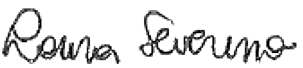




Validation report form for GS project activities (PCR)

VALIDATION REPORT

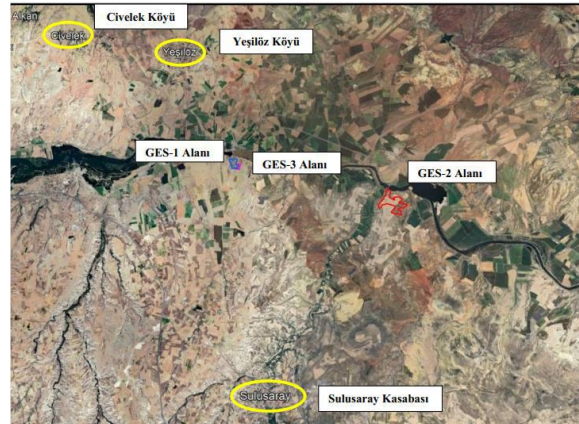
Title of the project activity	CEMEL HYDRO BUNDLE
Version number of the validation report	3.0Aa
Completion date of the validation report	22/10/2024
Version number of PDD to which this report applies	Version 0.9 of 07/10/2024
Version number of GS Passport to which this report applied	Not applicable
Project participant(s)	HGG Enerji Üretim A.Ş. (Project owner)
Host Party	Türkiye
Estimated annual average GHG emission reductions or net removals in the crediting period (tCO ₂ e)	38,859tCO ₂ (GS-VERs)
Sectoral scope(s) and selected methodology(ies)	Sectoral scope 1: Energy Industries (Renewable-/non-renewable sources) ACM0002: "Grid-connected electricity generation from renewable sources", version 21.0
Name of VVB	RINA Services S.p.A. (RINA)
Name, position and signature of the approver of the validation report	 Laura Severino (Authorized officer signing for the VVB) Decarb & Chain of Custody Product Management

SECTION A. Executive summary

Purpose and general description of the project

The Cemel HEPP project is a bundled a run-of-river type project located on Kızılırmak River, within the boundaries of Avanos district of Nevşehir province. The project is licensed in 14/12/2006 and in 09/02/2011 all the legal rights of the project is given to ZEYNEP ENERJİ ÜRETİM SANAYİ A.Ş. which later referred as HGG Enerji Üretim Anonim Şirketi for 44 years 11 months as per generation license /20/. The hydroelectric power plant is initially composed of: - Weir house - Derivation channel - Power House - Tail water channel.

On 28/09/2023, according to the board decision of EMRA, solar panels are going to be commissioned as auxiliary power unit. The location of the auxiliary unit relative to the villages nearby is shown below. As it can be seen there are three areas (SP AREA 1, 2 and 3) allocated for the auxiliary units i.e. solar panels.



According to EMRA Decision dated 28/09/2023 /21/, the installed capacity of the auxiliary solar unit is stated as 17.8310 MWm. According to Auxiliary Unit Feasibility Report /39/, the generation amount for the 13.90 MW is stated as 24.47 GWh. In this regard the generation amount for the 17.8310 MWm will be 26.17 GWh . Together with the auxiliary unit, the annual electricity generation reaches 100,12 MWh/yr (without capped) thus the project consists of 3 bundle project qualifies as a large-scale GS4GG project activity. The project will be connected to the National Grid by TEİAŞ Avanos-2 Substation.

Parameters	Before Design Change	After Design Change
Number of Facilities	HEPP Bundle (Cemel I HEPP, CEMEL II HEPP and Cemel III HEPP)	HEPP Bundle + SPP as an auxiliary unit
Capacity	21.6 MWm / 20.4 MWe	(21.6 MWm HEPP+17.8310 MWm SPP) total 39.4310 MWm / 20.4 MWe
Capacity (capped)		(21.6 MWm HEPP+4.32 MWm SPP) total 25.92 MWm / 20.4 MWe ¹
Annual Electricity Generation	73,950 MWh/yr	73,950 + 26,170=100,120 MWh/yr
Annual Electricity Generation (capped)		73,950 + 7,606=81,556 MWh/yr
Annual Emission Reduction (capped)	36,451 tCO ₂ e/yr over the crediting period of 01/07/2022 – 30/06/2029	38,859 tCO ₂ e/yr over the crediting period of 01/07/2022 –30/06/2029 and 40,200 tCO ₂ e/yr after design change

Regarding the capacity addition (design change) below timelines validated:

MILESTONE	DATE
Connection Agreement	20/03/2007
Preliminary EIA	16/11/2009
EIA Exemption Letter	04/06/2010
Water Right Utilization Agreement	05/11/2010
License Issuance	09/02/2011
Board Decision about carbon revenues	10/06/2011
Construction Subcontractor Agreement	13/07/2011
Start of Construction	27/07/2011
EM Equipment Purchase Contract	13/09/2011
Carbon Agreement	20/10/2011
Commissioning Date (Cemel I)	27/06/2013
Commissioning Date (Cemel II)	01/09/2013
Commissioning Date (Cemel III)	01/09/2015
First CP	01/07/2015 – 30/06/2022
First MP	01/07/2015 - 28/02/2017
Second MP	01/03/2017 - 31/05/2019
Third MP	01/06/2019 - 31/05/2021
Fourth MP	01/06/2021-30/06/2022
Company Name Change Decision	12/01/2021
Distribution System Utilization Agreement	24/03/2021
EIA Exemption Decision for the aux. unit	28/04/2022
Revised Connection Agreement	29/08/2022
Second CP	01/07/2022 – 30/06/2029
EMRA Decision	28/09/2023
Investment Decision for Design Change	FEBRUARY 2023
Stakeholder consultation meeting regarding the auxiliary unit	12/12/2023
Expected commissioning date of the auxiliary unit	DECEMBER 2024

The project type is HYDRO BUNDLE with solar panels which is an eligible project type as it is in accordance with Eligible Project Types & Scope under Renewable Energy Activity Requirements. The project is large scale retroactive project and GHG Emissions and Reduction & Sequestration product requirements have been applied. The project activity aims to reduce of fossil fuel demand as well as aims to support the local economy by creating employment and providing equipment locally.

The GHG benefit of the project activity was only accounted under Gold Standard. There are not any other RECs such as VERRA, GCC or Social Carbon were being issued for the project activity. Furthermore, as a host country in Türkiye such any programme like a government-regulated system or programme for the constraint and monetisation of GHG emissions (such as emissions trading scheme, cap and trade or carbon tax mechanisms) has not been implemented confirmed through the other standard portal.

Location

The project is located on Kızılırmak River, within the boundaries of Avanos district of Nevşehir province of Türkiye. The project is located 2 km away from the nearest village of Aladdin.

Scope of validation

The scope of the Validation is to have an independent evaluation of a project activity by a VVB against the GS4GG requirements and principles [/13/](#), on the basis of the PDD [/1/](#). Validation is a requirement and it is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of VERs and sustainability development.

Validation process

Validation is conducted using RINA procedures in line with the GS4GG requirements and principles and

applying standard auditing techniques. The validation assessment involved a document review of relevant documentation, the interview and/or on-site visit (or remote audit) and the reporting. Validation is not meant to provide any consultancy towards the project participants. However, stated request for clarifications and/or corrective actions may have provided input for improvement of the project design. DESIGN CHANGE REQUIREMENTS v 1.1 dated 14.04.2023 [/12/](#) has been followed to validate the design change of an already registered project activity.

Conclusion

RINA commissioned by HGG Enerji Üretim A.Ş. has performed the validation of the project activity “CEMEL HYDRO BUNDLE”, regarding the relevant GS4GG requirements and principles for project activities.

In conclusion, it is RINA's opinion that the project activity “CEMEL HYDRO BUNDLE”, in “Türkiye”, as described in the PDD version Version 0.9 of 07/10/2024 [/1/](#) meets all relevant requirements for GS activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology “ACM0002”, “Grid-connected electricity generation from renewable sources”, version 21.0 of 02/11/2022 [/7/](#).

SECTION B. Validation team, technical reviewer and approver

B.1. Validation team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)	Involvement in			
						Desk review	Onsite inspection	Interview(s)	Validation findings
1.	Team Leader, Validator, Technical Expert TA 1.2	IR	ERDOĞAN	Mehmet	RINA Turkey	✓	✓	✓	✓
2	Financial Expert	ER	Milkov	Viktor	Bulgaria	✓			✓

B.2. Technical reviewer and approver of the validation report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)
1.	Technical reviewer	IR	Amalorpavanathan	Cyril A A	RINA India
2.	Approver	IR	SEVERINO	Laura	RINA HO

SECTION C. Means of validation

C.1. Desk review

The PDD version Version 0.9 of 07/10/2024 /1/ and previous versions, in particular the applicability of the methodology, the baseline determination, the additionality of the project activity, the starting date, the project eligibility, the monitoring plan, the sustainability indicators, the stakeholder consultation, the emission reductions calculation /2/ were assessed as part of the validation. All documents reviewed or referenced during the validation are listed in Appendix 3.

C.2. Onsite inspection

Duration of on-site audit: 25/01/2024				
No.	Activity performed on-site	Site location	Date	Team member
1.	- Implementation and operation of the proposed project activity; - Baseline and Additionality - Emission reductions calculations - Interviewed key personnel of the plant to confirm the operational and data collection procedures; QA QC procedures - GS Sustainable Indicators - Local stakeholder consultation - Safeguarding Assessment - Compliance with legislation - Sustainable development criteria	Onsite Audit	25/01/2024	Mehmet ERDOĞAN

C.3. Interviews

No	Interview				Date	Subject	Team member
	Last name	First name	Gender	Affiliation			
1	S.	Hüseyin	M	HGG Enerji General Man.	25/01/2024	Description of the project activity, Baseline and Additionality, Emission reductions calculations, Monitoring plan and monitoring arrangements, GS Sustainable Indicators (SDGs), Local stakeholder consultation, Environmental and social impacts	Mehmet ERDOĞAN
2	A.	Cengiz	M	HGG Enerji Facility Man.			
3	Ş.	İsa	M	HGG Enerji Market Ex.			
4	U.	İsmail	M	HGG Enerji Electrical Tec.			
5	E	İsmet	M	HGG Enerji Operator			
6	B.	İlhan	M	Alaaddin Hometown Stakeholder	25/01/2024	Benefit of the project to the village Grievance/ Input Mechanism Level of Noise Excavated soil Dust emission SDG Impacts	Mehmet ERDOĞAN
7	Z.	Ekrem	M	Alaaddin Hometown (Avanos) Stakeholder			
8	A.	Mithat		Alaaddin Hometown Stakeholder			

During onsite audit, Mukhtar and stakeholders of Alaaddin village were interviewed. They all defined that they have no complaints about the project activity. They confirmed that no dust or noise emission, no excavation soil have been occurred. A logbook was left to the mukhtar and VVB has seen the logbook with no negative comments inside. In addition, mukhtar confirmed that they could reach the project owners by phone when needed. Around 28 people will be employed and this will contribute to the local economy. Logbook /14/ stays at village Mukhtar and stakeholders can also call the PP when needed. Communication is good.

Team has carried out interviews with relevant personals to verify the implementation and operation of the GS project activity as per the prepared PDD or any supporting documentation. It is verified that stakeholders are so satisfied because roads goes to project site is extended and improved.

Key supporting documents such as the EIA report /23/ and license were evaluated. Further, picture of monitoring meters, and other relevant background documents were provided and assessed.

In addition to this during interview, it is asked to the stakeholders and project employee if any legal contests or disputes have arisen during the monitoring period and they confirmed that there is no legal contest or disputes have arisen.

C.4. Sampling approach

There is no sampling approach applied.

C.5. Clarification requests, corrective action requests and forward action requests raised

Areas of validation findings	No. of CR	No. of CAR	No. of FAR
Project design document			
Description of project activity			1
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	1		3
- Deviation from methodology			
- Clarification on applicability of methodology, tool and/or standardized baseline		1	
- Project boundary			
- Establishment and description of baseline scenario			
- Project eligibility			
- Demonstration of additionality			
- Sustainability assessment			
- Emission reductions			
- Monitoring plan			
- Sustainability Monitoring plan		1	
Duration and crediting period			
Environmental impacts		1	
Local stakeholder consultation			
Pre-feasibility assessment		1	
Others (please specify)		1	1
Total	1	5	5

SECTION D. Validation findings**D.1. Project design document**

Means of PCR	The title of the project activity is defined as “CEMEL HYDRO BUNDLE” in the PDD version Version 0.9 of 07/10/2024 /1/ which is in line with the GS4GG Registry. The version and the completion date of the report are available at the cover page of the PDD. “GS4GG Project Design Document Template /11/ , version 1.5” which is the version approved at validation.
Findings	NA
Conclusion	RINA confirms that the PDD is based on the currently valid GS4GG Project Design Document Template /11/ , version 1.5.

D.2. GS Passport

Means of PCR	No GS Passport is available under GS4GG.
Findings	NA
Conclusion	No GS Passport is available under GS4GG.

D.3. Description of project activity

Means of PCR	The current project activity is a Hydro Bundle with a capacity of 21.6 MWm / 20.4 Mwe as confirmed through the generation license /20/. The design change of project involves solar power panels which will be located three areas (SP AREA 1, 2 and 3) and a total capacity of 17.8310 MWm. According to Design Change Requirements Version 1.1 %20 cap rule is applied so (21.6 x 0.2) 4.32 MW of the SPP can be claimed. According to Feasibility Report of the auxiliary unit /39/ Capped capacity of 4.32 MW corresponding to 7,606 MWh/year. Together with the auxiliary unit, the annual electricity generation reaches 81,556 MWh/yr. The acceptance of auxiliary units were expected in December 2024 but not realized yet. The project will be connected to the National Grid by TEİAŞ Avanos-2 Substation. The net electricity production is 81,556 MWh and according to the recalculation of the emission factor, the annual emission reductions are estimated to be 4tCO₂ per year and 38,859 tCO₂ over the CP and 40,200 tCO₂ after design change. The latitude and longitude of the Hydro Bundle plants with auxiliary units is presented in the PDD /1/.
Findings	NA
Conclusion	RINA confirms that the given explanation of project activity provided in PDD is in accordance with what was checked during the audit and based on the above referred documents.

D.4. Application of selected baseline and monitoring methodology

D.4.1. Applicability of methodology

Means of PCR	The project correctly applies the approved baseline and monitoring methodology “ACM0002”, “Grid-connected electricity generation from renewable sources”, version 21.0 of 02/11/2022 /7/ as indicated in the PDD /1/. The applied methodology is approved by CDM and the applied version is the latest version at the time of PDD submission. The project activity is a greenfield, grid connected renewable electricity generation project. • The project activity is the installation of Hydro Bundle plants with auxiliary units. • The project does not involve capacity addition, a retrofit of (an) existing plant(s) or a replacement of (an) existing plant(s). • Project activity does not involve switching from fossil fuels to renewable energy sources at the site of project activity. • The project does not involve combined heat and power generation activity. • The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available. According to applicability conditions given in the tools; • Tool 01 Tool for the demonstration and assessment of additionality: The project uses relevant tool together with ACM0002 methodology. No new methodology is used. • Tool 07 Tool to calculate the emission factor for an electricity system: This tool is applicable and used for the calculation of OM, CM and CM since the project activity includes grid power plants and supplies electricity to the grid. Applicability of the methodology does not change with the additional auxiliary units.
Findings	NA
Conclusion	RINA confirms that the selected baseline and monitoring methodologies have been previously approved by the CDM Executive Board and are applicable to the project, which complies with all the applicability conditions therein the selected versions are valid at the time of submission of crediting period. It is also confirmed that the methodologies are correctly applied by comparing them with the actual text of the applicable versions.

D.4.2. Deviation from methodology

Means of PCR	There is no deviation from methodology “ACM0002: Grid-connected electricity generation from renewable sources”, version 21.0 of 02/11/2022 /7/ .
Findings	NA
Conclusion	RINA verified that no deviation from methodology is available.

D.4.3. Clarification on applicability of methodology, tool and/or standardized baseline

Means of PCR	The project correctly applies the approved baseline and monitoring methodology “ACM0002: Grid-connected electricity generation from renewable sources”, version 21.0 of 02/11/2012 /8/ as indicated in the PDD /1/. The applied methodology is approved by CDM and the applied version is the latest version at the time of PDD submission. The following tools are applied: 1. Tool for the demonstration and assessment of additionality (version 7.0 of 23/11/2012); /10/ 2. Tool to calculate the emission factor for an electricity system (Version 07.0.0); /8/.
Findings	NA
Conclusion	RINA verified that the baseline was updated assessed according to the tool “Tool for the demonstration and assessment of additionality” (Version 07.0) /10/ .

D.4.4. Project boundary

Means of PCR	The project boundary clearly defined in accordance with the applied methodology, According to the approved baseline and monitoring methodology “ACM0002: Grid- connected electricity generation from renewable sources”, version 21.0 of 02/11/2022 /7/ the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project is connected to. A flow diagram of the project boundary, physically delineating the project activity is presented in the PDD /1/. The source of baseline emission CO₂ emissions is included in baseline calculation since fossil fuels fired for electricity generation. CH₄ and N₂O emissions are neglected regarding to the methodology. Project emissions are neglected regarding to the methodology since the project activity is a Hydro Bundle plants with auxiliary units. The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available in the PDD /1/ in accordance with the “Tool to calculate emission factor of electricity system” /8/. KMZ file include Hydro Bundle plants and auxiliary units (SP1-SP2 and SP3) are provided to VVB /19/.
Findings	NA
Conclusion	RINA confirmed that the project boundary is clearly defined and in accordance with the applied methodology, ACM0002. /7/.

D.4.5. Establishment and description of baseline scenario

Means of PCR	The baseline scenario for the project activity is already defined in the applied methodology. According to the approved methodology ACM0002 /7/, the baseline scenario is defined 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” is in line with the PDD /1/. Since the baseline is defined by the approved methodology, no further analysis is requested.
Findings	NA
Conclusion	RINA confirmed that the project boundary is clearly defined and in accordance with the applied methodology, ACM0002 /7/.

D.4.6. Proof of project eligibility

Means of PCR	GENERAL ELIGIBILITY CRITERIA: Scale of the project activity: Project activity falls under large scale project activity. Before and after the capacity addition, scale does not change. The total installed capacity of the project is more than 15 MW and therefore, falls under large-scale project activity. Host country or State: The project's host Party is Türkiye and eligible as per Gold Standard. Eligibility project type: The proposed GS project activity falls under ‘renewable energy activities’ as it involves hydroelectric power plant and solar panels to deliver mechanical energy. Greenhouse Gases: CO₂ is considered in the project activity and the same is eligible under Gold Standard. Legal Ownership: Legal ownership of the GS carbon credit generated from the project activity belongs to HGG Enerji Üretim A.Ş. Official Development Assistance (ODA) Declaration: The project does not involve any ODA. Therefore, the proposed project activity is deemed to be eligible under gold standard GS4GG.
Findings	NA
Conclusion	RINA hereby confirms that the selected baseline and monitoring methodology has been previously approved by the CDM Executive Board and allowed the use of GS Board, and is applicable to the Project, which complies with all the applicability conditions therein and the selected version is valid at the time of submission of the proposed project activity for registration. It is also confirmed that the methodology is correctly applied by comparing it

	with the actual text of the applicable version of the methodology.
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D.4.7. Demonstration of additionality and conservativeness

Means of PCR	Choice of approach For the demonstration of additionality the PP has used the “Tool for the demonstration and assessment of additionality”, version 07.0.0 /10/, choosing Investment Analysis, Option III: Benchmark analysis as appropriate for the project since the project generates financial and economic benefits through the sales of electricity generating other than Voluntary Emissions Reductions (VER) related income (and hence the “Simple Cost Analysis” is not applicable). Rejecting Investment comparison analysis as a method is in line with the Methodological tool 027: Investment analysis (ver.12) /30/ – the baseline scenario is the continuation of electricity supply from the existing power grid to meet the electricity demand rather than a new power investment project, hence investment comparison analysis is not appropriate. The investment analysis has been carried out in accordance with the specific guidance of the EB (Methodological tool 027: Investment analysis (ver.11) /30/), which could be verified by checking the spreadsheet provided by the project participant /03/. It could be verified that the cash flow calculation had the right structure, is complete, and is accurate. All the formulas in the spreadsheet are readable, relevant cells are viewable and unprotected. The present report refers to a design change of the initially validated hydro power plant project. The investment analysis applied to demonstrate project's additionality after the design change follows the requirements of CDM Annex 67- Guidelines on assessment of different types of changes from the project activity /28/ and GS4GG Design Change Requirements /12/ namely: - The additionality of the project activity established at the time of registration reflect specific conditions applicable to the project activity (investment/costs variables, barriers, relevant regulations) at the time when the decision to proceed with CDM took place. Therefore when project has not been implemented as described in the PDD, these conditions may change and the additionality of the project activity should be re-assessed; - The re-assessment of additionality shall be based on all original input data, thereby – in case of investment analysis – in principle only modifying the changed key parameters in the original spreadsheet calculations. In order to crosscheck and verify the correctness of the project's additionality demonstration after the change of design the audit team assessed the applicability of the approach according to the GS4GG Design Change Requirements, v. 1.1 dated 14/04/2023 /12/. The applicability was confirmed. Benchmark selection As stated above the Project Proponent used a benchmark defined according to the requirements of the Tool for the Demonstration and Assessment of Additionality ver. 07.0.0 /10/ - Sub-step 2b: Option III. Apply benchmark analysis and Tool 27, ver.12 /30/ -Investment Analysis. The benchmark had been defined as 15% following the estimation in the World Bank Report for Turkey #:ICR00004069, p.40 /38/ which is acceptable because according to Tool 27- Investment Analysis /30/, benchmark can be derived from “Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds”. The benchmark presented in the above Report /38/ is the recommended equity IRR after taxes for hydro power plant projects. The benchmark had been validated for the initial project and was applied to the design change. The benchmark of 15 % (equity, after taxes) is confirmed. Choice of financial indicators
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The PP has identified the equity IRR post-taxes as the most suitable financial indicator for the project.

The equity IRR of 6.04% post-tax is calculated based on the input parameters that are the latest available at the time of the investment decision taking which is 12/07/2011 (the date of construction agreement of HEPP) as validated in the initial approved Validation report.

The IRR is calculated for 44 years which is in line with the recommendations of Methodological tool 027: Investment analysis (ver.12) /30/ and the Methodological Tool "Tool to determine the remaining lifetime of equipment"/15/.

The fair value of the equipment is estimated as 0 because at the end of the license period the project is delivered to the state free of charge.

The PDD is developed and presented to GS4GG for certification of the design change that the project performed after the validation of the initial PDD.

In order to re-assess the additionality of the project the investment analysis provided in the initial PDD and approved by GS4GG has been revised by modifying the key parameters in the original spreadsheet calculations affected by the proposed or actual changes to the project.

Input parameters

RINA has validated the input parameters used in the investment analysis and the following steps have been followed to assess the investment analysis:

Assessment of the sources used for input parameters. All general input parameters used in the financial analysis are taken from publicly third party sources available /28/ /29/ /31/ /32/ /33/ /34/ /35/ /39/ and thus considered information provided by independent and recognized sources.

RINA compared the input parameters for the financial analysis included in the PDD /1/ and in the IRR spreadsheet /3/ with the parameters stated in the publicly third party sources listed above and was able to confirm that the values applied are consistent with the values stated in the document mentioned before.

All the data used for the investment analysis had been available at the time of the investment decision, which is stated as the date of construction agreement of HEPP (13/07/2011).

The PDD /01/ and the investment analysis calculation spread sheet /03/ presented the input parameters, as follows:

Parameters	Unit	Data Value
Installed Capacity After Design Change (HEPP)	MWe	20.4
Installed Capacity After Design Change (Solar)	MWm	17.8310
Grid Connected output (HEPP)-capped	GWh	73.95
Grid Connected output After Design Change	GWh	81.56
HEPP - Capital Investment (ex-VAT)	Million \$	51.906
SPP – Capital Investment	Million \$	8.934
HEPP - OPEX	\$/year	1,152
SPP - OPEX	\$/year	178
Expected Tariff	\$ Cents/kWh	7.3
Initial Project Design - Equity	%	100
Extension - Equity	%	100
Depreciation - HEPP	years	50
Depreciation - SPP	years	10

Following the recommendations of CDM Annex 67- Guidelines on assessment of different types of changes from the project activity /28/ and GS4GG Design Change Requirements /12/ the audit team assessed the input parameters modified for the design change and crosschecked them against the available references and public sources. The results of the assessment are the following:

1. Installed capacity of the solar plant: 17.8310 MWm. The extension of the project that is regarded as a design change envisages the installation of a photovoltaic park with the referred installed capacity. The value has been crosschecked by studying the following documents:

- Distribution System Connection Agreement with the distribution company Meram Elektrik Dagitim A.s., dated 29/08/2022 [/37/](#);
- Distribution System Usage Agreement with the distribution company Meram Elektrik Dagitim A.s., dated 24/03/2021 [/38/](#);
- PV Simulation Report prepared by a third party PVsyst, dated 13/04/2023 [/39/](#);
- Generation License-initial [/20/](#).

The installed capacity of the HEPP remains the same as in the validated PDD – 20.4 MWe.
The installed electric energy generation capacity was verified and confirmed.

2. Net total output after the design change: 81.56 GWh/year. The design change suggests an additional electric energy generation by the solar park of 26.17 GWh/year but the reported generation is capped at 7.606 GWh/year for the purposes of the GS4GG project. The value has been crosschecked by studying the following documents:

- Distribution System Connection Agreement with the distribution company Meram Elektrik Dagitim A.s., dated 29/08/2022 [/37/](#);
- Distribution System Usage Agreement with the distribution company Meram Elektrik Dagitim A.s., dated 24/03/2021 [/38/](#);
- PV Simulation Auxiliary Unit Feasibility Report prepared by a third party PVsyst, dated 13/04/2023 [/39/](#);
- Generation License-initial [/20/](#).

The generation of the HEPP is capped to remain the same as in the validated PDD – 73.95 MWh/year.

The estimated output of electric energy was verified and confirmed.

3. Investment in the PV installation: 8,934,000.00 US\$:

The amount of investment for the building of the PV park has been estimated based on Auxiliary Unit Feasibility Report [/41/](#), dated 11/2022.

In order to crosscheck the amount of the Investment costs and to compare the estimated value of the investment with other sources the audit team studied the “U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks” report, dated 09/2022, prepared by Ragnesh Rawasamy and colleagues [/40/](#).

4. The price of electric energy, set for the project at 7.3 UScents/kWh for the whole investment analysis period as validated in the initial PDD.

According to the local regulations the feed-in tariff of the electric energy generated by PV installations and HEPP is the same.

The estimated price of the electric energy was confirmed by studying the websites of the government [/29/](#) [/31/](#) [/32/](#).

5. O&M costs. The additional O&M expenses for the solar park are estimated at 178,000 US\$/year.

Publicly available resources available at the time of investment decision date have been used to estimate operational costs of the PV plant, namely the “U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks” report, p.53, dated 09/2022, prepared by Ragnesh Rawasamy and colleagues [/40/](#).

The audit team studied the referred report and verified the estimated value.

6. Depreciation rate: The rate is set at 50 years for the construction and electromechanical equipment and 10 years for the solar equipment. At the end of the period the electromechanical equipment is depreciated completely and the fair value is 0 because all installation will be delivered to the state, as verified for the initial PDD.

In order to verify the values used the audit team studied the available public sources [/33/](#) [/34/](#). The rate was confirmed.

7. Equity/Loan ratio: The IRR of the initial project had been calculated and validated assuming a 100% equity capital. As no loan agreement has been signed yet for the additional solar plant implementation a 100% equity have been applied for calculation of the IRR of the changed project too. The same was verified and confirmed by the audit team by studying the validated PDD and IRR calculation sheet of the initial project

The remaining parameters of the Investment analysis are unchanged compared to the initial IRR calculation spreadsheet and the PDD and need not to be assessed once again.

Calculation and conclusion

The equity IRR calculation after taxation was provided in a spreadsheet [/3/](#). The calculations were verified and found to be correct by RINA as well as the assumptions used in the calculation were deemed to be correct. The equity IRR after taxes without VER revenues is 6.04%, which confirms that the proposed project activity in absence of the VER benefits and compared to the benchmark IRR of 15.00 % is not financially attractive.

The investment analysis and sensitivity analysis results in the following results:

Scope of Analysis	Project IRR Calculated after taxes	Benchmark
Base Case	6.04%	15.00%

Sensitivity analysis

The following parameters that constitute more than 20% of the total revenues/costs have been identified and taken into account in the sensitivity analysis:

- Production expenses
- Electricity generation
- Electricity price

The sensitivity analysis has been performed with a range of +/-15% for all parameters identified which is in line with the Tool27: Investment analysis [/30/](#) and for that type of projects.

The sensitivity analysis results are as follows (VER revenues excluded):

% Fluctuation	-15	-10	-5	0	+5	+10	+15
Investment Cost	6.68%	6.46%	6.24%	6.04%	5.84%	5.66%	5.47%
Operating Cost	6.64%	6.44%	6.24%	6.04%	5.84%	5.65%	5.45%
Electricity Income	4.56%	5.07%	5.56%	6.04%	6.51%	6.97%	7.42%

The probability assessment of the Investment analysis is summarized below:

Parameter	Changes/variation	Probability of the situation
Investment cost	+/- 15%	In order to breach the benchmark IRR (15%), the investment cost shall decrease by more than 105% which is not possible.
O&M expenses	+/- 15%	The O&M expenses have very small influence in reaching the benchmark and that is unlikely to happen having in mind that the trend of those expenses is to increase with time. The IRR calculations show that even if the O&M expenses decrease to 0 the IRR cannot reach the benchmark.
Electricity Income	+/-15%	The electricity revenue depends on two factors: electricity price and electricity generation. Both factors have substantial influence on the IRR and their variation give equal results and can be regarded as one parameter. The electricity generation is based on the Energy Yield assessment reports based on records of water flow for a long period of time (~50 years) and big fluctuations are not probable to happen. In order to reach the benchmark the energy production has to increase with more than 100% which is not a credible scenario. The PP uses a constant value of 7.3 for HEPP and 7.3 for Solar because that was the feed-in tariff for RES (HEPP and Solar) projects in Türkiye. The probability of a considerable increase of the energy price for that long period of time very low. In order to reach the benchmark the average

		electricity price has to increase to 14.5 UScents/kWh. In this respect the probability of the electricity revenue to increase that much in a long-term perspective can be considered low. An eventual decrease of the electricity price may not be considered because in that case the IRR of the project will go down.	
	The calculations in the IRR spread sheet /3/ were verified and found to be correct. The assumptions used in the calculations have been found to be correct too. The benchmark and the equity IRR after taxes of the project are approved by the auditing team. Based on the information verified, RINA was able to confirm that the input parameters used in the investment analysis are reasonable and adequately represent the economic situation of the project activity at the time of the investment decision. Common Practice Analysis According to the methodological tool for the Demonstration and Assessment of Additionality /10/ and Tool 24: Common Practice, Ver.3.1 /43/, the stepwise approach for common practice analysis have been conducted applying the following steps: Step 1: The applicable output range is calculated as +/-50% of the capacity of the project activity in line with the tool. The installed capacity of the proposed project activity is 24 MWe. Therefore, the lower limit of the applicable output range is 10.20 MW and upper limit is 30.60 MW. However, the proposed project is a large scale project i.e., the electrical capacity of the bundle is larger than 15 MWe. In this regard, the projects with electrical capacity greater than 15 MWe are selected. Step 2: Start date of project activity is February 2023 as per Solar Panel Agreement. Therefore, all the compared power plants have been operational before the implementation of the project activity. The most up- to-date list of the plants operating in Turkey have been developed on the list of existing projects given by Annex-I in the TEIAS Capacity projection report was considered. All the plants chosen produce electricity. The plants whose capacities are between 15 MW and 30.60 MW were included. The projects which has the same measure and company type are included in the list. Step 3: The projects registered as VER projects and projects under validation are excluded. The number of remaining power plants, Nall, is 32. Step 4: Among the Nall projects, wind projects were excluded because they have a different technology. Therefore, the number of Ndiff is 27. Step 5: The factor F defined in the guideline is calculated with the formula below: $F = 1 - Ndiff/Nall$ $F = 1 - (27/32) \quad F: 0.16 < 0.2$ Nall-Ndiff: 5 The proposed project activity is a “common practice” within a sector in the applicable geographical area if the factor F is greater than 0.2 and Nall-Ndiff is greater than 3. Since Nall-Ndiff is greater than 3, and while F is less than 0.2, the proposed project activity is not a “Common Practice”. Therefore,		
Findings	NA		
Conclusion	RINA confirmed that the additionality of the project had been established applying the “Tool for the demonstration and assessment of additionality” (Version 7.0) /10/. RINA confirmed that the project has a continuous financial need and that the funding obtained from the Gold Standard Certification is important for the ongoing sustainability of the project. The changes in design (increase in capacity) does not affect the additionality of the project.		

D.4.8. Sustainability assessment

Means of PCR	As per GS4GG Safeguarding principles and requirements version 1.2 of October 2020, all projects shall conform to the Gold Standard for the Global Goals Safeguarding Principles & Requirements. The assessment is done as follows: <u>Principle 1- Human Rights:</u> The project does not respect internationally proclaimed human rights and is not complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights. Türkiye has ratified European Convention on Human Right on 10/03/1954. Therefore, the project is not expected to violate the rules regarding human rights. <u>Principle 2 – Gender Equality and Women’s Rights:</u> Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women’s employment; and also has ratified European Convention on Human Right in 10/03/1954, which includes the right to life as well as prohibition of torture, slavery, discrimination and forced labor. The project outputs serve everyone without regarding gender. It provides electricity for all. <u>Principle 3 – Community Health, Safety and Working Conditions:</u> Turkey has ratified ILO convention 155 and about work safety and precautions. EIA not necessary decision is seen for HGG Enerji Üretim A.Ş. auxiliary units. So it is not expected for the project to cause noise and dust problems. <u>Principle 4 – Cultural Heritage, Indigenous Peoples, Displacement and Resettlement:</u> No sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture were observed in the project area. For the project resettlement is not required. The land consists of agricultural land. The project area (including transmission line) was expropriated from private owners. <u>Principle 5 – Corruption:</u> Türkiye has ratified several conventions on bribery and corruption including OECD and UN conventions. <u>Principle 6 – Economic Impacts:</u> The project activity does not have any restrictions on employees’ freedom. Turkey has ratified ILO convention 29 and 105 on forced and compulsory labour. Turkey has also ratified ILO 87 and 98 conventions on establishing and joining labour organizations. All staff recruited are employed according to the national legislations. During the construction and operation phases, local people will have priority in terms recruitment. Turkey has also ratified ILO 182 Convention about Child Labour. All ratified ILO Conventions will be complied with during the Project activities. Plus, the project owner is committed to the safe and healthy working conditions during all phases of the project. All employees will attend trainings on first aid and health & safety. For positions that require specific skills (such as high voltage equipment) staff will either be trained or certified staff will be recruited. The project owner is also committed to ensuring that the staff receive their full salaries on time. All employees will be trained and certified for the required positions. All employees will attend training courses on first aid and health & safety. Training Records (including H&S) & Other Certificates are required for certain professions. HSE records will be kept in case of any injury happened on-site. For positions that require specific skills (such as high voltage equipment) staff will either be trained, or certified staff will be recruited. HSE records will be kept annually and provided if there is any injury at the site. The training programs help increase the efficiency of the workforce and provides employees skilled at their job. This not only helps the company but to self-improvement of individual employees. Working hours of the employee will also be checked in order to see whether they are appropriate as stated in GS4GG SG Principles (not exceeding 48 hours per week on a regular basis). HSE records will be controlled whether any fatal or non-fatal injuries happened in the relevant monitoring period. <u>Principle 7 – Emissions & Energy Supply:</u> The project helps to reduce GHG emissions by producing green energy. Since it is a Hydro
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	Bundle plants and auxiliary units, the project is expected to have a positive impact on Climate Change by eliminating fossil fuels. The Project will not affect the availability and reliability of energy supply to other users. Project does not use any local fuel resource. It is connected to the national grid and supply 81,556 MWh per year additional energy to the grid. Internal consumption which indicates the usage in the project site will be read from monthly records taken from the meters. <u>Principle 8 – Impact on Natural Water Patterns/Flows & Erosion and/or Water Body Instability:</u> According to the Environmental Impact Assessment (EIA) /23/, in construction phase 40 person and in operation phase 5 person will be employed so person will need potable water and domestic water will be used by workers also domestic water will be used for cleaning purpose of panels. Project does not affect the natural or pre-existing pattern of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity. According to the Environmental Impact Assessment (EIA) /23/, the project does not directly or indirectly cause harm on soil and water. <u>Principle 9.1 – Landscape Modification and Soil:</u> Auxiliary units will be located in agricultural land determined by national legislation. <u>Principle 9.2 – Vulnerability to Natural Disaster:</u> Avanos district and the project site are not in critical earthquake zones determined by the General Directorate of Disaster Affairs. All the design and construction works will be performed in accordance with Regulation on Buildings Constructed in Earthquake Zones. The parameter will be monitored once in the monitoring period to confirm construction completion, which is only possible if the construction is successful and complies with all laws and regulations. Construction Compliance Report was submitted to VVB. This principle will be monitored in the first monitoring period only. <u>Principle 9.4 – Release of pollutants:</u> Domestic waste water and is expected during construction and operation periods. All wastes are handled according to the national regulations. Appropriate disposal of wastewater as required by the Law on Water Pollution Control. Waste collection methods during site visits will be assessed and waste disposal records will be checked. <u>Principle 9.5 – Hazardous and Non-hazardous Waste:</u> Project is expected to create solid, liquid and particulate wastes/emissions during its construction. Hazardous wastes are also expected such as waste oils in the construction and operation period. According to EIA Report for SPP, solid wastes including paper, glass, plastic, scrap metal and similar wastes will not be disposed to any receiving environment. The provisions of the "Waste Management Regulation" will be complied with and the wastes will be sent to the nearest licensed hazardous waste recovery facility or will be sent to a licensed hazardous waste disposal facility for disposal. <u>Principle 9.7 – Harvesting of Forests:</u> There is forest area in the project site. <u>Principle 9.10 – High Conservation Value Areas and Critical Habitats:</u> There are no national parks, natural parks, natural protection areas, wildlife protection areas as declared in accordance with the Turkish national legislation <u>Principle 9.11 – Endangered Species:</u> According to the Environmental Impact Assessment (EIA) /23/, No endemic, endangered and or threatened flora and fauna species were identified in the project site and its vicinity. No endemic, endangered and or threatened flora and fauna species were identified in the project site and its vicinity. It will be ensured that the project does not create disturbance to the regional habitat by regular site vetting for bird/bat nests and carcasses and recording of the same will be performed along for the ornithological monitoring. Verification of these parameters will be carried out once in every monitoring period. The addition of capacity does not affect the projects impact on safeguards.
Findings	NA

Conclusion	RINA confirms that conservative approach has been applied by PP to demonstrate sustainable development of the project activity which is in line with GS4GG requirements. According to EIA report it is expected that project's effect is limited.
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D.4.9. Emission reductions

Means of PCR	The calculation of baseline emission reductions is carried out in a conservative manner providing documentation and references to data sources. An approved CDM methodology, ACM0002 /7/ and methodological tool "Tool to calculate the emission factor for an electricity system /8/ is applied. Baseline Emissions are calculated via formula: $BE_y = EG_{PJ,y} \times EF_{CM,y}$ Emission factor for the baseline scenario which was calculated by the Ministry of Energy and Natural Resources (released on 06/10/2021) for using data of year 2019 has been used. CM is 0.4929 tCO₂/MWh. The combined Margin is calculated for HEPP and solar power generation project activities: WOM = 0.25 and WBM = 0.75 for the second crediting period and for subsequent crediting periods /44/. Project emissions are neglected since the project activity is a HEPP power plant in line with the ACM0002 /7/. The leakage emissions are neglected as per ACM0002 /7/ because the power density is greater than 4 W/m² $D = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$ Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W) Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero A_{PJ} = Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m²) A_{BL} = Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m²). For new reservoirs, this value is zero $D = \frac{20,400,000 - 0}{0 - 0}$ No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected. Also the energy generating equipment is not transferred from or to another activity. Therefore leakage is considered as "0". according to para 53 of ACM0002 v 21.0. The ex-ante emission reduction has been calculated as following equation in line with the ACM0002 /7/: $ER_y = BE_y - PE_y - LE_y$ The project leakage emissions are zero for the project activity. Therefore, the emission reduction equals to baseline emissions. $CM = (OM \times 0.25) + (BM \times 0.75)$ $(0.7258 \times 0.25) + (0.4153 \times 0.75) = 0.4929 \text{ tCO}_2/\text{MWh}$ $BE_y = 81,556 \text{ MWh} \times 0.4929 \text{ tCO}_2\text{e}/\text{MWh} = 40,200 \text{ tCO}_2\text{e}$ after design change. All the assumptions and data used by the project participants are listed in the PDD including their references and sources. All the documentation used by the project participants as the basis for assumptions and source of data are quoted and interpreted in the PDD and the
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	Emission Reduction Calculation Spread Sheet /2/ .
Findings	NA
Conclusion	It is RINA's opinion: (a) All assumptions and data used by the PP are listed in the PDD; (b) All documentation used by the PP as the basis for assumption and source of data is correctly quoted and interpreted in the PDD (c) All values used in the PDD and ER spreadsheet including GWPs are considered reasonable in the context of the proposed project activity (d) The baseline methodology and methodological tools have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions; All estimates of the baseline and project emissions can be replicated using the data and parameters values provided in the PDD and ER spreadsheet.

D.4.10. Monitoring plan

D.4.10. Monitoring plan

Means of PCR

The monitoring plan (data and parameters fixed ex ante) includes all data and parameters fixed ex ante required by the applied methodology /8/ and baseline tool /2/.

Parameters ex-ante:

	Data/ parameter	Unit	Value applied	Assessment
/1/	Combined Margin of Türkiye National Grid (CM)	tCO2e/ MWh	0.4929	Ministry of Energy and Natural Resources (released on 06/10/2021) for using data of year 2019 /27/.
/2/	Cap _{pBL} Installed capacity of the hydro power plant before the implementation of the project activity	w	0	For new hydro power plants, this value is zero
/3/	Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m2).	M ²		For new reservoirs, this value is zero.

Parameters ex-post:

	Parameter	Description/Assessment																					
/1/	EG _{PJ,grid,y} (MWh/yr)	Quantity of net electricity generation supplied by the project plants/units to the grid in year y The quantity of electricity supplied by the project plants/units to the grid and the quantity of electricity delivered to the project plant/unit from the grid will be measured. Net generation will be calculated via subtracting energy delivered by the project activity to the grid for internal consumption from electricity fed to the grid. Metering devices used in power plants & monthly generation records. EPIAŞ records and cross-check with OSF forms. The net electricity will be measured continuously and recorded at least monthly. For this crediting period the value of the parameter is defined as 81,556 MWh/y. Generation data is recorded by two metering devices continuously. These records provide the data for the monthly invoicing to TEIAS. Generation is recorded via remote reading system. The quantity of electricity supplied by the project plant/unit to the grid (ISVM) and the quantity of electricity delivered to the project plant/unit from the grid (UECM) are measured. Net generation is calculated via subtracting energy delivered by the project activity to the grid for internal consumption from electricity fed to the grid. Meter have been verified as: <table border="1"> <thead> <tr> <th></th><th>Main Meter</th><th>Control Meter</th></tr> </thead> <tbody> <tr> <td>Serial No.</td><td>4632454</td><td>4632455</td></tr> <tr> <td>Brand</td><td>EMH</td><td>BAYLAN</td></tr> <tr> <td>Type</td><td>LZQJ-XC</td><td>LZQJ-XC</td></tr> <tr> <td>Class</td><td>0.5S</td><td>0.5S</td></tr> <tr> <td>Calibration date</td><td>22/08/2014</td><td>22/08/2014</td></tr> <tr> <td>Last test date</td><td>30/03/2022</td><td>30/03/2022</td></tr> </tbody> </table> Two calibrated meters backup each other. Maintenance and calibration of the metering devices are made by TEIAS. If there is a significant difference between the readings of two devices, maintenance and tests of the metering devices and the associated equipment are done before waiting for the periodical maintenance. The meters should comply with EPDK regulations which define the accuracy class of the meters as 0.2 or 0.5 depending on the capacity of the circuit as given in document in link (http://www.epdk.gov.tr/web/elektrik-piyasasi-dairesi/44). EPIAŞ records will be used as the main source for emission reduction calculation. Generation of the plant will be cross checked from meter readings at the site and/or OSF forms. Readings are done using main metering devices and spare metering devices are used in case of any discrepancy/maintenance of the main meters. Calibration of the meters will be done once in 10 years according to the national regulations.		Main Meter	Control Meter	Serial No.	4632454	4632455	Brand	EMH	BAYLAN	Type	LZQJ-XC	LZQJ-XC	Class	0.5S	0.5S	Calibration date	22/08/2014	22/08/2014	Last test date	30/03/2022	30/03/2022
	Main Meter	Control Meter																					
Serial No.	4632454	4632455																					
Brand	EMH	BAYLAN																					
Type	LZQJ-XC	LZQJ-XC																					
Class	0.5S	0.5S																					
Calibration date	22/08/2014	22/08/2014																					
Last test date	30/03/2022	30/03/2022																					
/2/	ERs (ton CO ₂)	Reduction of CO₂ emissions due to implementation of project activity will be monitored. Electricity generated by CEMEL HYDRO BUNDLE and Turkey's national electricity grid emission factor which is provided by Ministry of Energy and Natural Resources will be used as reference in calculation of the emission reduction. Estimated annual emission reduction is 38,859 tCO₂ over CP and 40,200 tCO₂ after design change.																					

	/3/	Number of employment	Project will create job opportunities for locals according to the job requirements and capabilities. Number of locally recruited staff will be monitored via their social security records. The project is expected to create job opportunity for around 28 people.
	/4/	Industry, Innovation and Infrastructure	Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all"
	/5/	Installed capacity of the hydro power plant after the implementation of the project activity	20,400,000 W This parameter will be monitored once at the beginning of each crediting period. It is confirmed also by the parameter readings on the design plates of each turbine and by summing the two units
	/6/	Area of the reservoir measured on the surface of the water, after the implementation of the project activity, when the reservoir is full	0 m ² Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m ²) Since no new reservoir is created as the project is impoundment type HEPP.
Findings	NA		
Conclusion	It is RINA's opinion that the monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions. RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology and methodological tools. RINA confirms that the monitoring arrangements described in the monitoring plan, including the data management and quality assurance and quality control procedures, are feasible within the project design, and do not change with capacity addition and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by/resulting from the proposed GS4GG project activity can be reported ex post and verified. Level of accuracy and completeness in the monitoring of the project activity does not change with the additional capacity.		

D.4.11. Sustainability Monitoring plan

Means of PCR	The Sustainability Monitoring Plan includes the way of monitoring for each GS4GG indicator.		
	Parameter	Description/Assessment	
1	EG _{PJ,grid,y}	SDG 7 - Indicator 7.2.1 – “renewable energy share in the total final energy consumption” The net electricity generation supplied to the grid will be monitored by EPIAS records. It is expected that the project generates 81,556 MWh.	
2	Air Quality	SDG13: Climate Action 13.2.1. Number of countries that have communicated the establishment Reduction of CO ₂ emissions due to implementation of project activity: Emission reduction is calculated with net electricity generation and emission factor which is fixed as 0.4929 tCO ₂ /MWh for the first crediting period. The expected emission reduction will be 40,200 tCO ₂ after design change.	
3	Air Quality	SDG13: Climate Action 13.2.1. Number of countries that have communicated the establishment The total electricity generation over the crediting period is estimated as 551,844.93 MWh. So the SO ₂ reduction and NO _x reduction is calculated to be 0.38 kt/year ((551,844.93 MWh × 4.85 kg/MWh) / 7 = 0.38 kt/year) and 0.082 kt/year	

			$((551,844.93 \text{ MWh} \times 1.05 \text{ kg/MWh}) / 7 = 0.082 \text{ kt/year})$ respectively
	4	Quantitative employment	SDG 8: Decent Work and Economic Growth Number of employments will be monitored annually with Social Security Records. Totally 28 employees will be hired at time of design change validation. 18 of them are locals.
	5	Quality of Employment	SDG 8: Decent Work and Economic Growth - 8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment. All employees will be trained about HSE issues.
	6	Quality, reliable, sustainable and resilient infrastructure for energy generation in	SDG 9: Industry, Innovation and Infrastructure The hydropower plant project is an innovative built infrastructure which is reliable, sustainable and resilient which provides sustainable electricity generation, therefore, supports economic development. The project provides infrastructural benefits for all.
	7	Water Quality and Quantity	Safeguarding Principle 8.1: Impact on Natural Water Patterns/Flows Since the project is run-off- river type, the water used for the electricity generation is released back to river with in 50 m and at least 1 m depth of water will always be available in weir area. Waste water due to management activities is stored and transferred to municipal waste water channel
	8	Hazardous and Non-hazardous Waste	Principle 9.5 – Hazardous and Non-hazardous Waste No domestic waste generation in the baseline scenario but there might be small amounts of domestic waste generation on site, generated waste will be collected by Municipality.
	9	Expropriation	Principle 4.3 Land Tenure and Other Rights - Compensation for expropriation According to EIA Report for SPP, easement rights will be obtained for treasury lands. Land with deeds will be expropriated by EMRA. There will be no resettlement for the areas to be used within the scope of the planned project
Findings	NA		
Conclusion	RINA confirms that sustainability monitoring plan and indicators included in the PDD confirm to the sustainable development requirements of GS4GG. The increase in capacity addition complies with the Sustainability Monitoring Plan.		

D.5. Duration and crediting period

Means of PCR	The project is already listed in GS registry. Start date of the crediting period is 01/07/2022, The end date of the second crediting period is 30/06/2029. Commissioning of turbine has not finalized yet. The length of crediting period is defined as 7 years and is planned to be renewed twice.
Findings	NA
Conclusion	RINA confirmed that this is the first crediting period of the registered GS4GG project activity.

D.6. Environmental impacts

Means of PCR	Environmental and Impact Assessment was approved for capacity increase on 28/04/2022 /23/. It could be confirmed that the proposed project activity is in line with the current environmental legislation in Türkiye.
Findings	NA
Conclusion	RINA confirmed that the project activity has no impact to the environment.

D.7. Local stakeholder consultation

Means of PCR	The local stakeholder consultation meeting was done on 12/12/2023 for design change of project. The meeting took place in Sulusaray Municipality Cultural Center in Sulusaray Town, Central District. No opinion was expressed by the local people. Stakeholder feedback round for proposed project was held on 16/07/2012 at Avanos Municipality Meeting Hall in Avanos District of Nevsehir province. Though, the GS guidelines were followed. Local residents were contacted by the PP and the information sheets including the sustainable development forms were provided. Local authorities and provincial institutions were also notified via e-mail and the same forms were sent to them as well. The stakeholders opinions did not change after the additional auxiliary unit implemented. Since the continuous input/grievance mechanism is in place and no negative opinions from the stakeholders were received, a physical stakeholder consultation meeting was not deemed necessary. The additional auxiliary unit also received EIA not required decision. No negative comment or grievance found recorded during the stakeholder meeting. Also logbook is seen during onsite visit and that no negative comments from stakeholders from the project activity. It is also noted that a continuous grievance mechanism as detailed during stakeholder meeting is found in practice at site. They can contact the project owners by phone and report any complaints or suggestions.
Findings	NA
Conclusion	RINA verified that no negative feedback is received during on site audit on 25/01/2024.

D.8. Pre-feasibility assessment

Means of PCR	NA
Findings	NA
Conclusion	NA

SECTION E. Internal quality control

The draft final validation report before being submitted to the client is subjected to an independent technical review to confirm that all validation activities has been completed according to the pertinent RINA's procedures. The technical review is performed by a technical reviewer(s) qualified in accordance with the RINA's qualification procedure.

SECTION F. Validation opinion

RINA Services Spa (RINA) has performed validation of the design change of project activity CEMEL HYDRO BUNDLE, Türkiye, with regard to the relevant GS requirements and principles. The review of the project design document, and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the fulfillment of the stated criteria.

The host Party is Türkiye and the Annex I Party is Türkiye.

The project correctly applies the approved baseline and monitoring methodology ACM0002: "Grid-connected electricity generation from renewable sources", 21.0 of 02/11/2022.

By generating renewable energy from HEPP Bundle + SPP as an auxiliary unit power plant, the project results in reduction of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the "CEMEL HYDRO BUNDLE" are estimated to be on average 40,200 tCO₂ after design change and 38,859 tCO₂ annually. (GS-VERs) per year over the selected 7 years renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

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

In conclusion, it is RINA's opinion that the project activity CEMEL HYDRO BUNDLE, as described in the PDD, version Version 0.9 of 07/10/2024 [/1/](#) meets all relevant GS product requirements and activity and GS Requirements (GS-VERs) also correctly applies the baseline and monitoring methodology ACM0002: Grid-connected electricity generation from renewable sources", version 21.0 of 02/11/2022 [/7/](#).

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
VVB	Validation Verification Body
EB	Executive Board
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GS4GG	Gold Standard for Global Goal
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MoV	Means of Verification
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services Spa
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig.:
We declare that Mr:

Mehmet ERDOGAN

è qualificato come¹:
is qualified as:

TL – VAL⁴ – VER – TEC – REG-EXP³ – ITR

nello schema²:
for the scheme:

VCS – CCB – GS4GG

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

1.1 – 1.2 – 9.2 – 13.1 – 13.2

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
3.1	Energy demand	3
9.2	Iron, steel and Ferro-alloy production	9
13.1	Waste handling and disposal	13
13.2	Manure	13

in accordo alle istruzioni dell'Unità responsabile (OU) per sostenibilità & cambiamenti climatici.
in accordance with the instructions of the responsible unit (OU) for the sustainability & climate change.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	24.03.2023	First Issue
1	12/04/2023	GS4GG extension
2	24/07/2023	GS4GG VAL extension
3	10/12/2023	TEC SS3 extension
4	31/01/2024	ITR extension

Il Responsabile di schema
Scheme Manager

¹
VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
REG-EXP: Regional Expert
ITR: Independent Reviewer
DET: Déterminer

²
CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS4GG: Gold Standard for Global Goals
SCS: SocialCarbon Standard
JI: Joint Implementation
ISO14064-2: International standard 14064 part 2
UER: Upstream Emission Reduction
CCB: The Climate, Community & Biodiversity Alliance

³ Turkey

⁴ For GS4GG only

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS
RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS4GG Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports

GHG_QUAL_CERT_EN(06-2021)

Page 1 of 2



CERTIFICATO DI QUALIFICA PER GLI SCHEMI VOLONTARI*
QUALIFICATION CERTIFICATE FOR VOLUNTARY SCHEMES*

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

Victor Milkov

è qualificato come:
 is qualified as:

TEC, FIN EXP

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

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)

Responsabile di schema
 Scheme Leader
 Rita Valoroso

*SCHEMI VOLONTARI/ VOLUNTARY SCHEMES: ACR American Carbon Registry, CCB The Climate, Community & Biodiversity Alliance, GS Gold Standard, JI Joint Implementation, SCS Social Carbon Standard, VCS Verified Carbon Standard.

TEC: Technical expert; VAL: Validator; VER: Verifier; TL: Team leader; FIN EXP: Financial Expert; ITRP: Independent technical reviewer

RINA Services S.p.A. è accreditato/riconosciuto da
 RINA Services S.p.A. is accredited /recognized by:

UNFCCC	quali Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects
VCSA	per condurre la Validazione e la Verifica di Progetti VCS to carry out Validation and Verification of VCS Projects
GS Foundation	per condurre la Validazione e la Verifica di Progetti GS to carry out Validation and Verification of GS Projects
Ecologica Institute	per condurre la Validazione e la Verifica di rapporti SCS to carry out Validation and Verification of SCS Reports
American Carbon Registry ACR	per condurre la Validazione e la Verifica di Progetti ACR to carry out Validation and Verification of ACR projects
The Climate, Community & Biodiversity Alliance CCB	per condurre la Validazione e la Verifica di Progetti co-benefit CCB to carry out Validation and Verification of co-benefit CCB projects



CERTIFICATO DI QUALIFICA PER GLI SCHEMI VOLONTARI*
QUALIFICATION CERTIFICATE FOR VOLUNTARY SCHEMES*

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

Cyril Augustus Arokiasamy Amalorpavanathan

è qualificato come:
 is qualified as:

TEC, VAL, VER, TL, Local Expert, ITRP

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

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
3.1	Energy Demand	3
5.1	Chemical Industry	5
13.1	Solid Waste and wastewater	13

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)
2	09/10/2017	Qualification update as ITRP

Responsabile di schema
 Scheme Leader
 Laura SEVERINO

*SCHEMI VOLONTARI/ VOLUNTARY SCHEMES: ACR American Carbon Registry, CCB The Climate, Community & Biodiversity Alliance, GS Gold Standard, JI Joint Implementation, SCS Social Carbon Standard, VCS Verified Carbon Standard.

TEC: Technical expert; VAL: Validator; VER: Verifier; TL: Team leader; FIN EXP: Financial Expert; ITRP: Independent technical reviewer

RINA Services S.p.A. è accreditato/riconosciuto da
 RINA Services S.p.A. is accredited /recognized by

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VCSA	per condurre la Validazione e la Verifica di Progetti VCS to carry out Validation and Verification of VCS Projects
GS Foundation	per condurre la Validazione e la Verifica di Progetti GS to carry out Validation and Verification of GS Projects
Ecologica Institute	per condurre la Validazione e la Verifica di rapporti SCS to carry out Validation and Verification of SCS Reports
American Carbon Registry ACR	per condurre la Validazione e la Verifica di Progetti ACR to carry out Validation and Verification of ACR projects
The Climate, Community & Biodiversity Alliance CCB	per condurre la Validazione e la Verifica di Progetti co-benefit CCB to carry out Validation and Verification of co-benefit CCB projects

Appendix 3. Documents reviewed or referenced

No	Author	Title	References to the document	Provider
1	GTE	PDD for “CEMEL HYDRO BUNDLE” in Türkiye	version 0.4 of 24/01/2024 version 0.5 of 06/03/2024 version 0.6 of 15/03/2024 version 0.7 of 27/03/2024 version 0.8 of 24/07/2024 version 0.9 of 07/10/2024	Project Participant
2	GTE	Baseline Study Calculation Excel Sheet	version 0.1 of 24/01/2024 version 0.2 of 06/03/2024 version 0.3 of 22/07/2024 version 0.4 of 03/09/2024	Project Participant
3	GTE	IRR Calculation	version 0.1 of 24/01/2024 version 0.2 of 06/03/2024 version 0.3 of 15/03/2024 version 0.4 of 27/03/2024 version 0.5 of 22/07/2024 version 0.6 of 07/10/2024	Project Participant
4	GTE	SDG impact tool	version 0.1 of 24/01/2024 version 0.2 of 22/07/2024 version 0.3 of 07/10/2024	Project Participant
5	CDM Executive Board	CDM Project Standard for Project Activities	version 03.0 of 09/09/2021	Publicly Available
6	CDM Executive Board	CDM Validation and Verification Standard For Project Activities	version 03.0 of 09/09/2021	Publicly Available
7	CDM Executive Board	Baseline and Monitoring Methodology “ACM0002: Grid-connected electricity generation from renewable sources”	version 21.0 of 02/11/2022	Publicly Available
8	CDM Executive Board	Methodological Tool “Tool to calculate the emission factor for an electricity system”	version 07.0 of 31/08/2018	Publicly Available
9	CDM Executive Board	Glossary of CDM terms	version 10.0 of 12/09/2019	Publicly Available
10	CDM Executive Board	Baseline and Monitoring Tool “Tool for the demonstration and assessment of additionality”	version 07.0 of 23/11/2012	Publicly Available
11	GS4GG	Project Design Document Template	version 1.5	Publicly Available
12	GS4GG	DESIGN CHANGE REQUIREMENTS	v1.1 of 14.04.2023	Publicly Available

13	GS4GG	Principles & Requirements	version 1.2 of 24/10/2019	Publicly available
14	CEMEL HYDRO BUNDLE	Logbook	-	Project Participant
15	CDM Executive Board	Methodological Tool “Tool to determine the remaining lifetime of equipment”	version 01.0 of 16/10/2019	Publicly Available
16	CDM Executive Board	Methodological Tool “Tool 24: Common Practice”	version 03.1 of 03/06/2015	Publicly Available
17	Nordex	Equipment Catalogue – Solar Panels, Inverters	-	Project Participant
18	Talesun	SPP Contract	06/02/2023	Project Participant
19	Project Participant	KMZ file	-	Project Participant
20	EMRA	Generation License - initial	09/02/2011	Project Participant
21	EMRA	Hybrid Project Decision	28/09/2023	Project Participant
22	Gediz EDAŞ	Grid Connection agreement	29/08/2022	Project Participant
23	Ministry of Environment, Urbanization and Climate Change	EIA Capacity increase	28/04/2022	Project Participant
24	GTE	PDD for “CEMEL HYDRO BUNDLE” in Türkiye (for Initial Validation)	version 0.4 of 13/03/2023	Project Participant
25	Carbon Check	Validation Report for “CEMEL HYDRO BUNDLE” in Türkiye (for Initial Validation)	version 4.0 of 13/03/2023	Project Participant
26	Gold Standard	Design Review “CEMEL HYDRO BUNDLE” in Türkiye (for Initial Validation)	19/07/2022	Project Participant
27	Ministry of Energy and Natural Resources	Emission Factor	06/10/2021	Publicly Available
28	CDM Executive Board	CDM Annex 67- Guidelines on assessment of different types of changes from the project activity	17/07/2009	Publicly Available
29	EMRA	Electricity feed in tariff Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy	02/01/2023	Publicly Available
30	CDM Executive Board	Methodological tool 27: Investment analysis	Version 12 of 02/11/2022	Publicly available
31	Turkish government	Energy Market Regulatory Authority: Electricity Market Law, No: 6446 of 14/03/2013	14/03/2013	Publicly available
32	Turkish government	Energy Market Regulatory Authority: Renewable Energy Sources Law No:6094 of 29/12/2010	29/12/2010	Publicly available
33	Turkish government	Website: http://www.gib.gov.tr/fileadmin/user_upload/Yararli_Bilgiler/amortisman_oranlari2011.html Argument: Amortization rates Language: Turkish	Retrieved on 20/03/2024	Publicly available

34	Turkish government	The Presidency of the Turkish Revenue Administration: General Communique on Tax Procedural Law, Depreciation Rate List, Official Gazette No: 28405, Enactment Date: 08/09/2012	08/09/2012	Publicly available
35	Turkish government	Website: http://www.epdk.gov.tr/index.php/4b360128-53aa-4174-8104-a6c10434ac9c Argument: Electricity tariffs – Turkey Language: Turkish	Retrieved on 28/11/2023	Publicly available
36	World bank	World bank Report for Turkey No: ICR00004069	Retrieved on 20/03/2024	Publicly available
37	Meram Elektrik Dagitim A.S.	Distribution System Connection Agreement	29/08/2022	Project Proponent
38	Meram Elektrik Dagitim A.S.	Distribution System Usage Agreement	24/03/2021	Project Proponent
39	PVsyst	Auxiliary Unit Feasibility Simulation Report	13/04/2023	Project Proponent
40	Vagnesh Ramasamy & others	Website: https://www.nrel.gov/docs/fy22osti/83586.pdf Argument: U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks Language: English	09/2023	Publicly available
41	HGG Enerji Uretim A.S.	Auxilliary Unit Feasibility Report	11/2022	Project Proponent
42	GTE	Common Practice	07/20/2024	Project Proponent
43	CDM Executive Board	Methodological Tool “Tool 24: Common Practice”	version 03.1 of 03/06/2015	Publicly Available
44	SC	T-V5.0-Deviation-Request-Form_	07.10.2024	Publicly Available

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from previous verification or design Certification (final CP Renewal Review (12/04/2023))

FAR ID	1	Section no.		Date:
Description of FAR				
In-line with GS4GG Principles and Requirements, VVB and PP shall consider the following rule after Design Renewal Certification is achieved: 5.1.29: 1st verification shall be completed within two years after the certification is achieved.				
Project participant response				Date:
Documentation provided by project participant				
VVB assessment				Date:

FAR ID	2	Section no.		Date:
Description of FAR				
Verifying VVB shall conducted onsite in the next verification since RCP is conducted remotely				
Project participant response				Date:
Documentation provided by project participant				
VVB assessment				Date:

FAR ID	3	Section no.		Date:
Description of FAR				
Verifying VVB shall assess there is no double counting of ERs during the next verification especially for IREC				
Project participant response				Date:
Documentation provided by project participant				
VVB assessment				Date:

FAR ID	4	Section no.		Date:
Description of FAR				
Verifying VVB shall include assessment of monitoring of fish passage and include photos of the fish passage in the verification report.				
Project participant response				Date:
Documentation provided by project participant				
VVB assessment				Date:

Table 2. CR from this verification

CR ID	1	Section no.		Date: 05/02/2024
Description of CR				
1- Please Revise Table 2 of Section A. Control annual electricity generation amount after design change. 2- Please check “With the commissioning of the auxiliary solar unit, the expected production is estimated as 98,422 MWh/yr.” expected electricity generation shall be checked and support with evidences. tion iv. The project is not registered with any other voluntary or compliance schemes. Please refer to I-REC. se control electricity generation value after design change and revise annual or total ER If necessary.				
Project participant response				Date: 06.03.2024
1 – Annual electricity generation value is revised according to EMRA Decision. 2 – The statement gas been revised. Enerji Piyasası Düzenleme Kurulu (EPDK - EMRA) Decision is stated as reference. 3 – The project is not registered to I-RECs. It is referred in the related section. 4 – The electricity generation value does not change after design change i.e. 73,950 MWh/yr. So, the ER and the PDD is revised accordingly.				
Documentation provided by project participant				
VVB assessment				Date: 18/03/2024
1- Please review and update Table 2 for related sections: Capacity of project and annual electricity generation generation values are not in line with EPDK decision (28/09/2023). Electrical power is revised but it is not in line with EPDK values (EPDK value is 20.4 Mwe)				
Parameters		Before Design Change	After Design Change	
Capacity		21,6 MWm / 20,4 MWe	24,6596 MWm / 20.4 MWe	
Annual Electricity Generation		73,950 MWh/yr	73,950 + 31,390=105,340 MWh/yr	
2- “The total annual electricity generation is estimated as 105,340 MWh/yr. The auxiliary solar unit is expected to be commissioned in 2024. “ The estimated electricity generation is calculated but in the last license revision electrical power is not increased so how it can be granted the electrical power will allowed up to 31,390 Mwe? Please share the reference 3- OK 4- Please control revise ER sheet and calculations according to EPDK decision – updated Mwe				
CR ID 1 is not closed.				
Project participant response				Date: 19/03/2024

- 1- According to EMRA decision (28/09/2023), the capacity of the project is 39.43 MWm / 20.40 MWe. As it can be seen, the MWm part of the capacity has changed but the MWe did not. It is noticed that the MWm part is written wrong throughout the report, so it is revised as "39.43 MWm" in Table 2 and the related sections.
In terms of electricity generation, the PVsyst Simulation Report is used to calculate the corresponding electricity generation value for the auxiliary unit with a capacity of 17.83 MWm.
According to PVsyst Simulation Report of the auxiliary unit, the generation amount for the 13.90 MW is stated as 24.47 GWh. In this regard the generation amount for the 17.83 MWm will be 31.39 GWh ($(17.83 \times 24.47) / 13.90 = 31.39$ GWh). This value is added to annual electricity generation value before design change i.e., 79.95 GWh, which makes 105.34 GWh.
As per EPDK implementation, for hybrid plants, only MWm is revised. MWe output is not changed since the grid capacity allocated to the plant is in terms of MWe and in any time, it is not allowed to exceed allocated MWe capacity. Even if hydro+ solar components can generate more than 20.4 MWe as certain time intervals, electricity fed to the grid will be limited to 20.4 MWe.
Also, EPDK does not increase the annual generation in hybrid plants due to auxiliary power component addition. Therefore, we have applied the generation value calculated for 17.83 MWm component of the plant. Otherwise, we would have increased the total installed capacity (and MWm capacity) but it would not be reflected in annual generation or ER calculation which would be confusing.
- 2- As explained above, EPDK does not revise annual generation figure. Electricity fed to the grid will be limited to the MWe capacity allocated to the plant. Solar component will contribute to generation when there is not power generation from hydro component. Thus, overall utilization of the grid capacity allocated to the plants will be increased which enables more power generation from renewable sources.
- 3- Please ignore the 4th response by the PP given on 06/06/2024. There was a mistake. As explained in the 1st response by PP, the MWe value of the project did not change. The updated electricity generation value of 105.34 GWh has already been used for ER and related calculations. So there is no need to revise the ER or other related calculations.

Documentation provided by project participant

VVB assessment

Date: 21/03/2024

1- First of all I think it will be useful to discuss why electricity generation value didn't change for license update for 3 MW solar implementation. Also according to EMRA decision of 17.83 MWm SPP there is no annual electricity generation estimate is shared so it is understood annual electricity generation value is based on calculation, please clarify.

On the other hand Design Change requirements para 3.5 up to %20 Of ER can be capped according to registered PDD. So **73,950*1.2: 88,740 MWh/yr** can be capped. Please review and revise MR, excel sheet and IRR if needed.

3.5 | Changes to the project design

3.5.1 | The changes to project design may include following, but not limited to:

- a. Increase in the capacity⁷ specified in the design certified PDD with following conditions:
 - i. If the project activity is large-scale; the project may claim emission reductions and/or other certified impacts:
 1. up to an amount calculated based on the increased capacity by 20 per cent of the capacity specified in the originally design certified PDDs, or

2- OK

3- OK

Project participant response

Date: 22/03/2024

1. Solar component is named as “auxiliary power source”. EPDK considers main source (hydro in this case) as firm energy source. Both EPDK, CDM and GS considers MWe capacity as basis for rules^{2,3} and uses default capacity factors for each type of powerplant. Also, since MWe capacity does not change, max output of the plant is limited to MWe capacity which does not change. Since the MWe does not change, there is no issue in terms of 20% limit. Please see article 4.1.4 of requirements which specifies the design change type.

(a) ADDITIONALITY

- 4.1.3 The Project Developer must discuss the effect of design changes on the validity of the demonstration of additionality and provide all required justifications. Within an investment analysis, all but the parameters affected by the design changes shall be given the same values as in the demonstration provided at the time of Design Certification. If the demonstration relies on a barrier analysis, the Project Developer shall discuss why the barriers still remain valid despite the design changes.
- 4.1.4 Changes may impact the validity of investment analysis or barrier analysis established at the time of project Design Certification, thus affecting the additionality of the project. This would typically be the case when:
- (a) Changes affect the output capacity due to an increased **installed capacity** or an increased number of units, or installation of units with lower capacity or units with a technology which is less advanced than that described in the project documentation.
 - (b) Components are added or the ones considered are extended.
 - (c) Sites are removed or added in the context of a project registered with multiple sites.
 - (d) Actual operational parameters within the control of the Project Developer are associated with different values than previously expected, affecting the determination of the emission reductions and the IRR calculation.

Documentation provided by project participant

VVB assessment

Date: 25/03/2024

1- Our opinion is electricity generation changes will be effect the ER and additionality so %20 capped rule should be applied. For this clause we are not agree with consultancy. According to information from consultancy and other PCR reports that is submitted to GS, this clause can be reevaluated again according to GS Review.

CR ID 1 is closed.

Table 3. CAR from this verification

CAR ID	1	Section no.		Date: 05/02/2024
Description of CAR				
1- Please Revise Table 2 of Section A. Control annual electricity generation amount after design change. 2- Please share test period in PDD (theoretical and share in Table 9) 3- Cap _{PJ} is not updated according to design change. 4- Please share values applied for SDG 13 rather than unit (SDG 13 air quality and ER). 5- SDG 9 Industry, Innovation and Infrastructure it is not clear how to apply this parameter.				
Project participant response				Date: 06.03.2024
1. Annual electricity generation value is revised according to EMRA Decision. 2. The theoretical test period together with relevant reference is stated in PDD. Also, the test reports are shared with VVB. 3. The installed capacity does not change with design change i.e., Cap _{PJ} remains AS 20.4 MWe. A statement is added to the table related to Cap _{PJ} ("The installed capacity is 20.4 MWe before and after design change."). EPDK Decision dated 28.09.2023 is shared as reference. 4. For the air quality parameters i.e., SO ₂ and NO _x parameters, the reduction amounts calculated from the overall electricity generation (kt/year) are added in the PDD (Please see B.7. Monitoring Plan Section SDG 13 Table with a title "Air Quality"). 5. The SDG 9 is stated in the registered PDD version 10. The project promotes quality, reliable, sustainable and resilient infrastructure for energy generation in Turkey, where energy demand is continuously increasing. Therefore, project presents clean and reliable energy source accessible for all.				
Documentation provided by project participant				
VVB assessment				Date: 18/03/2024
1- Same as CAR ID 1. 2- OK 3- OK. 4- OK 5- OK CAR ID 1 is not closed.				
Project participant response				Date: 19/03/2024
1- Please see the 1 st response given by the PP to the CAR ID 1 on 19/03/2024.				
Documentation provided by project participant				
VVB assessment				Date: 21/03/2024
1- OK				

CAR ID	2	Section no.		Date: 05/02/2024
Description of CAR				
1- Investment decision date (February 2023) and reason of investment decision date is not clearly mentioned under section B.5. Please share with evidence. 2- Revised IRR sheet is not shared with VVB.				
Project participant response				Date: 06.03.2024
1 – Revised. 2 – Revised IRR is shared with VVB. Accordingly, the PDD is revised.				
Documentation provided by project participant				
VVB assessment				Date: 11/03/2024
- The applicability of Tool 01 and Tool 27 is not stated. - The applicability of the benchmark chosen as per the requirements of Tool 27 is not stated. - The applicability of CDM Annex 67: GUIDELINES ON ASSESSMENT OF DIFFERENT TYPES OF CHANGES FROM THE PROJECT ACTIVITY AS DESCRIBED IN THE REGISTERED PDD is not assessed. - The PP does not use loan capital for the extension and yet the total cost of the investment and the equity remain unchanged. The equity with the extension is not considered. Please see the comment above. - The tariff for solar power is not stated. - The initial PDD applies a tariff of 7.3 \$c/MWh for the whole investment analysis period. Please address the discrepancy with regard to CDM Annex 67. - The income from solar electricity is not assessed separately in the investment analysis though the price of solar energy is different. - The investment decision date of the Solar extension is not relevant. See CDM Annex 67. - The applicability of the parameters chosen for the sensitivity analysis is not demonstrated as per the requirements of Tool 27: Investment analysis.				
Project participant response				Date: 15/03/2024
- The applicability of Tool 01 and Tool 27 are stated in Section B.2. - As per Section 6 of Tool 27 (page 5), "Benchmarks supplied by relevant national authorities are also appropriate". Please see the explanation given below Sub-step 2b. The figure defined by World Bank for similar project is used for benchmark analysis. In this regard, this benchmark value is appropriate for this project. - The applicability of the CDM Annex 67 is assessed under Sub-Step 2b. - IRR is revised. The total cost of the project is revised considering the extension and the equity is changed accordingly. - As per regulation tariff for the main source is applicable. - The investment analysis is revised. The tariff for the whole investment period is taken as 7.3 \$c/MWh. - The price of solar energy is not different as per regulation. It should be mentioned that the electricity income in general is assessed alone in the sensitivity analysis. - The investment decision date for the auxiliary unit is February 2023. The auxiliary solar unit is expected to be commissioned in 2024. The Solar Panels Contract is shared with the DOE as an evidence document. Also, an explanation is added to the IRR as a cell note. - According to Tool 27 Subject 7: Sensitivity Analysis, variables constituting more than 20% of either total project costs or total project revenues should be subjected to reasonable variation and the results of this variation should be presented in the PDD. In this regard, the investment cost, operation and maintenance cost and electricity income are the chosen parameters to include in the Sensitivity Analysis. It should be mentioned that in the registered PDD, these parameters also included in the sensitivity analysis. Their effect on the equity IRR, within the range of $\pm 15\%$ is demonstrated and presented in the PDD. Also, the cases where the project activity would pass the benchmark or become more favourable than the alternative is explained in the PDD which is again a requirement by the Tool 27.				
Documentation provided by project participant				
VVB assessment				Date: 25/03/2024

1. PDD is revised and applicability of Tool 27, v.12 is stated. ISSUE IS CLOSED
2. The choice of the benchmark is explained and justified. ISSUE IS CLOSED.
3. The applicability of the CDM Annex 67 is assessed. ISSUE ID CLOSED.
4. The IRR calculation sheet is revised to include the cost of the extension, however, the calculation sheet does not show the value the loan used for the initial project (value stated 0 – cell C21 of sheet “Cash Flow Extension”. Please clarify. ISSUE IS OPEN.
5. The tariff of the solar energy is discussed and explained. ISSUE IS CLOSED.
6. The price of the electric energy generated is considered constant throughout the whole investment analysis period as validated in the initial PDD. ISSUE IS CLOSED.
7. As stated by the PP the price of the hydro energy is the same as of the solar energy. ISSUE IS CLOSED.
8. The requirement of the CDM Annex 67 means that the Investment decision date should be the initial project investment decision date and not the solar extension panels supply contract. Hence, all auxiliary parameters (i.e. currency rates, taxes, depreciation regulation, etc.) of the IRR calculation should be taken as per the initial investment decision date (i.e the same as in the validated PDD and IRR calculation sheet). (Meaning that the Solar extension decision date should not be mentioned in this case). ISSUE IS OPEN.
9. The requirements of Tool 27 are stated correctly here but the same have to be included in the PDD – Sensitivity Analysis section. ISSUE IS OPEN.

CAR ID 2 is not closed.

Project participant response		Date: 26/03/2024
4. Revised. The loan used for the initial project can be found in cell 21 and the related other cells.		
8. Revised.		
9. The requirements of the Tool 27 are stated under Section Sub-step 2d Sensitivity Analysis.		
4. There is a problem with the equity for the project after the extension. No loan has been used for the solar extension so the complete additional amount goes to the equity and has to be added to the equity of the initial project. The 50/50 assumption for the loan/equity ratio cannot be applied in this case. There are 2 options – either the loan/equity ratio will be different (the loan payment parameters remain the same but the equity will be higher or the ratio remains the same but the loan payment values will be higher. ISSUE IS OPEN.		
8. The PDD is revised. ISSUE IS CLOSED		
9. The PDD is revised. ISSUE IS CLOSED.		
Project participant response		Date: 27/03/2024
4. Since we haven't use loan for extension and contribution of solar component started in 2024 in IRR calculation, we have updated equity ratio accordingly to reflect the actual conditions. IRR value has shaned, the report is revised accordingly.		
Project participant response		Date: 27/03/2024
4. The IRR calculation sheet and the PDD are revised to reflect the correct loan/equity ratio after the extension. ISSUE IS CLOSED.		

CAR ID	3	Section no.		Date: 05/02/2024
Description of CAR				
t updated report Table is not used. Please use updated template and revise safeguard principles section.				
Project participant response				Date: 06.03.2024
1 – The submitted PDD transferred to the new version i.e., v1.5. After that track change turned on and the requested changes have been made. The Appendix 1 to 4 are revised accordingly (including safeguard principles).				
Documentation provided by project participant				
VVB assessment				Date: 18/03/2024
1- OK				
CAR ID 3 is closed.				

CAR ID	4	Section no.		Date: 05/02/2024
Description of CAR				
e is no any mention for stakeholder consultation meeting regarding the auxiliary unit in Section E.2 tion E.2 please revise this section according nearest village Alaattin. In registered PDD Sulusaray and Cumhuriyet villages are not mentioned please clarify and revise this section.				
Project participant response				Date: 06.03.2024
1 – Section E.2 is revised according to EIA for SPP. 2 – In Section E.2., the villages where grievance notebooks placed are mentioned. As shared with DOE (as a supporting document), in Yenimahalle, Cumhuriyet and Alaattin villages, there exists grievance notebooks.				
Documentation provided by project participant				
VVB assessment				Date: 18/03/2024
1- OK 2- OK				
CAR ID 4 is closed.				

CAR ID	5	Section no.		Date: 05/02/2024
Description of CAR				
not mentioned about expropriation process because of solar implementation.				
Project participant response				Date: 06.03.2024
1 – The expropriation process has been going on. In Section B.7, “Principle 4.3 Land Tenure and Other Rights - Compensation for expropriation” is added as a monitoring parameter. Also, in Section D.1 and Appendix 1 of the PDD, related principle and explanations are added.				
Documentation provided by project participant				
VVB assessment				Date: 18/03/2024
1- OK				
CAR ID 5 is closed.				

Table 4. FAR from this verification

FAR ID	1	Section No.		Date:
Description of FAR				
1- The expropriation process should be finalized until the first verification after design change and VVB will control the process.				
Project participant response				Date:
Documentation provided by project participant				
DOE assessment				Date:

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	10/06/2016	Initial publication.