

VALIDATION REPORT

AYDIN SALAVATLI DORA-1 GEOTHERMAL POWER PLANT



Document Prepared By China Classification Society Certification Company (CCSC)

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Summary:

China Classification Society Certification Company (CCSC), commissioned by South Pole Carbon Asset Management Ltd., has performed the validation of the request to renew of the crediting period of the Aydin Salavatli Dora-1 Geothermal Power Plant (hereafter referred to as “the Project”) on the basis of requirements of Verified Carbon Standard (VCS) Version 3.7, VCS Validation and Verification Manual, and the approved Clean Development Mechanism (CDM) methodology AMS-I.D (Version 18.0), as well as criteria given to provide for consistent project operations, monitoring and reporting. The validation report and the validation protocol are summarizing the findings of the validation.

The validation scope is defined as an independent and objective review and ex-ante determination of the estimated GHG emission reductions, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion. The overall validation, from Contract Review to Validation Report & Opinion, was conducted using CCSC’s internal procedures.

The Project generate electricity by using geothermal to the grid and replacing equivalent electricity generated by fossil fuel fired power plants connected to the Turkey power grid. The Project involves the installation and operation of a 7.951MW Geothermal Power Plant, which is located in the west of the village Salavatlı, near the city of Aydin in Turkey. The Project is expected to export annual electricity of 51,284 MWh to the Turkish electricity grid respectively utilizing renewable geothermal resources. The project activity achieves greenhouse gas (GHG) emissions reductions by displacing electricity from existing fossil fuel based power plants and likely capacity additions within the given grid. The annual emission reductions in the second crediting period is 30,206tCO₂.

The first output of the validation process is a list of 0 Clarification Requests, 1 Corrective Actions Request and 0 Forward Action Request (CL, CAR and FAR), presented in APPENDIX D. Taking into account this output, the project proponent revised its project document.

In summary, it is CCSC's opinion that the Project correctly applies the VCS approved CDM methodologies AMS-I.D (Version 18.0) and meets the relevant VCS Standard v3.7 requirements and the relevant host country criteria.

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1 INTRODUCTION

1.1 Objective

South Pole Carbon Asset Management Ltd. (hereafter referred to as “the PP”) has commissioned CCSC to conduct the validation of the request to renew of the crediting period of the “Aydin Salavatli Dora-1 Geothermal Power Plant” (here after referred as the Project), which involves the installation and operation of a 7.951MW Geothermal Power Plant, which is located in the west of the village Salavatlı, near the city of Aydın in Turkey.

CCSC as the validation/verification body (VVB) of the Project has been accredited as a DOE by UNFCCC and also meets the competence requirements as set out in ISO 14065:2013.

The validation of renewal of crediting period serves as assessment of validity of the baseline of project that has opted for a renewal of the crediting period. The validation is an independent third-party assessment of the project baseline. In particular, the project's baseline and the monitoring plan (MP) are validated in order to confirm that the project baseline, as documented, is sound and reasonable, and meet the stated requirements and identified criteria. Assessment of validation of baseline is a requirement for all VCS projects seeking renewal of the crediting period and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Voluntary Carbon Units (VCUs).

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the VCS project description (VCS-PD), the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against VCS version 3.7 requirements, UNFCCC rules and associated interpretations.

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

CCSC has undertaken a reasonable assurance engagement in accordance with VCS Version 3.7. It requires a reasonable level of assurance in validation that GHG assertions are free of material errors, omissions and misrepresentations. The validation conclusion is based on the VCS Project Description (VCS-PD) /5/, supporting evidences made available to the verifier and information collected through performing interviews.

1.4 Summary Description of the Project

The Project was registered as a VCS project on 09/09/2009 (VCS Project ID: 120). The first 10-year renewable crediting period is from 01/07/2008 to 30/06/2018. As per the registered VCS-PD, the Project involves the installation and operation of a 7.951MW Geothermal Power Plant, which is located in the west of the village Salavatlı, near the city of Aydın in Turkey. The Project is

expected to export annual electricity of 51,284 MWh to the Turkish electricity grid respectively utilizing renewable geothermal resources.

The PP is applying for a second crediting period started from 01/07/2018 to 30/06/2028. And in this crediting period, the project activity does not change comparing to the first crediting period. /3/

2 VALIDATION PROCESS

2.1 Method and Criteria

The overall validation, from Contract Review to Validation Report & Opinion, was performed using CCSC internal procedures.

CCSC validated the Project against the requirements set in VCS standard version 3.7.

2.2 Document Review

The VCS-PD for the renewal of the crediting period was submitted by South Pole Carbon Asset Management Ltd. (the consultant) and additional background documents related to the project design and baseline were reviewed.

Furthermore, cross checks were made between information provided in the VCS-PD and information from sources other than those used.

The validation conclusions presented in this report relate to the Project as described in the VCS-PD version 1.0 dated 26/03/2018 /4/. To address CCSC's corrective action and clarification requests, the VCS-PD was revised to version 2.0 /5/ and resubmitted on 09/09/2018.

Appendix B of this report contains a complete list of all documents and proofs reviewed by the validation team.

2.3 Interviews

The site visit interview was held on 07/09/2018 to 08/09/2018 by Mr. LI Xingtong and Mr. LI Yong from CCSC, which is focused on the issues identified during the desk review. The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed Organization	Interview Topics
South Pole Carbon Asset Management Ltd.	↪ Status of the project and any modifications with respect to the registered VCS-PD.

MENDERES Geothermal Elektrik Üretim A.Ş	↪ Applicability of selected methodology. ↪ National policies and changes ↪ Baseline of the project and its updates ↪ Emission Factors and their updates
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2.4 Site Inspections

During the desk review, the relevant documents, including the registered VCS-PD and the relevant Validation Report, the previous monitoring reports and corresponding verification reports for the 1st crediting period, the follow-up interview by telephone and other relevant background documents were provided and assessed /1//2//3/. The project description in the VCS-PD for the renewable crediting period was verified from these documents. CCSC validation team can confirm the project design, construction, operation and monitoring plan were not changed. And the baseline scenario information also can be confirmed as it was defined by the applied methodology AMS I.D. Version 18.0 /9/. Hence, CCSC validation team has not concluded a physical site visit as part of validation process of the crediting period renewal for the registered Project, and it does not change the reasonable assurance of this validation.

2.5 Resolution of Findings

The objective of this phase of the validation is to resolve issues that require further elaboration, research or expansion prior to CCSC's positive conclusion on the project design.

A Corrective Action Request (CAR) is raised, if one of the following situations occurs:

- a) The project proponents have made mistakes that will influence the ability of the project activity to achieve real, measurable, verifiable and additional emission reductions;
- b) The applicable VCS requirements have not been met;
- c) There is a risk that emission reductions cannot be monitored or calculated.

A Clarification Request (CL) is raised, if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

A Forward Action Request (FAR) may also be raised during validation, to identify issues related to project implementation that require review during the first validation of the project activity.

To guarantee the transparency of the validation process, the issues raised, the responses provided by the project proponents, the means of validation of such responses and references to any resulting changes in the VCS-PD or supporting annexes are documented in the Appendix D.

2.5.1 Forward Action Requests

No Forward Action Requests were raised during this validation.

3 VALIDATION FINDINGS

3.1 Project Details

The project description in the VCS-PD for the crediting period renewal was verified against the relevant documents, including the registered VCS-PD, the previous monitoring reports and corresponding verification reports for the 1st crediting period, Power Purchase Agreement /7/ and other relevant background documents. CCSC validation team can confirm the project design, construction, operation were not changed.

Table 2 The Project information

Project Title:	Aydin Salavatli Dora-1 Geothermal Power Plant
Project ID:	120
Registration Date:	09/09/2009
1 st Crediting Period:	01/07/2008 to 30/06/2018 (renewable)
Sectoral Scope:	01, "Energy Industries (renewable- /non-renewable resources)"
Methodologies Used	AMS-I.D Version 18.0
Project Start Date:	04/04/2003
Project Proponents:	MENDERES Geothermal Elektrik Üretim A.Ş. South Pole Carbon Asset Management Ltd. (Switzerland)

The validation team confirmed the location, technical information etc. of the geothermal power plant provided in the revised VCS-PD is same with the registered VCS-PD and the previous verification reports.

Project crediting period

Renewable crediting period has been chosen by the Project, the 1st 10 years crediting period is 01/07/2008 to 30/06/2018. Hence, CCSC validation team confirmed that the 2nd 10 years crediting period from 01/07/2018 to 30/06/2028 of the Project is correctly chosen.

Project scale and estimated GHG emission reductions or removals

According to VCS standard, Projects are categorized by size according to their estimated average annual GHG emission reductions or removals:

- 1) Small Projects: Less than or equal to 300,000 tonnes of CO₂e per year.
- 2) Large projects: Greater than 300,000 tonnes of CO₂e per year.

The estimated annual average GHG emission reductions of the Project in the second crediting period are 30,206tCO₂e. CCSC validation team confirmed that the Project is a small Project.

Conditions prior to project initiation

Prior to the initiation of the Project, Electricity delivered to the grid by the Project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid, which is in conformity with the approved AMS-I.D Version 18.0. This is also the baseline scenario.

Project compliance with applicable laws, statutes and other regulatory frameworks

As described in the validation report of the registered VCS-PD, the Project complies with relevant laws and regulations. CCSC validation team also confirmed there has been no significant change in the relevant national and/or sectoral policies since the date of earlier registered VCS-PD till now. The Project is compliance with applicable laws, statutes and other regulatory frameworks.

Ownership and other programs

- Project ownership

The ownership of the emission reductions will belong to the plant owner as confirmed through the Power Purchase Agreement/7/ and Business license of the project owner/16/.

- Emissions trading programs, other binding limits

Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or for meeting binding limits on GHG emissions.

- Other forms of environmental credit sought or received and eligible to be sought or received

The Project has not created another form of Environmental Credit.

- Participation under other GHG programs:

The Project has not been registered or seeking registration under other GHG programs as confirmed through the GS or CDM project activity. PP has also provided a declaration for the same.

- Rejection by other GHG programs

The Project has not been rejected by other GHG programs as confirmed through the GS, VCS and CDM project data base.

Additional information relevant to the project

- Eligibility criteria for Projects

The geothermal power plant was included at the time of registration of the Project. There is no inclusion of additional project activity instances in this crediting period. Hence, CCSC validation team confirmed the geothermal power plant meets all eligibility criteria for Project.

- Leakage management for AFOLU projects

The Project is not an AFOLU project.

- Commercially sensitive information

N.A.

- Any further information

N.A.

3.2 Application of Methodology

3.2.1 Title and Reference

The VCS-approved methodology applied to the Project is the approved consolidated CDM baseline and monitoring methodology AMS-I.D Version 18.0 “Grid-connected renewable electricity generation” /9/.

The methodology also refers to:

“ACM0002 - Grid-connected electricity generation from renewable sources” (Version 19.0), “Tool to calculate the emission factor for an electricity system” (Version 07.0), “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (Version 03.0) /12/, “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” (Version 03.0.1), /13/. More information concerning the above methodology and tools can be referred to:

<http://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQOQFQOH4SBK>

3.2.2 Applicability

At the time of registration, project proponent had used the methodology AMS-I.D Version 13 “Grid-connected renewable electricity generation” /8/.

The revised VCS-PD for the renewable crediting period applies the latest available version of the same methodology, viz. AMS-I.D Version 18.0 “Grid-connected renewable electricity generation”. Therefore, it meets the condition that for renewal of the crediting period, the methodology shall not be changed.

CCSC validation team has checked the definitions of AMS-I.D Version 18.0 of the applicability of this methodology, and confirmed the comparison in the following table, which explains the reason why the methodology applies to the Project:

Table 3 the project applicability

AMS-I.D Version 18.0	the Project
This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	YES. The Project includes geothermal energy generation unit, and supplies electricity to the national grid of Turkey.
This methodology is applicable to the project activities that (a) install a Greenfield plant; (b) involve a capacity addition to (an) existing plant(s); (c) involve a retrofit of (an) existing plant(s); (d) involve a rehabilitation of (an) existing plant(s); or (e) involve a replacement of (an) existing plant(s).	YES. The Project is a Greenfield geothermal power plant.
Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in existing reservoir with no change in the volume of reservoir; or (b) The project activity is implemented in an existing reservoir, where the volume of the reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m²; or (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m².	NA.
If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not be exceed the limit of 15MW.	N.A.
Combined heat and power (co-generation) system are not eligible under this methodology.	N.A.
In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	N.A.

In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	N.A.
In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as “AMS-I.C.: Thermal energy production with or without electricity” shall be explored.	N.A.
In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.	N.A.

It can be concluded from the above analysis that the Project complies with the applicability requirement of the methodology AMS-I.D Version 18.0.

3.2.3 Project Boundary

According to AMS-I.D Version 18.0, spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity systems that the project power plants are connected to, which is Turkey power grid.

CCSC validation team reviewed the emissions source determination included in the VCS-PD and found the justification accurate and in accordance with the applied methodology.

Overall, the project proponents provided an accurate description of the project boundary.

3.2.4 Baseline Scenario

As demonstrated in the registered VCS-PD, the baseline for the Project is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kgCO₂e/kWh) calculated in a transparent and conservative manner as a combined margin (CM), consisting of the combination of operation margin (OM) and build margin (BM).

According to the registered VCS-PD and the relevant validation report, the geothermal power plant involved in the Project is a Greenfield project. Hence, the baseline scenario, defined by the AMS-I.D Version 18.0, is that electricity delivered to the grid by the project activity would have otherwise been generated by the generation of grid-connected power plants and by the addition of new generation sources into the grid. It is same with that in the registered VCS-PD.

According to the requirement of Section 3.8.5 of the VCS Standard version 3.7, the validity of the original baseline scenario shall be assessed. With reference to Methodological Tool “Assessment of the validity of the current/original baseline and update of the baseline at the renewal of the crediting period”, an assessment of the continued validity of the baseline is performed in steps as follows:

Step 1.-Assess the validity of the current baseline for the next crediting period

As per the requirement of the tool to assess the impact of new relevant national and/or sectoral policies and circumstances on the baseline following sub-steps have been used:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/sectoral policies

The current baseline remains the same with it was in the registered VCS-PD. There has been no significant change in the relevant national and/or sectoral policies since the date of earlier registered VCS-PD till now, although national policies favor the development of renewable energy, electricity generated by fossil fuel based plants dominated the electricity supply/15/. Hence, it can be concluded that the current baseline still complies with all relevant policies.

Step 1.2: Assess the impact of circumstances

As per the requirement of the sub-step, it has been assessed that there were no impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline scenarios.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) is technically possible

It is clear that the grid equipments as a system has longer lifetime and will exceed the next 10-year crediting period. Hence, this sub step is not applicable, as the baseline scenario is electricity provided by the grid and the project proponents or third party (or parties) would not undertake an investment later due.

Step 1.4: Assessment of the validity of the data and parameters

The emission factor that was determined only at the start of the previous crediting period is no more valid on account of change in the grid configuration. As per the requirement of AMS-I.D Version 18.0, new data available should be used to revise the baseline scenario and emissions for updating the baseline at the start of the second and third crediting period. Hence the emission factor needs to be updated accordingly.

Step 2.-Update the current baseline and the data and parameters

Step 2.1: Update the current baseline

As per the requirement of the sub-step, the update for baseline emissions of the second crediting period should be based on the latest approved version of the methodology applicable to the project activity.

As per AMS-I.D Version 18.0, the baseline for the Project remains the same as that in the registered VCS-PD 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 into the grid.

Step 2.2: Update the data and parameters

The baseline emission from the Project has been calculated as per the “Tool to calculate the emission factor for an electricity system” (Version 07.0). CCSC was able to confirm that calculation method of emission factor is consistent with the “Tool to calculate the emission factor for an electricity system”, version 7.0.

CCSC was able to confirm values applied in the calculation of the updated emission factors were in line with the 2011-2015 data on electricity generation, including renewable energy and electricity imports, and 2013-2015 data on fuel consumed, heating value of thermal power plants, net electricity generation, commissioned power plants in Turkey/15/.

With reference to the “Tool to calculate the emission factor for an electricity system”, the Simple OM emission factor ($EF_{grid,OM,y}$) of the Turkey Power Grid is calculated as 0.638 tCO₂e/MWh. Similarly, the build margin emission factor ($EF_{grid,BM,y}$) of the Turkey Power Grid is calculated ex-ante as 0.573 tCO₂e/MWh.

Therefore, the combined baseline emission factor is determined ex-ante and will remain fixed during the second crediting period, that is:

$$EF_{grid,CM,y} = 0.25 \times 0.638 + 0.75 \times 0.573 = 0.589 \text{ tCO}_2\text{e/MWh}$$

CCSC validation team hereby confirmed the original baseline scenario is still valid and the necessary data and parameters updates has been correctly conducted in the VCS-PD.

3.2.5 Additionality

According to the requirement of Section 3.8.5 of the VCS Standard Version 3.7, a full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with Section 4.6.3) and the project description shall be updated accordingly. As mentioned in above section, there has been no significant change in the relevant national and/or sectoral policies since the date of earlier registered VCS-PD till now, although national policies favor the development of renewable energy, electricity generated by fossil fuel based plants dominated the electricity supply. Hence, the Project is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, and systematically enforced law, statute or other regulatory framework. And the relevant updates, i.e. emission factors of the project electricity system, calculation of ERs have been correctly provided in the VCS-PD for the renewable of crediting period.

3.2.6 Quantification of GHG Emission Reductions and Removals

As per AMS-I.D (Version 18), baseline emissions are calculated as follows for the project activity with the installation of a Greenfield power plant:

$$BE_y = EG_{PJ,y} * EF_{grid,y} = EG_{PJ,facility,y} * EF_{grid,y}$$

Where:

Parameter	SI Unit	Description
BE_y	tCO_2e	Baseline Emission in year y
$EF_{grid,y}$	tCO_2e/MWh	Combined margin CO_2 emission factor for grid connected power generation in year y
$EG_{PJ,facility,y}$	$MWh/year$	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y

The emission factors for the project activity have been updated as per the “Tool to calculate the emission factor for an electricity system”, version 7.0. CCSC was able to confirm that calculation method of emission factor is consistent with the “Tool to calculate the emission factor for an electricity system”, version 7.0

CCSC was able to confirm values applied in the calculation of the updated emission factors were in line with the 2011-2015 data on electricity generation, including renewable energy and electricity imports, 2013-2015 data on fuel consumed, heating value of thermal power plants, net electricity generation, commissioned power plants in Turkey/15/, the IPCC default value, and efficiencies of thermal power plants are “Default value from Determining the baseline efficiency of thermal or electric energy generation systems(v02.0)”.

According to the “Tool to calculate the emission factor for an electricity system”, the default weights for geothermal power generation projects are as follows: $w_{OM} = 0.25$ and $w_{BM} = 0.75$. Therefore the combined margin emission factors is calculated as:

$$EF_{grid,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} = EF_{grid,OM,y} \times 0.25 + EF_{grid,BM,y} \times 0.75$$

With reference to the “Tool to calculate the emission factor for an electricity system”, the Simple OM emission factor ($EF_{grid,OM,y}$) of the Turkey Power Grid is calculated as 0.638 tCO₂e/MWh. Similarly, the build margin emission factor ($EF_{grid,BM,y}$) of the Turkey Power Grid is calculated ex-ante as 0.573tCO₂e/MWh.

Therefore, the combined baseline emission factor is determined ex-ante and will remain fixed during the second crediting period, that is:

$$EF_{grid,y} = 0.25 \times 0.638 + 0.75 \times 0.573 = 0.589 \text{ tCO}_2\text{e/MWh}$$

The calculation of project emissions

The project activity emissions are calculated as follows:

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

Where,

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO₂e/yr)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (tCO₂e/yr)

Project emissions from fossil fuel consumption are calculated as per Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (version 03.0) as follows:

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

Where:

$PE_{FF,j,y}$ Are the CO₂ emissions from fossil fuel combustion during the year y (tCO₂/yr)

$FC_{FF,i,y}$ Is the quantity of fuel type i combusted during the year y (mass or volume unit/yr)

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

i Are the fuel types combusted during the year y

The CO₂ emission coefficient $COEF_{i,y}$ can be calculated using Option B of the tool as follows

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

Where,

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

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

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

This project may use little diesel. It is considered as 0 in ex-ante calculation. The NCV and EF of diesel are from the IPCC default value. It is confirmed reasonable by the team.

This project is a binary but not dry, flash steam, thus, $PE_{GP,y}$ is calculated as follows:

$$PE_{GP,y} = PE_{binary,y} = PE_{steam,y} + PE_{working\ fluid,y}$$

Where:

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO₂e/yr)

$PE_{binary,y}$ = Project emissions from the operation of binary geothermal power plants due to physical leakage of non-condensable gases and working fluid in year y

$PE_{steam,y}$ = Project emissions from the operation of binary geothermal power plants due to physical leakage of non-condensable gases in year y.

$PE_{working\ fluid,y}$ = Project emissions from the operation of binary geothermal power plants due to physical leakage of working fluid contained in heat exchangers in year y

Based on the notarially certified statement of Menderes Geothermal Electric Üretim A. S., dated 9 January 2009, the raw gas from DORA-1 geothermal power plant have been utilized by a newly erected neighbouring LINDE GAZ A S. that belongs to LINDE GROUP. No leakage was released due to the flow in and out of the exchanger, thus the project emission of from the operation of

binary geothermal power plants due to physical leakage of non-condensable gases can be considered as 0.

The validation team checks AR4 of IPCC, and does not find the GHG info and GWP of pentane. Thus, the project emission of working fluid is not considered for the project.

Leakage

According to AMS-I.D. (v18.0), General guidance on leakage in biomass project activities shall be followed to quantify leakages pertaining to the use of biomass residues. This is not the case of the project, so leakage can be considered as 0.

LE_y= 0.

Emission reductions of the Project (Unit: tCO₂e)

Year	Estimated baseline emissions or removals	Estimated project emissions or removals	Estimated leakage emissions	Estimated net GHG emission reductions or removals
01/07/2018-31/12/2018	15,227	0	0	15,227
2019	30,206	0	0	30,206
2020	30,206	0	0	30,206
2021	30,206	0	0	30,206
2022	30,206	0	0	30,206
2023	30,206	0	0	30,206
2024	30,206	0	0	30,206
2025	30,206	0	0	30,206
2026	30,206	0	0	30,206
2027	30,206	0	0	30,206
01/01/2028-30/06/2028	14,979	0	0	14,979
Total	302,060	0	0	302,060

CCSC validation team verified the emission reductions calculation spreadsheet /6/ and confirms that the emission reductions of the project were reasonably estimated and correctly calculated.

The parameters namely, $FC_{i,y}$, $NCV_{i,y}$, $EF_{CO_2,i,y}$ and $EG_{m,y}$ were not included in section 4.1 of PD version 1.0. CAR-1 is therefore raised.

The parameters of $FC_{i,y}$, $NCV_{i,y}$, $EF_{CO_2,i,y}$ and $EG_{m,y}$ have been included in the updated PD.. The validation team checked the revised VCS-PD, and confirms all the data and parameters available at validation have been added in the VCS-PD. The CAR-1s is therefore closed.

3.2.7 Methodology Deviations

N.A.

3.2.8 Monitoring Plan

The VCS PD applies the approved consolidated monitoring methodology AMS-I.D Version 18.0. CCSC validation team confirmed that the selected monitoring methodology is applicable to the Project.

Data and Parameters Monitored

The main data that needs to be monitored ex-post is the amount of the electricity delivered to the Turkey power grid, which will be continuously monitored through electricity meters.

The project owner of the Project will keep copies of the electricity sales receipts, which have been verified by onsite assessment of previous verifications in the 1st crediting period. Receipts from electricity sales will be obtained for double checking.

Diesel Consumption will be calculated by the operating hours of the diesel generator engine and consumption rate of technical specification, which will be measured continuously, recorded monthly. The monitoring plan has been verified by review of the verification reports of the 1st crediting period.

CCSC validation team confirmed the monitoring plan contained in the VCS-PD version 2.0 dated 06/09/2018 is in accordance with the monitoring methodology and the monitoring plan contained in the registered VCS-PD. The monitoring plan will give opportunity for real measurements of achieved emission reductions.

Implementation of the Monitoring Plan

The quality assurance and quality control procedure has been clearly described in the revised VCS-PD. This includes description of the responsibilities, monitoring data, meters calibration frequency, data management system, QA/QC procedure, training and emergency procedures. And it is same with the one in the registered VCS-PD.

All the monitoring records, i.e. electronic data and documents, written data and documents will be regularly copied and archived, and kept at least for 5 years after the end of the crediting period.

The validation team considers that the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions achieved by/resulting from the Project can be reported ex post and verified.

CCSC validation team hereby confirms that the monitoring plan complies with the requirements of the methodology including applicable tool(s), the monitoring arrangements described in the monitoring plan are feasible within the initial design and the project owners are able to implement the described monitoring plan.

3.3 Non-Permanence Risk Analysis

As the Project is not an AFOLU project, the project activity does not require a non-permanence risk analysis.

4 SAFEGUARDS

4.1 No Net Harm

According to the VCS-PD, there is no potential negative environmental and socio-economic impact of the Project. CCSC validation team confirmed it by verifying the registered VCS-PD and the relevant validation report and the follow-up interview.

4.2 Environmental Impact

By checking the validation report of the 1st crediting period, an official document, dated 23 June 2003, stating the Exemption for Environmental Impact Analysis for the “Aydin Salavatli Dora-1 Geothermal Power Plant”, has been submitted to TÜV Rheinland. The potential environmental impacts have been sufficiently identified. The noise mitigation of the ORC plant itself is achieved by the installation of silencers inside the plant, which is part of the project design. CCSC confirmed the implementation of the measures by onsite interview.

4.3 Local Stakeholder Consultation

There is no mandatory requirement to conduct a local stakeholder consultation for small-scale geothermal projects in place in Turkey. The planned employment of local residents for the construction phase and the later operational phase could be verified. The overall positive impact of these measures could be confirmed during on-site inspection and interview.. It can be concluded that the project, which is located in the marginal lands of the villages, has no negative impacts on the residents of the villages. It was reported, that no further comments of local or global stakeholders to the project activity were received by the project proponents.

4.4 Public Comments

No public comment was received.

5 VALIDATION CONCLUSION

CCSC validation team has performed the validation of the renewal of the crediting period of “Aydin Salavatli Dora-1 Geothermal Power Plant”, which applied the methodology AMS-I.D Version 18.0. The validation was performed on the basis of VCS Standard version 3.7 and host country criteria and also on the criteria given to provide for consistent Project operations, monitoring and reporting.

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) follow-up interview with project stakeholders; iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

Through detailed analysis of the Project, it is concluded that the Project is likely to result in reductions of GHG emissions. The “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)” has been applied to demonstrate that validity of the Project’s baseline scenario. Emission reductions attributable to the Project are hence additional to any that would occur in the absence of the Project.

The validation covered all project components and issues that need to be validated for the renewal of crediting period as a VCS project. In our opinion, CCSC validation team hereby confirms that the Project correctly applied the baseline and monitoring methodology AMS-I.D Version 18.0 and meets the relevant VCS requirements for the renewal of the crediting period.

CCSC validation team hereby requests the renewal of crediting period of the Project. Provided that the project is implemented and maintained as designed, the Project is expected to achieve annual average emission reduction of 30,206 tCO₂e within the 2nd crediting period.

APPENDIX A: ABBREVIATIONS

Abbreviations	Full texts
AFOLU	Agriculture, Forestry and Other Land Use
BM	Build Margin
CAR	Corrective Action Request
CCSC	China Classification Society Certification Company
CDM	Clean Development Mechanism
CL	Clarification Request
CME	Coordinating/managing entity
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DOE	Designated Operation Entity
DNA	Designated National Authority
EB	Executive Board
EF	Emission Factor
EIA	Environmental Impact Assessment
ERPA	Emission Reduction Purchase Agreement
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
NGO	Non-governmental Organization
OM	Operating Margin
PD	Project Description
PP	Project Proponent

PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCU	Voluntary Carbon Unit
VVB	Validation / Verification Body

APPENDIX B: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS



Appendix 9

CERTIFICATE OF COMPETENCE

Date of issue: 16/10/2017

Mr. Li Xingtong

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- CDM validator for Technical Area(s): TA1.1/TA1.2/TA3.1/TA9.2/TA13.1
- CDM verifier for Technical Area(s): TA1.1/TA1.2/TA3.1/TA9.2/TA13.1
- ☐ Technical expert for Technical Area(s): _____

Huang ShiYuan
CCSC General Manager



Appendix 9

CERTIFICATE OF COMPETENCE

Date of issue: 16/10/2017

Mr. Yong Hanlin

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- CDM validator for Technical Area(s): TA1.1/TA1.2/TA8.1/TA10.1
- CDM verifier for Technical Area(s): TA1.1/TA1.2/TA8.1/TA10.1
- ☐ Technical expert for Technical Area(s): _____

Huang ShiYuan
CCSC General Manager



Appendix 9

CERTIFICATE OF COMPETENCE

Date of issue: 16/10/2017

Ms. Zheng Ling

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- CDM validator for Technical Area(s): TA1.2
- CDM verifier for Technical Area(s): TA1.2
- Technical expert for Technical Area(s): TA13.1

Huang ShiYuan
CCSC General Manager

APPENDIX C: DOCUMENTS REVISED OR REFERENCED

No.	Author	Title	References to the document	Provider
/1/	South Pole Carbon Management Ltd.	Registered VCS-PD	Dated 14/05/2008	Others
/2/	TÜV Rheinland	Validation report of the registered VCS-PD	Dated 15/01/2009	Others
/3/	South Pole Carbon Management Ltd. and Verification DOE	Monitoring reports, corresponding verification reports and VCS Project Review Report for the monitoring periods of the 1st crediting period	https://www.vcsprojectdatabase.org/#/project_details/120	Others
/4/	South Pole Carbon Management Ltd.	VCS-PD sent to CCSC to request a renewal of crediting period of the Project	Version 1.0 26/03/2018	Others
/5/	South Pole Carbon Management Ltd.	Final VCS-PD to request a renewal of crediting period of the Project	Version 2.0 06/09/2018	Others
/6/	South Pole Carbon Management Ltd.	Emission Reductions Calculation Spreadsheet	/	Others
/7/	South Pole Carbon Management Ltd. & MENDERES Geothermal Elektrik Üretim A.Ş.	Power Purchase Agreement	/	Others
/8/	CDM-EB	Methodology AMS-I.D	Version 13.0 Dated 14/12/2007	Others
/9/	CDM-EB	Methodology AMS-I.D	Version 18.0 Dated 28/11/2014	Others
/10/	VCS Board	VCS standard	Version 3.7 Dated 19/10/2016	Others
/11/	VCS Board	VCS validation and verification manual	Version 3.2 Dated 19/10/2016	Others
/12/	CDM-EB	ACM0002 - Grid-connected electricity generation from renewable sources Tool to calculate the emission factor for an electricity system Tool to calculate project or leakage CO2 emissions from fossil fuel combustion	Version 19.0 Dated 31/08/2018 Version 07.0 Dated 31/08/2018 Version 03.0 Dated 22/09/2017	Others

/13/	CDM-EB	Assessment of the validity of the current/original baseline and update of the baseline at the renewal of the crediting period	Version 03.0.1 Dated 02/03/2012	Others
/14/	VCS Board	VCS Project Description template	Version 3.3	Others
/15/	Turkey Electricity Transmission Company (TEIAS)	2011-2015 data on electricity generation, including renewable energy and electricity imports. 2013-2015 data on fuel consumed, heating value of thermal power plants, net electricity generation, commissioned power plants in Turkey	https://www.teias.gov.tr	/
/16/	/	Business license of the project owner	/	Others
/17/	/	Confirmation on avoiding double counting	/	PP

APPENDIX D: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

Draft report clarifications and corrective action requests by validation team	Summary of project proponent response	Validation team conclusion
CAR-1: The parameters namely, $FC_{i,y}$, $NCV_{i,y}$, $EF_{CO2,i,y}$ and $EG_{m,y}$ was not included in section 4.1 of PD version 1.0.	The parameters of $FC_{i,y}$, $NCV_{i,y}$, $EF_{CO2,i,y}$ and $EG_{m,y}$ have been included in the updated PD.	The validation team checked the revised VCS-PD, and confirms all the data and parameters available at validation have been added in the VCS-PD. The CAR-1 is therefore closed.