Gold Standard®

Gold Standard for the Global Goals
Key Project Information & Project Design Document (PDD)

Version 1.1 – August 2017

Gold Standard

KEY PROJECT INFORMATION

Title of Project:	Çorum Solar Power Plant Project
Brief description of Project:	Çorum Solar Power Plant is the 8 MWe unlicensed grid connected solar power plant which is located in Tatar village Çorum in Turkey. The 8 unlicensed project creates the Çorum SPP which is invested by Galata Wind Enerji A.Ş. The project names are Deniz SPP, Doğanay SPP, Hilalay SPP, Karagül SPP, Kızıl SPP, Maviay SPP, Portakal SPP and Şenay SPP. All project capacities are same an 1 MWe. The projects are started to electricity generation on 19/12/2017. [1] The electricity will be fed to the grid at Çorum TM-2, TRA – DM 12/1A. Estimated electricity generation is 14,060 MWh per year. The electricity generation will result 7,880 tonnes of CO_2/year and total emission reduction will be 39,399 tonnes of CO2e for the first crediting period. The project operational lifetime is 25 years.[2]
Expected Implemetation Date: Expected duration of Project:	19/12/2017 25 Years and 00 Months
Project Developer:	Galata Wind Enerji A.Ş
Project Representative:	Rüzgar Danışmanlık-Çağla Balcı Eriş
Project Participants and any communities involved:	Galata Wind Enerji A.Ş
Version of PDD: Date of Version:	05 21/01/2019
Host Country / Location:	TURKEY / Merkez District, Tatar village near Avlandere in Çorum.
Certification Pathway (Project Certification/Impact Statements & Products	Impact Statements & Products - SDG 13: Gold Standard Emissions Reductions (GS VERs-carbon credits)
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG
Methodologies applied:	AMS I.D Version 18
Product Requirements applied:	1(Energy industries (renewable - / non-renewable sources) Gold Standard Verified Emission Reductions (GS-VERs)
Regular/Retroactive:	Retroactive
SDG Impacts:	1 – SDG 7 Affordable and Clean Energy 2 – SGD 8 Decent Work and Economic Growth 4 – SDG 13 Climate Action
Estimated amount of SDG Impact Certified	7,880 tonnes CO_2e

1 TEDAŞ Provisional Acceptance - 19/12/2017

2 Solar Panel Technical Lifetime (Jinko Eagle 320 Watt)

SECTION A. Description of project

A.1. Purpose and general description of project

Çorum Solar Power Plant Project is invested by Galata Wind Enerji A.Ş. The 8 unlicensed project creates the Çorum SPP which is invested by Galata Wind Enerji A.Ş. The project names are Deniz SPP, Doğanay SPP, Hilalay SPP, Karagül SPP, Kızıl SPP, Maviay SPP, Portakal SPP and Şenay SPP. The projects are newly built grid-connected solar power plant project. All project capacities are same an 1 MWe and total capacity is 8 MWe AC. The project is locates in Merkez District, Tatar village of Çorum. The project started to electricity generation on 19/12/2017. Provisional acceptance are signed between TEDAŞ and 8 solar power plant legal entity.

The estimated electricity generation is 14,060 MWh[3] per year by the project activity.

The project has supply the Turkish National Grid (hereafter referred to as „the Grid") with zero emission energy, generated by the solar energy. Electricity currently generated by the grid is relatively carbon intensive, with a combined margin emission factor of 0.5460 /MWh. The connection point of the project activity is Çorum TM-2 TRA-DM 12/1A. Thorugh the estimated electricity generation total emission reduction will be 7,880 tCO2e per year and 39,399 tCO2e for the first crediting period. The project operational lifetime is 25 years.

Project commissioning date is 19/12/2017.

This electricity amount have contributed to the following goals:

- Further dissemination of the by now very uncommon solar power in Turkey
- Displacement of ecologically unsound and climate unfriendly power generation
- Extension of nationally sourced power generation.
- Help to growth Solar Energy sector in Turkey
- Reduce the greenhouse gas emissions

[3] Feasibility Report August 2017- SolarWind Energy

A.2. Eligibility of the project under Gold Standard

The project activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document as described below.

- The project applies methodology AMS I.D., which is an approved methodology under Gold Standard.

- The project type is Photovoltaic which is an eligible project type as it is in accordance with 1.1.1 a) and 1.1.1 b) of the Eligible Project Types & Scope under Renewable Energy Activity Requirements.

- The project activity results in displacement of electricity from thermal power stations while contributing to sustainable development of Turkey. Hence, the project contributes to the Gold Standard Vision and Mission.

- Photovoltaic is an approved project type and does not require approval from Gold Standard.

- This project activity is not associated with geo-engineering or energy generated from fossil fuel or nuclear, fossil fuel switch, nor does it enhances or prolongs such energy generation.

General Eligibility Criteria under Renewable Energy Activity Requirements

Project Type: As discussed above, the project type is eligible.
Project Location: The project is located in Tatar village, Merkez District of Çorum, Turkey. Thus, the project is eligible.
Project scale: The project activity is a 8 MWel solar project and thus qualifies under small scale projects.

A.3. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

The project participant Galata Wind Enerji A.Ş. is the legal owner of the project and has the legal rights for the credits.
But 8 unlicensed project creates the Çorum SPP which is invested by Galata Wind Enerji A.Ş. The project names are Deniz SPP, Doğanay SPP, Hilalay SPP, Karagül SPP, Kızıl SPP, Maviay SPP, Portakal SPP and Şenay SPP are registered under the Galata Wind Enerji A.Ş.

8 unlicensed project creates Çorum Solar Power Plant projects belong to same entity (Galata Wind Enerji A.Ş)[4]

A.4. Location of project

A.4.1. Host Country

Turkey

[4] Board Decision for only offical is Galata Wind dd. 15/03/2018

A.4.2. Region/State/Province etc.

Central Anatolian Region, Çorum

A.4.3. City/Town/Community etc.

The project site is located at Merkez district in Çorum Province.

A.4.4. Physical/Geographical location

The nearest small town is Tatar village in Merkez District.

Northern Tip: 653025,31 / 4484695,69
Southern Tip: 652950,39 / 4484140,17
Easthern Tip: 653185,01 / 4484725,92
Western Tip: 652884,51 / 4484188,95

Please see below the maps showing the location of the project activity in Turkey and the locations of the project area:

Figure 1: Tatar Village of Turkey[5]

[5] Feasibility Report August 2017- SolarWind Energy

Figure 2: The location of the project activity[6]

Table 1: The locations of the project area[7]

Deniz SPP

	East	North
K1	652997,82	4484481,4
K2	653040,3	4484548,09
K3	653261,25	4484530,71
K4	653262,34	4484535,81
K5	653262,08	4484466,78
K6	653275,09	4484532,45
K7	653280,24	4484529,67
K8	653284,12	4484481,49
K9	653300,67	4484498,77

[6] Land Registry and Cadastre General Directorate Parcel Inquiry Application

[7] Çorum SPP Technical Evaluation Forms

Doğanay SPP

	East	North
K1	652930,16	4484722,6
K2	652930,52	4484797,54
K3	652986,62	4484692,35
K4	652991,49	4484794,38
K5	653008,65	4484697,59
K6	653022,75	4484789,46
K7	653025,31	4484695,69
K8	653034,09	4484690,26
K9	653055,34	4484785,04
K10	653087,58	4484782,1
K11	653114,42	4484775,24
K12	653136,35	4484767,91
K13	653164,22	4484757,05
K14	653174,8	4484745,01
K15	653184,91	4484726,1
K16	653185,01	4484725,92

Hilalay SPP

	East	North
K1	652872,38	4484284,46
K2	652913,08	4484348,37
K3	653235,05	4484270,09
K4	653164,8	4484297,14
K5	653180,84	4484310,67
K6	653203,81	4484326,9
K7	653207,06	4484332,28

Karagül SPP

	East	North
K1	653044,66	4484341,06
K2	653126,09	4484396,5
K3	653126,92	4484400,66
K4	653128,97	4484410,92
K5	653130,98	4484398,08
K6	653131,4	4484474,09
K7	653138,24	4484385,96
K8	653138,73	4484421,36
K9	653055,34	4484785,04
K26	653244,87	4484384,53
K27	653248,64	4484447,01

K28	653261,04	4484454,17
K29	653263,6	4484465,63
K30	653265,08	4484466,78
K31	6532700,41	4484389,19
K32	653270,48	4484392,81

Kızıl SPP

	East	North
K1	653034,09	4484690,26
K2	653037,68	4484688,04
K3	653038	4484652,38
K4	653048,28	4484585,35
K5	653048,45	4484661,49
K6	653049,33	4484675,42
K7	653184,91	4484726,1
K8	653185,01	4484725,92
K9	653194,13	4484703,96
K10	653202,16	4484687,64
K11	653219,92	4484666,57
K12	653238,23	4484646,86
K13	653256,73	4484634,9

Maviay SPP

	East	North
K1	653034,09	4484690,26
K2	653037,68	4484688,04
K3	653038	4484652,38
K4	653048,28	4484585,35
K5	653048,45	4484661,49
K6	653049,33	4484675,42
K7	653184,91	4484726,1
K8	653185,01	4484725,92
K9	653194,13	4484703,96
K10	653202,16	4484687,64
K11	653219,92	4484666,57
K12	653238,23	4484646,86
K13	653256,73	4484634,9

Portakal SPP

	East	North
K1	652913,08	4484348,37

K2	652952,47	4484410,2
K3	652997,82	4484481,4
K4	653046,66	4484341,06
K5	653131,4	4484474,09

Şenay SPP

	East	North
K1	652866,32	4484274,96
K2	652872,38	4484284,46
K3	652884,51	4484188,95
K4	652887,85	4484184,43
K5	652891,73	4484148,57
K28	653079,48	4484246,14
K29	653092,12	4484245,87
K30	653101,61	4484245,49
K31	653124,28	4484260,3
K32	653135,05	4484270,09

A.5. Technologies and/or measures

The capacity of Çorum Solar Power Plant Project is 8 MWel. Solar Energy is an environment friendly technology. The Solar Power Plant main components are Photovoltaic Modules and Invertors.

Table 2: Technical specifications of the typical modules will be as follows[8]

Module Type	JKM320PP-72
Type of Modules	Polycrystalline
Maximum Power (Pmax)	320 Wp
Maximum Voltage (Vmp)	37.4 V
Maximum Power Current (Imp)	8.56 A
Open Circuit Voltage (Voc)	46,4 V
Short Circuit Current (Isc)	9,05 A
Module Efficiency STC (%)	16,49 %
Maximum System Voltage (V)	1000 VDC (IEC)
Power Tolerance	0 / +3%
Maximum fuse rating	15 A

Table 3 Technical specifications of the typical invertors will be as follows[9]

[8] Jinko Solar Technical Data Sheet

[9] SMA Technical Data Sheet

Model	SMA / MLX 60
Rated power at nominal voltage	60 kW
Maximum Input Voltage	1000 V
MPP voltage range	570 V to 800 V @400 Vac, 685 V to 800 V @480 Vac
Max. input voltage	565 V @400 Vac, 680 V @480 Vac
Max. DC short-circuit current	110 A / 150 A
Number of independent MPP inputs	1/1 (split up by external DC-Combiner Box)
Max. efficiency / European efficiency / CEC efficiency	98.6 % / 98.0 % / 98.0 %

The project activity has 29,376 Photovoltaic Modules and 135 invertors.

Project technical lifetime is determined through " Tool to determine the remaining lifetime of equipment" (Version 01). The project option is selected as (a) as below;

(a) Use manufacturer's information on the technical lifetime of equipment and compare to the date of first commissioning;

According to the equipment agreement, the system has 25 years linear pique power warranty.[10] Also the project activity is unlicensed power plant and government guarantees 10 year electricity purchasing so operational lifetime of the project is 25 years through linear piques power warranty.

PLF in case of solar energy have been calculated as follows:

1.In case of past period: The data such as actual power generated in a year will determine the PLF.

Plant Load Factor is the ratio of the actual output of a power plant over a period of time and its output if it had operated a full capacity of that time period.

Plant Load Factor = Gross Generation / (Installed Capacity * Number of Hours) Plant load factor is 20,06%

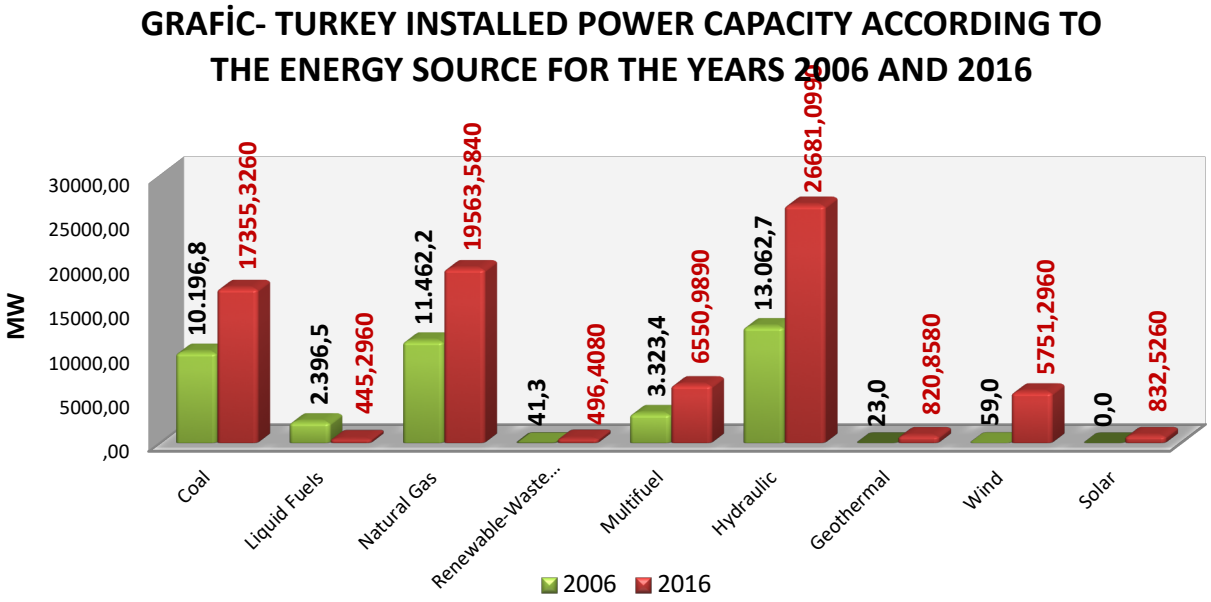
PLF= 14,060/ (8 *8760)*100=20,06%

The amount of annual production is 14.060 MWh. The project is planned to connect to Corum 2 TM that has 31,5 kV medium voltage. Latest building technologies will be used in the project. National and international standard values will be based in used materials. The electricity generation will result 7,880 tonnes of CO_2e/year and total emission reduction will be 39,399 tonnes of CO_2e for the first crediting period.

Figure 3: Jinko PV Module & SMA Inverter

The Project reduces GHG emissions by substituting fossil fuel generated electricity. The Project is expected to generate 14,060 MWh of electricity per year without emitting GHGs. The electricity generation is mainly done by fossil fuel fired power plants in Turkey. The share of resources in the electricity generation in Turkey[11] has been shown in the Figure as below;

Figure 4: Turkey Total Capacity (2006-2016)



[11] https://www.teias.gov.tr/tr/i-kurulu-guc

Total capacity is 78.497,4 MW in Turkey and Solar Power Projects have 832,5 MW capacities.

Generation of emission reduction and crediting period will start with the first day of the documented electricity supply to the national grid. The first 5 years will be the first crediting period of the project activity as 19/12/2017 to 18/12/2022 after the commissioning. Applying the approved methodology to the project annual avarege emission reduction will be 7,880 tCO2e by producing 14,060 MWh/year electricity. Totally 39,399 tCo2e emission reduction is expected over the period of 5 years.

A.6. Scale of the project

Small Scale

A.7. Funding sources of project

The project activity does not have any public funding or Official Development Assistance (ODA) funding.

A.8. Assessment that project complies with 'gender sensitive' requirements

(https://globalgoals.goldstandard.org/101-1-g-gold-standard-gender-equality-requirements-guidelines/)

Question 1: Does the project reflect the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy? Explain how.

Response: As per Gold Standard Gender Policy (https://globalgoals.goldstandard.org/101-1-g-gold-standard-gender-policy/), p. 10 "Foundational gender-sensitive requirement - This strengthens Gold Standard's 'do no harm' approach and addresses safeguards to prevent or mitigate adverse impacts on women or men and girls and boys. Such action is mandatory for all projects seeking Gold Standard certification and includes compliance with the gender 'do no harm' safeguards, gender gap analysis and gender sensitive stakeholder consultations."

The project being a renewable energy project is not gender sensitive project. The project does not adversely impact women or men.

Question 2: Does the project align with existing country policies, strategies and best practices? Explain how.

Response: The project does not involve and is not complicit in any form of discrimination based on gender, race, religion, sexual orientation or any other basis. Turkey is party to Convention on Discrimination since 1972 to prevent any form of discrimination. (https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=IV-2&chapter=4&lang=en)

Question 3: Does the project address the questions raised in the Gold Standard Safeguarding Principles & Requirements document? Explain how.

Response: The Project shall complete the following gender assessment questions (https://globalgoals.goldstandard.org/101-4-gold-standard-for-the-global-goals-safeguarding-principles-requirements/) below:

1. Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits? No, the Project being a solar power project does not reduce access to or control of resources for women.

2. Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)? No, the Project beneficiaries in terms of employment and social upliftment of the area are common for both the gender. The project does not involve in any form discrimination in any kind of form.

3. Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)? No, The project does not involve in any form discrimination in any kind of form.

4. Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)? Yes the project takes into account gender roles and abilities of women/men. Job profile is allocated based on the type of work to be carried out.

5. Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities? No, on the contrary the project leads to increased availability of electricity in the regional grid thereby uplifiting the living standards.

6. Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits? No, since the project is a renewable electiricity generation project, thus it will not have discriminated against women.

7. Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services? No, in fact, the project leads to improved electricity in the regional grid.

Question 4: Does the project apply the Gold Standard Stakeholder Consultation & Engagement Procedure Requirements? Explain how.

Response: The project is applying for retroactive GS registration. Because the date of inverter purchase agreement has been adopted as the starting date of the project activity. But the Stakeholder Consultation & Engagement Procedure Requirements has been done as explained below.

The project is applying for retroactive GS registration. The Stakeholder Consultation meeting has been done on 20th of June 2018 with the participation of Tatar village Mukhtar office of Merkez district in Çorum province.

Galata Wind Enerji A.Ş. has organized "Public Participation Meeting" for GS4GG Registration.

New LSC according to new Gold Standard Stakeholder Consultation & Engagement Procedure Requirements hasl been hold on 20th June 2018 in Tatar village mukhtar office near project site. Before the meeting the questionnaire regarding the sustainable development indicators and monitoring of the indicators along with the explanation of the indicators, meeting evaluation forms and non-technical description of the Çorum Solar Power Plant project has been provided to the local stakeholders on 21th of May 2018 and via mail on 18/05/2018.

Since the project's application for GS registration is retroactive, a Stakeholder Feedback round would also be carried out.

SECTION B. Application of selected approved Gold Standard methodology

B.1. Reference of approved methodology

According to the Appendix B to the simplified modalities and procedures for small-scale project activities, the proposed project activity falls under the following type and category:

Project type: Type I – Renewable Energy Projects

Category: D – Electricity generation for a system

Methodology: AMS I.D. Grid connected renewable electricity generation / Version 18;

Sectoral Scope: 01 Energy industries (renewable - / non-renewable sources) as per 'Sectoral scopes related approved methodologies and DOEs.

The methodology refers to:

- "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion", Version 03.[12]
- "Tool to calculate the emission factor for an electricity system", Version 06.0.0[13].
- Demonstration of additionality of small scale project activities Version 10.0[14]
- Tool to determine the remaining lifetime of equipment", Version 01[15]

[12] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf

[13] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf

[14] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v1.pdf

[15] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf

B.2. Applicability of methodology

Methodology "AMS-I.D. "Grid-connected renewable electricity generation, version 18, EB 81, Annex 24.", is applicable to the proposed project activity because it fulfils the required criteria:

Table 4 Applicability of AMS I.D Version 18

Applicability Condition	Justification
This methodology is applicable to project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity; (b) Involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s).	The project activity involves installation of a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity. The proposed project activity is a greenfield project activity . [16]
Solar power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: - The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; - The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4W/m2; or - The project activity result in new single reservoir and the power density of power plant, as per definitions given in the project emissions section, is greater than 4W/m2.	This condition is not applicable to the project activity as it does not involve the installation of a solar power plant.[17]
If the new unit has both renewable and non-renewable components (e.g. wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The proposed project activity involves the installation of a solar project with a total capacity of 8 MW and there is no non-renewable component to the proposed project activity.
Combines heat and power (co-generation) systems are not eligible under this category.	The proposed project activity is not a combined heat and power system.

[16] Call Letters – 10/07/2015

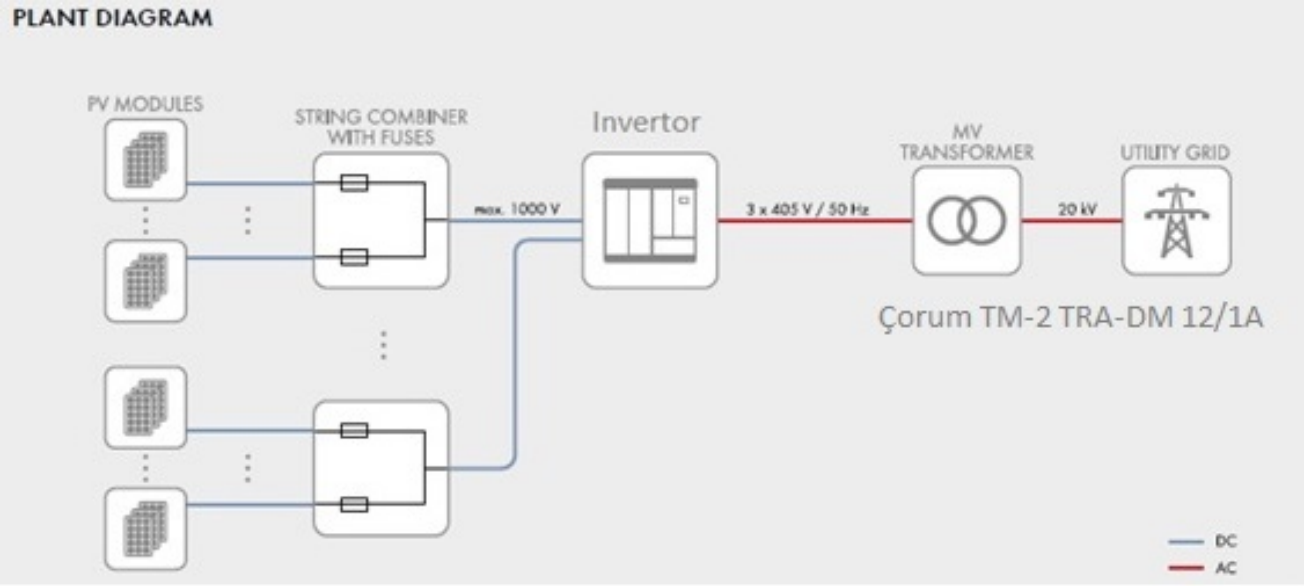
[17] TEDAŞ Provisional Acceptances – 19/12/2017

In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units	This condition is not applicable to the project activity since the project activity is a Greenfield grid connected solar power plant[18].
In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	The project activity is a Greenfield grid connected solar power plant. No retrofit or replacement exists in the project activity.

B.3. Project boundary

The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system. The project boundary for the project activity is as demonstrated in the figure below:

Figure 5: Project Boundary



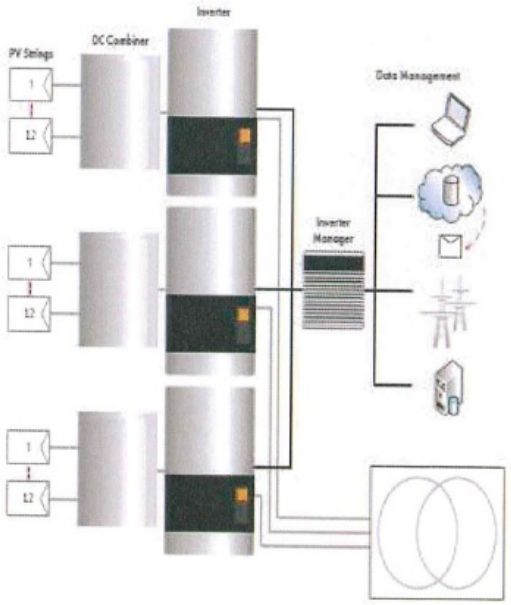
[18] TEDAŞ Provisional Acceptances – 19/12/2017

Table 5: The greenhouse gases and emission sources

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	CO_2 emissions resulting from electricity generation in fossil fuel fired power plants that are replaced due to the project activity	CO_2	Yes	Main emission source. The dominant emissions from power plants are in the form of CO_2, therefore CO_2 emissions from fossil fuel fired power plants connected to the grid will be considered in baseline calculations.
		CH_4	No	Minor emission sources
		N_2O	No	Minor emission sources
Project scenario	Construction and operation of the project activity	CO_2	No	Minor emission sources as stated in AMS I.D., version 18.0.0
		CH_4	No	Minor emission sources as stated in AMS I.D., version 18.0.0
		N_2O	No	Minor emission sources as stated in AMS I.D., version 18.0.0

The following figure represents the line diagram of the project activity, including metering points:

Figure 6: Single Line Diagram



The scheme shows the connection points of Çorum Solar Power Project with the national grid. The Çorum Solar Farm has to be connected to the national grid via 31.5 kV Medium Voltage overhead

transmission line. Two electricity meters will be installed at Çorum Solar Power Plant Project. These meters will be working in parallel. Solar System will be connected to the meters through a step-up transformer 154/31.5 kV

In accordance with AMS-I.D., version 18.0 no project emissions are relevant for the project activity, since these emissions are occurred as a result of the operation of geothermal power plants and water reservoirs of hydropower plants.

B.4. Establishment and description of baseline scenario

According to the "Baseline Methodology Procedure" in "Tool to calculate the emission factor for an electricity system, Version 06.0.0" baseline emissions are calculated under Section B.6.3.

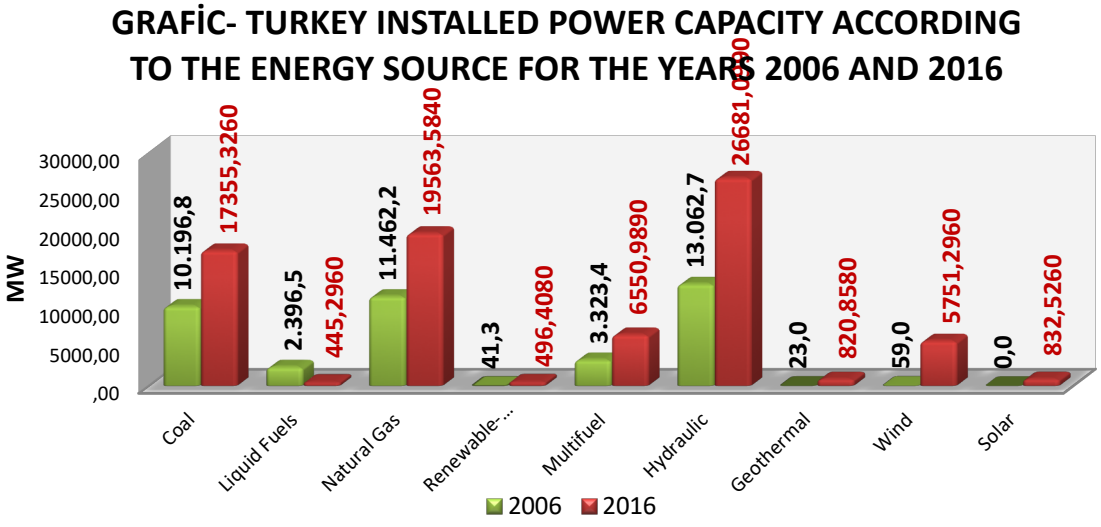
In respect of small-scale consolidated methodology AMS-I.D "Grid Connected Renewable Electricity Generation, version 18, EB 81, Annex 24", the baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid".

Since the proposed project activity is "The installation of a new grid-connected renewable power plant ", the baseline scenario is defined as the consolidation of electricity delivered to the grid by the project activity and electricity generated by the operation of grid-connected power plants in Turkey and electricity produced by the new generation sources.

Installed electricity generation capacity in Turkey has reached 78.497,4 megawatts (MW) as of 2016. Solar Power projects have totally have 832,5 MW.

The electricity generation is predominantly composed by fossil fuel fired power plants in Turkey. The share of resources in the electricity generation in Turkey may be seen in Figure 4 The contribution to annual electricity generation from wind energy was only 1,06 % in 2016.

Figure 7: Projected Electricity Generation Mix[19]



[19] https://www.teias.gov.tr/tr/i-kurulu-guc

According to the 5-year projection it is clear that fossil fuels will remain the main sources for electricity generation (71.5 % in 2019). Natural gas will continue to dominate the market. Hydro will account for 22.1% of the mix whereas all non-hydro renewable combined (geothermal/biogas/waste/wind/solar) will only account for 6.4% of all electricity generation. This projection is consistent with continuing fossil fuel dependent characteristics of Turkish electricity sector.

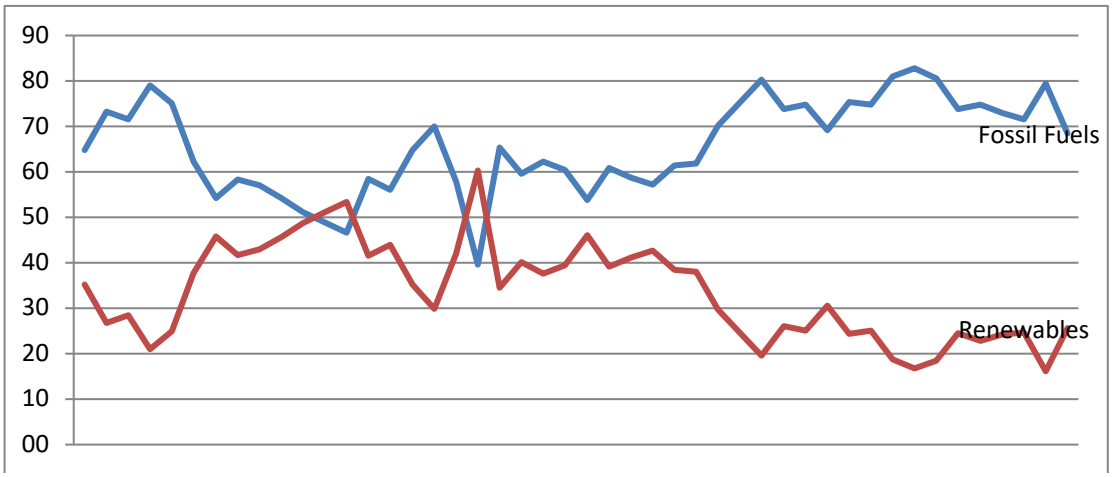


Figure 8: Fossil Fuels and Renewable in Turkish Electricity Mix (1970-2015)[20]

B.5. Demonstration of additionality

According to Additionality of small scale Project Activity (ver. 9 EB 68 Annex 27), it goes on to provide a positive list of grid-connected renewable electricity generation technologies that are automatically defined as additional, without further documentation of barriers.
The list of technologies and project activity types are defined as automatically additional for project size up to and including small scale CDM thresholds (e.g. installed capacity up to 15 MW).

The positive list comprises of the following grid-connected renewable electricity generation technologies of installed capacity up to 15 MW:
1) Solar technologies (photovoltaic and solar thermal electricity generation);
2) Off-shore wind technologies;
3) Marine technologies (wave, tidal).
4) Building-integrated wind turbines or household rooftop wind turbines of a size up to 100 kW;

The project activity is uses solar technology and project capacity is 8 MW. The project automatically becomes as additional and does not require demonstration of barriers. Thus, it is well established that the proposed project activity is additional.

The table below is only applicable if the proposed project is deemed additional, as defined by the applied approved methodology or activity requirement or product requirement.

[20] http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/istatistik2014.htm

Specify the methodology or activity requirement or product requirement that establish deemed additionality for the proposed project (including the version number and the specific paragraph, if applicable).	Additionality of small scale Project Activity (ver. 9 EB 68 Annex 27)
Describe how the proposed project meets the criteria for deemed additionality.	The positive list comprises of the following grid-connected renewable electricity generation technologies of installed capacity up to 15 MW: 1) Solar technologies (photovoltaic and solar thermal electricity generation); The project activity is uses solar technology and project capacity is 8 MW. The project automatically becomes as additional and does not require demonstration of barriers. Thus, it is well established that the proposed project activity is additional.

Milestones of the project activity is listed as below;

Milestones	Dates
EIA Exempt Letters	04/06/2015
Zoning Approval Letter	12/01/2017
Board Decision (For Carbon Prior Considiration)[21]	08/02/2017
EPC Agreement	06/07/2017
Construction Start Date	06/07/2017
Connection Opinion Letter	18/10/2017
Energy Transmission Line Provisional Acceptance	19/11/2017
Provisional Acceptance for 8 unlicensed project	19/12/2017

B.6. Sustainable Development Goals (SDG) outcomes

B.6.1. Relevant target for each of the three SDGs

a) SDG 7 : Affordable and Clean Energy : The project is expected to generate 14,060 MWh of clean energy per annum.

b) SDG 8 : Decent Work and Economic Growth : The project provides employment to 5 people.

c) SDG13 : Climate Action : The project would lead to reduction of approx. 7,880 tCO_2 per annum.

No	SDGs	Target ("T") and Indicators ("I")
1	Goal 7. Affordable and Clean Energy	T: 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix I: 7.2.1 "Renewable energy share in the total final energy consumption
2	Goal 8. Decent Work and Economic Growth	T: 8.5 By 2030 achieve full and productive employment and decent work for all women and men I: 8.5.2 Unemployment rate, by sex, age and persons with disabilities

[21] Board Decision Documents have been provided to the GS

3	Goal 13. Climate Action	T:13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning I:13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions

B.6.2. Explanation of methodological choices/approaches for estimating the SDG outcome

SDG 7 : Affordable and Clean Energy :

The project is expected to generate 14,060 MWh of clean energy per annum. The project contributes to the following indicators 7.2.1 "Renewable energy share in the total final energy consumption" and following target: 7.2 ''By 2030, increase substantially the share of renewable energy in the global energy mix"

The electricity generation is predominantly composed by fossil fuel fired power plants in Turkey. Natural gas will continue to dominate the market. Hydro will account for 22.1% of the mix whereas all non-hydro renewable combined (geothermal /biogas/waste/wind/solar) will only account for 6.4% of all electricity generation. But this project increases the renewable energy sharing of global energy mix and contribute to improved air quality by reducing air pollution.

SDG 8 : Decent Work and Economic Growth :

The project leads to employment opportunities which would not have been possible in the baseline scenario. The project provides employment to 5 people during the opration phase.

The project contributes to the following indicators 8.5.2 "Unemployment rate, by sex, age and persons with disabilities" and following target: "8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value"The target will be monitored by the number of full-time employees (5 employee) full time employees with the SGK records during the verification process. Because of the social conditions of the project area, employment of woman and persons with disabilities is not possible.

SDG13 : Climate Action :

The project would lead to reduction of approx. 7,880 tCO_2 per annum The project contributes to the following indicators 13.3.2 "Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target 13.3 "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning"

The project's contribution is done through training and awareness raising of local people and setting good example by investing to the climate friendly technology

The project leads to mitigation of 7,880 tCO2 per annum.

As developing the baseline and calculation of the emission reductions for the proposed project activity are calculated according to "Tool to calculate the emission factor of an electricity system" version 06.0.0.

Emission Reductions

The emission reductions are calculated based on the below formula:

$$ER_y = BE_Y - PE_Y - LE_y$$

Where:

ER_y = Emission reductions in year y (tCO_2e/yr)
BE_y = Baseline emissions in year y (tCO_2/yr)
PE_y = Project emissions in year y (tCO_2e/yr)
LE_y = Leakage emissions in year *y* (t CO_2/y)

Project Emissions

As the proposed project activity is a new grid-connected solar power plant. For this reason, PE_y is considered as "0" in line with AMS I.D Version 18.
$PE_y=0$

Leakage

Leakage emission (LE_y) is considered as "0" as suggested in AMS I.D Version 18

Baseline Emissions

The baseline emissions are calculated as follows:

$$BE_{y=}EGBL,y * EF_{CO2,grid,y}$$

Where:

BE_y = Baseline emissions in year *y* (tCO_2/yr)
EG_{BLy} = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)

$EF_{CO2grid\ y}$ = CO_2 emission factor of the grid in year *y* (t CO_2/MWh)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for (a) greenfield plants; (b) retrofits and replacements and; (c) capacity additions. Since the proposed project activity falls under the description greenfield plants, the following method has been adopted:

Greenfield renewable energy power plants

$$EG_{PJ,y} = EG_{facility,y}$$

Where:
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)
$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

Calculation of $EF_{grid,CM}$

$EF_{grid,CM}$ is calculated according to the "Tool to calculate the emission factor for an electricity system" version 06.0.0.

This tool provides the following steps to calculate combined margin (CM) emission factor:

Step 1. Identify the relevant electric systems;
Step 2. Choose whether to include off-grid power plants in the project electricity system (optional);
Step 3. Select a method to determine the operating margin (OM);
Step 4. Calculate the operating margin emission factor according to the selected method;
Step 5. Calculate the build margin (BM) emission factor;
Step 6. Calculate the combined margin (CM) emissions factor

Step 1. Identify the relevant electric systems

According to the "Tool to calculate the emission factor for an electricity system" (version 06.0.0), a project electricity system has to be defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints.
Similarly, a connected electricity system, e.g. national or international, is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint.

The transmission lines in Turkey are operated by TEDAŞ (Turkish Electricity Transmission Co), which is a state owned company. The grid is 56.744 km long and constitutes of 701 transformer stations with a total transformer capacity of 138,951 MVA and 10 interconnections to neighbour countries.[22] The interconnected grid system is operated continuously and there are no electricity price differences throughout the regions. For this reason, the relevant electric power system is defined as the national grid system of Turkey.

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional)

According to the applicable tool, Project Participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I : Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.

Option I has been chosen for the project activity and therefore only grid power plants are considered in the calculation.

Step 3. Selection of an operating margin (OM) method

According to "Tool to calculate the emission factor for an electricity system" (version 06.0.0), the calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:

(a) Simple OM; or
(b) Simple adjusted OM; or
(c) Dispatch data analysis OM; or
(d) Average OM.
The data specific to the power plants connected to the grid, such as the dispatch order for each power plant in the system and the amount of power dispatched from all plants in the system during each hour, are not available. Therefore, Simple OM has been selected as the methodology.

Option (a) Simple OM method has been selected for calculation of the operating margin emission factor. This choice is applicable since low-cost/must-run resources constitute less than 50% of total grid generation in:

1)average of the five most recent years or
2)based on long-term averages for hydroelectricity production

The low-cost/must-run resources include hydro, geothermal, wind, low-cost biomass, nuclear and solar power generation.
The share of the installed capacity of renewable energy sources excluding hydro power is 2.9% of the total electricity generation and is therefore not taken into consideration. There is no indication that coal is used as a must-run and no nuclear energy plants are located in Turkey. This makes solar

[22] http://www.teias.gov.tr/FaaliyetRaporlari/faaliyet2015/teias%20ing_2015.pdf The emission factor from neighbouring countries is taken as 0 tCO2eq/MWh for determining the OM.

power as the only relevant low-cost must run source for electricity. The requirements for the use of the Simple OM calculations are satisfied.

Table 5. Below shows the share of hydro and renewable resources in generation for the five most recent years (2012-2016) and it is below %50 of the total grid generation.

Table 6: Share of primary sources in electricity generation 2011-2015[23]

YEAR							
	THERMAL (GWh)	THERMAL Ratio	HYDRO (GWh)	HYDRO Ratio	GEOTHERM + WIND + WİND (GWh)	GEOTHERM + WIND + WİND Ratio	TOTAL (GWh)
2012	174871.7	73.0%	57865	24.2%	6760.1	2.8%	239496.8
2013	171812.5	71.6%	59420,5	24.7%	8921	3.7%	240154
2014	200416.6	79.5%	40644,7	16.1%	10901.5	4.3%	251962.8
2015	179366.4	68.5%	67145.8	25.6%	15271	5.8%	261783.3
2016	185798.1	67.7%	67230.9	24.5%	21378.7	7.8%	274407.7

Table 7: Breakdown of shares by sources of the electricity generation from the Turkish grid

Generation Shares							
Years	Coal Total	Liquid Total	Natural Gas	Wastes	Hydro	Geothermal +Wind + Wind	Total (GWh)
2012	13.9%	0.7%	43.6%	0.3%	24.2%	2.8%	239496.8
2013	26.6%	0.7%	43.8%	0.5%	24.7%	3.7%	240154
2014	30.2%	0.9%	47.9%	0.6%	16.1%	4.3%	251962.8
2015	29.1%	0.9%	37.9%	0.7%	25.6%	5.8%	261783.3
2016	33.6%	0.7%	32.5%	0.9%	24.5%	7.8%	274407.7

For the simple OM, the emissions factor can be calculated using either of the two following data vintages:

- Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM PDD to the DOE for validation.

- Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

[23] http://www.teias.gov.tr/sites/default/files/2017-10/59%282000-2016%29.xls (Annual Development of Turkey's Gross Electricity Generation by Share of Primary Energy Sources 1970-2016)

The ex ante option has been selected for the proposed project activity. Data from the period 2014-2016 has been obtained for calculating the three year average. This period is standing for the most recent data available at the time of submission of the PDD to DOE.

Step 4: Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2e/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. The simple OM emission factor might be calculated as follows:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit;

Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Since the fuel consumption and the average efficiency data for each power plant/unit are not available Option B is used for simple OM calculation.

The simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost/must run power plants/units, and based on the fuel type(s) and total fuel consumption of the project electricity system as follows:

$$EF_{grid,OMsimple,y} \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_y}$$ Equation (9)

Where:

$EF_{grid,OMsimple,y}$ = Simple operating margin CO2 emission factor in year *y* (t CO_2/MWh)
$FC_{i,y}$ = Amount of fuel type *i* consumed in the project electricity system in year *y* (mass or volume unit)
$NCV_{i,y}$ = Net calorific value (energy content) of fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$ = CO_2 emission factor of fuel type *i* in year *y* (t CO_2/GJ)
EG_y = Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year y (MWh)
i = All fuel types combusted in power sources in the project electricity system in year y
y = The three most recent years for which data is available at the time of submission of the PDD to the DOE for validation (ex-ante option)

Step 5: Calculate the build margin (BM) emission factor

The Build Margin have been calculated for the year 2016.

There are two main information sources for the Turkish electricity system: TEDAŞ (www.teias.com.tr) and Ministry of Energy and Natural Resources (www.etkb.gov.tr).

In terms of vintage of data, project participants can choose between one of the following two options:

Option 1: For the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Project Proponent chooses Option 1 in terms of vintage of data for the proposed project activity.

Data from the period 2014-2016 has been obtained for this calculating. This period is standing for the most recent data available at the time of submission of the PDD to DOE.

Step 6: Calculate the combined margin emissions factor

According to the applicable methodological tool, the calculation of the combined margin (CM) emission factor (EFgrid, CM) is based on one of the following methods:

(a) Weighted average CM; or
(b) Simplified CM.

The Project Participant chooses option (a), weighted average CM.

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \cdot w_{OM} + EF_{grid,BM,y} \cdot w_{BM} \qquad \text{Equation (16)}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (t CO_2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (t CO_2/MWh)
w_{OM} = Weighting of operating margin emissions factor (per cent)
w_{BM} = Weighting of build margin emissions factor (per cent)

According to the "Tool to calculate the emission factor for an electricity system" (version 06.0.0), the default weights for the operating margin and build margin emission factors for solar power generation is defined as:

w_{OM}=0.75
w_{BM}=0.25

for the first crediting period.

B.6.3. Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs

a. SDG 7 : Affordable and Clean Energy : The project is expected to generate 14,060 MWh of clean energy per annum The project contributes to the following indicators 7.2.1 "Renewable energy share in the total final energy consumption" and following target: 7.2 ''By 2030, increase substantially the share of renewable energy in the global energy mix."

b. SDG 8 : Decent Work and Economic Growth : The project provides employment to around 5 people.

The project contributes to the following indicators 8.5.2 Unemployment rate, by sex, age and persons with disabilities and following target 8.5 'By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value'.

d.SDG13 : Climate Action : The project would lead to reduction of approx. 7,880 tCO2 per annum The project contributes to the following indicators 13.3.2 "Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target 13.3 "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning"

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target
Data/parameter	EGgross
Unit	MWh
Description	Gross electricity production by fossil fuel power sources (2013-2015)
Source of data	TEIAS (Turkish Electricity Transmission Company) www.teias.gov.tr. The distribution of gross electricity generation by primary energy resources and the electricity utilities in Turkey (2013, 2014, 2015).
Value(s) applied	Year 2014: 198,984,002 MWh Year 2015: 177,608,288 MWh Year 2016: 183,426,500 MWh

Choice of data or Measurement methods and procedures	TEIAS, the Turkish Electricity Transmission Company is the official source for the related data, thus providing the most up-to-date and accurate information available.
Purpose of data	Calculation of baseline emissions to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target
Data/parameter	FCi,y
Unit	tonnes (m3 for gaseous fuels)
Description	Amount of fossil fuel type i consumed in the project electricity system by generation sources in year y (2013-2015)
Source of data	TEIAS (Turkish Electricity Transmission Company) www.teias.gov.tr . Fuels consumed in thermal power plants in Turkey by the electricity utilities (2013-2015) See table 8
Value(s) applied	

	Units	2014	2015	2016
Natural Gas	1000m3	25,426,014	20,914,868	18,954,093
Lignite	tonnes	57,696,139	49,940,131	60,213,772
Coal	tonnes	14,501,934	16,629,492	19,642,410
Fuel Oil	tonnes	754,283	516,912	526,674
Diesel Oil	tonnes	119,988	238,388	306,393
Lpg	tonnes	0	0	0
Naphta	tonnes	0	0	0

Choice of data or Measurement methods and procedures	TEIAS, the Turkish Electricity Transmission Company is the official source for the related data, thus providing the most up-to-date and accurate information available.
Purpose of data	Calculation of baseline emissions to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	

<table>
<tr><td>Relevant SDG Indicator</td><td>13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target</td></tr>
<tr><td>Data/parameter</td><td>NCVi,y</td></tr>
<tr><td>Unit</td><td>TJ/kt (106 m3 for gaseous fuels)</td></tr>
<tr><td>Description</td><td>Net calorific value (energy content) of fossil fuel type i in year y</td></tr>
<tr><td>Source of data</td><td>Calculated based on TEIAS (Turkish Electricity Transmission Company) www.teias.gov.tr Heating values of fuels consumed in thermal plants in Turkey by the electricity utilities (2013-2015)</td></tr>
<tr><td>Value(s) applied</td><td>Please see calculations of emission factor (Section B.6.1) See table 9</td></tr>
<tr><td>Choice of data or Measurement methods and procedures</td><td>
<table>
<tr><td></td><td colspan="3">NCVi(TJ/kt)</td></tr>
<tr><td></td><td>2014</td><td>2015</td><td>2016</td></tr>
<tr><td>Natural Gas</td><td>37.49</td><td>37,837</td><td>38,011</td></tr>
<tr><td>Lignite</td><td>7.11</td><td>7,161</td><td>7,196</td></tr>
<tr><td>Hard Coal + Imported Coal</td><td>23.93</td><td>24,075</td><td>24,074</td></tr>
<tr><td>Fuel Oil</td><td>41.32</td><td>44,216</td><td>42,418</td></tr>
<tr><td>Diesel Oil</td><td>43.44</td><td>43,784</td><td>44,203</td></tr>
<tr><td>Lpg</td><td>0</td><td>0,000</td><td>0,000</td></tr>
<tr><td>Naphta</td><td>0</td><td>0,000</td><td>0,000</td></tr>
</table>
</td></tr>
<tr><td>Purpose of data</td><td>Calculation of baseline emissions to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning</td></tr>
<tr><td>Additional comment</td><td>-</td></tr>
</table>

<table>
<tr><td>Relevant SDG Indicator</td><td>13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target</td></tr>
<tr><td>Data/parameter</td><td>$EFC0_2,i,y$</td></tr>
<tr><td>Unit</td><td>tCO2/TJ</td></tr>
<tr><td>Description</td><td>CO_2 emission factor of fossil fuel type i used in power unit m in year y</td></tr>
</table>

Source of data	Natural Gas: 54,3 Lignite: 90,9 Hard Coal + Imported Coal: 89,5 Fuel Oil: 75,5 Diesel Oil: 72,6 Lpg: 61,6 Naphta: 69,3
Value(s) applied	http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.htm
Choice of data or Measurement methods and procedures	Please see calculations of emission factor (Section B.6.1) See table 7
Purpose of data	There is no information on the fuel specific default emission factor in Turkey, hence, IPCC values has been used as referred in the "Tool to calculate the emission factor for an electricity system ".
Additional comment	Calculation of baseline emissions to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target
Data/parameter	ηm,y
Unit	%
Description	Average net energy conversion efficiency of power unit m in year y
Source of data	"Appendix 1, Default efficiency factors for power plants" of "Tool to calculate the emission factor for an electricity system" version 06.0.0.
Value(s) applied	Natural Gas: 0.60 Import Coal: 0.50 Lignite: 0.50
Choice of data or Measurement methods and procedures	The average values of thermal plants in Turkey are taken from "Tool to calculate the emission factor for an electricity system" 06.0.0.
Purpose of data	Calculation of baseline emissions to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-
Data / Parameter:	EFgrid,CM,y

Data unit:	tCO2/MWh
Description:	Emission factor of the Turkish grid
Source of data used:	Corum Solar Power Plant Project
Value(s) applied	0.5503
Choice of data or measurement methods and procedures	Baseline emission calculation
Purpose of data	Emission factor of the Turkish grid determined ex- ante. Calculated specific emission factors based on the carbon emission data and the electricity production of the grid.
Additional comments:	N/A

B.6.4. Ex ante estimation of outcomes linked to each of the three SDGs

Calculation of the operating margin emission factor

For the calculation of the OM the consumption amount and heating values of the fuels for each sources used for the years 2014, 2015 and 2016, is taken from the TEIAŞ annual statistics, which holds data on annual fuel consumption by fuel types as well as electricity generation amounts by sources and electricity imports. All the data needed for the calculation, including the emission factors and net calorific values (NCVs). Total CO2 emission due to electricity generation in Turkey for the years of 2014, 2015 and 2016 are given in:

Table 8: CO2 emission from electricity production (2014-2016)(tCO2)

tCO2 (tonnes)	2014	2015	2016
Hard Coal+Imported Coal+Asphaltite	31,054,429	35,832,091	42,322,566
Lignite	37,264,883	32,508,012	39,388,444
Fuel Oil	2,353,074	1,725,608	1,686,704
Diesel Oil	378,432	757,776	983,254
Natural Gas	51,754,461	42,970,146	39,120,876
Total CO2-Emissions	122,805,280	113,793,634	123,501,844

The amount of fuel consumption (FCi,y) is taken from website of TEIAS for the calculation of the Simple OM.

The fuel consumption values for 2014-2016 may be seen in Table 9:

Table 9: Fuel consumption of generation sources connected to the grid (2014-2016)[24]

	Units	2014	2015	2016	Total
Natural Gas	1000m3	25,426,014	20,914,868	18,954,093	65,294,975
Lignite	tonnes	57,696,139	49,940,131	60,213,772	167,850,042
Coal	tonnes	14,501,934	16,629,492	19,642,410	50,773,836
Fuel Oil	tonnes	754,283	516,912	526,674	1,797,869
Diesel Oil	tonnes	119,988	238,388	306,393	664,769
Lpg	tonnes	0	0	0	0
Naphta	tonnes	0	0	0	0

Annual heating values for each fuel type are directly related with the fuel consumption and are used to calculate Net Calorific Values (TJ/kt) for each year (Table.10). The annual heating values are converted to TJ and divided by the fossil fuel consumption(kt) for that year.
Turkish specific net calorific values (NCVi,y) values for fossil fuel types have been calculated, using data from the IPCC Guidelines for National Greenhouse Gas Inventory for the emission factor of the fossil fuel types (EFCO2,i,y).

Table 10: NCV and emission factor of fossil fuel type[25]

	NCVi(TJ/kt)			EFCO2,i (tonnes/TJ)[26]
	2014	2015	2016	
Natural Gas	37.49	37.837	38.011	54,3
Lignite	7.11	7.161	7.196	90,9
Hard Coal + Imported Coal	23.93	24.075	24.074	89.5
Fuel Oil	41.32	44.216	42.418	75.5
Diesel Oil	43.44	43.784	44.203	72.6
Lpg	0	0.000	0.000	61.6
Naphta	0	0.000	0.000	69.3

The electricity delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units (EGgross,y) is obtained from TEIAS (Turkish Electricity Transmission Company).

Table 11 shows the gross electricity production for 2014-2016 produced by fossil fuel power sources:

24 Annual Development of Fuels Consumed in Thermal Power Plants in Turkey by the Electric Utilities

http://www.teias.gov.tr/sites/default/files/2017-10/73_1.xls

25 http://www.teias.gov.tr/sites/default/files/2017-10/75.xls

26 http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

Table 11 Gross electricity generation by fossil fuel power sources 2014-2016[27]

	EGgross,y (MWh)			
	2014	2015	2016	Total
Natural Gas	120,576,031	99,218,742	89,227,100	309,021,873
Lignite	36,615,369	31,335,735	38,569,900	106,521,004
Hard Coal + Import Coal	39,647,313	44,829,872	53,703,200	138,180,385
Fuel Oil	1,662,854	980,378	969,100	3,612,332
Diesel Oil	482,435	1,243,561	957,200	2,683,196
Lpg	0	0	0	0
Naphta	0	0	0	0

To calculate the net electricity fed into the grid by specific fuel sources, relation between overall gross/net electricity generation data is calculated. The electricity consumption of the power plants is included in the gross electricity production. This relation is derived in in Table 12:

Table 12: : Relation between net and gross electricity generation 2014-2016[28]

	2014	2015	2016
Gross generation (MWh)	251,962,800	261,783,300	274,407,700
Net generation (MWh)	239,448,800	249,899,500	261,950,900
Relation	95,03%	95,5%	95.5%

The net electricity delivered to the grid by the fossil fuel plants (EGnet,y) is calculated in Table 13

Table 13: Net electricity generation fossil fuel power plants and electricity imports 2014-2016[29]

	2014	2015	2016	Total
Gross electricity generation (GWh)	198,984	177,608	183,426.50	376,592
Net electricity generation EGnet,y (GWh)	189,101	169,546	175,099.800	358,647
Electricity imports (GWh)	7,953.3	7,135.5	6,330	15,089
Electricity supplied to grid EGy (GWh)	197,055	176,681	175,099.80	373,736

27 http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2015/uretim%20tuketim(34-64)/48(2006-2015).xls and http://www.teias.gov.tr/sites/default/files/2017-10/37.docx

28 http://www.teias.gov.tr/sites/default/files/2017-10/46.xls

29 http://www.teias.gov.tr/sites/default/files/2017-10/46.xls

The calculation of EFgrid,OM,y requires the inclusion of electricity imports with an emission factor of 0 tCO2/MWh. Therefore, the imports in the electricity production has been added.

The last step is to calculate EFgrid,OMsimple,y:

Table 14: Operating Margin

	2014	2015	2016
CO2-Emmissions (tCO_2)	122,805,280	113,793,634	123,501,844
Net Electricity Supplied to Grid by relevant sources (GWh)	197,055	176,681	181,430
EFgrid,OMsimple,y (tCO_2/MWh)	0,6232	0,6441	0,6807
3-year Generation Weighted Average EFgrid,OMsimple,y (tCO_2/MWh)	0,6486		

Based on the above values, the simple operating margin CO_2 grid emission factor (EFgrid,OMsimple,y) calculated through equation is **0.6486 tCO_2/MWh.**

Calculation of the build margin emission factor

The Build Margin have been calculated for the year 2015.

There are two main information sources for the Turkish electricity system: TEDAŞ (www.teias.com.tr) and Ministry of Energy and Natural Resources (www.etkb.gov.tr).

Step 5.1 Select the option regarding the vintage:

In terms of vintage of data, project participants can choose between one of the following two options:
Option 1: For the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third

crediting period, the build margin emission factor calculated for the second crediting period should be used.

Project Proponent chooses Option 1 in terms of vintage of data for the proposed project activity:

Step 5.2 The Identification of Power Units to Be Used in Calculation of BM

The sample group of power units m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

The recent added power units (SET5 Units) list can be obtained from the Ministry of Energy and Natural Resources web site[30]

Table 15: The 5 most recent power plants (accordingly year 2016)(excluding VERs)

Company Name	Plant Name	Place	Fuel Type	Power Capacity MWe	Temporary Acceptance Date
BEŞTEPELER ENERJİ ÜRETİM SAN. VE TİC. A.Ş.	KUBİLAY JES	Aydın	Jeotermal	23	31/12/16
OLGU ENERJİ YATIRIM ÜRETİM VE TİC. A.Ş.	DİNAR RES	Afyonkarahisar	RES	7,4	30/12/16
TAN ELEKTRİK ÜRETİM A.Ş.	ALİAĞA RES	İzmir	RES	9,6	30/12/16
BEREKET ENERJİ ÜRETİM A.Ş.	GÖKTAŞ HES (GÖKTAŞ-1 HES)	Adana	HES	122,2	29/12/16
BEREKET ENERJİ ÜRETİM A.Ş.	ÇİĞDEM REG. VE HES (ÇİĞDEM 3 HES)	Sinop	HES	4.8	29/12/16

Important Note: (The Rationale for Usage of Power Capacities instead of Annual Electricity Production Data)

There is no data available for annual electricity production of each power plant belonging to years 2014, 2015 and 2016. The data available for the annual energy production for specific power station belongs to year 2012. To update the BM to the year 2016, the only data that we can use to estimate the annual production is the power capacity. We can make calculations as if every power plant had operated with full capacity all around the year.

The usage of capacity is a CDM Executive Board approved deviation from the methodology AM005 for a similar situation[31]. According to the board-approved deviation, as the annual production data is absent, we will "use of weights estimated using installed capacity in place of annual electricity generation" (cited from the link given in footnote).

[30] http://www.etkb.gov.tr/tr-TR/AramaSonuclari?k=2015+enerji+yat%u0131r%u0131mlar%u0131&page=2

[31] http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

The CDM registered projects are excluded from the five power plants given in Table 6. The sum of power capacities of these plants is 167 MW. AEGSET 5 Units: 167 MW * year.

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as VER project activities

Total capacity at the end of the year 2016 is 78497.4 [32] (which is AEGTotal). The 20 percent of total capacity is 15699.5MW so AEGSET≥20 per cent > AEGSET 5 Units.

(c) Selection of The SETsample

AEGSET≥20 per cent > AEGSET 5 Units so the set AEGSET≥20 per cent is selected. None of them has started to produce electricity more than 10 years ago, so the steps (d), (e) and (f) are ignored. SETsample (AEGSET≥20 per cent)

The 20 percent of total power is 15700 MW.

Table 16: SET-Sample Periods

Period	Capacity Addition (MW)	CDM Registered (MW)	Addition (Excluding CMD Projects) (MW)	Thermal (MW)
02/10/2013 – 31/12/2013	2602.64	254.42	2348.22	1735.57
2014	6305.2	570,435	5734.7	3882.31
2015	4287.571	1252,299	3035,27	930.836
2016	5919.10	1329.77	4589.33	2121.44
Total	19114.514	2077.2	15707.52	8670.15

The sum of 2016, 2015 and 2014 projects (excluding VER registered) is 13359.3 MW. We need to include more projects from 2013 to exceed 15,700 MW (we need 2340.7 MW more). As we include the projects between dates 21.06.2013 and 31.12.2013, we sum up to 15875,2 MW. Here we get the SETSample.

SETSample List

You can find the list of SETSample below in Table 27, yellow rows indicate that the project is VER registered and they are excluded from the SET.

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Table 17: SET-Sample List

SANTRAL ADI	YAKIT CİNSİ	İLAVE KURULU GÜÇ MWe	GEÇİCİ KABUL TARİHİ
SARPINCIK RES	RES	6.90	31/12/16
KUBİLAY JES	JEOTERMAL	23.00	31/12/16
DİNAR RES	RES	7.432	30/12/16
ALİAĞA RES	RES	9.60	30/12/16
ÇATALCA RES	RES	16.50	29/12/16
GÖKTAŞ HES (GÖKTAŞ-1 HES)	HES	122.20	29/12/16
ÇİĞDEM REG. VE HES (ÇİĞDEM 3 HES)	HES	4.80	29/12/16
OVARES RES	RES	0.00	28/12/16
SAMATLAR REGÜLATÖRÜ VE HES	HES	5.783	27/12/16
YAHYALI RES	RES	23.10	24/12/16
KIRKAĞAÇ RES	RES	17.100	23/12/16
FATMA RES	RES	11.200	23/12/16
MELİKOM REGÜLATÖRÜ VE HES	HES	6.750	23/12/16
MEHMETHAN JES	JEOTERMAL	22.80	22/12/16
TOPÇAM HES	HES	20.450	21/12/16
KEBAN DERESİ HES	HES	0.325	18/12/16
KELTEPE RES	RES	9.20	18/12/16
AKNİŞASTA TERMİK KOJENERASYON SANTRALİ	DG	2.30	17/12/16

KURTEKS ÜRETİM TESİSİ	DG	2.00	16/12/16
SOMA RES	RES	9.00	16/12/16
OMMER OTEL TRİJENERASYON TESİSİ	DG	1.286	16/12/16
ÇATALCA RES	RES	16.50	16/12/16
YALOVA RES	RES	10.50	15/12/16
SAYALAR RES	RES	3.00	15/12/16
ERAK GİYİM KOJENERASYON SANTRALİ	DG	-0.165	15/12/16
SARPINCIK RES	RES	11.50	09/12/16
BANDIRMA-3 RES	RES	7.20	09/12/16
KOCAELİ ÇÖP BİYOGAZ SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	1.415	09/12/16
SEYİTALİ RES	RES	4.00	08/12/16
URLA RES	RES	7.50	08/12/16
FATMA RES	RES	16.80	08/12/16
BALIKLI I-II-III HES	HES	3.237	07/12/16
YAHYALI RES	RES	23.10	07/12/16
KARACABEY RES	RES	10.00	07/12/16
KARADAĞ RES	RES	13.542	07/12/16
SENKRON EFELER BİYOGAZ SANTRALİ	BİYOKÜTLE	1.20	07/12/16
ZELİHA RES	RES	9.00	07/12/16
SUSURLUK RES	RES	0.000	06/12/16
DİNAR RES	RES	31.586	06/12/16
İNCESU RES	RES	14.00	06/12/16

SEFERİHİSAR RES	RES	9.00	06/12/16
KINIK RES	RES	48.00	05/12/16
MAZI I RES	RES	17.00	05/12/16
MEŞELİ HES	HES	3.10	08/11/16
EDİNCİK RES	RES	21.00	06/11/16
FUATRES RES	RES	10.20	05/11/16
SOMA RES	RES	21.00	05/11/16
KOZBÜKÜ HES	HES	60.810	05/11/16
ELMALI RES	RES	18.00	05/11/16
KONAKPINAR RES	RES	5.70	04/11/16
YAHYALI RES	RES	19.80	04/11/16
ERİK REGÜLATÖRÜ VE HES	HES	9.012	04/11/16
URLA RES	RES	5.00	04/11/16
KUBİLAY JES	JEOTERMAL	1.00	31/10/16
MEHMETHAN JES	JEOTERMAL	2.00	31/10/16
AHMETLİ HES	HES	11.640	31/10/16
ATLAS İNŞAAT OSMANİYE ÇÖP GAZI ELEKTRİK ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	3.120	31/10/16
KEN 3 JES	JEOTERMAL	9.8	31/10/16
SULTANHİSAR JES	JEOTERMAL	1.10	31/10/16
YUMRUTEPE REGÜLATÖRÜ VE HES	HES	9.958	31/10/16
DEREİÇİ HES	HES	6.770	30/10/16
SARPINCIK RES	RES	4.60	30/10/16

HALK ENERJİ ERZURUM GES	GES	4.90	30/10/16
MELİKOM REGÜLATÖRÜ VE HES	HES	0.85	29/10/16
UMURLU-2 JES	JEOTERMAL	12.00	28/10/16
KARGI REGÜLATÖRÜ VE HES	HES	0.97	28/10/16
KIRKAĞAÇ RES	RES	5.70	28/10/16
KASIMLAR BARAJI VE HES	HES	25.00	28/10/16
MUTLULAR BES	BİYOKÜTLE (ORMAN ATIĞI)	30.00	28/10/16
MALATYA-1 ÇÖP GAZ ELEKTRİK ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	1.20	28/10/16
HATAY GÖKÇEGÖZ ÇÖP SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	4.239	28/10/16
MEŞELİ HES	HES	3.10	25/10/16
KILCAN HES	HES	2.39	22/10/16
MAS 1 YENİLENEBİLİR ENERJİ ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	0.835	22/10/16
ZEUS BİYOKÜTLE ENERJİSİNE DAYALI ELK. ÜRT. TESİSİ	BİYOKÜTLE	12.00	22/10/16
SEFERİHİSAR RES	RES	3.00	22/10/16
MARAŞ BİYOKÜTLE TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	1.20	21/10/16
FATMA RES	RES	5.60	21/10/16
GÜVERCİN REG. VE HES	HES	16.372	21/10/16
AFYONKARAHİSAR SANDIKLI BİYOKÜTLE ÜRETİM TESİSİ	BİYOKÜTLE	1.40	21/10/16
ERİK REGÜLATÖRÜ VE HES	HES	6.010	21/10/16
KARACABEY RES	RES	15.00	21/10/16
URLA RES	RES	2.50	20/10/16
NAZAR ÜRETİM TESİSİ	DG	4.50	15/10/16

BURSA ÇİMENTO KOJENERASYON TESİSİ	ATIK ISI	9.00	14/10/16
TİRE BİYOGAZ TESİSİ	BİYOKÜTLE	4.268	14/10/16
SOLENTEGRE GES	GES	8.00	14/10/16
OKKAYASI REG. VE ŞEHİTLİK HES	HES	22.708	13/10/16
İZMİT RAFİNERİ TERMİK-KOJENERASYON	DG/FO	35.00	08/10/16
NAMNAM HES	HES	3.720	07/10/16
BANDIRMA-3 RES	RES	9.60	07/10/16
KARABEL RES	RES	3.00	06/10/16
KUZEY I-II REG. VE HES	HES	5.55	06/10/16
TÜFEKÇİKONAĞI HES	HES	5.18	04/10/16
AKYURT RES	RES	4.40	02/10/16
AREL YENİLENEBİLİR ENERJİ ISPARTA BİYOKÜTLE TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	2.826	01/10/16
BOZYAKA RES	RES	2.40	01/10/16
KARAÇAYIR RES	RES	1.60	01/10/16
ALAŞEHİR JES 2	JEOTERMAL	24.000	01/10/16
GREENECO JES	JEOTERMAL	12.800	30/09/16
OVARES RES	RES	3.00	29/09/16
KONAKPINAR RES	RES	6.30	29/09/16
YAHYALI RES	RES	13.20	24/09/16
KANDİL REG. VE HES	HES	6.192	23/09/16
ELMALI RES	RES	9.00	23/09/16
SİVAS ÇÖP GAZ ELEKTRİK ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	1.41	22/09/16

BALKODU II HES	HES	6.492	10/09/16
DEMİRCİLİ RES	RES	10.00	09/09/16
AKYURT RES	RES	8.40	09/09/16
ÜNDOĞDU RES	RES	6.750	08/09/16
OVARES RES	RES	8.00	08/09/16
ITC-KA ÇARŞAMBA ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	1.415	08/0G9/16
ATİLLA REGÜLATÖRÜ VE HES	HES	10.43	08/09/16
KARAÇAYIR RES	RES	8.40	08/09/16
BALIKLI I-II-III HES	HES	6.55	02/09/16
KOZBÜKÜ HES	HES	20.27	02/09/16
ALİAĞA RES	RES	6.00	02/09/16
ÇARIKLI HES	HES	8.96	02/09/16
DEMİRCİLİ RES	RES	10.00	26/08/16
DEMİRCİLER RES	RES	14.75	26/08/16
OVARES RES	RES	4.00	26/08/16
SARITEPE RES	RES	5.000	25/08/16
TERMİK-KOJENERASYON SANTRALİ	DG	2.022	19/08/16
ALİAĞA RES	RES	18.00	12/08/16
YALOVA RES	RES	12.00	12/08/16
ZONGULDAK EREN ENERJİ ELEKTRİK ÜR. A.Ş. ÜRETİM TESİSİ (ZETES III)	YERLİ/İTHAL TAŞKÖMÜRÜ VEYA LİNYİT	700.00	11/08/16
GEYCEK RES	RES	18.00	05/08/16
BOREAS I ENEZ RES	RES	2.50	31/07/16

KARADAĞ RES	RES	2.70833	30/07/16
BEREKETLİ RES	RES	30.00	29/07/16
DEMİR REGÜLATÖRÜ VE HES	HES	0.705	29/07/16
DEMİRCİLİ RES	RES	10.00	29/07/16
AFYON-I BİYOGAZ SANTRALİ	BİYOKÜTLE (HAYVANSAL ATIK)	1.20	29/07/16
ZİNCİRLİ RES	RES	2.40	24/07/16
DEMİRCİLER RES	RES	8.55	22/07/16
ULUBORLU RES	RES	19.992	22/07/16
SARITEPE RES	RES	10.00	22/07/16
EBRU REG. VE HES	HES	15.310	22/07/16
İNTEPE RES	RES	2.30	21/07/16
İÇ ANADOLU DGKÇS	DG	280.000	21/07/16
AMASYA RES	RES	15.000	15/07/16
GEP KARAMAN OSB KOJENERASYON SANTRALİ	DG	4.200	15/07/16
ZELİHA RES	RES	6.00	04/07/16
ALİAĞA RES	RES	6.00	01/07/16
DEMİRCİLİ RES	RES	10.00	01/07/16
DORA-4 JES	JEOTERMAL	17.00	30/06/16
GEBZE KOJENERASYON TESİSİ	DG	11.85	30/06/16
ZONGULDAK EREN ENERJİ ELEKTRİK ÜR. A.Ş. ÜRETİM TESİSİ (ZETES III)	YERLİ/İTHAL TAŞKÖMÜRÜ VEYA LİNYİT	700.00	30/06/16
YANIKKÖPRÜ HES	HES	9.20	30/06/16

İÇ ANADOLU DGKÇS	DG	280.00	29/06/16
ÇERÇİKAYA RES	RES	4.00	24/06/16
ABALIOĞLU KOJENERASYON TESİSİ	DG	6.066	24/06/16
ZİNCİRLİ RES	RES	9.60	24/06/16
SEFERİHİSAR RES	RES	2.00	24/06/16
ÇAYALTI REGÜLATÖRÜ VE HES (2. SANTRAL)	HES	2.16	24/06/16
POYRAZ RES	RES	21.00	24/06/16
MORDOĞAN RES	RES	13.80	24/06/16
İÇ ANADOLU DGKÇS	DG	280.00	23/06/16
DEMİR REGÜLATÖRÜ VE HES	HES	1.895	18/06/16
AMASYA RES	RES	12.00	17/06/16
BOZYAKA RES	RES	0.50	17/06/16
POYRAZ RES	RES	12.00	17/06/16
ODAYERİ BİYOGAZ	BİYOKÜTLE (ÇÖP GAZI)	5.660	17/06/16
SARITEPE RES	RES	35.00	17/06/16
TAHA DGKÇS	DG	68.00	10/06/16
ULUBORLU RES	RES	16.67	10/06/16
ÇATALTEPE RES	RES	2.50	10/06/16
TERMİK (KOJENERASYON) SANTRALİ	İTHAL KÖMÜR	9.70	09/06/16
BOZYAKA RES	RES	4.80	09/06/16
GARZAN BARAJI VE HES	HES	1.34	03/06/16
ALAÇATI RES	RES	16.00	03/06/16

SEFERİHİSAR RES	RES	12.00	03/06/16
YALOVA RES	RES	13.50	03/06/16
AMASYA RES	RES	15.00	30/05/16
POYRAZ RES	RES	9.00	27/05/16
İNTEPE RES	RES	13.80	27/05/16
TEKAS ELEKTRİK ÜRETİM SANTRALİ	DG	0.80	27/05/16
URLA RES	RES	13.00	27/05/16
GERES RES	RES	2.500	27/05/16
PAMUKÖREN JES 3	JEOTERMAL	22.51	20/05/16
ENERJEO KEMALİYE SANTRALİ	JEOTERMAL	24.90	20/05/16
ÇATALTEPE RES	RES	7.50	20/05/16
TAHA DGKÇS	DG	68.00	20/05/16
AKPINAR HES	HES	9.010	19/05/16
MARTEKS ÜRETİM TESİSİ	DG	4.300	14/05/16
KURTKAYASI RES	RES	9.000	13/05/16
KANİJE RES	RES	0.000	13/05/16
İNEGÖL-CERRAH HES	HES	1.181	13/05/16
İKİLER HES	HES	6.120	13/05/16
DOĞANŞAR REG. VE HES	HES	6.770	13/05/16
BANDIRMA II DGKÇS	DG	205.600	13/05/16
İNTEPE RES	RES	9.200	06/05/16
GERMİYAN RES	RES	10.800	06/05/16

ULUBORLU RES	RES	15.003	06/05/16
VANAZİT HES	HES	3.089	06/05/16
ŞENBÜK RES	RES	9.160	06/05/16
HAYMEANA I-II HES (HAYMEANA I HES)	HES	3.200	05/05/16
ÇAYALTI REGÜLATÖRÜ VE HES (2. SANTRAL)	HES	3.120	29/04/16
UMUTLU HES	HES	6.780	29/04/16
KANİJE RES	RES	12.800	22/04/16
PAŞALI REGÜLATÖRÜ VE HES	HES	3.500	22/04/16
TAV EGE ADNAN MENDERES HAVALİMANI OTOPRODÜKTÖR TESİSİ	DG	9.780	18/04/16
ÇAY REGÜLATÖRÜ VE HES	HES	4.143	15/04/16
KARACABEY-2 BİYOGAZ TESİSİ	BİYOKÜTLE	1.067	15/04/16
KURTKAYASI RES	RES	14.400	15/04/16
KOJENERASYON TESİSİ	DG	4.300	14/04/16
ARISU REGÜLATÖRÜ VE HES	HES	0.863	14/04/16
BANDIRMA II DGKÇS	DG	401.600	14/04/16
UMUTLU HES	HES	13.560	08/04/16
ÇANDIR-1 REG. VE HES	HES	1.710	08/04/16
TOROS TARIM SAMSUN SANTRALİ	ATIK ISI	30.600	08/04/16
YAMANLI II HES (1. KADEME ÜNİTE 3)	HES	11.781	07/04/16
KANİJE RES	RES	19.200	01/04/16
ULUBORLU RES	RES	8.335	01/04/16
ARIKAN ÜRETİM TESİSİ	DG	9.000	01/04/16

GREENECO JES	JEOTERMAL	12.800	31/03/16
YAYLAKÖY RES	RES	15.000	25/03/16
BAYRA HES	HES	9.046	25/03/16
GÖKBÖĞET HES	HES	3.176	25/03/16
TUFANBEYLİ ÜRETİM TESİSİ	LİNYİT	150.000	25/03/16
AKSARAY OSB BİYOGAZ SANTRALİ	BİYOKÜTLE	3.201	18/03/16
ANI BİSKÜVİ KOJENERASYON SANTRALİ	DG	1.200	11/03/16
KURTKAYASI RES	RES	12.000	11/03/16
KANİJE RES	RES	12.800	04/03/16
SUSUZ REGÜLATÖRÜ VE HES	HES	7.100	03/03/16
ITC-KA BİYOKÜTLE GAZLAŞTIRMA TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	5.425	03/03/16
YUNUS EMRE TERMİK SANTRALİ	LİNYİT	145.000	25/02/16
ÇİLEHANE HES	HES	5.664	19/02/16
AKBÜK II RES	RES	20.000	12/02/16
YAMANLI II HES (1. KADEME ÜNİTE 1 VE 2)	HES	47.628	11/02/16
TERMİK-KOJENERASYON SANTRALİ	DG	4.300	06/02/16
ARTVİN BARAJI VE HES	HES	166.090	03/02/16
KURTKAYASI RES	RES	9.600	29/01/16
BOLU-GÖYNÜK ENERJİ SANTRALİ	LİNYİT	135.000	29/01/16
YAHYALI RES	RES	16.800	29/01/16
KÖROĞLU BARAJI VE KOTANLI HES	HES	50.000	29/01/2016
İÇDAŞ BİGA RES	RES	8.800	22/01/16

BEYPİ A.Ş. BOLU YEM FABRİKASI KOJEN. SAN.	DG	4.300	22/01/16
ALAŞEHİR JES	JEOTERMAL	11.270	15/01/2016
TARABYA OTELİ KOJENERASYON	DG	1.200	01/01/2016
İÇDAŞ BİGA RES	RES	12.800	31/12/15
UMURLU JES	JEOTERMAL	9.720	30/12/15
ITC-KA ELAZIĞ ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	2.830	30/12/15
HANAK HES	HES	5.139	29/12/15
ALPERTEKS SANTRALİ	DG	4.290	25/12/15
KALEKÖY HES	HES	2.740	25/12/15
BANDIRMA RES	RES	15.000	25/12/15
FUATRES RES	RES	16.500	25/12/15
TUĞRA REG. VE HES	HES	2.120	25/12/15
YAHYALI RES	RES	18.900	25/12/15
SİLOPİ TERMİK SANTRALİ	YERLİ ASFALTİT	135.000	22/12/15
BAĞBAŞI REG. VE HES	HES	13.600	19/12/15
İSKENDERUN ÇÖP GAZ ELEKTRİK ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	2.830	18/12/15
ATAKÖY HES	HES	5.000	17/12/15
ŞANLIURFA BİYOKÜTLE ENERJİ SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	3.120	17/12/15
SÖKE RES	RES	45.000	14/12/15
TÜPRAŞ İZMİT RAFİNERİSİ TERMİK KOJENERASYON SANTRALİ	DG	41.280	11/12/15
ARTVİN BARAJI VE HES	HES	166.090	10/12/15
HASANLAR HES	HES	0.000	09/12/15
SARES RES	RES	2.750	04/12/15
TUFANBEYLİ ÜRETİM TESİSİ	LİNYİT	300.000	02/12/15
İÇDAŞ BİGA RES	RES	22.400	02/12/15
FLORANCE NIGHTINGALE HASTANESİ KOJENERASYON SANTRALİ	DG	0.800	02/12/15
İNCESU RES	RES	3.200	26/11/15
TEKİRDAĞ ENERJİ ÜRETİM SANTRALİ	DG	4.240	26/11/15
KANGAL RES	RES	14.000	26/11/15
YAHYALI RES	RES	7.200	20/11/15
ŞANLIURFA OSB ENERJİ SANTRALİ	DG	18.310	18/11/15
KOÇAK REG. VE HES	HES	1.344	17/11/15
KANDİL REG. VE HES	HES	6.192	16/11/15
OSB ÜRETİM SANTRALİ	DG	21.750	13/11/15
SÜLOĞLU RES	RES	24.000	13/11/15
KANİJE RES	RES	3.200	13/11/15

AKBÜK RES	RES	4.800	12/11/15
KIYIKÖY RES	RES	11.000	12/11/15
ASLAN ÇİMENTO ATIK ISIDAN ENERJİ ÜRETİM TESİSİ	ATIK ISI	7.500	06/11/15
DÜZOVA RES	RES	1.500	06/11/15
TEPEKIŞLA BARAJI VE HES	HES	32.993	05/11/15
ÇİLEHANE HES	HES	1.536	02/11/15
ŞANLIURFA BİYOKÜTLE ENERJİ SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	3.120	31/10/15
UMURLU JES	JEOTERMAL	2.280	31/10/15
KANGAL RES	RES	20.000	30/10/15
PAMUKÖREN JES 2	JEOTERMAL	22.510	29/10/15
HIZIR REGÜLATÖRÜ VE HES	HES	1.955	29/10/15
KANDİL REG. VE HES	HES	2.616	29/10/15
BAĞARASI RES	RES	24.400	29/10/15
HAYMEANA I-II HES (HAYMEANA I HES)	HES	3.200	29/10/15
KARAMAN BİYOGAZ TESİSİ	BİYOKÜTLE	1.414	29/10/15
ÇAY REGÜLATÖRÜ VE HES	HES	4.143	28/10/15
OVACIK BİYOGAZ ENERJİ SANTRALİ	BİYOKÜTLE	4.800	28/10/15
FUATRES RES	RES	3.300	28/10/15
KANİJE RES	RES	3.200	28/10/15
PAKMİL BİYOKÜTLE SANTRALİ	BİYOKÜTLE	1.763	27/10/15
AKBÜK RES	RES	2.400	27/10/15
KARAKAYA REG. VE HES	HES	9.010	26/10/15
KARADUVAR ATIKSU ARITMA TESİSİ BİYOGAZ SANTRALİ	BİYOKÜTLE	1.900	26/10/15
TRABZON RİZE ÇÖP GAZI SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	2.826	25/10/15
PAŞALI REGÜLATÖRÜ VE HES	HES	3.500	25/10/15
BABADERE JES	JEOTERMAL	8.000	24/10/15
DİLOVASI ÇÖP BİYOGAZ SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	1.063	24/10/15
SERHAT REGÜLATÖRÜ VE HES	HES	8.840	24/10/15
SİVAS BİYOKÜTLEDEN (ÇÖP GAZI) ELEKTRİK ENERJİSİ ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	1.410	24/10/15
SEBİL REG. VE HES	HES	22.636	24/10/15
POYRAZGÖLÜ RES	RES	14.000	24/10/15
HİLAL-2 RES	RES	7.000	23/10/15
KIYIKÖY RES	RES	12.000	23/10/15
YAHYALI RES	RES	9.600	23/10/15
ATAKÖY HES	HES	2.500	22/10/15
ADA 2 RES	RES	3.200	21/10/15
GÜNAYŞE REG. VE HES	HES	0.800	19/10/15
ANGUTLU HES	HES	14.400	19/10/15
DEMİRCİ REG. VE HES	HES	12.600	17/10/15
AKBÜK RES	RES	2.400	16/10/15
İÇDAŞ BİGA RES	RES	16.000	16/10/15

EGE RES	RES	7.000	16/10/15
ARPACIK REGÜLATÖRÜ VE HES	HES	3.770	15/10/15
ÇİLEKLİTEPE HES	HES	23.625	15/10/15
SÜLOĞLU RES	RES	18.000	11/10/15
TERMİK-KOJENERASYON SANTRALİ	DG	4.000	10/10/15
ADARES RES	RES	10.000	10/10/15
GERES RES	RES	0.000	03/10/15
KÖPRÜBAŞI HES	HES	7.949	02/10/15
GÖKTAŞ HES (GÖKTAŞ-2 HES)	HES	153.400	02/10/15
BAĞARASI RES	RES	21.600	29/09/15
POYRAZGÖLÜ RES	RES	16.000	18/09/15
KARACABEY-2 BİYOGAZ TESİSİ	BİYOKÜTLE	1.067	18/09/15
SÜLOĞLU RES	RES	18.000	18/09/15
HANAK HES	HES	3.690	17/09/15
KEN KİPAŞ JES	JEOTERMAL	24.000	17/09/15
KIYIKÖY RES	RES	9.000	17/09/15
İZNİK DEREKÖY HES	HES	0.715	15/09/15
DİLEK RES	RES	9.600	15/09/15
KUYUCAK RES	RES	15.100	12/09/15
ALAŞEHİR JES	JEOTERMAL	33.730	12/09/15
ORİON ÜRETİM SANTRALİ	DG	1.200	11/09/15
TERMİK-KOJENERASYON SANTRALİ	DG	2.000	10/09/15
TERMİK-KOJENERASYON SANTRALİ	DG	1.200	09/09/15
TEPEKIŞLA BARAJI VE HES	HES	32.993	04/09/15
EĞERCİ REGÜLATÖRÜ VE HES	HES	1.3436	03/09/15
AYVALI (ÇORUH) BARAJI VE HES	HES	121.654	03/09/15
TERMİK-KOJENERASYON SANTRALİ	DG	4.044	02/09/15
KOCADAĞ 2 RES	RES	2.500	02/09/15
DİLEK RES	RES	7.200	27/08/15
SEKİYAKA II HES	HES	1.090	27/08/15
EFELER JES	JEOTERMAL	47.400	26/08/15
SUÇATI-I HES	HES	8.316	20/08/15
TEPEKIŞLA BARAJI VE HES	HES	3.641	13/08/15
KIYIKÖY RES	RES	12.000	13/08/15
PAMUKÖREN JES	JEOTERMAL	16.006	07/08/15
AKÇAKOYUN HES	HES	6.790	06/08/15
ZİYARET RES	RES	1.000	04/08/15
MUT RES	RES	0.500	31/07/15
AKINCI (KAYABEYİ) HES	HES	10.175	30/07/15
GÖKSU HES	HES	17.177	25/07/15
DİLEK RES	RES	7.200	24/07/15
PAMUKÖREN JES	JEOTERMAL	6.504	21/07/15
BOLU-GÖYNÜK ENERJİ SANTRALİ	LİNYİT	135.000	15/07/15
DOĞU HES	HES	5.985	08/07/15
KARAKUZ BARAJI VE HES	HES	76.000	08/07/15
MANAHOZ HES	HES	1.120	05/07/15

TELLİ 1-2 HES	HES	0.000	03/07/15
EFELER JES	JEOTERMAL	22.500	03/07/15
AVANOS REGÜLATÖRÜ VE CEMEL HES	HES	6.000	03/07/15
ALÇE HES	HES	5.140	02/07/15
SOMA RES	RES	8.000	26/06/15
SÖĞÜTLÜ HES	HES	9.160	26/06/15
MANAHOZ HES	HES	5.960	25/06/15
ÖDEMİŞ RES	RES	8.000	25/06/15
ÇEŞME RES	RES	7.000	20/06/15
MUT RES	RES	13.200	19/06/15
TOSUNLAR-1 JES	JEOTERMAL	3.807	12/06/15
ÇAYKARA HES	HES	10.560	11/06/15
BOLU ÇİMENTO ATIK ISIDAN ENERJİ ÜRETME TESİSİ	ATIK ISI	6.000	05/06/15
MUT RES	RES	16.500	05/06/15
HAVVA HES	HES	4.780	04/06/15
ÖDEMİŞ RES	RES	12.000	29/05/15
EKOTEN TEKSTİL SAN. VE TİC. A.Ş. KOJEN. SANTRALİ	DG	0.008	29/05/15
SEBENOBA RES	RES	9.000	28/05/15
BEYHAN I BARAJI VE HES	HES	31.600	26/05/15
ANGUTLU 2 HES	HES	8.898	25/05/15
EDİNCİK RES	RES	26.400	23/05/15
KORU RES	RES	10.400	22/05/15
MUT RES	RES	19.800	22/05/15
POLATLI BES	BİYOKÜTLE	0.637	22/05/15
ÇEŞME RES	RES	9.000	22/05/15
GÜNEYYAKA HES	HES	6.630	21/05/15
SEMA REGÜLATÖRÜ VE HES	HES	17.000	21/05/15
KARGI (KIZILIRMAK) HES	HES	101.720	20/05/15
AKSARAY OSB BİYOGAZ SANTRALİ	BİYOKÜTLE	1.067	15/05/15
YALNIZARDIÇ HES	HES	0.530	08/05/15
KORU RES	RES	19.800	08/05/15
ORTAMANDIRA RES	RES	10.000	08/05/15
SİLOPİ TERMİK SANTRALİ	YERLİ ASFALTİT	135.000	08/05/15
ÇAĞLAYAN REGÜLATÖRÜ VE HES	HES	3.978	07/05/15
HARMANLIK RES	RES	10.400	06/05/15
KIZILÇAM REGÜLATÖRÜ VE HES	HES	1.320	05/05/15
AKINCI (KAYABEYİ) HES	HES	74.506	03/05/15
KİPAŞ KAĞIT SANAYİ İŞLETMELERİ A.Ş. TERMİK-KOJENERASYON SANTRALİ	KÖMÜR	7.600	01/05/15
YANBOLU HES	HES	6.21	30/04/15
DURKAR 1 TERMİK-KOJENERASYON SANTRALİ	DG	2.433	30/04/15
STS-1 HES	HES	11.243	30/04/15
YUNUSLAR HES	HES	7.960	28/04/15
HARMANLIK RES	RES	13.200	24/04/15

KORU RES	RES	19.800	22/04/15
BARAN REGÜLATÖRÜ VE HES (BARAN-I)	HES	8.865	17/04/15
BOREAS I ENEZ RES	RES	2.500	17/04/15
BEYHAN I BARAJI VE HES	HES	183.500	17/04/15
YANBOLU HES	HES	2.870	16/04/15
GARZAN BARAJI VE HES	HES	3.210	15/04/15
HARMANLIK RES	RES	26.400	11/04/15
İNCEBEL HES	HES	6.930	09/04/15
SOMA RES	RES	12.000	09/04/15
YALNIZARDIÇ HES	HES	15.930	08/04/15
SEYİTALİ RES	RES	2.000	07/04/15
BAĞIŞTAŞ I BARAJI VE HES	HES	89.540	03/04/15
ÇAKMAK REGÜLATÖRÜ VE HES	HES	8.630	03/04/15
ONUR REGÜLATÖRÜ VE HES	HES	19.568	02/04/15
BEYHAN I BARAJI VE HES	HES	183.500	29/03/15
ÇERÇİKAYA RES	RES	11.15795	20/03/15
SOMA RES	RES	18.000	20/03/15
SÜTLÜCE HES VE REGÜLATÖRÜ	HES	5.640	19/03/15
YALNIZARDIÇ HES	HES	15.930	19/03/15
ALAKÖPRÜ BARAJI VE HES	HES	28.890	18/03/15
PEMBELİK BARAJI VE HES	HES	63.670	13/03/15
KIYIKÖY RES	RES	3.000	13/03/15
MODERN ENERJİ TERMİK SANTRALİ	DG+ORMAN ÜRÜN.	27.600	12/03/15
BEYHAN I BARAJI VE HES	HES	183.500	12/03/15
SÖĞÜTLÜ HES	HES	9.160	12/03/15
ÇAKMAK REGÜLATÖRÜ VE HES	HES	18.750	10/03/15
EFELER JES	JEOTERMAL	22.500	06/03/15
BÜYÜKBAHÇE REGÜLATÖRÜ VE HES	HES	11.700	06/03/15
BANDIRMA RES	RES	0.600	27/02/15
TÜPRAŞ İZMİT RAFİNERİSİ TERMİK KOJENERASYON SANTRALI	DG	79.080	27/02/15
BAĞIŞTAŞ I BARAJI VE HES	HES	51.090	27/02/15
ÇERÇİKAYA RES	RES	13.94735	19/02/15
YAMANLI II HES	HES	11.222	19/02/15
PEMBELİK BARAJI VE HES	HES	63.670	18/02/15
SEBENOBA RES	RES	8.000	13/02/15
SİNCAN ÇADIRTEPE BİYOKÜTLE ENERJİ SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	5.664	13/02/15
MEREK REGÜLATÖRÜ VE HES	HES	9.180	12/02/15
DEMİRER KOJENERASYON TESİSİ	DG	2.476	11/02/15
PİTANE RES	RES	4.800	09/02/15
KADAHOR REGÜLATÖRÜ VE HES	HES	9.362	07/02/2015
SOMA RES	RES	6.000	07/02/2015
KOCADAĞ 2 RES	RES	7.500	06/02/2015
KÖPRÜYANI REGÜLATÖRÜ VE HES	HES	11.900	04/02/2015

YAMANLI II HES	HES	11.222	31/01/2015
ADIGÜZEL II HES	HES	30.09	24/01/2015
TEKİRDAĞ ENERJİ ÜRETİM SANTRALİ	DG	1.125	23/01/2015
MMK METALURJİ SAN. TİC. VE LİMAN İŞLETMECİLİĞİ A.Ş KOJENERASYON TESİSİ	DG	15.000	17/01/2015
HAYAT BİYOKÜTLE PROJESİ	BİYOKÜTLE	0.955	16/01/2015
ÇAYKARA HES	HES	15.360	16/01/2015
KARDEMİR KARABÜK DEMİR ÇELİK SAN. VE TİC. A.Ş. TERMİK-KOJENERASYON SANTRALI	KÖMÜR+DİĞER	15.000	10/01/2015
ÇERÇİKAYA RES	RES	27.8947	10/01/2015
BUCAKKIŞLA HES	HES	41.000	08/01/2015
PET CİPS RESİN VE KOJ. TESİSİ	DG	8.600	31/12/2014
M.KEMALPAŞA-SUUÇTU HES	HES	2.304	31/12/2014
TEKİRDAĞ ENERJİ ÜRETİM SANTRALİ	DG	13.075	31/12/2014
HAMZABEY HES	HES	8.820	31/12/2014
TERMİK KOJENERASYON SANTRALİ	LİNYİT	1.640	31/12/2014
TEKSMAK TERMİK KOJENERASYON SANTRALİ	DG	2.677	30/12/2014
YEŞİLKÖY REG. VE HES	HES	3.720	30/12/2014
GÜNAYDIN RES	RES	2.500	26/12/2014
YAZILI I-II-III HES	HES	6.620	25/12/2014
SOMA RES	RES	24.000	25/12/2014
SEBENOBA RES	RES	13.000	20/12/2014
GÜNAYDIN RES	RES	5.000	20/12/2014
ÇAĞLAYAN REGÜLATÖRÜ VE HES	HES	7.956	19/12/2014
ATLAS TERMİK SANTRALİ	İTHAL KÖMÜR	600.000	19/12/2014
BANDIRMA RES	RES	26.400	14/12/2014
ARAKLI 3 HES	HES	0.631	12/12/2014
ŞADILLI RES	RES	11.000	06/12/2014
CENGİZ 240MW DGKÇS	DG	208.670	05/12/2014
EREN HES	HES	35.186	04/12/2014
MURAT HES	HES	11.089	01/12/2014
BİLECİK DOĞALGAZ ÇEVRİM SANTRALİ	DG	13.050	28/11/2014
MENTAŞ HES	HES	9.600	28/11/2014
SOMA RES	RES	32.000	26/11/2014
KELTEPE RES	RES	0.000	21/11/2014
EKİNCİK HES	HES	7.520	20/11/2014
YAKINCA REGÜLATÖRÜ VE HES	HES	11.700	14/11/2014
YÜCE HES	HES	5.283	14/11/2014
PİRİNÇLİK HES	HES	21.315	14/11/2014
GÖNEN BİYOGAZ TESİSİ PROJESİ	BİYOKÜTLE	1.487	14/11/2014
ŞADILLI RES	RES	13.750	14/11/2014
ÜÇGEN HES	HES	3.388	07/11/2014
MERNİOS HALI KOJENERASYON SANTRALİ	DG	9.730	01/11/2014
BEYPAZARI BİYOGAZ TESİSİ BİYOKÜTLE PROJESİ	BİYOKÜTLE	0.7936	31/10/2014

CANAN TEKSTİL KOJENERASYON SANTRALI	DG	2.000	31/10/2014
GÖKBOYUN REGÜLATÖRÜ VE HES	HES	5.000	29/10/2014
AMASYA ÇÖP GAZ ELEKTRİK ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	1.200	29/10/2014
TUĞRA REGÜLATÖRÜ VE HES	HES	11.480	28/10/2014
ŞADILLI RES	RES	8.250	26/10/2014
TERMİK-KOJENERASYON SANTRALI	DG	15.000	25/10/2014
KOCABEY-2 BİYOGAZ SANTRALİ	BİYOKÜTLE	2.134	25/10/2014
AFYON BİYOGAZ ENERJİ SANTRALİ BİYOKÜTLE PROJESİ	BİYOKÜTLE	4.017	24/10/2014
TURKOL OTEL SANTRALİ (TERMİK KOJENERASYON)	DG	1.000	24/10/2014
ADANA DOĞU ATIKSU SANTRALİ	BİYOKÜTLE	0.800	24/10/2014
TUANA HES	HES	3.695	24/10/2014
ALBE-I BİYOGAZ SANTRALİ	BİYOKÜTLE	1.813	24/10/2014
POLATLI BES	BİYOKÜTLE	0.834	24/10/2014
CENGİZ 240MW DGKÇS	DG	401.330	22/10/2014
İNCESU RES	RES	10.000	22/10/2014
SİGMA SULUOVA BİYOGAZ TESİSİ	BİYOKÜTLE	1.000	20/10/2014
ZEKERE HES	HES	3.978	17/10/2014
BURDUR ŞEKER FABRİKASI ÜRETİM TESİSİ (TERMİK KOJENERASYON)	DG/FO/LİNYİT	4.750	17/10/2014
KEREM JES	JEOTERMAL	24.000	16/10/2014
GÜRGEN REGÜLATÖRÜ VE HES	HES	2.360	15/10/2014
ALİAĞA RES	RES	2.400	10/10/2014
EFELER JES	JEOTERMAL	22.500	01/10/2014
PİRO REGÜLATÖRÜ VE HES	HES	4.060	01/10/2014
MODERN BİYOKÜTLE ENERJİ SANTRALİ	BİYOKÜTLE	6.000	30/09/2014
UMURLAR RES	RES	10.000	30/09/2014
SAMSUN AVDAN BİYOGAZ TESİSİ BİYOKÜTLE PROJESİ	BİYOKÜTLE (ÇÖP GAZI)	2.400	27/09/2014
KOJEN	DG	1.189	26/09/2014
ALAŞEHİR JES	JEOTERMAL	24.000	25/09/2014
KAVAKLI RES	RES	13.700	25/09/2014
ASLANCIK HES	HES	46.500	19/09/2014
GARZAN HES	HES	5.420	19/09/2014
SİLİVRİ RES	RES	7.500	19/09/2014
DORUK HES	HES	28.278	19/09/2014
AYVASIL REGÜLATÖRÜ VE HES	HES	2.976	19/09/2014
KANGAL RES	RES	2.000	19/09/2014
SERAP HES	HES	28.960	19/09/2014
ALİAĞA RES	RES	7.200	12/09/2014
DOĞANÇAY HES	HES	20.160	12/09/2014
HAYAT KİMYA KOJENERASYON SANTRALİ	DG	15.040	12/09/2014

KAYSERİ KATI ATIK DEPONİ SAHASI ELEKTRİK ÜRETİM SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	1.560	11/09/2014
ATİK RES	RES	2.000	09/09/2014
KANGAL RES	RES	42.000	05/09/2014
KORKMAZ RES	RES	14.000	04/09/2014
SİLİVRİ RES	RES	12.500	03/09/2014
DOĞANÇAY HES	HES	10.080	29/08/2014
KÖRFEZ ENERJİ SAN. VE TİC. A.Ş. TERMİK KOJENERASYON SANTRALİ	BİYOKÜTLE (ÇÖP GAZI)	2.830	29/08/2014
AK NİŞASTA SAN. VE TİC. A.Ş. KOJENERASYON SANTRALİ	DG	2.000	22/08/2014
DİNAR RES	RES	36.800	22/08/2014
KAVAKLI RES	RES	36.300	21/08/2014
SİLİVRİ RES	RES	25.000	20/08/2014
ALADEREÇAM HES	HES	7.350	19/08/2014
SAMURLU RES	RES	4.500	16/08/2014
KORKMAZ RES	RES	10.000	15/08/2014
GÖKRES-2 RES	RES	24.000	15/08/2014
TERMİK-AKIŞKAN YATAKLI KOJENERASYON SANTRALİ	LİNYİT	5.500	15/08/2014
KIYIKÖY RES	RES	24.000	15/08/2014
ŞENKÖY RES	RES	9.000	15/08/2014
GENERAL REGÜLATÖRÜ VE HES	HES	5.950	08/08/2014
ATLAS TERMİK SANTRALİ	İTHAL KÖMÜR	600.000	08/08/2014
ÇANTA RES	RES	12.500	24/07/2014
ÜÇGEN 2 REGÜLATÖRÜ VE HES	HES	10.319	17/07/2014
SARAY REGÜLATÖRÜ VE HES	HES	13.500	16/07/2014
PANER KOJENERASYON SANTRALİ	DG	2.800	16/07/2014
AKDERE HES	HES	7.480	12/07/2014
HASANBEYLİ RES	RES	7.500	11/07/2014
BALABANLI RES	RES	16.100	11/07/2014
AŞKALE ÇİMENTO TERMİK KOJENERASYON SANTRALİ	ATIK ISI	5.500	10/07/2014
KOÇLU HES	HES	36.260	10/07/2014
BEKİRLİ TERMİK SANTRALİ	İTHAL KÖMÜR	600.000	10/07/2014
KARADERE RES	RES	4.800	04/07/2014
UŞAK RES	RES	28.500	04/07/2014
ÇANTA RES	RES	20.000	28/06/2014
SUSURLUK RES	RES	15.000	28/06/2014
ALTINSU TEKSTİL KOJENERASYON TESİSİ	DG	1.189	27/06/2014
GÜNAYDIN RES	RES	2.500	27/06/2014
HASANBEYLİ RES	RES	7.500	26/06/2014
KARADERE RES	RES	11.200	21/06/2014
GÖKRES 2 RES	RES	11.000	20/06/2014
KÖROĞLU HES	HES	9.060	20/06/2014

BERKE REGÜLATÖRÜ VE HES	HES	3.127	20/06/2014
ITC AKSARAY ÜRETİM TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	1.415	17/06/2014
KAVŞAK BENDİ HES	HES	5.430	17/06/2014
BÜKOR II HES	HES	12.597	13/06/2014
SENTETİK-2 KOJENERASYON TESİSİ	DG	3.349	13/06/2014
GÖKBEL I-II HES	HES	4.282	13/06/2014
EDİNCİK BES	BİYOGAZ	2.126	12/06/2014
ARKUN BARAJI VE HES	HES	88.819	12/06/2014
TOKMADİN HES	HES	3.430	12/06/2014
SALMAN RES	RES	2.000	06/06/2014
ÇİNE HES	HES	46.600	06/06/2014
ERZİN DGKÇS	DG	319.820	05/06/2014
DORA 3 JES	JEOTERMAL	17.000	03/06/2014
ZİYARET RES	RES	10.000	31/05/2014
DERHAN TEKSTİL TERMİK KOJENERASYON SANTRALİ	DG	1.189	31/05/2014
ÇANTA RES	RES	15.000	31/05/2014
ARKUN BARAJI VE HES	HES	156.010	30/05/2014
SALMAN RES	RES	6.000	30/05/2014
HASANBEYLİ RES	RES	7.500	29/05/2014
GÜLLE TEKSTİL TERMİK KOJENERASYON SANTRALİ	DG	4.300	27/05/2014
ŞENBÜK RES	RES	13.940	25/05/2014
BALABANLI RES	RES	23.000	17/05/2014
UŞAK RES	RES	25.500	17/05/2014
ZALA REGÜLATÖRÜ VE HES	HES	5.422	16/05/2014
KİRAZLIK REGÜLATÖRÜ VE HES	HES	2.500	16/05/2014
SALMAN RES	RES	12.000	14/05/2014
TUANA HES	HES	3.695	13/05/2014
PROKOM PİROLİTİK YAĞ VE GAZ TAKITLI ELEKTRİK ÜRETİM TESİSİ	PİROLİTİK YAĞ	7.040	11/05/2014
GÜVEN GIDA TETMİK KOJENERASYON SANTRALİ	DG	2.006	10/05/2014
TONYA I-II HES	HES	2.500	09/05/2014
ASLANCIK HES	HES	12.800	09/05/2014
HASANBEYLİ RES	RES	10.000	09/05/2014
KAYAKÖPRÜ HES	HES	14.200	08/05/2014
GERES RES	RES	27.500	08/05/2014
EROĞLU GİYİM TERMİK KOJENERASYON SANTRALİ	DG	1.165	08/05/2014
ÇAMLICA II HES	HES	17.580	02/05/2014
AYVASIL REGÜLATÖRÜ VE HES	HES	1.466	30/04/2014
ERZİN DGKÇS	DG	292.090	28/04/2014
CANAN TEKSTİL TERMİK KOJENERASYON SANTRALİ	DG	2.000	27/04/2014

KALEALTI II HES	HES	9.977	26/04/2014
BOYAR KİMYA TERMİK KOJENERASYON SANTRALİ	DG	2.000	26/04/2014
DÜZCE-AKSU HES	HES	46.200	25/04/2014
SÖLPEREN REGÜLÂTÖRÜ VE HES	HES	9.762	25/04/2014
HAVVA HES	HES	2.390	22/04/2014
YEŞİLYURT ENERJİ SAMSUN DGKÇ SANTRALİ	DG	18.321	18/04/2014
GEYCEK RES	RES	14.000	18/04/2014
GÖKBEL 2 HES	HES	14.504	18/04/2014
MELİKE İPLİK TERMİK KOJENERASYON SANTRALİ	DG	9.730	18/04/2014
UZUNDERE II REGÜLATÖRÜ VE HES	HES	7.020	18/04/2014
SİNCİK RES	RES	2.500	17/04/2014
ERZİN DGKÇS	DG	292.090	12/04/2014
ARSAN DOKUMA TERMİK KOJENERASYON SANTRALİ	DG	4.300	12/04/2014
KAMER REGÜLATÖRÜ VE HES	HES	3.750	11/04/2014
DAĞBAŞI HES	HES	10.433	11/04/2014
MANYAS BARAJI VE HES	HES	20.250	08/04/2014
POLAT ENERJİ KÜTAHYA TERMİK SANTRALİ	LİNYİT	51.000	05/04/2014
İZDEMİR ENERJİ ELEKTRİK ÜRETİM TESİSİ	İTHAL KÖMÜR	350.000	04/04/2014
GÜMÜŞKÖY JES	JEOTERMAL	6.600	04/04/2014
BALABANLI RES	RES	11.500	04/04/2014
KALEALTI II HES	HES	3.837	04/04/2014
KALE HES	HES	17.100	28/03/2014
GEYCEK RES	RES	14.000	28/03/2014
KOJENERASYON SANTRALİ	DG	2.000	26/03/2014
DÜZOVA RES	RES	10.000	21/03/2014
AKSU REGÜLATÖRÜ VE HİDROELEKTRİK SANTRALİ	HES	5.770	21/03/2014
BOĞAZKÖY HES	HES	10.000	19/03/2014
KOJENERASYON SANTRALİ	ATIK ISI	9.560	14/03/2014
KİRAZLIK REGÜLATÖRÜ VE HES	HES	14.537	14/03/2014
DEĞİRMEN REGÜLATÖRÜ HE HİDROELEKTRİK SANTRALİ	HES	6.840	13/03/2014
SARES RES	RES	2.250	08/03/2014
ASLANCIK BARAJI VE HES	HES	46.500	07/03/2014
EKİNÖZÜ 1-2 HES	HES	5.660	06/03/2014
KOZBEYLİ RES	RES	4.200	28/02/2014
HASANBEYLİ RES	RES	7.500	28/02/2014
SAF I HES	HES	7.490	28/02/2014
ITC-KA BİYOKÜTLE GAZLAŞTIRMA TESİSİ	BİYOKÜTLE (ÇÖP GAZI)	5.425	27/02/2014
BARAN REGÜLATÖRÜ VE HES (BARAN-I)	HES	12.410	27/02/2014
AÇMA REGÜLATÖRÜ VE HES	HES	2.400	27/02/2014

GÖNEN BİYOGAZ SANTRALİ	BİYOKÜTLE	2.134	26/02/2014
ZİYARET RES	RES	7.500	22/02/2014
BİFA BİSKÜVİ VE GIDA SAN. A.Ş. KOJENERASYON SANTRALİ	DG	2.145	21/02/2014
UMUT REGÜLATÖRÜ VE HES	HES	24.450	21/02/2014
KAVŞAK BENDİ HES	HES	61.950	20/02/2014
ARISU HES	HES	3.821	17/02/2014
ATİK RES	RES	12.000	15/02/2014
KOJENERASYON SANTRALİ	DG	2.145	14/02/2014
GEYCEK RES	RES	23.000	14/02/2014
KOJENERASYON SANTRALİ	DG	4.300	14/02/2014
KIY HİDROELEKTRİK SANTRALİ	HES	11.900	13/02/2014
BERKE REGÜLATÖRÜ VE HES	HES	6.254	08/02/2014
İNTEPE RES	RES	0.000	07/02/2014
ÖZLÜCE HES	HES	18.190	07/02/2014
SIRIMTAŞ HİDROELEKTRİK SANTRALİ	HES	13.617	31/01/2014
DİYOBAN HES	HES	10.520	31/01/2014
KORES KOCADAĞ RÜZGAR ENERJİ SANTRALİ	RES	2.500	31/01/2014
ÇORAKLI HİDROELEKTRİK SANTRALİ	HES	2.600	30/01/2014
YUNTDAĞ RES	RES	2.500	29/01/2014
YAHYABEY HES	HES	0.310	24/01/14
SİNCİK RES	RES	25.000	24/01/2014
HASANBEYLİ RES	RES	10.000	24/01/2014
KANDİL BARAJI VE HES	HES	4.720	24/01/2014
KAVŞAK BENDİ HES	HES	61.950	24/01/2014
KIY HİDROELEKTRİK SANTRALİ	HES	11.900	23/01/2014
GEYCEK RES	RES	16.000	17/01/2014
ALKUMRU BARAJI VE HES	HES	14.250	17/01/2014
SEKİYAKA II HES	HES	2.300	17/01/2014
KİRAZLIK REGÜLATÖRÜ VE HES	HES	14.537	15/01/2014
ZAFER TEKSTİL SAN. VE TİC. A.Ş. KOJENERASYON SANTRALİ	DG	1.450	10/01/2014
DERELİ REGÜLATÖRÜ VE HES	HES	49.200	10/01/2014
MAKYOL ETİLER TİCARET MERKEZİ KOJENERASYON SANTRALİ	DG	0.6000	10/01/2014
MERCEDES BENZ TÜRK KOJENERASYON TESİSİ	DG	2.020	10/01/2014
KOJENERASYON	DG/FO	9.800	09/01/2014
AĞAOĞLU DGKÇS	DG	12.900	08/01/2014
ORDU HES	HES	21.000	04/01/2014

ÖZLÜCE HES	HES	18.190	27/12/13
KOJENERASYON	DG	2.022	27/12/13
UZUNDERE II HES	HES	7.020	27/12/13

GEYCEK RES	RES	12.000	27/12/13
KOJENERASYON	ATIK ISI	12.930	26/12/13
YEŞİLYURT DGKÇS	DG	11.396	26/12/13
BURÇAK HES 2. KADEME	HES	26.260	26/12/13
SAYALAR RES	RES	20.000	25/12/13
MİDİLLİ HES	HES	11.577	24/12/13
YENİ ELEKTRİK ÜRETİM A.Ş. DGKÇS	DG	575.909	20/12/13
KALECİK I HES	HES	7.757	20/12/13
ÇAMBAŞI REGÜLATÖRÜ VE HES	HES	44.100	20/12/13
ÇİĞDEM REGÜLATÖRÜ VE HES	HES	17.700	20/12/13
KAVŞAK BENDİ HES	HES	61.950	19/12/13
SUKENARI REGÜLATÖRÜ VE HES	HES	8.566	19/12/13
BOZTEPE HES	HES	18.150	17/12/13
ADACAMİ HİDROELEKTRİK SANTRALİ	HES	14.652	16/12/13
SARIGÜZEL BARAJI HES	HES	3.660	14/12/13
TATAR HİDROELEKTRİK SANTRALİ	HES	64.110	13/12/13
ORDU HES	HES	21.000	13/12/13
AKBAŞ HİDROELEKTRİK SANTRALİ	HES	12.502	12/12/13
ÇERMİKLER BARAJI VE HES	HES	22.000	12/12/13
KAYA BELEK TERMİK KOJENERASYON SANTRALİ	DG	1.286	08/12/13
SIRIMTAŞ HİDROELEKTRİK SANTRALİ	HES	13.617	07/12/13
ORTADOĞU RULMAN SANAYİ TERMİK KOJENERASYON SANTRALİ	DG	7.744	06/12/13
YENİ ELEKTRİK ÜRETİM A.Ş. DGKÇS	DG	289.091	06/12/13
GEYCEK RES	RES	33.000	05/12/13
KİRAZLIK REGÜLATÖRÜ VE HES	HES	14.537	05/12/13
DARAN HİDROELEKTRİK SANTRALİ	HES	23.870	05/12/13
DURU REGÜLATÖRÜ VE HES	HES	1.630	04/12/13
OYLAT HES	HES	1.900	03/12/13
DİNAR RES	RES	0.000	29/11/2013
ISPARTA MENSUCAT SAN. VE TİC. A.Ş. KOJENERASYON SANTRALİ	DG	0.000	29/11/13
KARAKÖY HİDROELEKTRİK SANTRALİ	HES	3.000	28/11/13
ADASU HİDROELEKTRİK SANTRALİ	HES	9.600	28/11/13
AĞKOLU HES	HES	4.380	28/11/13
PAŞALİMANI RES	RES	0.800	25/11/2013
EREM HİDROELEKTRİK SANTRALİ	HES	3.050	23/11/13
YAZYURDU REGÜLATÖRÜ VE HES	HES	14.900	22/11/13
AKKENT CALKUYUCAK HES	HES	13.813	22/11/13
AMBARLI TERMİK SANTRALİ	DG	516.000	21/11/13
SOĞUKPINAR HİDROELEKTRİK SANTRALİ	HES	8.900	15/11/13
H.G. ENERJİ GEDİZ SANTRALİ	DG	5.350	15/11/13
TATAR HİDROELEKTRİK SANTRALİ	HES	64.11	14/11/13

KÖPRÜBAŞI HİDROELEKTRİK SANTRALİ	HES	14.660	08/11/2013
LUTUF MENSUCAT KOJENERASYON SANTRALİ	DG	2.000	08/11/13
KIZILDERE II JES	JEOTERMAL	20.000	31/10/2013
SENKRON EFELER BİYOGAZ SANTRALİ	BİYOGAZ	2.400	31/10/2013
PAMUKÖREN JES	JEOTERMAL	45.020	31/10/2013
ORTAÇAĞ REGÜLATÖRÜ VE HİDROELEKTRİK SANTRALİ	HES	12.944	24/10/2013
ÇERMİKLER BARAJI VE HES	HES	3.000	24/10/2013
ODAŞ I DOĞALGAZ KOMBİNE ÇEVRİM SANTRALİ	DG	12.000	23/10/2013
BATIÇİM BATI ANADOLU ÇİMENTO SANAYİİ A.Ş. TERMİK KOJENERASYON SANTRALİ	ATIK ISI	9.000	12/10/2013
NAKSAN ENERJİ SANTRALİ 2	DG	1.100	11/10/2013
GEYCEK RÜZGAR ENERJİ SANTRALİ	RES	12.000	11/10/2013
KANDİL BARAJI VE HES	HES	203.200	10/10/2013
PİRİNÇLİ REGÜLATÖRÜ VE HİDROELEKTRİK SANTRALİ	HES	9.340	10/10/2013
İPEKSAN ELEKTRİK ÜRETİM A.Ş. TERMİK KOJENERASYON SANTRALİ	DG	8.600	10/10/2013
AVANOS REGÜLATÖRÜ VE CEMEL HİDROELEKTRİK SANTRALİ	HES	7.200	04/10/2013
GOREN-2 TERMİK KOJENERASYON SANTRALİ	DG	48.650	04/10/2013
DERİNER HİDROELEKTRİK SANTRALİ	HES	167.500	02/10/2013

Step 5.3 The Calculation of Build Margin Emission Factor

The TOOL Formula for BM Calcuation

TOOL07 Methodological tool: (Tool to calculate the emission factor for an electricity system Version 06.0)[33] gives the following formula for BM emission factor calculation.

The build margin emissions factor is the generation-weighted average emission factor (t CO2/MWh) of all power units m during the most recent year y for which electricity generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$ Equation 15

Where:
EFgrid,BM,y = Build margin CO2 emission factor in year y (t CO2/MWh)
EGm,y = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
EFEL,m,y = CO2 emission factor of power unit m in year y (t CO2/MWh)
m = Power units included in the build margin
y = Most recent historical year for which electricity generation data is available

[33] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf

According to, "Tool to calculate the emission factor for an electricity system" (version 06.0.0)[34], the CO2 emission factor of each power unit m (EF_{EL},m,y) should be determined as per the guidance from the tool in step 4 for simple OM, using options A1, A2 or A3, using for y the most recent historical year for which power generation data is available, where m is the power units included in the build margin.

As plant specific fuel consumption data is not available for Turkey, option A2 has been selected for the calculation (since only fuel type and electricity generation are known) of the CO2 emission factor of each power unit m (EFEL,m,y) as follows:

$$\mathrm{EF}_{EL,m,y} = \frac{EF_{CO_{2,m,i,y}} \times 3.6}{\boldsymbol{\eta}_{m,y}} \qquad \text{Equation 5}$$

Where:

EFELm,y = CO2 emission factor of the power unit m in year y (tCO2/MWh)
EFCO2,m,i,y = Average CO2 emission factor of fuel type i used in power unit m in year y (tCO_2/GJ)
ηm,y = Average net energy conversion efficiency of power unit m in year y (ratio)
M = All power units serving the grid in year y except low-cost/must-run power units
Y = The relevant year as per the data vintage chosen in Step 3

Where several fuel types are used in the power unit, the lowest CO_2 emission factor for $EFCO_2$,m,i,y has been used.

(a) Identification of Average CO_2 Emission Factor of Fuel Type i in Power Unit m in Year y (EFCO2,m,i,y)

The fuel types used in Set Sample are

- Natural Gas
- Import Coal
- Lignite

Table 18: EF-$C0_2$ Values of Fuels Used in Set Sample

Fuels Used in SET Sample	$EFCO_2$ Values (t CO_2/GJ)
Natural Gas	0.0543
Import Coal	0.0895
Lignite	0.0909

$EFCO_2$ values are taken from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 Introduction, Table 9[35]. It is noted that $EFCO_2$ values for hydro, geothermal, wind, solar, biogas and renew. + wastes are given as zero so they are taken into calculation.

[34] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf

[35] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

(b) Average net energy conversion efficiency of power unit m in year y (ηm,y)

There is no available data for the plant and year specific efficiency data. So we take efficiency level of best technology available complying the board approved deviation given in footnote 2. Quotation from the board-approved deviation is given below:

"(ii) Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin (BM). For the estimation of the operating margin (OM) the average emission factor for the grid for each fuel type can be used."

Table 19: Efficiency Ratios for Fuels and Used in Set Sample

Fuels Used in SET Sample	η Values (Ratio)
Natural Gas	0.62
Import Coal	0.39
Lignite	0.39

Efficiency values are taken from Tool to calculate the emission factors for an electricity system , Annex 1: Default efficiency factors for power plants[36].

(c) Calculation of CO2 emission factor of power unit m in year y (t CO_2/MWh)

Using the above formula we obtain EFEL values for the different fuel types.

Table 20*:* EF_{EL} Values for Fuel Types in Set Sample

Fuels Used in SET Sample	EFEL (t CO_2 MWh)
Natural Gas	0.3258
Import Coal	0.8262
Lignite	0.8391

(d) Calculation of CO_2 Build Margin emission factor (t CO_2/MWh)

Table 21: Total Capacities and Emission Contributions by Fuel Type

	Total NG Capacity Addition (MWe)	Emission Addition of NG (MW * tCO2/MWh)	Total Import Coal Capacity Addition (MWe)	Emission Addition of Coal (MW * tCO2/MWh)	Total Lignite Capacity Addition (MWe)	Emission Addition of Lignite (MW * tCO2/MWh)	Total Emission Coefficient (MW * tCO2/MWh)
2016	1691,44	551,07	0.000	0.00	430.00	360.80	911.87
2015	203.24	66.21	292.600	241.73	435.00	365.00	672.95
2014	1674.17	545.44	2150	1776.23	58.14	48.78	2370.46
2013	1481.15	482.56	0	0.00	0.00	0.00	482.56
Total	5049.99	1645.29	2442.60	2017.96	923.14	774.59	4437.84

[36] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-09-v2.0.pdf

Table 22: Net - Gross Electricity Production Ratios

	2016
Gross Electricity Production (GWh)	274,407.7
Net Electricity Production (GWh)	261,950.9
Net/Gross	0.955

By using the below formula

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad \text{Equation (15)}$$

We don't have the exact annual electricity production values for each power plant. Thus we assume production of each power plant is proportional to its capacity. Each production value will be then capacity multiplied by 365 days * 24 hours. Since 365 days * 24 hours will be at both the Numerator and Denominator of the formula, we just don't add up to the formula.

We also do correction to reflect Gross/Net Electricity Generation difference so we multiply the total capacity by 0.955. Calculation becomes

$$EF_{BM,2016} = \frac{5049.99\ MW \times 0.3258\ {}^{tCO_2}/_{MWh} + 2442.6 MW \times 0.8262\ {}^{tCO_2}/_{MWh} + 923.14\ MW \times 0.8391\ {}^{tCO_2}/_{MWh}}{15707.56\ \text{MW} * 0.955}$$

$EF_{BM,2016}$ =0.2961 t CO_2/MWh

The build margin emission factor EFgrid,BM,y calculated through equation is **0.2961 tCO_2/MWh.**

Calculating the combined margin emission factor

The combined margin emission factor EFgrid,CM,y calculated through equation is

EFgrid, CM, y = 0.75 * 0.649 + 0.25 * 0.2961= **0.5605 tCO_2/MWh**

Baseline emissions

As per AMS I.D, the baseline emissions are calculated as the net electricity generated by the project activity, multiplied with the baseline emission factor for the project grid.
Baseline emissions calculated as explained in section B.6.1 above are summarized as below.

BEy = EGy * EFy
Where,
EGy = the net electricity exported to the grid system during the year y (14,060 MWh/annum)
EFy = the emission factor of the grid to which the project exports electricity (0.5605 tCO2/MWh)
Hence,

BEy = 14,060 MWh/annum * 0.5605 tCO_2/MWh

BEy = 7,880 tCO_2 per annum

Project emissions

The proposed project activity involves the generation of electricity by development of a small scale solar power project. The generation of electricity does not result in greenhouse gas emissions and therefore:

PEy = 0 tCO_2/year

Leakage

The energy generating equipment is not transferred from or to another activity. Therefore leakage does not have to be taken into account, and:

LEy = 0 tCO_2/year

Emission reductions

ERy = BEy - PEy ERy = 7,880 – 0
ERy = 7,880 tCO_2 (ERy = BEy)

B.6.5. Summary of ex ante estimates of each SDG outcome

SDG 13 Climate Action

Year	Baseline estimate	Project estimate	Net benefit (tCO_2)
19.12.2017-31.12.2017	280	0	273
2018	7,880	0	7,880
2019	7,880	0	7,880
2020	7,880	0	7,880
2021	7,880	0	7,880
01.01.2022-18.12.2022	7,599	0	7,403
Total	39,399	0	39,399
Total number of crediting years		5	
Annual average over the crediting period	7,880	0	7,880

SDG 7 : Affordable and Clean Energy

Year	Baseline estimate	Project estimate	Net benefit (MW)
19.12.2017-31.12.2017	500	0	500
2018	14,060	0	14,060
2019	14,060	0	14,060
2020	14,060	0	14,060
2021	14,060	0	14,060
01.01.2022-18.12.2022	13,559	0	13,559
Total	70,300	0	70,300
Total number of crediting years		5	
Annual average over the crediting period	14,060	0	14,060

SDG 8 : Decent Work and Economic Growth

The project leads to employment opportunities which would not have been possible in the baseline scenario. The project have been provided employment to 5 people.

This will help to achieve SDG 8 with indicators 8.5.2 "Unemployment rate, by sex, age and persons with disabilities" and following target: 8.5 "By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value" There is no opportunity to employ woman. So "equal pay for work of equal value" does not apply.

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Relevant SDG Indicator	7.2.1 "Renewable energy share in the total final energy consumption"
Data / Parameter	$EG_{facility,y}$
Unit	MWh/yr
Description	Quantity of net electricity supplied to the grid in year y
Source of data	Meter reading protocols (OSOS records) (Meter reading records or OSF forms of main meters (00419695 and 00419697) are cross-checked

Value(s) applied	14,060 MWh[37]
Measurement methods and procedures	The net electricity generation supplied to the grid will be measured continuously by TEDAS meters (both main and spare) and recorded monthly. Please see B.7.3. for more detailed description of the monitoring plan.

[37] Çorum SPP Feasibility Report – August 2017

Monitoring frequency	Continuous measurement and at least monthly recording. (Remote automatic meter reading system-OSOS) Information of the meters are listed as followed:

Doğanay SPP	Electricity Meter	Electricity Meter (Secondary)
Manufacturer	MAKEL	MAKEL
Model	C510.AMT.5851	C510.AMT.5851
Serial number	65001349	65003325
Date of installation	12/12/2017	14/12/2017
Date of initial calibration	07/09/2016	31/10/2017

Portakal SPP	Electricity Meter	Electricity Meter (Secondary)
Manufacturer	MAKEL	MAKEL
Model	C510.AMT.5851	C510.AMT.5851
Serial number	65001148	65003416
Date of installation	13/12/2017	14/12/2017
Date of initial calibration	08/09/2016	31/10/2017

Hilalay SPP	Electricity Meter	Electricity Meter (Secondary)
Manufacturer	MAKEL	MAKEL
Model	C510.AMT.5851	C510.AMT.5851
Serial number	65001374	65003370
Date of installation	13/12/2017	1412/2017
Date of initial calibration	08/09/2016	31/10/2017

Şenay SPP	Electricity Meter	Electricity Meter (Secondary)
Manufacturer	MAKEL	MAKEL
Model	C510.AMT.5851	C510.AMT.5851
Serial number	65001237	65003389
Date of installation	13/12/2017	14/12/2017
Date of initial calibration	07/09/2016	31/10/2017

Deniz SPP	Electricity Meter	Electricity Meter (Secondary)
Manufacturer	MAKEL	MAKEL
Model	C510.AMT.5851	C510.AMT.5851
Serial number	65001094	65003361
Date of installation	13/12/2017	14/12/2017
Date of initial calibration	08/09/2016	31/10/2017

Maviay SPP	Electricity Meter	Electricity Meter (Secondary)
Manufacturer	MAKEL	MAKEL
Model	C510.AMT.5851	C510.AMT.5851
Serial number	65001333	65003363
Date of installation	12/12/2017	14/12/2017
Date of initial calibration	07/09/2016	31/10/2017

Kızıl SPP	Electricity Meter	Electricity Meter (Secondary)
Manufacturer	MAKEL	MAKEL
Model	C510.AMT.5851	C510.AMT.5851
Serial number	65001373	65003339
Date of installation	12/12/2017	14/12/2017
Date of initial calibration	07/09/2016	31/10/2017

Karagül SPP	Electricity Meter	Electricity Meter (Secondary)
Manufacturer	MAKEL	MAKEL
Model	C510.AMT.5851	C510.AMT.5851
Serial number	65000979	6503351
Date of installation	12/12/2017	14/12/2017
Date of initial calibration	15/05/2016	31/10/2017

The accuracy of meters is given as 0.5s class

QA/QC procedures	• Measurements are undertaken using energy meters. • Concerning metering system accuracy, project participants have to comply with relevant national legislation. The project must ensure that the metering devices are in line with the technical requirements which are set out by the Communiqué for Metering Devices to be used in the Electricity Market, which describes the minimum accuracy requirement the metering devices have to fulfil, which are categorized according to the installed capacity. Maintenance and calibration of TEDAŞ meters will be carried out according to the System Usage Agreement. The periodical calibration or maintenance is under the responsibility of TEDAŞ and has been fixed as once in 10 years. Since TEDAŞ meters are sealed by TEDAŞ, the project proponent cannot intervene with the devices. • The net electricity export/supplied to a grid is the difference between the measured quantities of the grid electricity export and the import. Data measured by meters will be crosschecked with the YEDAŞ notice via e-mail or fax mail.
Purpose of data	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
Additional comment	-

Relevant SDG Indicator	8.5.2. Unemployment rate, by sex, age and persons with disabilities
Data / Parameter	Number of employment generation
Unit	Number
Description	Number of people employed directly due to the project activity
Source of data	SGK Records
Value(s) applied	The project provides 5 employment
Measurement methods and procedures	The total number of persons working in the plant would be calculated based on the SGK Records
Monitoring frequency	Once for each monitoring period
QA/QC procedures	Social insurance registries of employees will be provided during each monitoring period.After first verification, only changes in employees will be reported.
Purpose of data	8.5 "By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value'
Additional comment	-

Relevant SDG Indicator	8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status.
Data / Parameter	Health and Safety Training Records
Unit	Number of people per monitoring period
Description	Number of people trained on health and safety issues during per monitoring period
Source of data	Training Records or Certificates
Value(s) applied	The project will provide health and safety training to all staff (5 employee) at each monitoring period
Measurement methods and procedures	The total number of Health and Safety training based on Training Records or Certificastes
Monitoring frequency	Once for period each monitoring
QA/QC procedures	Training records will be provided
Purpose of data	Monitoring the health and safety trainings of employees to demonstrate contribution to SDG8-8.8 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
Additional comment	n.a

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following
Data / Parameter	ERy
Unit	tCO_2/y
Description	Emission Reductions in year y (t CO_2/yr) As per AMS I.D, the baseline emissions (emission reductions) are calculated as the net electricity generated by the project activity, multiplied with the baseline emission factor for the project grid.
Source of data	Measured and Calculated. (The emission reduction value the emission factor of the grid to which the project exports electricity (0.5460 tCO2/MWh) and net electricity generated)

Value(s) applied	7,880 tCO_2[38]
Measurement methods and procedures	Please see B.6.2-B.6.4 and B.7.3 for more detailed description of the monitoring plan.
Monitoring frequency	Once for each monitoring period
QA/QC procedures	Please see B.7.3. for more detailed description of the monitoring plan.
Purpose of data	Calculation of baseline emissions (Baseline emissions calculated as explained in section B.6.2-B.6.4) to demonstrate contribution to SDG13-13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

B.7.2. Sampling plan

Not Applicable

B.7.3. Other elements of monitoring plan

According to the Turkish Law and Regulations, the methods of monitoring the net electricity fed to the grid and quality control and assures are explained below:

Monitoring data is collected in accordance with the agreement done between the project owner and Turkish Electricity Distribution Company (TEDAS) which provides the infrastructure for the connection to the national grid. Connection Agreement has signed on 03/02/2017 with YEDAŞ Electricity Authorised Distribution Company. The metering system is defined in the agreement as two groups: main meter and spare meter. The design of the metering system is checked and approved by TEDAS before commissioning of the plant. The technical specifications of the power

meters should be in line with Measure and Metering Devices Regulation by Ministry of Industry and Trade. In addition, the Communiqué for Power Meters announced by Energy Market Regulations Authority (EMRA) requires all meters to be in line with either Turkish Standards Institution or International Electrotechnical Commissions Standards. The meters are placed at the point the electricity is fed to the grid and sealed on behalf of the both parties. This prevents any intervention and assures the accuracy and quality of the measurements. All requirements and specifications of the meters will be done according to Communique on the counter to be used in the Electricity Market by Energy Market Regulatory Authority on 22.04.2011.

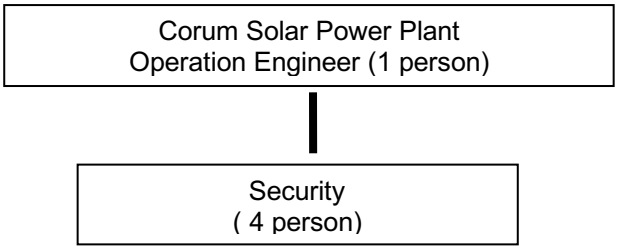
Data will be stored electronically, during the crediting period and at least two years after the last issuance of credits for the solar power project activity in the concerning crediting period. The Project Participant will be responsible for storage of data received from the measuring devices.

The main and spare meter readings are recorded monthly and cross-checked whether calibration is required. The capacity of the transmission line connected is 31.5 kVA, the accuracy class for power meters have been defined in the Communiqué for Power Meters as 0.5 s class. The calibration will

[38] This value will be changed accordig to net electicity generation value.

be implemented in accordance with the related standard procedures. The periodical maintenance is under the responsibility of TEDAŞ and has been fixed as once in 10 years.

The Project aims to create local employment opportunities in the project region in a sustainable way. The Project proponent prefers to prioritize personnel from the project region, which is defined as a Gold Standard indicator to be verified each year. The proposed project provides local employment both during the construction and operational phases. It is 5 employees' permanent during the operation of the plant. Roles and responsibilities have been summarized in the following chart:



SECTION C. Duration and crediting period

C.1. Duration of project

C.1.1. Start date of project

06/07/2017[39]

C.1.2. Expected operational lifetime of project g

25 years and 0 months

C.2. Crediting period of project

Renewable crediting period will be used.

C.2.1. Start date of crediting period

Starting date of the first crediting period: 19/12/2017[40]

C.2.2. Total length of crediting period

5 years and 0 months, which is planned to be renewed twice. (15 years)

[39] EPC agreement has been adopted as the starting date of the project activity

[40] Full capacity electricity generation has started according to Acceptance Protocol by Ministry

SECTION D. principles assessment

D.1. Analysis of social, economic and environmental impacts

https://globalgoals.goldstandard.org/101-4-gold-standard-for-the-global-goals-safeguarding-principles-requirements/

Safeguarding principles	Assessment questions	Assessment of relevance to the project (Yes/potentially/no)	Justification	Mitigation measure (if required)
SOCIAL &ECONOMIC SAFEGUARDING PRINCIPLES				
Principle 1- Human Rights	1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights. 2. The Project shall not discriminate with regards to participation and inclusion.	No	1. The Project is not in conflict with the economic livelihood or other issue of the local community. Thus, the Project does not cause any human rights abuse and respects internationally proclaimed human rights issue. 2.Project activities are not expected to cause any human rights abuse. As a member of United Nations and part of	Not Required

			UN Agreement on Human Rights, it is ensured by law in Turkey that no action can be taken against human rights.[41]	
Principle 2- Gender Equality and Women's Rights	The Project shall complete the following gender assessment questions in order to inform Requirements, below: 1. Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits? 2. Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)? 3. Is there a possibility that the Project might not take into account gender roles and the	No	1. The project does not decrease women´s access to or control of resources. 2. No, there is no possibility of adverse effect. 3. No, the Project does not disconsider gender roles and in fact actively engages both women and men. Community meetings are scheduled considering participation by both Men and Women. 4. The project does nto	Not Required

41 http://www.resmigazete.gov.tr/main.aspx?home=http://www.resmigazete.gov.tr/arsiv/7217.pdf&main=http://www.resmigazete.gov.tr/arsiv/7217.pdf

	abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)? 4. Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)? 5. Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities? 6. Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?		discriminate on basis of gender, caste or religion. 5. No the Project was not designed to increase women´s workload nor add care responsibilities. 6. There is no place for discrimination against women in this Project. The project does nto discriminate on basis of gender, caste or religion. 7. The Project will not limit women´s ability regarding natural resources. The project being solar project thus does not have any major impact on natural resources of the region. 8. No the Project will not expose women and girls to further risks or hazards.	

	7. Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services? 8. Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards? The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women. 1. Sexual harassment and/or any forms of violence against women - address the multiple risks of gender-based violence, including sexual exploitation or human trafficking. 2. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls. 3. Restriction of women's rights or		1. The project proponent has a grievance cell which would look into compalints. 2. There is no such risk for the project. Participation in the project is 100% voluntary. The project proponent has a grievance cell which would look into compalints. 3. The Project will not restrict women´s rights or access regarding natural resources. The project proponent does not discriminate on gender, caste, religion etc. 4. Marital status is completely irrelevant to the Project. The project proponent does not discriminate on gender, caste, religion etc 1. Yes, the Project has equal opportunity for women and men	

	access to resources (natural or economic). 4. Recognise women's ownership rights regardless of marital status - adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources. Projects shall apply the principles of nondiscrimination, equal treatment, and equal pay for equal work, specifically: 1. Where appropriate for the implementation of a Project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities. 2. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy,		to contribute both in volunteer and working positions. 2. The project proponent has a stipulated HR policy that takes into account participation by both men and women. 3. There is no limit on the access to Project participation and benefits from either of these conditions. Çorum solar power plant project does not involve in any form discrimination in any kind of form. Turkey ratified ILO 100 Equal Remuneration Convention and 111 Discrimination (Employment and Occupation) Convention[42]	

[42] http://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO::P11200_COUNTRY_ID:102893

	maternity/paternity leave, or marital status. 3. Ensure that these conditions do not limit the access of women or men, as the case may be, to Project participation and benefits. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.			
Principle 3- Community Health, Safety and Working Conditions	The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments.	Potentially	The project owner is committed to the safe and healthy working conditions during all phases of the project. All employees will attend trainings health & safety. This issue is protected by Labor Law and regulations[43] and UN Agreement on Human Rights[44] .	All the employees will be trained about health and safety issues during operation phase of the project but this is not required.
Principle 4-Cultural Heritage,	Does the Project Area include sites, structures,	No	During the construction and	Not Required

[43] http://www.mevzuat.adalet.gov.tr/html/1243.html

[44] https://www.unicef.org/turkey/udhr/_gi17.html

Indigenous Peoples, Displacement and Resettlement	or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, or practices)? Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)? Does the Project require any change to land tenure arrangements and/or other rights? For Projects involving land-use tenure, are there any uncertainties with regards land tenure, access rights, usage rights or land ownership? Are indigenous peoples present in or within the area of influence of the		operation of the Çorum Solar Power plant project will not be any damage, alteration or removal to the critical cultural heritage. Cultural and environmental heritage is protected against alteration, damage or removal by the law[45]. The project does not involve any settlement areas. Thus, this project does not cause the physical or economic relocation of peoples. The project's area private land.[46] The project does not require any changes to land tenure	

[45] Reference: "Law on Protection of Cultural and Environmental Assets"

http://mevzuat.basbakanlik.gov.tr/Metin.Aspx?MevzuatKod=1.5.2863&MevzuatIliski=0&sourceXmlSearch=

[46] Land Documents

	Project and/or is the Project located on land/territory claimed by indigenous peoples?		arrangements or other rights. And this Çorum Solar Power Plant Project is not involving land-use tenure. Furthermpre there is not any uncertainties with regards land tenure, access rights, usage rights or land ownership. The Land for the project has been approved by the several local Authorities.[47] No cultural heritage/ indigenous people are displaced due to the project.	
Principle 5- Corruption	The project does not involve and is not complicit in corruption.	No	Çorum Solar Power Plant project does not involve and is not complicit in any kind of corruption. Turkey has ratified	Not Required

[47] Land Documents

			UN Convention against Corruption and the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions.[48]	
Principle 6- Economic Impacts	1. The project does not employ and is not complicit in any form of child labor. 2. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments. 3. The project does not involve and is not complicit in any form of forced or compulsory labor.	No	1.Galata Wind Enerji and their subcontractors complying with all relevant national laws. Çorum Enerji will not employ children in any shape or form for their works. Turkey has ratified ILO 138 Minumum Age Conventions and 182 Worst Forms of Child Labour Convention[49] 2. The project owner is committed to the safe and healthy working	Not Required

[48] http://treaties.un.org/Pages/ViewDetails.aspx?mtdsg_no=XVIII-14&chapter=18&lang=en

[49] http://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO::P11200_COUNTRY_ID:102893

			conditions all phases of the project. All employees will attend trainings health & safety. This issue is protected by Labor Law and regulations[50] and UN Agreement on Human Rights[51] 3. Galata Wind Enerji and appointed subcontractors will not involve in any form forced or compulsory labour Turkey has ratified ILO 29 Forced Labour Convention[52]	
ENVIRONMENTAL & ECOLOGICAL SAFEGUARDING PRINCIPLES				
Principle 1-Climate and Energy	Will the Project increase greenhouse gas emissions over the Baseline Scenario? Will the Project use energy from a local grid	No	The project reduces greenhouse gas emissions and fossil fuel use compared to the baseline scenario.	Not Required

[50] http://www.mevzuat.adalet.gov.tr/html/1243.html

[51] https://www.unicef.org/turkey/udhr/_gi17.html

[52] http://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO::P11200_COUNTRY_ID:102893

	or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?		On the contrary the project generates renewable energy and supplies to the grid.	
Principle 2-Water	Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The project being a solar power project thus there is no impact of water resources due to the project. In project site there is no area defined in the water pollution control regulation. The project is in scope of Exempt EIA.[53]	Not Required
Principle 3-Environment, ecology and land use	1. Does the Project involve the use of land and soil for production of crops or other products? 2. Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	1. The Land for the project has been approved by the all relevant local Authorities. 2. The project is susceptible to decreased vulnerability to wind, earthquakes,subsidence,landslides, erosion,flooding, drought or other	Not Required

[53] EIA Exempt Letters – 04/06/2015

	3. Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)? 4. Could the Project potentially result in the release of pollutants to the environment? 5. Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials? 6. Will the Project involve the application of pesticides and/or fertilisers?		extreme conditions. 3.Solar systems not affects the herbal life negatively. The 8 unlicensed project is exemp from EIA legally. Furthermore, there is not effect negatively organism, flora, fauna or GMOs. 4. The project takes a precautionary approach in regard to environmental challenges and is not complicit in practices contrary to the precautionary principle. The environment is protected by several Laws and Regulations in Turkey. The purpose of the "Law on Environmental Protection" is to protect the environment with principles of sustainable	

			development and environment. The project owner also follows necessary procedures for environmental safety at the project site at international standard (such as Bern Convention). 5. The all wastes will be disposed of according to related regulations. Solid waste has been disposed in appropriate Tatar village's locations by employees. 6.Not applicable for Solar Power Systems.	

Assessments regarding Safeguarding Principles and Requirements paragraph 4.2.2 and 4.3.7 to 4.3.11 are briefly given below.

4.2.2 Erosion and/or Water Body Instability

Question: Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? If 'Yes' or 'Potentially' proceed to question 2.

No, the project is not caused additional erosion or water body instability and disrupt natural pattern of erosion. The project owner has had prepared the ground survey report to third party independent experts for the purpose of assessing the suitability of the land, examination of the disaster events likely to occur in and around the site (erosion, rockfall, flood etc.) and to reduce or

prevent it if any likelihood is assessed. The report's verdict is that the disastrous events are not likely to happen.[54]

Question: Is the Project's area of influence susceptible to excessive erosion and/or water body instability? No.

4.3.7 Harvesting of Forests

Question: Will the Project involve the harvesting of forests?

This is solar power project so the project does not involve the harvesting of forests.

4.3.8 Food

Question: Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?

The project area does not involve agricultural land so the project activity does not have any negatively impact to access and availability of food for people.

4.3.9 Animal husbandry

Question: Will the Project involve animal husbandry?

This solar power project does not involve any animal husbandry.

4.3.10 High Conservation Value Areas and Critical Habitats

Question: Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites[55] identified?

The project does not affect or alter High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or cultural sites.

4.3.11 Endangered Species

Questions: 1. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?

2. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?

There are no endangered species identified as potentially being present within the Project boundary (including those that may route through the area). The project is not within the vicinity of area that contains endangered species.

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[54] Ground Survey Report

[55] Charter of the United Nations, Article 1, para 3. http://www.un.org/en/sections/un-charter/chapter-i/index.html

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from stakeholders

The stakeholders to the project activity was defined jointly by the project owner and Rüzgar Danışmanlık (Cagla Balci Eris) , who is the consultant to the GS project cycle, taking into account the characteristics and possible impacts of the project activity.

The stakeholders from all categories suggested by Gold standard were invited to the meeting on 20/05/2018. Generally the preferred means for invitation was through e-mails. Most of the stakeholders were invited through emails and phone calls followed by the emails where possible.

New LSC according to new Gold Standard Stakeholder Consultation & Engagement Procedure Requirements has been held with local stakeholders on 20th June 2018 in Tatar village mukhtar office Before the meeting the questionnaire regarding the sustainable development indicators and monitoring of the indicators along with the explanation of the indicators, meeting evaluation forms and non-technical description of the Çorum Solar Power Plant project has been provided to the stakeholders.

E.2. Summary of comments received

The stakeholders from all categories suggested by Gold standard For Global Goals were invited to the meeting via mail on 18/05/2018 and via face to face with the villager on 21/05/2018. And The local stakeholder meeting has been held on 20th of June 2018 in Tatar Village Mukhtar Office , Merkez District of Corum province. Also all local people are informed about meeting in advance by local announcements. Before the meeting the questionnaire regarding the sustainable development indicators and monitoring of the indicators along with the explanation of the indicators, meeting evaluation forms and non-technical description of the Corum Solar Power Plant Project have been provided to the stakeholders.

At the end of the meeting, continuous input mechanism discussed and the book has been given to the Tatar Village's mukhtar with a protocol. All local stakeholders agreed on this mechanism. During this part of the meeting, the contact details of the project owner, project proponent and the GS responsible person were shared with the the participants and also mukhtar of Tatar village. Local stakeholders were encouraged to give feedback about the project.

Stakeholder Feedback Round (SFR)

The Gold Standard stakeholders' consultation process has two main events: a "live" local stakeholders consultation meeting and the stakeholders feedback round. The consultation meeting includes a discussion of the design and consequent impacts of the project while the feedback round provides ground for stakeholders to provide feedback on how their comments have been taken into account.

The feedback round has started on 16/08/2018 with sending out the documents to the stakeholders and no feedback has been received till 16/10/2018.The beginning of two months Stakeholder

Feedback Round has been announced from the headman of Tatar village. This public announcement emails and documents contain information such as location of available these documents, the procedure to commit comments, timing and the contact's details.

The documents including the SCR and the PDD havel been delivered to the stakeholders who have been selected as stakeholders to the project activity. The main communication method had been through e-mails and delivery of several hard copies of the mentioned documents for those who don't have an email address (specifically the locals) to the headman of the Tatar village. Also the documents made available under the Gold Standard's webpage.

In addition, all these documents has been made available under the GS registry webpage (www.markit.com) as required by GS.

E.3. Report on consideration of comments received

Detailed information of the Stakeholders Consultation Process may be found in Stekeholder Consultation Report.

Appendix 1. Contact information of project participants

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Appendix 2. Summary of post registration design changes

Revision History

Version	Date	Remarks
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1	10 July 2017	Initial adoption