, found that the installed equipment and metering system are in place and fully consistent with the registered PD.

This is the 4th monitoring period i.e. from 01/09/2011 to 31/12/2014 within the first crediting period. According to the registered PD, the project participant has opted for the first crediting period of 10 years i.e. from 01/07/2008 to 30/06/2018. The previous three monitoring period is shown in the table below:

No. of monitoring period	Date
1 st monitoring period	01/07/2008 - 31/07/2009
2 nd monitoring period	01/08/2009 - 31/07/2010
3 rd monitoring period	01/08/2010 – 31/08/2011
Current monitoring period (4 th)	from 01/09/2011 to 31/12/2014

It is clear from the above table that there is no overlap between the 3rd monitoring period and the current monitoring period, and the current monitoring period is within the crediting period limit.

During the monitoring period from 01/09/2011 to 31/12/2014 (including both the days), the project activity has supplied a total of 152,281.424 MWh of electricity to the National Electricity Grid of Turkey and thus leads to CO₂ emission reduction of 89,997 tCO₂e due to the displacement of equivalent amount of electricity that would have been imported from the grid.

The trainings for the employees were conducted in various topics as per the registered PD. The Verification Team has checked the staff training records/14/, which ensures that the monitoring staffs have received sufficient trainings for proper monitoring, operation and maintenance of the project.

The project design of the project activity is consistent with the registered PD, please refer to the table below:

Any Project Design Change been sought?	☐ Yes ☒ No	Through on-site visit and document review, the Verification Team confirms that the project design is consistent with the registered PD.
Any Revision in Monitoring plan is sought?	☐ Yes ☒ No	There is no change related with project monitoring system and equipment.
Does the monitoring report provide line diagram showing all relevant monitoring equipment?	☒ Yes ☐ No	The Verification Team verified the same on the site visit and confirms that the monitoring points are implemented in accordance to the diagram and is adequate to ensure the actual emission reduction.

In summary, the monitoring period is reasonable and the actual implementation of the project activity is appropriate to its GS-VER development.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

According to the monitoring plan contained in the registered PD, the emission reduction of the project activity is calculated as follows:

$$ER_y = BE_y - (PE_y + LE_y) \quad (1)$$

Where BE_y is calculated as below:

$$BE_y = (EG_y - EG_{baseline}) * EF_{grid,CM,y} \quad (2)$$

According to the registered PD, the $EG_{baseline}$ is zero, and the $EF_{grid,CM,y}$ is ex-ante determined as 0.591 tCO_{2e}/MWh for the whole 1st crediting period.

According to the monitoring plan contained in the registered PD, project emissions resulting from combustion of fossil fuels are neglected if these emissions are contributing less than 1% of baseline emissions. According to the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”, the project emissions resulting from combustion of fossil fuel are calculated by the following formulas:

$$PE_y = PE_{FF,y} \quad (3)$$

$$PE_{FF,y} = \sum_i FC_{FF,i,y} \times COEF_{FF,i,y} \quad (4)$$

$$COEF_{FF,i,y} = NCV_{i,y} \times EF_{CO2,i,y} \quad (5)$$

Leakage is not required to be considered in accordance with the applied AMS-I.D. version 13.

The Verification Team confirms that the registered monitoring plan under implementation is in line with AMS-I.D Version 13, the approved methodology applied by the registered PD.

The Verification Team confirms that the emission reduction formula applied in the monitoring report is correctly referred from the monitoring methodology AMS-I.D Version 13. The Emission reduction calculation Spreadsheet/2/ is available to the Verification Team. The relevant calculations are summarized below:

(a) Baseline Emissions (BE_y)

According to the registered PD, the BE_y is calculated as below:

$$BE_y = (EG_y - EG_{\text{baseline}}) * EF_{\text{grid,CM,y}}$$

			Official Records (PMUM)		Calculations		
Sl. No.	Year	Month	Electricity exported (kWh)	Electricity imported (kWh)	Balance of Net electricity Exported to the Grid (kWh)	GHG Emission Factor (tCO2/MWh)	Baseline Emissions (tCO2e)
1	2011	September	3,239,838	277	3,239,561	0.591	1,915
2		October	3,877,550	4,738	3,872,812	0.591	2,289
3		November	3,985,796	4,990	3,980,806	0.591	2,353
4		December	4,754,421	907	4,753,514	0.591	2,809
Sub-Total-2011			15,857,605	10,912	15,846,693		9,365
5	2012	January	4,772,981	3,944	4,769,037	0.591	2,819
6		February	4,318,524	3,238	4,315,286	0.591	2,550
7		March	4,539,969	945	4,539,024	0.591	2,683
8		April	3,836,751	4,385	3,832,366	0.591	2,265
9		May	3,329,827	10,294	3,319,533	0.591	1,962
10		June	3,023,672	5,758	3,017,914	0.591	1,784
11		July	2,995,348	3,289	2,992,059	0.591	1,768
12		August	3,105,434	1,638	3,103,796	0.591	1,834
13		September	3,231,799	2,054	3,229,745	0.591	1,909
14		October	3,681,456	1,273	3,680,183	0.591	2,175
15		November	3,935,371	2,898	3,932,473	0.591	2,324
16		December	4,388,820	3,125	4,385,695	0.591	2,592
Sub-Total-2012			45,159,952	42,841	45,117,111		26,664
17	2013	January	4,365,018	2,369	4,362,649	0.591	2,578
18		February	3,841,475	1,726	3,839,749	0.591	2,269
19		March	4,033,689	2,684	4,031,005	0.591	2,382
20		April	1,669,803	20,135	1,649,668	0.591	975
21		May	4,061,535	1,336	4,060,199	0.591	2,400
22		June	3,662,972	3,541	3,659,431	0.591	2,163
23		July	2,429,784	13,406	2,416,378	0.591	1,428
24		August	3,558,064	353	3,557,711	0.591	2,103

25		September	3,769,681	731	3,768,950	0.591	2,227
26		October	4,259,481	769	4,258,712	0.591	2,517
27		November	4,353,917	1,978	4,351,939	0.591	2,572
28		December	4,907,184	101	4,907,083	0.591	2,900
Sub-Total-2013			44,912,603	49,129	44,863,474		26,514
29	2014	January	4,725,277	983	4,724,294	0.591	2,792
30		February	4,126,815	239	4,126,576	0.591	2,439
31		March	4,307,272	353	4,306,919	0.591	2,545
32		April	3,819,237	769	3,818,468	0.591	2,257
33		May	3,561,201	1,348	3,559,853	0.591	2,104
34		June	3,217,423	2,243	3,215,180	0.591	1,900
35		July	3,152,129	2,016	3,150,113	0.591	1,862
36		August	3,182,760	1,600	3,181,160	0.591	1,880
37		September	3,570,588	1,210	3,569,378	0.591	2,110
38		October	4,133,783	1,197	4,132,586	0.591	2,442
39		November	4,292,064	605	4,291,459	0.591	2,536
40		December	4,379,302	1,142	4,378,160	0.591	2,587
Sub-Total-2014			46,467,851	13,705	46,454,146		27,454
Total			152,398,011	116,587	152,281,424		89,997
Total Baseline Emissions (tCO2e)							89,997

The balance of the net electricity generated is monitored by the installed energy meters which monitor the “Electricity generated by the project activity” and “Electricity imported by the project”. The verification team checked the accuracy class of the meters and found the same suitable for monitoring the parameters.

From the SCADA system, the verification team found that in addition to the monthly readings done by TEDAS (i.e. PMUM records), hourly readings are conducted and recorded by the project proponent. The difference between the meter reading at the substation and the SCADA system accounts for transmission losses and electricity consumed by the plant.

The Verification Team has checked the official electricity records (PMUM)/11/ and is able to confirm that all the data shown in the table above is consistent with the PMUM records. Based on above calculation table, the baseline emissions (BE_y) by the project activity during the current monitoring period is 89,997 tCO₂e.

(b) Project Emissions (PE_y)

The project emissions resulting from combustion of fossil fuels are calculated by the following formulas:

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

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

Parameter	Unit	Value
Initial Operating hours	hrs	368.4
Final Operating hours	hrs	582
Operating hours during the current monitoring period	hrs	213.6
Fuel Consumption Rate	liter/hr	27.61
Fuel Consumption during the current monitoring period	liter	5,897
Density of Diesel	kg/liter	0.83
Diesel Consumption during the current monitoring period	kg	4,890
Diesel Consumption during the current monitoring period	tonnes	4.8902
NCV of Diesel	TJ/Gg	43
Carbon Emission factor of Diesel	kg/TJ	74,100
Emission Factor for Diesel	tCO ₂ / ton	3.186
GHG Emissions from Diesel (PE_{FF,y})	tCO_{2e}	16

The Verification Team has checked the diesel consumption records/12/, and therefore is able to confirm that all the data used in the above tables are consistent and all the calculations are correct.

Based on above calculation tables, the carbon emissions (PE_{FF,y}) i.e. 16 tCO_{2e} is much less than 1% of baseline emissions (i.e. 89,997 tCO_{2e}), therefore according to the registered PD, the project emission is deemed as zero.

$$PE_y = 0 \text{ tCO}_2\text{e}$$

(c) Leakage (L_y)

According to the registered PD, leakage is excluded from consideration for this project, L_y = 0 tCO_{2e}.

(d) Emission Reduction

Consequently, the Emission Reductions (ER_y) of the project for this monitoring period is confirmed to be:

$$ER_y = BE_y - (PE_y + L_y) = 89,997 \text{ tCO}_2\text{e} - (0 + 0) \text{ tCO}_2\text{e} = 89,997 \text{ tCO}_2\text{e}.$$

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

All the information made available by the project participants and the project owner to the verification team, including the reliability of the evidence and the source and nature of the evidences (external, internal, oral and documented) were considered sufficient in quantity and appropriate in quality.

PMUM records which the basis for the electricity sales are and AYDEM (Distribution Company) signed report used to confirm the verification data's. Also SCADA records made available to check the generated electricity. The equipment record has been used to confirm the operating hours of the diesel generator. All sources were sufficient and appropriate for the verification of the project.

The Voluntary Carbon Standard Monitoring Report, version 02, issued on 21/01/2015, was the base utilized for this Verification Report.

4.4 Non-Permanence Risk Analysis

During the verification site visit it could be verified that the operational structure is in line with the VCS PD and the management procedures are in place. An operational structure was established with responsibilities identified. A monitoring mechanism was found to be established by MENDERES Geothermal Elektrik Üretim A.Ş. in place and working appropriately. The verification team confirms that the authorities and responsibilities for monitoring and reporting of all data related to the emission reductions were clearly defined for the monitoring period. Moreover, all project related equipment was checked to be operated by qualified and trained staff.

The monitoring data and records were archived in electronic documents and paper documents. The project owners keep the copies of electricity generation records and sales receipts. Calibration of Meters & Metering has been implemented periodically according to relevant sector standards in Turkey. After calibrated by qualified entity, the electricity metering equipment is sealed and stamped, which has been verified during on-site assessment. It was also confirmed during site assessment that all the staff involved has received periodic trainings on operation and maintenance of the geothermal power plant.

In summary, the verification team has ensured that the quality management system for the Project is in place. The documented instructions including the responsibilities have been properly implemented and in line with the monitoring report and registered VCS PD/3/.

5 VERIFICATION CONCLUSION

The verification team assigned by the VVB (TÜV Rheinland (China) Ltd) has performed the verification for the project activity of “Aydin Salavatli Dora-1 Geothermal Power Plant” on the basis of VCS Version 3.5, as well as the criteria given to provide for consistent project operations, monitoring and reporting. The verification team concluded that the project as described in the VCS Monitoring Report (version 02, 21/01/2015), meets all relevant requirements of the above-defined criteria. The VVB therefore issue a positive verification opinion.

Verification period: From 01-09-2011 to 31-12-2014

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011 (from Sep. to Dec. only)	9,365	0	0	9,365
Year 2012	26,664	0	0	26,664
Year 2013	26,514	0	0	26,514
Year 2014	27,454	0	0	27,454
Total	89,997	0	0	89,997

APPENDIX A: ABBREVIATIONS

ACM	Approved Consolidated Methodology
AYDEM	Aydın Elektrik Dağıtım (Aydın Electricity Distribution Company)
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification Request
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
DR	Document Review
ER	Emission Reductions
GHG	Greenhouse Gas(es)
I	Interview
IPCC	Intergovernmental Panel on Climate Change
kW	Kilo Watt
kWh	Kilo Watt Hours
MP	Monitoring Plan
MWh	Mega Watt Hours
NCV	Net Calorific Value
NGO	Non-governmental Organization
OEC	Ormat Energy Converter
OM	Operating Margin
PD	Project Description
PP	Project Participants
SCADA	Supervisory Control and Data Acquisition System
t	Tonne
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Unit
VER	Voluntary Emission Reduction
VVB	Validation and Verification Body

APPENDIX B: CERTIFICATES OF COMPETENCE

Qualification

Jin, Hua /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:

(AuditorenRegNr)

Appointed:

(Zugelassen)

☒ ja

Qualification Level:

(Qualifikationsstufe)

Lead Auditor

External:

(Externer)

☐ ja

Add. reviewer:

(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:

(EAC Branchen)

CDM 13 - Waste handling and disposal

CDM 01 - Energy industries (renewable - / non-renewable sources)

Add. qualification:

(zus. Qualifikation)

First Appointment:

(Erstberufung)

01/23/2011

Valid to:

(Gültig bis)

01/22/2017

Remarks:

Valid for TA 1.2 and TA 13.1/ 13.2

Languages:

Chinese simplified

English

Experience Exchange

Date

Location

Remarks

Accreditation(s)

2011-06-18

Change

Beijing

Beijing CDM Seminar-EB61/62

United Nations Framework Convention on C

Monitoring

Latest Monitoring:

(letzte Beurteilung)

Next Monitoring:

(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

History of scope allocation

Date: 2012-11-26
Change: EAC CDM added; CDM 01 Energy Industries removed
By: Praveen Urs
Reason:

Date: 2012-02-09
Change: EAC 01 removed; CDM 01 Energy Industries added
By: Praveen Urs
Reason:

Date: 2012-02-09
Change: EAC 01 added
By: Praveen Urs
Reason:

Date: 2011-01-24
Change: EAC CDM added
By: Manfred Brinkmann
Reason: Valid for TA 13.1

History

Created:	11/16/2010 04:34:24 PM	Hua Jin/Bj/Chn/TUV
Modified:	01/20/2014 03:32:21 PM	Hua Jin/Chn/TUV
	11/26/2012 12:53:46 PM	Hua Jin/Chn/TUV
	04/16/2012 07:20:41 PM	Manfred Brinkmann/Jpn/TUV
	04/16/2012 07:20:28 PM	
	02/09/2012 07:38:35 PM	
	01/24/2011 11:21:34 AM ZE9	
	01/24/2011 11:19:42 AM ZE9	
	11/16/2010 04:34:39 PM	

Export to ICMS

Last Export:

Qualification

Zhu, Jiang /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No. :
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☒ yes
(Zusätzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 04 – Manufacturing industries

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

2009/03/08

Valid to:
(Gültig bis)

2015/03/07

Remarks:

CDM 01: valid for TA 1.1, 1.2
CDM 04: valid for TA 4.5 – Other WHR and Fuel Switch
+ Part Time TR

Languages:

Chinese
English

Experience Exchange

Date

Location

Remarks

Accreditation

2011-06-18
Change

Beijing

Beijing CDM Seminar-EB61/62

United Nations Framework Convention on

2010-12-21

Beijing

GC CDM Auditor Experience Exchange, Beijing, 2010-12-21 to 23

United Nations Framework Convention on Climate Change

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(nächste
Beurteilung)

Remarks:

[View / Edit Monitoring](#)

History of scope allocation

Date: 2009-03-08
Change: EAC CDM added
By: Manfred Brinkmann
Reason:

History

Created:	2008/03/20 13:56:52	Daxun Li/Bj/Chn/TUV
Modified:	2012/09/28 11:52:16	Praveen Urs/Chn/TUV
	2012/09/28 11:27:35	Praveen Urs/Chn/TUV
	2012/03/12 15:05:17	Praveen Urs/Chn/TUV
	2012/03/07 14:06:06	
	2011/01/13 15:24:11 ZE9	
	2011/01/13 15:22:23 ZE9	
	2010/11/10 18:24:28 ZE9	
	2010/11/10 18:23:35 ZE9	
	2008/03/20 13:57:07	

Export to ICMS

Last Export:

Qualification

NA, SUN /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:

(AuditorenRegNr)

Appointed:

(Zugelassen)

☒ ja

Qualification Level:

(Qualifikationsstufe)

Lead Auditor

External:

(Externer)

☐ ja

Add. reviewer:

(Zusätzlicher Prüfer)

☒ yes

EAC Scopes:

(EAC Branchen)

CDM 01 - Energy industries (renewable - / non-renewable sources)

CDM 13 - Waste handling and disposal

Add. qualification:

(zus. Qualifikation)

First Appointment:

(Erstberufung)

06/23/2013

Valid to:

(Gültig bis)

06/22/2016

Remarks:

CDM 01: valid for TA1.2 - Renewable Energies

CDM 13: valid for TA 13.1- Waste handling & disposal

Languages:

Chinese

English

Experience Exchange

Date

Location

Remarks

Accreditation(s)

2011-06-18
Change

Beijing

Beijing CDM Seminar-EB61/62

United Nations Framework Convention on C

2010-12-21

Beijing

GC CDM Auditor Experience Exchange, Beijing, 2010-12-21to23

United Nations Framework Convention on Climate Change

Monitoring

Latest Monitoring:

(letzte Beurteilung)

Next Monitoring:

(nächste Beurteilung)

Remarks:

History of scope allocation

Date: 2010-06-24
Change: EAC CDM, CDM added
By: Manfred Brinkmann
Reason: Scope 1 c) - Renewable Energies except Biomass generation

History

Created:	05/11/2010 09:57:32 AM	Na Sun/Bj/Chn/TUV
Modified:	09/30/2013 11:52:31 AM	Henri Phan/Chn/TUV
	09/22/2013 03:23:41 PM	Daxun Li/Chn/TUV
	10/22/2012 10:39:55 PM	Manfred Brinkmann/Jpn/TUV
	02/11/2012 12:15:14 PM	
	01/13/2011 03:42:06 PM ZE9	
	01/13/2011 03:41:24 PM ZE9	
	11/10/2010 05:56:12 PM ZE9	
	06/24/2010 10:02:50 PM ZE9	

Export to ICMS

Last Export:

Qualification

Tang, Walter /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:

(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

Lead Auditor

External:
(Externer)

☐ ja

Add. reviewer:
(Zusätzlicher Prüfer)

☒ yes

EAC Scopes:
(EAC Branchen)

CDM 01 - Energy industries (renewable - / non-renewable sources)
CDM 02 - Energy distribution
CDM 03 - Energy demand
CDM 13 - Waste handling and disposal
CDM 04 - Manufacturing industries

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

10/11/2011

Valid to:
(Gültig bis)

09/11/2015

Remarks:

Appointed as Technical Reviewer for TA 1.1, 1.2, 2.1, 2.2, 3.1 Direct work experience. TA 4.3, 4.5, 13.1 based on Annex D para 9 of the Accreditation Standard

Languages:

Chinese simplified
English

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next Monitoring:
(nächste Beurteilung)

Remarks:

History of scope allocation

Date: 2012-02-13
Change: EAC CDM added
By: Praveen Urs
Reason:

Date: 2012-02-13
Change: EAC CDM, CDM, CDM, CDM added
By: Praveen Urs
Reason:

History

Created:	12/06/2011 05:00:51 PM	Walter Tang/Chn/TUV
Modified:	07/06/2012 04:47:48 PM	Praveen Urs/Chn/TUV
	07/02/2012 03:08:57 PM	Praveen Urs/Chn/TUV
	07/02/2012 03:08:48 PM	Praveen Urs/Chn/TUV
	05/15/2012 03:30:46 PM	
	02/13/2012 08:00:10 PM	
	12/06/2011 05:01:30 PM	

Export to ICMS

Last Export: