



Verified Carbon Standard

ÜÇPINAR WIND POWER PROJECT, TURKEY

Project title	Üçpınar Wind Power Project, Turkey
Project ID	VCS 1907
Crediting period	18-June-2019 to 17-June-2029
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Most recent date of issue	02-July-2026 (Project Design Deviation)
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Prepared by	Life İklim ve Enerji Ltd. Şti

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Derbent Enerji Üretim Pazarlama İthalat ve İhracat A.Ş. (hereafter referred to as “**Üçpınar**”) invested into a new Wind Power Project called **Üçpınar Wind Power Project, Turkey** (hereafter referred to as the “**Project**” or “**Üçpınar WPP**”), which involves installation and operation of 3 MWe wind turbines. The project consists of 33 wind turbines. The generated energy will be fed to the grid Seyit Onbaşı TM (previously Çan Havza TM) ¹

An estimated electricity net generation of 317,500 MWh² per year by the efficient utilization of the available wind energy by project activity will replace the grid electricity, which is constituted of different fuel sources, mainly fossil fuels. Although the generation license indicates a higher annual generation value of 342,254 MWh³, the more conservative value of 317,500 MWh provided in the feasibility assessment was taken as the basis for the Project. Since the Project was initially registered and assessed using the P75 values presented in the extension feasibility study, the same approach has been maintained in the current monitoring and calculation framework to ensure methodological consistency throughout the Project's crediting period. The electricity produced by project activity will result in a total emission reduction of 180,199 tonnes of CO₂e/year.

The original design of the Project has been revised with the addition of two turbines to the original design and an additional solar unit. The initial installed capacity of the Project was 121 MWm/99 MWe. Following the solar equipment agreement signed on 03/02/2024, an additional 39.9399 MWm solar unit was incorporated into the Project. Subsequently, under the turbine supply agreement signed with Nordex on 23/07/2024, the total installed capacity of the Project was revised to **161.7399 MWm / 108.6 MWe⁴**, and the project license was updated accordingly. As a result of these additions, the estimated annual electricity generation of the Project was revised to **363,254 MWh/year⁵**. The annual **estimated emission reduction amount will be 206,183 tCO₂e after the project design deviation**. The total emission reduction by the project activity is estimated to be **1,915,249 tonnes of CO₂e** for the first crediting period, which is 18/06/2019-17/06/2029. Moreover, project activity will contribute further dissemination of wind and solar energy; extension of national power generation.

¹ Grid connection point has been changed from Çan Havza to Seyit Onbaşı TM on 21/11/2024. Please See; Official Generation License ,Page 34.

² Please see energy yield assessment report. The details is given in the CM Calculation Excel.

³ Initial generation license of the Project.

⁴ Initial generation license of the Project.

⁵ Revised generation license of the Project.

Table 1: Project information related to before and after design deviation of Üçpınar WPP

	Number of Turbines	Total Capacity	Date of Being operational	Estimated Annual Net Electricity Generation (MWh/y)	Estimated Emission Reduction (tCO ₂ /y)
Initial Design	33 WTG	121 MWm/ 99MWe	Partial Commissioning on 14-February-2025, 14-March-2025	317,500 MWh	180,199
After Design Deviation	35 WTG	161.7399 MWm/ 108.6 MWe (39 MWm solar capacity, 108.6 MWm/Mwe wind)	19- September-2025	363,254 MWh	206,183

The project will help Turkey to stimulate and commercialize the use of grid connected renewable energy technologies and markets. Furthermore, the project will demonstrate the viability of grid connected wind and solar farms which can support improved energy security, improved air quality, alternative sustainable energy futures, improved local livelihoods and sustainable renewable energy industry development. The specific goals of the project are to:

- reduce greenhouse gas emissions in Turkey compared to the business-as-usual scenario;
- help to stimulate the growth of the wind and solar power industry in Turkey;
- create local employment during the construction and the operation phase of the wind-solar plant;
- reduce other pollutants resulting from power generation industry in Turkey, compared to a business-as-usual scenario;
- help to reduce Turkey's increasing energy deficit;
- and differentiate the electricity generation mix and reduce import dependency.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	18-June-2019 to 17-June-2029	VCS	RINA Services S.p.A	10 years
1 st Verification	18-June-2019 to 31-May-2022	VCS	Earthood	2 years 11 months
2 nd Verification	01-June-2022 to 31-December-2023	VCS	Earthood	1 year 7 months

3 rd Verification	01-January-2024 to 31-December-2024	VCS	RINA Services S.p.A	1 year
Project Design Deviation & 4 th Verification	01-January-2025 to 31-December-2025	VCS	BM Certification	1 year

1.3 Sectoral Scope and Project Type

Sectoral scope ⁶	No. 1 "Energy Industries (renewable/non-renewable)"
Project activity type	Renewable Energy (REN), wind power project

1.4 Project Eligibility

1.4.1 General eligibility

VCS The project activity is a grid-connected wind power plant located in Türkiye and applies an approved renewable energy methodology eligible under the VCS Program. Although grid-connected wind power projects in non-LDC countries are currently listed among the excluded project activity categories under Section 2.1.3, Table 1 of the VCS Standard V 4.7⁷, Üçpınar WPP project was listed and progressed through the VCS project development cycle prior to the introduction of these exclusion provisions. Therefore, the project remains eligible under the applicable VCS transition provisions and grandfathering arrangements.

The project activity involves the generation of electricity through grid-connected wind and solar power technology and the displacement of electricity that would otherwise be generated by fossil fuel-dominated grid sources. The project does not involve any prohibited activities, including but not limited to nuclear power generation, activities involving the destruction of HCFC-22, illegal activities, or activities that are mandated by law without additional voluntary climate benefits. Therefore, the project is eligible under the VCS Program scope.

The project has complied with all VCS Program procedural requirements related to project registration timelines. The project was listed on the relevant project pipeline prior to the applicable VCS deadline requirements. Furthermore, the opening meeting with the Validation/Verification Body (VVB) was conducted within the required timeframe and documented accordingly. Validation activities were completed and submitted in line with the applicable validation deadline requirements under the VCS Program.

⁶ Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

⁷ <https://verra.org/wp-content/uploads/2024/04/VCS-Standard-v4.7-FINAL-4.15.24.pdf>

The project applies an approved VCS-eligible methodology for grid-connected renewable electricity generation projects. The applied methodology is eligible under the VCS Program and is appropriate for the project technology, scale, and implementation conditions. The project activity utilizes wind and solar energy for electricity generation and exports renewable electricity to the Turkish national grid, thereby displacing anthropogenic greenhouse gas emissions associated with grid electricity generation.

Where applicable, the project has been assessed against methodology scale and capacity limitations. The project is not a fragmented component of a larger activity or grouped development intended to circumvent methodology applicability thresholds or capacity limits. The project has been implemented as a single, independently developed renewable energy facility with distinct technical, financial, and operational characteristics. No single cluster of project activity instances exceeds any applicable capacity limitation under the applied methodology.

The project activity is implemented voluntarily and seeks certification under the VCS Program to quantify, monitor, and verify greenhouse gas emission reductions resulting from renewable electricity generation. All monitoring, validation, and verification procedures will be conducted in accordance with the applicable VCS rules and requirements.

Accordingly, Üçpınar WPP project activity satisfies all relevant eligibility requirements under the VCS Program.

1.4.2 AFOLU project eligibility

N/A.

1.4.3 Transfer project eligibility

N/A

1.5 Project Design

- ☒ Single location or installation
- ☐ Multiple locations or project activity instances (but not a grouped project)
- ☐ Grouped project

1.5.1 Grouped project design

N/A

1.6 Project Proponent

Organization name	Derbent Enerji Üretim Pazarlama İthalat ve İhracat A.Ş.
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Contact person	Melis Yılmaz
Title	Energy and Carbon Markets Manager
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Telephone	+90 (312) 408 10 00
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1.7 Other Entities Involved in the Project

Organization name	Life İklim ve Enerji Ltd. Şti
Role in the project	Project Consultant
Contact person	Seren Özdemir
Title	Carbon Consultant
Address	Oğuzlar Mahallesi, 1377. Sk. No:19, 06520 Çankaya/ANKARA
Telephone	+90 312 481 21 42
Email	seren.ozdemir@life-climate.com

1.8 Ownership

The Project is owned by Derbent Enerji Üretim Pazarlama İthalat ve İhracat A.Ş.

1.9 Project Start Date

Project start date	18-June-2019
Justification	Official start and commissioning date of Üçpınar WPP

1.10 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☐ Ten years, fixed ☒ Other (The project activity has a crediting period of 10 years, which may be renewed twice in accordance with the applicable VCS requirements valid at the time of the initial registration under VCS)
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Start and end date of first or fixed crediting period	18-June-2019 to 17-June-2029 (First Crediting Period)
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1.11 Project Scale and Estimated GHG Emission Reductions or Removals

☒ < 300,000 tCO₂e/year (project)

☐ ≥ 300,000 tCO₂e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO ₂ e)
18-June-2019 to 31-December-2019	97,258
01-January-2020 to 31-December-2020	180,199
01-January-2021 to 31-December-2021	180,199
01-January-2022 to 31-December-2022	180,199
01-January-2023 to 31-December-2023	180,199
01-January-2024 to 31-December-2024	180,199
01-January-2025 to 31-December-2025	203,546
01-January-2026 to 31-December-2026	206,183
01-January-2027 to 31-December-2027	206,183
01-January-2028 to 31-December-2028	206,183
01-January-2029 to 17-June-2029	94,901
Total estimated ERRs during the first or fixed crediting period	1,915,249
Total number of years	10
Average annual ERRs	191,524

1.12 Description of the Project Activity

Wind and solar energy technology have been selected for power generation in this study. The key technical design parameters of the **Siemens SWT-3.4-108** wind turbine model are summarized in **Table 1**. Furthermore, the specifications of the **Nordex N133/3** wind turbines and the **Solar Power Plant (SPP)** are presented in **Tables 2 and 3**, respectively.

Table 2: Technical specifications of Siemens SWT-3.4-108 Curtailed to 3MW⁸

Specifications	Siemens SWT-3.4-108 Curtailed to 3 MW
Rated Power (kW)	3000 ⁹
Rotor Diameter (m)	108
Blade Length (m)	53
Num. of Blades	3
Swept Area (m ²)	9144
Cut-out wind speed (m/s)	25

Table 3: Technical specifications of Nordex N133/4800¹⁰

Specifications	Nordex
Rated Power (kW)	4800
Rotor Diameter (m)	133
Hub Height (m)	110
Num. of Blades	3
Cut-in wind speed (m/s)	3
Cut-out wind speed (m/s)	28

⁸ Please see https://www.siemens.com/content/dam/internet/siemens-com/global/market-specific-solutions/wind/data_sheets/data-sheet-wind-turbine-swt-3.2-108-3.4-108.pdf

⁹ Please see license of the project

¹⁰ Provisional acceptance documents of added WTGs

Table 4: Technical specifications of solar unit¹¹

Specifications	SPE 550 Half Cut Bifacial
Number of Power Modules	15288
Maximum Power (Wp)	550
Power Tolerance	0~+5 W
Maximum Power Voltage (Vmp)	42.15
Maximum Power Current (Imp)	13.07
Open Circuit Voltage (Voc)	49.74
Short Circuit Current (Isc)	13.86
Maximum System Voltage	1500 V DC
External Dimensions (L × W × H)	2278 mm × 1134 mm × 35 mm
Operating Temperature Range	-40 °C to +85 °C
Nominal Operating Temperature	-45 °C ±2

Technical life time of Üçpınar WPP is determined by using the “Tool to determine the remaining lifetime of equipment” (v. 1)¹². In the tool it is stated that;

Project participants may use one of the following options to determine the remaining lifetime of the equipment:

- (a) Use manufacturer’s information on the technical lifetime of equipment and compare to the date of first commissioning;
- (b) Obtain an expert evaluation;
- (c) Use default values.

For the project option (a) is used. According to the equipment agreement, the system has 25 years of warranty¹³. Accordingly with the selected option; wind turbines were commissioned in 2019. Based on a technical lifetime of 25 years, the equipment age is 7 years and the remaining lifetime is 18 years as of 2026.

¹¹ Agreement w/Asunim

¹² Please see <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>

¹³ Please see EPC agreement.

1.13 Project Location

The project is located in Çanakkale Province, Lapseki District, Üçpınar Village. Location of the project is given in Figure 1. Moreover, the coordinates of the project activity are given under Table 4.

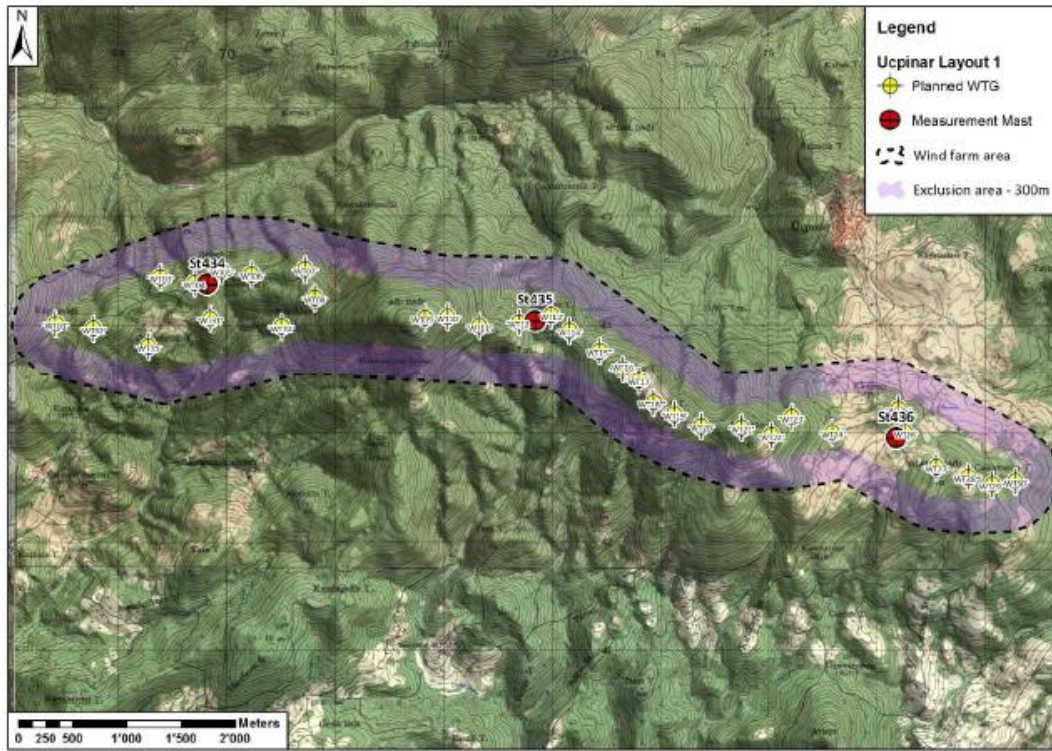


Figure 1: Location of the plant¹⁴

Table 5: Geographic coordinates of the project activity of Üçpınar WPP¹⁵

Wind Turbine No.	Latitude (N)	Longitude (E)
1	40° 08' 45.1824"	26° 37' 45.4110"
2	40° 08' 43.7676"	26° 38' 00.1718"
3	40° 08' 59.2908"	26° 38' 26.3783"
4	40° 08' 57.5160"	26° 38' 39.7017"
5	40° 09' 01.2780"	26° 38' 50.2911"
6	40° 09' 00.2412"	26° 39' 01.9621"
7	40° 09' 01.7964"	26° 39' 22.7919"
8	40° 08' 53.1456"	26° 39' 26.6395"
9	40° 08' 47.4000"	26° 40' 09.1445"
10	40° 08' 47.7168"	26° 40' 17.9340"

¹⁴ Please see energy Yield Assesment Report.

¹⁵ Please see Production License for the coordinates and <https://rcn.montana.edu/resources/Converter.aspx> for the conversion.

11	40° 08' 45.0276"	26° 40' 30.3304"
12	40° 08' 46.0752"	26° 40' 45.9211"
13	40° 08' 48.3504"	26° 40' 58.3363"
14	40° 08' 43.6992"	26° 41' 05.5428"
15	40° 08' 37.6008"	26° 41' 17.4892"
16	40° 08' 32.2080"	26° 41' 26.5157"
17	40° 08' 28.8204"	26° 41' 32.7858"
18	40° 08' 22.1532"	26° 41' 38.6478"
19	40° 08' 18.6396"	26° 41' 46.7775"
20	40° 08' 15.1296"	26° 41' 57.1889"
21	40° 08' 14.7840"	26° 42' 12.9531"
22	40° 08' 12.3792"	26° 42' 24.6692"
23	40° 08' 17.8476"	26° 42' 32.6751"
24	40° 08' 13.2828"	26° 42' 48.4994"
25	40° 08' 20.3496"	26° 43' 14.2907"
26	40° 08' 13.3836"	26° 43' 16.8970"
27	40° 08' 03.1956"	26° 43' 29.2355"
28	40° 08' 00.2112"	26° 43' 41.8400"
29	40° 07' 57.9612"	26° 43' 51.1876"
30	40° 07' 58.9224"	26° 44' 00.1000"
31	40° 08' 46.8636"	26° 38' 45.8011"
32	40° 08' 44.5452"	26° 39' 13.7920"
33	40° 08' 38.5512"	26° 38' 21.7541"
34*	40° 08' 04.9440"	26° 42' 33.5664"
35*	40° 08' 02.0880"	26° 43' 17.5992"
*Added WTGs		
SPP Unit/Corner Number	Latitude (N)	Longitude (E)
SPP1 K1	40° 8' 36.3472"	26° 43' 11.2415"
SPP1 K5	40° 8' 34.2250"	26° 43' 13.2255"
SPP1 K10	40° 8' 31.8722"	26° 43' 13.7768"
SPP1 K15	40° 8' 31.9671"	26° 43' 10.7410"
SPP1 K20	40° 8' 32.8518"	26° 43' 4.1918"
SPP1 K25	40° 8' 35.1957"	26° 43' 3.7839"
SPP1 K30	40° 8' 35.8747"	26° 43' 5.4047"
SPP1 K35	40° 8' 35.9992"	26° 43' 7.6967"
SPP1 K40	40° 8' 36.2716"	26° 43' 10.4803"
SPP2 K1	40° 8' 27.4177"	26° 43' 17.7177"
SPP2 K5	40° 8' 25.3817"	26° 43' 16.7437"
SPP2 K10	40° 8' 24.4681"	26° 43' 18.9136"
SPP2 K15	40° 8' 22.5719"	26° 43' 16.9157"
SPP2 K20	40° 8' 24.6504"	26° 43' 15.1670"
SPP3 K1	40° 8' 28.1640"	26° 43' 7.6669"
SPP3 K5	40° 8' 25.9948"	26° 43' 6.7312"
SPP3 K10	40° 8' 26.0897"	26° 43' 39.0705"
SPP3 K15	40° 8' 26.3173"	26° 43' 41.0838"
SPP3 K20	40° 8' 21.1333"	26° 43' 39.4379"

SPP3 K25	40° 8' 19.3497"	26° 43' 38.2988"
SPP3 K30	40° 8' 19.6201"	26° 43' 36.0238"
SPP3 K35	40° 8' 18.5167"	26° 43' 35.2051"
SPP3 K40	40° 8' 19.7118"	26° 43' 35.8668"
SPP3 K45	40° 8' 19.6125"	26° 43' 37.6298"
SPP3 K50	40° 8' 21.0441"	26° 43' 39.5257"
SPP3 K55	40° 8' 22.6319"	26° 43' 38.8855"
SPP3 K60	40° 8' 23.0491"	26° 43' 36.9821"
SPP4 K1	40° 8' 24.9066"	26° 43' 46.5781"
SPP4 K5	40° 8' 26.0669"	26° 43' 42.3474"
SPP4 K10	40° 8' 23.2205"	26° 43' 45.0033"
SPP4 K15	40° 8' 23.0858"	26° 43' 45.7253"
SPP4 K20	40° 8' 24.0073"	26° 43' 49.6243"
SPP4 K25	40° 8' 25.7851"	26° 43' 50.6906"
SPP4 K30	40° 8' 26.6418"	26° 43' 52.5922"
SPP4 K35	40° 8' 23.9354"	26° 43' 54.8988"
SPP4 K40	40° 8' 25.7964"	26° 43' 51.6658"
SPP4 K45	40° 8' 24.3246"	26° 43' 54.8973"
SPP4 K50	40° 8' 25.3920"	26° 43' 53.6353"
SPP4 K55	40° 8' 26.9502"	26° 43' 55.8791"
SPP4 K60	40° 8' 12.7735"	26° 43' 45.5378"
SPP4 K65	40° 8' 22.6441"	26° 43' 50.0532"
SPP4 K70	40° 8' 22.3908"	26° 43' 51.6792"
SPP4 K75	40° 8' 22.6010"	26° 43' 54.5861"
SPP4 K80	40° 8' 21.7626"	26° 43' 55.0222"
SPP4 K85	40° 8' 22.0786"	26° 43' 53.9317"
SPP4 K90	40° 8' 20.7163"	26° 43' 53.9371"
SPP5 K1	40° 8' 13.0985"	26° 43' 41.8937"
SPP5 K5	40° 8' 11.8385"	26° 43' 42.0476"
SPP5 K10	40° 8' 12.2927"	26° 43' 42.5198"
SPP5 K15	40° 8' 13.9133"	26° 43' 42.0485"
SPP5 K20	40° 8' 13.2589"	26° 43' 39.6253"
SPP5 K25	40° 8' 11.9131"	26° 43' 41.2365"
SPP5 K30	40° 8' 11.9572"	26° 43' 37.7882"
SPP6 K1	40° 8' 20.8937"	26° 44' 0.2985"
SPP6 K5	40° 8' 19.6959"	26° 44' 2.2815"
SPP6 K10	40° 8' 16.8022"	26° 44' 2.7788"
SPP6 K15	40° 8' 14.5959"	26° 44' 2.4592"
SPP6 K20	40° 8' 13.6668"	26° 44' 5.0406"
SPP6 K25	40° 8' 8.4688"	26° 44' 1.2956"
SPP7 K1	40° 8' 6.5682"	26° 43' 6.7579"
SPP7 K5	40° 8' 5.1045"	26° 43' 7.2477"
SPP7 K10	40° 8' 4.0728"	26° 43' 8.5548"
SPP7 K15	40° 8' 4.2807"	26° 43' 10.6734"
SPP7 K20	40° 8' 4.8023"	26° 43' 11.9864"
SPP7 K25	40° 8' 3.4730"	26° 43' 12.1793"
SPP7 K30	40° 8' 2.2112"	26° 43' 13.4944"

SPP7 K35	40° 7' 58.5861"	26° 43' 8.5222"
SPP7 K40	40° 7' 59.4910"	26° 43' 7.1487"
SPP7 K45	40° 8' 0.9848"	26° 43' 7.9031"
SPP7 K50	40° 8' 0.8293"	26° 43' 10.6505"
SPP7 K55	40° 7' 59.0148"	26° 43' 11.4185"
SPP7 K60	40° 7' 58.6481"	26° 43' 7.3212"
SPP8 K1	40° 8' 12.8472"	26° 43' 8.3288"
SPP8 K5	40° 8' 11.7463"	26° 43' 9.1245"
SPP8 K10	40° 8' 10.4777"	26° 43' 7.6085"
SPP8 K15	40° 8' 10.2131"	26° 43' 5.4966"
SPP8 K20	40° 8' 11.4111"	26° 43' 4.6465"
SPP8 K25	40° 8' 12.2910"	26° 43' 6.3755"
SPP8 K30	40° 8' 11.6469"	26° 43' 8.2375"
SPP9 K1	40° 8' 3.5414"	26° 42' 59.1905"
SPP9 K5	40° 8' 3.4509"	26° 43' 1.9684"
SPP9 K10	40° 8' 3.4591"	26° 43' 5.3489"
SPP9 K15	40° 8' 3.4673"	26° 43' 8.7295"
SPP9 K20	40° 8' 2.9446"	26° 43' 1.2098"
SPP9 K25	40° 8' 2.9497"	26° 43' 3.3227"
SPP9 K30	40° 8' 2.9549"	26° 43' 5.4355"
SPP10 K1	40° 8' 13.9887"	26° 42' 55.8522"
SPP10 K5	40° 8' 4.7239"	26° 42' 45.7664"
SPP10 K10	40° 8' 5.0901"	26° 42' 52.3741"
SPP10 K15	40° 8' 13.0871"	26° 42' 53.2348"
SPP10 K20	40° 8' 12.1718"	26° 42' 50.3651"
SPP11 K1	40° 8' 13.4543"	26° 42' 53.9771"
SPP11 K5	40° 8' 11.6168"	26° 42' 53.6972"
SPP11 K10	40° 8' 9.9624"	26° 42' 52.6771"
SPP12 K1	40° 8' 29.1901"	26° 42' 57.6124"
SPP12 K5	40° 8' 28.6985"	26° 42' 48.0156"
SPP12 K10	40° 8' 27.1870"	26° 43' 0.5473"
SPP12 K15	40° 8' 22.8516"	26° 42' 53.3010"
SPP12 K20	40° 8' 22.2770"	26° 43' 0.9058"
SPP12 K25	40° 8' 20.1285"	26° 43' 0.5912"
SPP12 K30	40° 8' 18.5068"	26° 43' 0.5979"
SPP12 K35	40° 8' 16.8851"	26° 43' 0.6046"
SPP13 K1	40° 8' 31.5604"	26° 43' 0.9265"
SPP13 K5	40° 8' 29.2633"	26° 42' 57.3838"
SPP13 K10	40° 8' 28.1522"	26° 42' 57.5997"
SPP13 K15	40° 8' 27.0016"	26° 42' 54.9190"
SPP13 K20	40° 8' 23.9191"	26° 42' 58.4937"
SPP13 K25	40° 8' 22.6595"	26° 43' 0.6543"
SPP13 K30	40° 8' 21.0416"	26° 43' 2.2246"
SPP13 K35	40° 8' 19.4244"	26° 43' 4.0907"
SPP13 K40	40° 8' 17.8077"	26° 43' 6.1682"
SPP13 K45	40° 8' 16.1912"	26° 43' 8.2878"

1.14 Conditions Prior to Project Initiation

The pre-project scenario is same as baseline scenario. Please refer Section 3.4 (Baseline Scenario) for the description of baseline scenario.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

Laws as relevant to the project are (Law No. and Publication Date in Official Gazette):

(1) Electricity Market Law (6446, 30/3/2013) ¹⁶

This Law applies to electricity generation, transmission, distribution, wholesale, and retail sale, import and export, market operation as well as to the rights and obligations of all real and legal persons engaged in such activities. One of the terms in the implementation of this law is the connection agreement. Connection agreement means the agreement entered into for purposes of ensuring connection with the transmission system or distribution system of a generation company, distribution company or consumer. For the Üçpınar WPP, connection agreement documents have been provided. Also, Üçpınar WPP generated electricity within the framework of this law. In addition, to be specifically stated, Article 14 is about analyzed electricity generation. Taking into account all of these, this project in line with this law.

(2) Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy (5346, 18/5/2005) ¹⁷

Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy covers protection of renewable energy resource areas and principles and procedures for the use of these resources. Üçpınar WPP is using wind and solar as a source and called renewable energy project. Üçpınar WPP is a hybrid project that converts wind energy and sunlight into electrical energy and the project activity generated electricity within the framework of this law. Additionally, Article 14-(3) generated that excess amount of electricity for analyzed electricity generation will be both in accordance with this law.

(3) Environment Law (2872, 11/8/1983) ¹⁸

According to the relevant Environmental Impact Assessment Regulation for Hasanoba Wind Power Project, an Environmental Impact Assessment is not required. The official letters from Provincial Directorate of Environment and Urbanization confirming non-applicability of this regulation is available to DOE during validation process. So, Environmental Impact Assessment is not required for this project and with legal entity.

¹⁶ See: <https://www.epdk.org.tr/Detay/DownloadDocument?id=fAxHn|ONEw=>

¹⁷ See: <https://www.epdk.org.tr/Detay/DownloadDocument?id=kvZVO0DFQ3E=>

¹⁸ See <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf>

In terms of capacity addition:

For the wind capacity addition, following the submission and evaluation of the relevant EIA reports, an “EIA Positive” decision was obtained from the Ministry of Environment, Urbanization and Climate Change on 14/08/2020. The approval confirms that the environmental impacts of the wind capacity increase were assessed by the competent authority and deemed acceptable in accordance with the applicable environmental regulations and mitigation measures defined within the EIA process.

In terms of addition of solar capacity, another ‘EIA Positive’ decision has been obtained from Ministry of Environment, Urbanization and Climate Change on 27/04/2022, confirming that the environmental impacts associated with the solar capacity addition were assessed and approved by the competent authority in line with the applicable environmental legislation and the mitigation measures defined within the EIA documentation.

(4) Occupational Health and Safety Regulation (6331, 30/6/2012) ¹⁹

All necessary precautions and requirements are taken by the project owner in this project. Health and safety risks, emergency plans of the project have been considered by project developer both during construction and operation phases. Project developer identify the occupational health and safety measures to be taken as well as the protective gear or equipment to be used as a consequence of the risk assessment. Healthy and safe working conditions for the employers with internal procedures and protective equipments have been provided by project developer in this project. Occupational safety measures taken in maintenance, repair and operation works are carried out and recorded according to the written procedure. Warning labels are provided before any maintenance and repair work. The maintenance and repairs of the plant and devices are performed periodically. Maintenance and repairs are recorded. Vehicles suitable for the land and road conditions, auto tires suitable for climate and nature conditions are used, and the maintenance of the vehicles is carried out periodically by the authorized service. So, this project is in line with this law.

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.16.2 Registration in Other GHG Programs

Has the project registered under any other GHG programs?

☐ Yes ☒ No

Is the project active under the other program?

¹⁹ See: <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.6331.pdf>

☐ Yes ☒ No

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 1.12 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

Has the project proponent(s) or authorized representative posted a public statement on their website saying, "Carbon credits may be issued through Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities]."

☐ Yes ☒ No

1.18 Sustainable Development Contributions

As the project developer, Derbent believes that efficient utilization of all kinds of natural resources with a harmony coupled with responsible environmental considerations is vital for sustainable development of Turkey and the World. The project is aligned with the United Nations Sustainable Development Goals (SDGs), particularly SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 13 (Climate Action) and SDG 6 (Clean Water and Sanitation).

- **SDG 7- Affordable and Clean Energy**

The project generates electricity from renewable wind/solar resources and supplies clean energy to the national grid, thereby increasing the share of renewable energy in Turkey's electricity generation mix. By displacing electricity that would otherwise be generated from fossil fuel-based power plants, the project contributes to reducing dependence on imported energy resources, enhancing energy security, and supporting the diversification of the national energy portfolio. Furthermore, the project promotes the deployment and wider adoption of renewable energy technologies within the country. The expected electricity generation for Üçpınar WPP is 317,500 MW/year before design deviation and 363,254 MWh/year after design deviation.

- **SDG 8 – Decent Work and Economic Growth**

The project creates employment opportunities during both the construction and operational phases, contributing to local economic development and income generation. Preference is given to local suppliers and service providers wherever feasible, supporting regional businesses and stimulating economic activity in surrounding communities. In addition, the project contributes to sustainable economic growth by encouraging further investments in the renewable energy sector and strengthening the domestic renewable energy industry. The expected number of employees who work at Üçpınar WPP is 16.

- **SDG 13 – Climate Action**

The project directly contributes to climate change mitigation through the generation of renewable electricity and the avoidance of greenhouse gas emissions that would otherwise result from grid-connected fossil fuel power plants. By reducing carbon dioxide and other associated emissions from conventional power generation, the project supports Turkey's efforts to transition towards a low-carbon economy and contributes to global climate action objectives. The project also demonstrates the practical implementation of clean energy technologies and promotes long-term climate-resilient development. The expected ERs for Üçpınar WPP is 180,199 tCO₂/y before design deviation and 206,183 tCO₂/y after design deviation.

- **SDG6 - Clean Water and Sanitation**

The project contributes to the conservation of water resources by generating electricity from wind and solar energy, which requires minimal water consumption during operation compared to conventional fossil fuel-based power plants. In addition, the project implements measures to prevent water contamination and ensures the regular collection and proper management of waste generated during both the construction and

operational phases, thereby supporting the protection of local water resources and environmental quality.

1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

In accordance with ACM0002, leakage emissions for this project are considered negligible and project emissions are deemed to be zero for grid-connected renewable electricity generation activities. Potential emissions associated with power plant construction and upstream fossil fuel activities (e.g., extraction, processing, and transportation) are excluded from the calculation, as permitted under ACM0002. Therefore, the emission reductions are calculated as follows:

$$ER_y = BE_y$$

1.19.2 Commercially Sensitive Information

Any commercially sensitive information that has been excluded from the public version of the VCS PD that will be displayed on the VCS Project Database shall be listed by the project proponent.

1.19.3 Further Information

N/A

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	Residents of Üçpınar Village, identified as a key stakeholder group based on their proximity to the project site and the potential for direct or indirect impacts associated with project implementation and operation
Legal or customary tenure/access rights	For property rights, the project site has acquired property rights in line with the existing legislation and implemented the project. No issues were or are raised due to property rights to territories and

	resources held by stakeholders, local communities, and customary rights. No Indigenous People were identified.
Stakeholder diversity and changes over time	The stakeholders have different levels of education and skills, and income levels may vary. The project has a positive impact on the economy of the stakeholders since it has created employment for the local people. However there no impact on the social, and cultural diversity within stakeholder groups.
Expected changes in well-being	There are no expected changes in well-being and other stakeholder characteristics under the baseline scenario. There are no expected changes to ecosystem services either.
Location of stakeholders	The stakeholders are the residents of the local villages nearby. The closest village is Üçpınar village, which is approximately 6 km away from the project site.
Location of resources	The local village nearby which is Üçpınar village.

2.1.2 Stakeholder Consultation and Ongoing Communication

Date of stakeholder consultation	31-July-2018
Stakeholder engagement process	Local stakeholders were informed about the project and invited to attend a stakeholder consultation meeting. The project owner presented the project details and potential impacts, while stakeholders were encouraged to share their opinions, concerns, and suggestions. Feedback received during the consultation was recorded and taken into consideration during project implementation.
Consultation outcome	During the meeting, the only concern raised by the stakeholders was the road status, since the trucks are using the roads passing through the villages. As a result, the project owner will take necessary precautions to prevent the roads from being damaged.
Ongoing communication	A logbook is available for comments of local stakeholders. Within the established grievance mechanism, local stakeholders will have a chance to submit their requests and complaints to the project owner about the project. In addition, muhtar (head of the village) had

	already taken the contact information (e.g mobile phone) of public relationships expert, project manager and assistant general director of the company so that the local stakeholders will be able to reach these people whenever they have any complaints, suggestions or ideas about the project. They will be able to communicate with them in case of any problems.
Stakeholder input	During the meetings held with local stakeholders on 27 April 2026, it was confirmed that they are aware of capacity addition and the grievance mechanism of the Project, and no project-related complaints had been received as of that date including capacity addition-related concerns. This was documented through a signed declaration submitted to the DOE.

2.1.3 Free Prior and Informed Consent

Obtaining consent	The local villagers were invited to the meeting.
Outcome of FPIC	The local villagers gave consent.

2.1.4 Grievance Redress Procedure

Development process	No grievances were received
Grievance redress procedure	The village head (muhtar) serves as the primary communication channel between the project owner and local stakeholders. Stakeholders may submit any grievances, comments, suggestions, or concerns directly to the muhtar or to the contact persons designated by the project owner. In addition, a stakeholder engagement logbook is maintained at the muhtar's office, where local stakeholders can record their grievances, comments, and suggestions in writing at any time. The entries recorded in the logbook are periodically reviewed and communicated to the project owner for assessment and resolution. All grievances and stakeholder feedback are documented and addressed within a reasonable timeframe. As of the date of this report, no grievances have been received.

2.1.5 Public Comments

Comments received	Actions taken
No comments were received.	If there are any comments, the stakeholders can write it down in the logbook or talk to the village head and immediate action will be taken.

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

The PO's management team has experience in identifying risks to stakeholders and the environment since the project start date which is 18-June-2019.

2.2.2 Risk Assessment

	Risks identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing	No risk identified	There are no risks that would affect the local people, only on the project site training and safety precautions are given.
Risks to stakeholder participation	No risk identified	There are no risks for stakeholder participation. Turkey has ratified ILO convention 155 and about work safety and precautions.
Working conditions	No risk identified	Turkey has ratified ILO convention 155 and about work safety and precautions.
Safety of women and girls	No risk identified	Turkey has ratified ILO convention 155 and about work safety and precautions.
Safety of minority and marginalized groups, including children	No risk identified	There are no minority or marginalized groups in the project area.
Pollutants (air, noise, discharges to water,	Prevention of wastewater discharge to environment.	The wastewater is stored in a septic tank and transferred to

generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)		wastewater treatment plant. Hazardous materials are collected regularly and are disposed of. ²⁰
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2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified ²¹	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality. It is also parallel with the national strategies prepared for women employment by creating opportunities for all.
Sexual harassment	No risk identified	The organization does not tolerate harassment for any women employees which includes sexual, psychological or any other form of harassment that can be a form of discrimination.
Equal pay for equal work	No risk identified	Turkey has ratified ILO convention 100, 111, 122 and 142, the same for discrimination goes for equal pay for equal work.
Gender equity in labor and work	No risk identified	Conventions 100, 111, 122 and 142 ensure gender equity in labor and work.
Forced labor	No risk identified	All employees are recruited according to the national legislations. There is no forced labour.

²⁰ Solid and hazardous waste disposal documents have been shared.

²¹ The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

Child labor	No risk identified	Turkey is a party of IPEC, since 1992 and ratified ILO convention 138 and 182.
Human trafficking	No risk identified	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality. It is also parallel with the national strategies prepared for women employment by creating opportunities for all.

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	The project continues to recognize, respect, and promote the protection of the rights of IPs, LCs, and customary rights holders in line with applicable international human rights law, and the United Nations Declaration on the Rights of Indigenous Peoples and ILO Convention 169 on Indigenous and Tribal Peoples. Turkey has ratified European Convention on Human Right on 10-Mar-1954. Therefore, the project does not violate human rights.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
No risk identified	No sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture were observed in the project area. And no indigenous people were identified.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	The project site has acquired property rights in line with the existing legislation and implemented the project. No issues are raised due to property rights.

2.3.5 Benefit Sharing

Process used to design the benefit sharing plan	Not Applicable. No benefit-sharing plan was developed as the project does not affect the property rights, livelihoods, or access to resources of local stakeholders. During stakeholder consultations, no requests or expectations regarding benefit-sharing arrangements were raised by the affected stakeholders.
Summary of the benefit sharing plan	Not Applicable. As the project does not result in any impact on stakeholder property rights or livelihoods, and no benefit-sharing requirements were identified during stakeholder consultations, no benefit-sharing arrangement has been established.
Approval and dissemination of benefit sharing plan	Not Applicable. Since no benefit-sharing plan has been developed, no approval or dissemination process was required. Stakeholders were informed about the project activities during the stakeholder consultation process, and no requests related to benefit-sharing were received.

2.4 Ecosystem Health

	Risks identified	Mitigation or preventative measure(s) taken
Impacts on biodiversity and ecosystems	Operation of wind turbines may provide a possible risk to aerial species.	Regular controls continue to be carried out by Üçpınar WPP personnel during the operation phase. Monitoring is conducted by assigned personnel to observe nests and carcasses. The potential impact of the photovoltaic (PV) panels on habitat

		has also been assessed. The installation of PV panels is limited to the designated project area and does not result in significant habitat loss, fragmentation, or degradation. The project site does not contain critical habitats or areas of high biodiversity value, and no sensitive vegetation communities have been identified within the PV installation area.
Soil degradation and soil erosion	No risk identified	The project activities will replace the grid electricity, which is constituted of different fuel sources causing greenhouse gas emissions. By replacing in the consumption of these fuels, it contributes to conservation of water, soil, flora and faunas and transfers these natural resources and also the additional supply of these primary energy sources to the future generations.
Water consumption and stress	The project is not consuming any water for its operations. The only water consumption is due to the daily routines of the plant's employees (food, WC, etc.). Thus, no risk is identified yet evidence of proper disposal of wastewater is provided.	Wastewater transfer invoices regarding the Water Quality and Quantity indicator are provided for this monitoring period. So, this indicator did not have a negative impact on the Kocalar Wind Power Project.
Water Quality and Quantity (Water consumption associated with PV panel cleaning (panel washing))	No risk identified	No routine water-based cleaning is applied; natural rainfall is primarily used for module cleaning. In line with common practice for PV installations in Türkiye, module cleaning is primarily achieved through natural rainfall, which provides sufficient passive soiling removal. Any additional cleaning is

performed on an as-needed basis using minimal water.

2.4.1 Rare, Threatened, and Endangered Species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☐ Yes

☒ No

Species and habitat

When the number of turbines to be installed under the project, the distance between the turbines and bird migration routes are considered together, it is not expected to create a significant risk for migratory bird species on condition that the above-mentioned recommendations are implemented.

No VU or EN species were observed. Mammals and reptiles identified are common and not endangered. No significant bat activity or roosting sites were detected.²²

Areas needed for habitat connectivity

The project area does not contain or impact any critical areas needed for habitat connectivity for birds or bats.

- No bat roosting, breeding, or migration activity was observed in the project area or its surroundings.
- The site does not lie on significant wildlife corridors or migration routes for bird species.
- Local bird species observed in the area are typical of similar habitats in the region and do not rely on specific connectivity features within or across the project site.

Therefore, it has been concluded that the project has not adversely impacted, nor is it expected to impact, areas required for the connectivity of habitats for either local or migratory species.

No habitat fragmentation or obstruction to species movement was detected as a result of project activities.

²² Ecosystem Evaluation Report and Ornithology Reports have been shared with the VVB.

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No habitats for rare, threatened, or endangered species were identified.	No further measures were required.
Areas for habitat connectivity	No areas for habitat connectivity for birds or bats identified.	Monitoring found no bat roosts, breeding sites, or migration routes; no intervention necessary.

2.4.2 Introduction of Species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
No species were introduced.	Not available since there are no species introduced.	Not available since there are no species introduced.	Not available since there are no species introduced.

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
There are no invasive species.	Since there are no invasive species, there are no mitigation measures to prevent the spread or continued existence of invasive species.

	Risks identified	Mitigation or preventative measure(s) taken
Invasive species	There are no invasive species.	Since there are no invasive species, there are no mitigation measures to prevent the spread or continued existence of invasive species.

2.4.3 Ecosystem Conversion

Not available since the project is not an ARR, ALM, WRC or ACoGS project.

	Risks identified	Mitigation or preventative measure(s) taken
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Ecosystem conversion	No risk identified	Project area was not cleared or drained of existing natural ecosystems.
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3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable ²³	Title	Version
Methodology	ACM0002 (Version 19.0)	<i>Grid Connected Electricity Generation from Renewable Sources</i>	Version 19.0 ²⁴
Tool	Tool 07	<i>Tool to calculate the emission factor for an electricity system</i>	Version 07.0 ²⁵
Tool	Tool 01	<i>Tool for the demonstration and assessment of additionality</i>	Version 07.0.0 ²⁶
Tool	Tool 02	<i>Combined tool to identify the baseline scenario and demonstrate additionality</i>	Version 07.0 ²⁷
Tool	Tool 03	<i>Tool to calculate project or leakage CO2 emissions from fossil fuel combustion</i>	Version 03.0 ²⁸

²³ In accordance with VCS Standard v4.7, methodology version updates and baseline reassessments are associated with crediting period renewal (Section 3.9.8). Section 3.20 governing project description deviations does not establish a requirement to update the applied methodology version or grid emission factor as part of Design Deviation. Furthermore, Section 3.20.2(4) allows projects to transition to a newer methodology version during an active crediting period on a voluntary basis. Accordingly, the project continues to apply the currently valid version of ACM0002, the associated tools, and the grid emission factor applicable to the ongoing crediting period. Therefore, no updates to the methodology, tools, or emission factor have been undertaken as part of the present design deviation validation. Related values will be updated during the subsequent crediting period renewal.

²⁴ <https://cdm.unfccc.int/UserManagement/FileStorage/58IAGB7SZUDEO2VN6LYM30K41HFPRQ>

²⁵ Please see <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v7.0.pdf>

²⁶ Please see <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf>

²⁷ Please see <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-02-v7.0.pdf>

²⁸ Please see <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-03-v3.pdf>

Tool	Tool 10	<i>Tool to determine the remaining lifetime of equipment</i>	Version 01.0 ²⁹
Tool	Tool 27	<i>Investment analysis</i>	Version 08.0 ³⁰
Tool	Tool 24	<i>Common Practice Analysis</i>	Version 03.1 ³¹

3.2 Applicability of Methodology

Methodology ID	Applicability condition	Justification of compliance
ACM0002	This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).	The project activity consists of installation of Greenfield power plant at a site where no renewable power plant was operated prior to the implementation of the project activity. Thus, it meets the said applicability condition.
	In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between	The project activity is the installation of wind turbine generators (WTVCS) and a solar unit. The project activity only involves capacity addition of solar and wind. Hence, this criterion is not applicable to the project activity.

²⁹ Please see <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>

³⁰ Please see <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v8.pdf>

³¹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf>

	the start of this minimum historical reference period and the implementation of the project activity. In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	
ACM0002	In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m²; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or (d) The project activity is an integrated hydro	The project activity is not a hydro power plant. Hence, this criterion is not applicable to the project activity.

	power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
ACM0002	In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this	The project activity is not a hydro power plant. Hence, this criterion is not applicable to the project activity.

	water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	
ACM0002	The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units	Project activity does not involve: • Switching from fossil fuels to renewable energy sources at the site of the project activity. • Biomass fired plants. Hence this criterion is not applicable.
ACM0002	In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.	The project is not a retrofit, rehabilitations, replacements or capacity addition; hence, this criterion is not applicable to the project activity
ACM0002	In addition, the applicability conditions included in the tools referred to above apply.	Applicability conditions of the applied tool are justified.

3.3 Project Boundary

For the initial design of the Üçpınar WPP, the project uses wind energy to produce electricity. Kinetic power of the wind is converted to electrical energy, which then will be transferred to the grid. Back-up power generators in the wind farm will only be used when the wind farm is out of service and power cannot be supplied from grid. Hence, emissions due to usage of back-up power generation are expected to be very low and are taken to be zero complying with the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (v.3).”

Project boundary diagram is depicted in the diagram below:

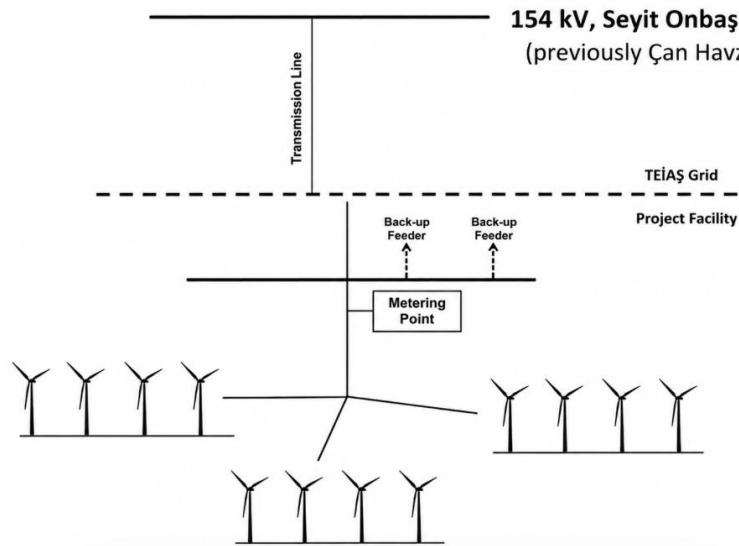


Figure 2: Project boundary diagram

Within the added capacity, the Üçpınar WPP Project uses wind energy and solar energy to produce electricity. The kinetic power of the wind and solar radiation are converted into electrical energy, which is then transferred to the grid. Electricity generated from wind and solar sources is monitored and recorded separately through dedicated main and back-up meters installed for each generation source. Back-up power generators at the wind farm will only be used when the facility is out of service and power cannot be supplied from the grid. The revised project boundary including the added capacity is provided below.

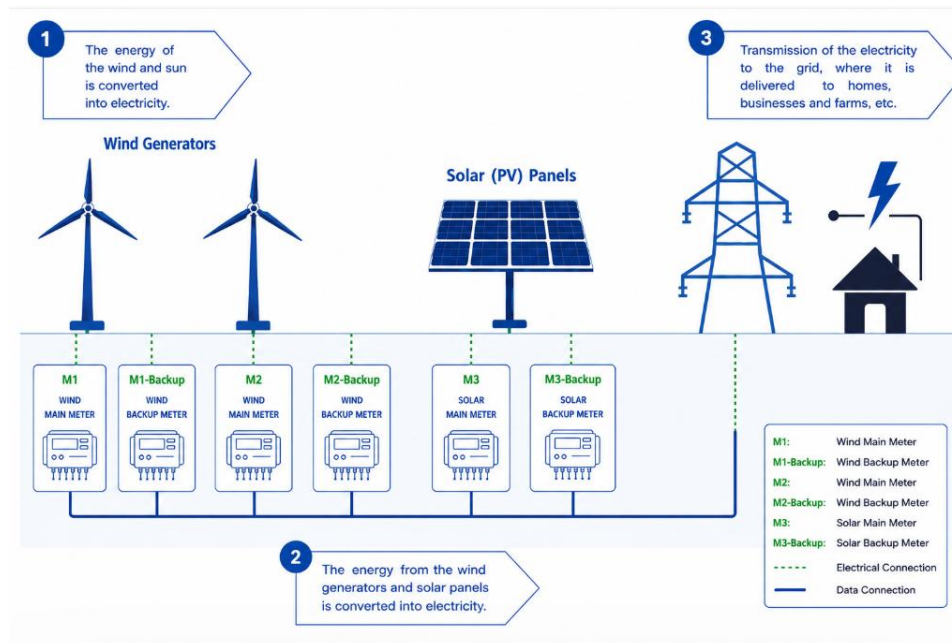


Figure 3: Project boundary diagram after design change of Üçpınar WPP

Table 6: Emissions sources included in or excluded from the project boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Grid	CO ₂	Yes	<i>Main emission source:</i> Fossil fuels fired for electricity generation cause CO ₂ emissions. It is included to baseline calculation to find the displaced amount by the project activity.
		CH ₄	No	Excluded for simplification. This is conservative
		N ₂ O	No	Excluded for simplification. This is conservative
Project	No emission	CO ₂	No	Minor emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	Yes	<i>Main emission source:</i> Fossil fuels fired for electricity generation cause CO ₂ emissions. It is included to baseline calculation to find the displaced amount by the project activity.

3.4 Baseline Scenario

According to the guidelines of the applicable large scale approved methodology ACM 0002 (Version 19), “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.” Thus, proposed project activity will evacuate power to the National Grid complying with the stated guideline.

To describe the baseline and its development for the project activity, long-term electricity demand and supply projections for Turkey are assessed.

When **Table 7** and **Figure 4** are examined, electricity demand is expected to exceed 420 billion kWh in 2027 with an average increase of 3.9%³² for the low scenario, for the baseline scenario, electricity demand is expected to increase by 4.6% on average to exceed 450 billion kWh; it is expected that electricity demand will exceed 500 billion kWh with an average increase of 5.8% for the high scenario.³³

Table 7: Low and High Demand Projection Scenarios for Ten Years Period (TWh)

³² Please see: https://www.teias.gov.tr/sites/default/files/2018-02/Taleprapor_2017.pdf

³³ Please see: https://www.teias.gov.tr/sites/default/files/2018-02/Taleprapor_2017.pdf

Scenarios	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
High Scenario	307.2	323.8	343.2	363.4	384.8	407.9	431.7	456.5	482.3	508.6
Low Scenario	301.5	315.8	328.4	341.0	354.2	367.9	381.8	396.1	410.5	424.9

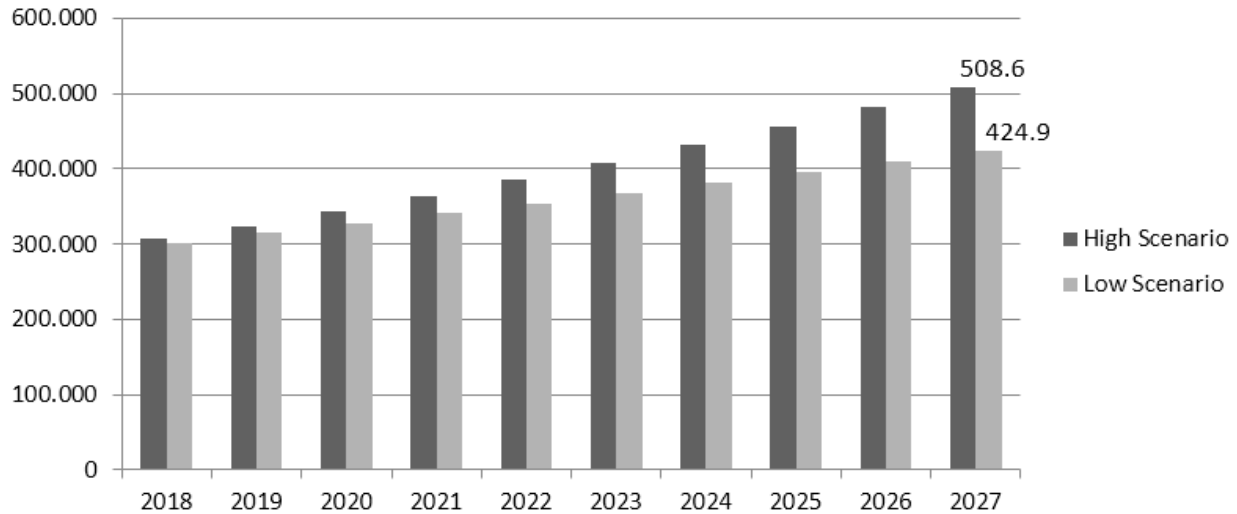


Figure 4: Electricity Demand Projections for Ten Years

In this projection, electricity supplies are also forecasted taking into account all power plants, which are in operation, under construction, solar production facilities within the scope of Public and pre-licensed/licensing phase/licensed/YEKA project, unlicensed biomass, wind, cogeneration production facilities and private sector power plants with licenses, which are expected to be commissioned on the prescribed dates. Generation projection based on fuel-based generation is given in **Table 8**:

Table 8: Projection of Total Generation Capacity by Fuel Types (TWh)³⁴

YEARS	2017	2018	2019	2020	2021	2022	SHARE IN 2022 (%)
LIGNITE	62.540	68.189	68.057	68.251	71.262	71.262	13.2
HARDCOAL & ASPHALTIT	5.449	5.449	5.449	5.449	5.449	5.449	1.0

³⁴ Please see: https://www.teias.gov.tr/sites/default/files/2018-09/Kapasite_Projeksiyonu_2018_2022.pdf

YEARS	2017	2018	2019	2020	2021	2022	SHARE IN 2022 (%)
IMPORT. COAL	58.855	58.855	59.017	59.017	74.246	74.246	13.8
NATURAL GAS	188.804	197.576	197.450	200.929	200.929	200.929	37.3
GEOTHERMAL	8.257	9.197	9.462	9.480	9.480	9.480	1.8
FUEL OIL	2.138	2.294	2.294	2.294	2.294	2.294	0.4
DIESEL	7	7	7	7	7	7	0
NUCLEER	0	0	0	0	0	0	0
OTHER	1.148	1.848	2.548	3.248	3.948	4.648	0.9
BIOGAS+WASTE	4.280	4.564	4.827	4.967	5.107	5.247	1.0
HYDRO	93.543	97.961	101.290	107.729	109.150	109.164	20.3
WIND	20.807	21.578	24.930	32.349	33.954	34.044	6.3
SOLAR	8.552	14.802	17.302	19.802	21.052	22.302	4.1
TOTAL	454.381	482.320	492.634	513.523	536.878	539.073	100

According to the 5-year projection it is clear that fossil fuels will remain the main sources for electricity generation (66.6 % in 2022). Natural gas will continue to dominate the market. Hydro will account for 20.3% of the mix whereas all non-hydro renewable combined (geothermal/biogas/waste/wind/solar) will only account for 13.2% of all electricity generation. This projection is consistent with continuing fossil fuel dependent characteristics of Turkish electricity sector, which is given in **Figure 5**.

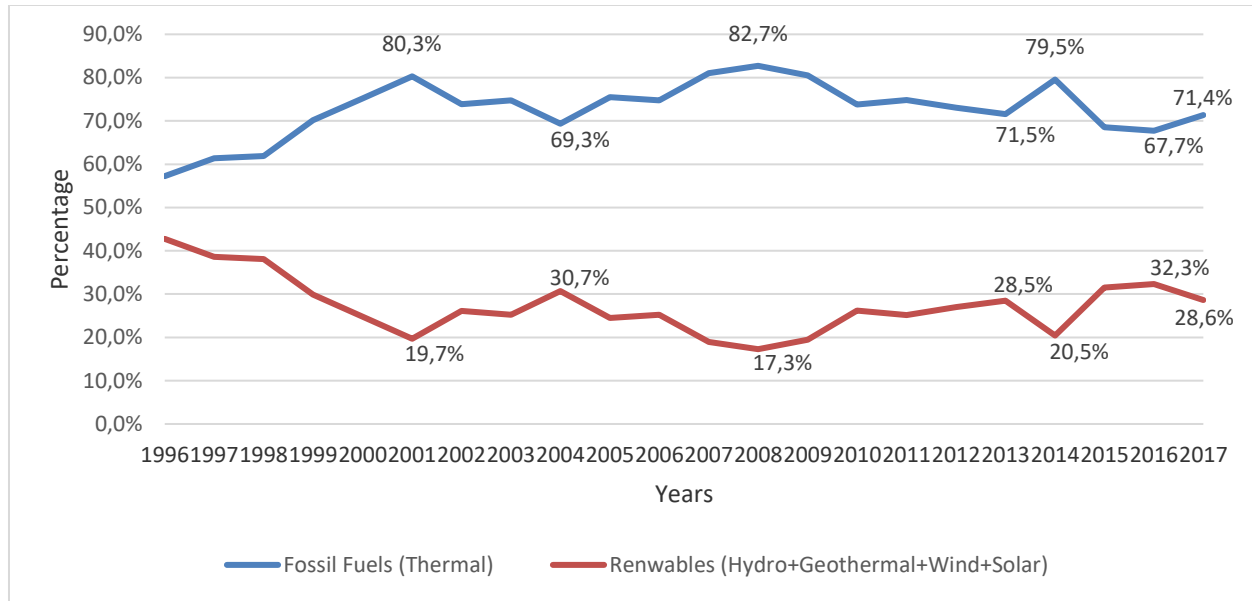


Figure 5: Fossil Fuels and Renewable in Turkish Electricity Mix (1996-2017)³⁵

In the shed of above analysis for the baseline scenario (continuation of current situation) it can be concluded that:

- **Conclusion-1:** Energy demand in Turkey has been increasing with significant rates since ten years, and it is expected to continue at least for next ten years.
- **Conclusion-2:** Even all operational plants, construction phase plants and licensed ones are taken into account lack of supply is projected after five operational years.³⁶ So, there is significant need for electricity generation investments to satisfy demand, which means electricity to be generated by the project activity would otherwise be generated by new power plants to avoid power shortage in coming years.
- **Conclusion-3:** Fossil fuels will hold the dominance in generation mix till the end of 2022 with 66.6% share. Hydro included renewable will remain low with 33.5% share and non-hydro energy contribution will stay with only 13.2% of total share by the end of that period. This also shows that most of new capacity additions will be fossil fuel fired power plants.

The combination of aforementioned trends indicates that if Üçpınar WPP would not be built, power from a new grid-connected thermal plant would be the most likely scenario.

3.5 Additionality

³⁵ Please see: <http://www.teias.gov.tr/sites/default/files/2018-10/46.xls>

³⁶ Please see: https://www.teias.gov.tr/sites/default/files/2018-09/Kapasite_Projeksiyonu_2018_2022.pdf

For the explanation of how and why the project activity leads to emission reductions that are additional to what would have occurred in the absence of the project activity, the Baseline Methodology refers to the consolidated “Tool for the demonstration and assessment of additionality”³⁷ version 7.0.0 (Tool), which defines a step-wise approach to be applied to the proposed project.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations.

Sub-step 1a. Define Alternatives to the project activity

To identify the realistic and credible alternative scenario(s) for project participants, scenarios in the Tool are assessed:

a) The proposed project activity undertaken without being registered as a VCS VER project activity
This alternative is realistic and credible as Üçpınar WPP may undertake project activity if it sees no risk for project and/or if the project turns out to be financially attractive without VCS VER credit income. However, investments analysis shows that the project is not economically feasible without VCS VER credit income. Detail information is given in Step-3.

b) Other realistic and credible alternative scenario(s) to the proposed VCS VER project activity scenario that deliver electricity with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology;

The project activity is power generation activity without any greenhouse gas emission harnessing the energy of the wind and solar. Being a private entity, Üçpınar doesn't have to invest power investments even proposed project activity. Also, since Üçpınar has a license only for wind and solar power investment and since in the proposed project area there is no hydro or other sources for electricity generation, other project activities delivering same electricity in the same project area is *not* realistic for project participant.

c) Continuation of the current situation, i.e. Üçpınar WPP is not built
The decision in favor or against a project investment depends on the expected revenues and risks, like for every other private investment. Investment decisions other than Üçpınar WPP are independent from the question whether Üçpınar WPP is built or not. This alternative is also realistic and credible.

According to baseline scenario, which is described in B.4, there is a need for energy investment to satisfy increasing demand and if the Üçpınar WPP is not built, the same amount of energy will be supplied by other private investors to the grid. Forecasts shows that electricity supplied in the absence of Üçpınar WPP will be mainly based on fossil fuels as the projections for the year of 2022 forecasts 66.6% share for fossil fuels in the energy mix.

In the absence of the project the power will be produced by new and existing power plants in accordance with the baseline in ACM0002 version 19.

Outcome of Step 1.a: Therefore, two realistic and credible alternative scenarios are identified for the project activity:

a) The proposed project activity undertaken without being registered as a VCS VER project activity.

³⁷ Version 7, <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf> (Page7)

b) Continuation of the current situation, i.e. Üçpınar WPP is not built.

c)

Sub-step 1b. Consistency with mandatory laws and regulations

Both alternatives are (building or not building the project activity) in compliance with the following identified applicable mandatory laws and regulations:

(1) Electricity Market Law³⁸

(2) Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy³⁹

(3) Environment Law⁴⁰

Table 9: Project Implementation Schedule

Date (DD/MM/YYYY)	Activity
02/03/2009	"EIA is not required" Certificate
29/09/2011	Issuance of the License
11/07/2014	Site Related Wind Potential Analysis and Energy Yield Assessment Report at the Üçpınar Site
19/03/2018	EPC agreement
19/03/2018	Turbine Maintenance Agreement
23/03/2018	Construction Start Date (Notice to Proceed for Execution of Works)
03/08/2018	Loan Agreement
10/08/2018	Facility Supplement Agreement
18/06/2019	Project start date, date which plant will start to generate electricity, start date of the first crediting period
14/11/2019	License revision for the additional WTGs
14/08/2020	'EIA Positive' decision for additional WTGs
19/08/2021	License revision for additional solar unit
27/04/2022	'EIA Positive' decision for additional solar unit
15/02/2024	Equipment agreement of solar capacity addition to Üçpınar WPP
13/03/2024	Extension Energy Yield Assessment of Üçpınar Wind Power Plant

³⁸ See: <https://www.epdk.org.tr/Detay/Icerik/23-2-3/mevzuat> (Enactment Date:2013)

³⁹ See: <https://www.epdk.org.tr/Detay/Icerik/23-2-3/mevzuat> (Enactment Date: 2005)

⁴⁰ See <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf> (Enactment Date: 1983)

23/07/2024	Equipment agreement of wind capacity addition to Üçpınar WPP
14/02/2025	Partial commissioning of additional solar unit (Provisional Acceptance)
14/03/2025	Partial commissioning of additional solar unit (Provisional Acceptance)
19/09/2025	Provisional acceptance of T34 and T35
17/06/2029	End of the first crediting period (expected)

According to Turkish regulations, to get necessary permits for further project implementation, license issued by EMRA is required. Hence, issuance of license cannot be considered as ‘Investment Decision Taken Date’ but a prerequisite to proceed for further project development activities. EPC agreement date is set to be Investment Decision Taken Date (19/03/2018) from above implementation.

Aforementioned project implementation schedule shows us that Üçpınar WPP started to consideration of VER from the beginning of the project implementation and VER Revenue has decisive impact on decision of proceeding to the project.

In the following, the investment analysis is applied to clearly demonstrate that the project activity is unlikely to be financially/economically attractive without the revenue from the sale of VERs.

Outcome of Step 1.b: Üçpınar complies with mandatory laws and regulations. Project implementation schedule shows us that Üçpınar started to consideration of VER from the beginning of the project implementation and VER Revenue has decisive impact on decision of proceeding to the project.

Step 2. Investment analysis

“Tool 27: Investment Analysis⁴¹” version 08.0 is taken into account when applying this step.

Applied tool: “Tool for the demonstration and assessment of additionality version 7.0.0”

Sub-step 2a: Determine Appropriate Analysis Method

Three options can be applied for the investment analysis: the simple cost analysis, the investment comparison analysis and the benchmark analysis.

- Option I: Simple cost analysis
- Option II: Investment comparison analysis
- Option III: Benchmark analysis

The simple cost analysis is not applicable for the proposed project because the project activity will have revenue (from electricity sales) other than CDM related income. The investment comparison analysis is

⁴¹ See, <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v8.pdf>

also not applicable for the proposed project because the baseline scenario, providing the same annual electricity output by the Turkish National Grid, is not an investment project.

To conclude, the benchmark analysis will be used to identify whether the financial indicators (Equity IRR in this case) of the proposed project is better than relevant benchmark value.

Sub-step 2b: Option III: Benchmark analysis

While applying the Benchmark Analysis, Option III, the Equity IRR is selected as the financial indicator for the demonstration of the additionality of the project as permitted in the additionality tool.

Benchmark rate is calculated in line with “Tool 27: Investment Analysis⁴²” version 08.0 which suggests the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or WACC are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate.

Since Turkey is not listed in the Tool 27’s Appendix, similar countries having same credit rates around 19.03.2018 (investment decision taken date) are examined. In Tool 27, it is stated that Moody’s credit ratings are used for determining expected returns on equity as benchmark. Moody’s credit rating for Turkey on 7 March 2018 is Ba2.⁴³ Moreover, Moody’s credit rating for Georgia is Ba2 after 11 September 2017.⁴⁴ After the reference given in Tool 27 which is updated in January 2019⁴⁵ is checked, it can be still seen Georgia’s Moody’s credit is Ba2 as unchanged. In this sense, it can be confirmed that, Georgia’s Moody’s credit rate is Ba2 around 19.03.2018 (investment decision taken date). In the appendix of Tool 27: Investment analysis version 08.0, Georgia’s default value for equity IRR is 12.72 for Group 1 (which includes energy industries). Consequently, benchmark for Turkey can be taken as 12.72.

Assessment of likelihood conditions for each parameter to reach benchmark IRR is provided below:

Electricity Price

In order to reach 12.72% equity IRR benchmark, electricity price should increase more than 10% from assumed price (55.5 EUR/MWh). This feed-in-tariff price is already very high compared to general market price and not likely to increase. Thus, this 10.0% increase of the feed-in-tariff is not likely to happen. Even if electricity price will increase by 10%, equity IRR cannot reach up to 12.72%.

Investment Cost

In order to reach benchmark IRR, investment costs shall be decreased more than 10%. Since the equipment contract which has the higher share of the total costs is fixed, 10% decrease in the investment cost is unlikely. Thus, it is not likely for project activity to have threshold investment cost and reach to benchmark IRR. Even if investment cost will decrease by 10%, equity IRR cannot reach up to 12.72%.

⁴² See, <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v8.pdf>

⁴³ Please see, <https://countryeconomy.com/ratings/turkey>

⁴⁴ Please see, <https://countryeconomy.com/ratings/georgia>

⁴⁵ Please see, http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html

Energy Yield

To have benchmark IRR, annual energy yield amount shall increase more than 10% more than base case electricity generation amount used in financial analysis. Although most of the wind power project uses p90 electricity generation amount from energy yield reports, to be conservative in financial investment analysis of the project activity p75 is used (317,500 MWh/yr). These figures are annual electricity generation to be sold except transmission loss. Using electricity generation amount in financial analysis, which have less than 10% probability of occurrence is not rational. Thus, it is not likely for project activity to generate threshold energy yield to reach benchmark IRR. Even if energy yield will increase by 10%, equity IRR cannot reach up to 12.72%.

Operation Cost

In order to reach benchmark IRR, annual operation decrease more than 10%. Such huge decrease in annual operation cost is not likely. Even if operation cost will decrease by 10%, equity IRR cannot reach up to 12.72%.

Sub-step 2c: Calculation and comparison of the IRR

In the paragraph 12 of the ‘Guidance on the Assessment of Investment Analysis’⁴⁶ version 5, it is stated that:

“Required/expected returns on equity are appropriate benchmarks for equity IRR”. Since, benchmark identified in the Sub-step 2b is *required/expected returns on equity*, equity IRR (after tax) of the project activity shall be calculated for comparison.

Table 10:IRR inputs

Item	Value	Units	Source	Date of The Source Document
Installed Power	99	MWe	License of The project	29/09/2011
Technical lifetime of the project	25	years	Tool to determine the remaining lifetime of equipment (v.1) ⁴⁷	16/10/2009
Gross Generation	317,500	MWh	Üçpınar Wind Data Analysis and Energy Production Generation Assessment Report	11/07/2014

⁴⁶ See, http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf (Page 3)

⁴⁷ See; <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>

Electricity tariff	55.5	EUR Per MWh	Feed-in-tariff ⁴⁸	18/05/2005
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Technical life time of the Üçpınar WPP is determined by using the ‘Tool to determine the remaining lifetime of equipment’ (v.1). In the tool it is said that default lifetime for the on-shore wind turbines is 25 years.

The equity IRR (after tax) of Üçpınar WPP is calculated on the basis of expected cash flows (investment, operating costs and revenues from electricity sale), as used in the financial analysis for the feasibility assessment of the project.

The parameters and values used for the IRR calculation are available to DOE during validation and also can be seen from the table below.

Table 11: Financial parameters of the Project

FINANCIALS	
Equity Amount	Confidential
Loan Amount	Confidential
Interest Rate	7.50%
Repayment Period	13
Grace Period (years)	2
Notice to Proceed Date	23/03/2018
Power Plant Operation Start Date	01/09/2019
Investment Decision Date	19/03/2018
USD/TL	3.9362
EUR/USD	1.228
EUR/TL	4.8335
Corporate Tax Rate	20%

⁴⁸ For feed-in-tariff (5.5 Eur/kWh) see, <http://www.epdk.org.tr/TR/Dokuman/1859> (page 2-footnote 1)the Law stating the electricity selling price is revised and the new law is : <http://www.epdk.org.tr/TR/Dokuman/6777>

However, the price has not been changed in the Law, so the 5.5 €/kWh, which is stated in the former Law is still valid. This explanation is also given with the footnotes in the IRR Excel and PD.

Since there is a project design deviation, the IRR analysis has been reassessed for the added capacity by considering the additional installed capacity, additional capital expenditures, and revised operational costs. IRR analysis has been re-evaluated and revised in line with the investment decision dates of 15/02/2024 for the solar capacity addition and 23/07/2024 for the wind capacity addition. Accordingly, the currency assumptions and related financial parameters used in the IRR analysis were also revised based on these respective investment decision dates. Revised IRR inputs related to the capacity addition are provided below.⁴⁹.

Table 12: IRR inputs after project design deviation

Item	Value	Units	Source	Date of The Source Document
Installed Power	108.6	MWe	Official Generation License of the Project	29/09/2011
Technical lifetime of the project	25	years	Tool to determine the remaining lifetime of equipment (v.1) ⁵⁰	16/10/2009
Gross Generation	363,254	MWh	Official Generation License of the Project	29/09/2011
Electricity tariff	55.5	EUR Per MWh	Feed-in-tariff ⁵¹	18/05/2005
Investment Cost (Additional Solar Unit)	23.5	MI EUR	EPC Agreement	15/02/2024
Investment Cost (Additional 2 Wind Turbines)	7.9	MI EUR	EPC Agreement	23/07/2024

⁴⁹ Revised IRR Excel in terms of added capacity has been provided to DOE.

⁵⁰ See; <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-10-v1.pdf>

⁵¹ For feed-in-tariff (5.5 Eur/kWh) see, <http://www.epdk.org.tr/TR/Dokuman/1859> (page 2-footnote 1) the Law stating the electricity selling price is revised and the new law is : <http://www.epdk.org.tr/TR/Dokuman/6777> However, the price has not been changed in the Law, so the 5.5 €/kWh, which is stated in the former Law is still valid. This explanation is also given with the footnotes in the IRR Excel and PDD.

In the initial establishment phase of the Project, the investment was partially financed through external debt, and therefore the financial analysis conducted for the original project activity was based on the applicable equity IRR approach considering the loan structure and related financing conditions. However, the subsequent capacity additions implemented during the revised project scope were realized through internal company resources without the involvement of external financing or loan arrangements. In line with this revised investment structure, the IRR analysis was reassessed following the capacity addition, and the updated IRR results are presented below. Revised IRR inputs and revised analysis IRR related to capacity addition has been given below.

The resulting IRR for 25 years is stated in below table. In Sub-step-2, sensitivity analysis has been conducted to ensure that the project IRR is below the benchmark even the +/- 10 % variation of electricity price, investment cost, energy yield and operational costs.

Table 13:IRR value for project activity (after tax) (after project design deviation)

Period	IRR
25 years	8.25 %

The Benchmark is 12.72%, it does clearly exceed the resulting equity IRRs, thus rendering the project activity economically unattractive.

PLF= Annual Gen. / Installed Cap. * (working hours) (before project design deviation)

=317,500/(99*8760)

=36.61%

PLF= Annual Gen. / Installed Cap. * (working hours) (after project design deviation)

=362,254/(108.6*8760)

=38.08%

Sub-step 2d: Sensitivity analysis

While the main parameter determining the income of the project is the electricity sales revenue, investment cost and operation cost, a variation of the accordant values shall demonstrate the reliability of the IRR calculation. Key parameters are varied with +/-10%. The worst, base and best-case results for each parameter variation are given below, in **Hata! Başvuru kaynağı bulunamadı.14.**

The sensitivity analysis confirms that the proposed project activity is unlikely to be economically attractive without the revenues from VERs as even the maximum IRR result for the best-case scenario (11.13 %) is below the benchmark, which is 12.72%.

Table 14: Equity IRR results according to different parameters (initial registration of the project)

Parameter	Electricity Price			Investment Cost			Energy Yield			Operating Cost		
Variance	-10%	0%	10%	-10%	0%	10%	-10%	0%	10%	-10%	0%	10%
IRR	5.70 %	8.98 %	12.34 %	12.30 %	8.98%	6.86%	5.70 %	8.98 %	12.34%	10.89 %	8.98%	6.90 %

Table 15: IRR results according to different parameters (after project design deviation)

Parameter	Electricity Price			Investment Cost			Energy Yield			Operating Cost		
Variance	-10%	0%	10%	-10%	0%	10%	-10%	0%	10%	-10%	0%	10%
IRR	5.54 %	8.25 %	11.10 %	10.60 %	8.25%	6.62%	5.54 %	8.25 %	11.10%	9.57 %	8.25%	6.86 %

Table 16 IRR Breaching Values for Üçpınar WPP after design deviation

Parameter	IRR Breaching Values	IRR Result
Power Price (USD/MWh)	15.75%	12.75%
Investment Cost	16.00%	12.72%
Energy Yield	15.75%	12.76%
Operating Cost	-39.00%	12.74%

Breaching values have been tested in order to determine the level of variation required for each parameter to reach the benchmark IRR threshold of 12.72%. The results of the breaching value analysis are presented below.

Power Price (USD/MWh)

The project benefits from the YEKDEM mechanism during the first 10 years of operation, allowing electricity sales at a relatively favorable and predictable tariff level. However, following the expiration of the YEKDEM support period, the selling price assumption changes and becomes subject to merchant market conditions, which are comparatively more uncertain and potentially lower.

Accordingly, the breaching analysis indicates that a positive variation of 15.75 % in the power price would be required for the project IRR to reach the benchmark level of approximately 12.75%. This demonstrates the project's strong sensitivity to electricity sales prices and highlights the importance of tariff assumptions and post-YEKDEM market conditions in overall project profitability. Additionally, according

to the revised project license, the additional two wind turbines added within the scope of the wind capacity increase are not included in the capacity eligible to benefit from the YEKDEM support mechanism. Therefore, the electricity to be generated from these additional units is expected to be sold under market-based electricity pricing conditions rather than under the YEKDEM tariff structure.

Investment Cost

For investment cost, a reduction of 16.00 % would be required for the project IRR to increase to approximately 12.72 %, which is the benchmark threshold. However, such a reduction is considered highly unlikely under realistic project conditions, as the majority of the capital expenditures have already been determined through finalized equipment selections, and EPC-related costs.

Energy Yield

The breaching value analysis shows that an increase of 15.75 % in energy yield would be necessary for the IRR to reach approximately 12.76%. However, such an increase is considered technically unrealistic, as the energy yield assumptions used in the model are already based on the licensed generation values, which were determined with relatively optimistic production expectations during the licensing stage. These values already reflect favorable assumptions regarding resource availability, plant performance, and operational efficiency.

Operating Cost

To breach the benchmark IRR, operation costs need to decrease by 39.00%. Such a reduction is not considered realistic under normal project operating conditions, since the majority of operating expenditures consist of fixed cost items, including maintenance, personnel, and operational service costs.

Step 3. Barrier analysis

The investment analysis has fully demonstrated and explained the additionality of the project, so step 3 is skipped.

Step 4: Common Practice Analysis

The section below provides the analysis as per step 4 of the “*Tool for the demonstration and assessment of additionality*”, version 7.0.0 and according to “Common Practice” Tool version 03.1⁵².

Step 1. Calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity: The proposed project has a capacity of 108.6 MWe with the added

⁵² Please see <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-24-v1.pdf>

capacity after project design deviation. Per the guideline of +/-50%, the applicable output range for the project is 54.3 MW and 162.9 MW.

Step 2: Identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

- (a) The projects are located in the applicable geographical area; (Turkey)*
- (b) The projects apply the same measure as the proposed project activity; (Renewable Energy Projects)*
- (c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity; (Wind Power Plants)*
- (d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant; (N.A.)*
- (e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1; (54.3 MW and 162.9 MW)*
- (f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity; The CP assessment was revised in line with the latest implementation date associated with the capacity addition activities, and therefore 23/07/2024 (EPC Agreement Date for additional wind turbines) was considered as the relevant reference date within the updated CP analysis.*

Step 3: Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all} .

$N_{all} = 20$

Step 4: Within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff} .

$N_{diff} = 19$

Step 5: Calculate factor $F = 1 - N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

$$F = 1 - (N_{diff}/N_{all})$$

$$= 1 - (19/20)$$

Factor F equals to 0.05.

The proposed project activity is a “common practice” within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all-N_{diff}}$ is greater than 3.

In case of Üçpınar WPP F factor is not greater than 0.2, and $N_{all-N_{diff}}$ equals to 1, Üçpınar WPP is not common practice.

3.5.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☒ Annex 1 country ☐ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes ☐ No

3.5.2 Additionality Methods

The additionality of the project activity is demonstrated in accordance with the latest applicable version of the "Tool for the Demonstration and Assessment of Additionality" as required by ACM0002 (v.19), during the initial registration of Üçpınar WPP, Grid-connected electricity generation from renewable sources.

The assessment follows the applicable steps of the tool and includes:

- Identification of realistic and credible alternatives to the project activity;
- Investment Analysis to determine whether the project is financially attractive in the absence of carbon revenue; and
- Common Practice Analysis to assess whether similar project activities are already widely implemented in the relevant geographical area and circumstances.
- The Investment Analysis compares the project Internal Rate of Return (IRR) with the applicable benchmark using project-specific financial data and assumptions. The Common Practice Analysis evaluates the extent to which similar renewable energy projects have been implemented under comparable conditions.
- The assumptions, input parameters, data sources, calculations, and results of each step are presented in the following sections. The results demonstrate that the project activity is not financially attractive without carbon revenue and is not common practice in the relevant context. Therefore, the project activity is considered additional in accordance with ACM0002 and the Tool for the Demonstration and Assessment of Additionality.

3.6 Methodology Deviations

There is no methodology deviation.

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel. The clean energy generated by the project is calculated based on the amount of electricity generated by the project per annum. The project is expected to generate 363,254 MWh of clean energy per annum with the added capacity.

Baseline scenario is identified and described in B.4. Emission reductions due to project activity will be calculated according to “Tool to calculate the emission factor for an electricity system” (v6) (Tool)⁵³ as indicated in ACM 0002.

Stepwise approach of „Tool to calculate the emission factor for an electricity system” version 06.0.0 is used to find this combined margin (emission coefficient) as described below

Step 1. Identify the relevant electric systems

There are 21 regional distribution regions in Turkey but no regional transmission system is defined. In Article 20 of License Regulation it is stated that:

*“TEİAŞ shall be in charge of all transmission activities to be performed over the existing transmission facilities and those to be constructed as well as the activities pertaining to the operation of **national transmission system** via the National Load Dispatch Center and the regional load dispatch centers connected to this center and the operation of Market Financial Reconciliation Center⁵⁴”.*

As it can be understood from this phrase, only one transmission system, which is national transmission system is defined and only TEİAŞ is in the charge of all transmission system related activities. Moreover, a communication with representative of TEİAŞ, which indicates that: “*There are not significant transmission constraints in the national grid system which is preventing dispatch of already connected power plants*” is submitted to the DOE. Therefore, the national grid is used as electric power system for project activity. The national grid of Turkey is connected to the electricity systems of neighboring

⁵³ Please see: <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v6.pdf>

⁵⁴ Please see, www.enermet.com.tr/upload/mce/.../1. electricity_market_licensing_regulation.doc (Page 21)

countries. Complying with the rules of the tool, the emission factor for imports from neighboring countries is considered 0 (zero) tCO₂/MWh for determining the OM. There is no information about interconnected transmission capacity investments, as TEİAŞ, who operates the grid, also didn't take into account imports-exports for electricity capacity projections.⁵⁵ Because of that, for BM calculation transmission capacity is not considered.

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

According to 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

For this project **Option I** is chosen.

Step 3: Select a method to determine the operating margin (OM);

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 Simple Operating Margin (OM) emission factor ($EF_{grid, OM, y}$) is calculated as the generation weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all the generating plants serving the system, excluding low-cost/must-run power plants. As electricity generation from solar and low-cost biomass facilities is insignificant and there are no nuclear plants in Turkey, the only low cost /must run plants considered are hydroelectric, wind and geothermal facilities. The Turkish electricity mix does not comprise nuclear energy. Also, there is no obvious indication that coal is used as must run resources. Therefore, the only low-cost resources in Turkey, which are considered as must-run, are Hydro, Renewables and Waste, Geothermal and Wind (according to statistics of TEİAŞ).

Table 17: Share of Low-Cost Resource (LCR) Production 2013-2017 (Production in GWh)⁵⁶

Share of Low Cost Resource (LCR) Production 2012-2016 (Production in GWh)

⁵⁵ Please see, <http://www.epdk.org.tr/TR/Dokumanlar/Elektrik/YayinlarRaporlar/UretimKapasiteProjeksiyonlari>

⁵⁶ Please see: <http://www.teias.gov.tr/sites/default/files/2018-10/59%282000-2017%29.xls>

	2013	2014	2015	2016	2017
Gross production	240.153,95	251.962,82	261.783,3	274.407,7	297.277,5
TOTAL LCR Production	69.512,7	52.961,4	83.981,00	89.938,10	85.222,10
Hydro	59.420,47	40.644,70	67.145,83	67.230,90	58.218,50
Renewables and Waste	1.171,20	1.432,59	1.758,19	2.371,60	2.972,30
Geothermal and Wind	8.921,04	10.884,12	15.076,97	20.335,60	24.031,30
Share of LCRs	28,95%	21,02%	32,08%	32,78%	28,67%
Average of last five years	28,70%				

As average share of low-cost resources for the last five years is far below 50% (28,70%), the simple OM method is applicable to calculate the operating margin emission factor ($EF_{grid,OM,y}$).

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

- **Ex ante option:** 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, or
- **Ex post option:** The year, in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

The **ex-ante option is selected for Simple OM method**, with the most recent data for the baseline calculation stemming from the years 2015 to 2017.

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 CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants. The calculation of the simple OM emission factor can be based on

- **Option A:** data on net electricity generation a CO₂ emission factor of each power unit, or
- **Option B:** data 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.

Option B is chosen to calculate the Simple OM, as there is no power plant specific data available, renewable power generation are considered as low-cost power sources and amount of electricity supplied to the grid by these sources is known.

Where Option B is used, 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, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \quad (1)$$

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$FC_{i,y}$	=	Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO_2,i,y}$	=	CO ₂ emission factor of fossil fuel type i in year y (tCO 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 fossil fuel types combusted in power sources in the project electricity system in year y
y	=	three most recent years for which data is available at the time of submission of the PDD to the DOE for validation

For the calculation of the OM the consumption amount and heating values of the fuels for each sources used for the years 2015, 2016 and 2017, is taken from the TEİAŞ 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), are provided in excel table that shows OM emission factor, Excel Table 8 Fossil Fuel Consumption Amounts and Excel Table 9 Net Calorific Values. Total CO₂ emission due to electricity generation in Turkey for the years of 2015, 2016 and 2017 are given in **Table 18**.

Table 18:CO₂ emissions from electricity production 2015-2017 (ktCO₂)

	2015	2016	2017
CO ₂ -Emmissions	113,727	123,437	133,025

Table 19 presents the gross electricity production data by all the relevant energy sources. Low-cost/must run resources like hydro, wind, geothermic and biomass do not emit fossil CO₂ and thus are not taken into account in calculations.

Table 19: Gross electricity production by fossil energy sources 2015-2017 (GWh)⁵⁷

Gross Electricity Production by Energy Source 2015-2017 [GWh]			
Natural Gas	99,218.70	89,227.10	110,490.00

⁵⁷ Please see: <http://www.teias.gov.tr/sites/default/files/2018-10/59%282000-2017%29.xls>

Gross Electricity Production by Energy Source 2015-2017 [GWh]			
Lignite	31,335.70	38,569.90	40,694.40
Coal	44,829.90	53,703.20	56,781.90
Fuel Oil	980.4	969.10	520.60
Motor Oil	1,243.60	957.20	679.30
Naphtha	0.0	0.0	0.0
LPG	0.0	0.0	0.0
Total fossil fuels	177,608.3	183,426.5	209,166.2

Above table shows gross data, but EG_y in the above described formula means electricity delivered to the grid, i.e. net generation, the following table shall help to derive net data by calculating the net/gross proportion on the basis of overall gross and net production numbers.

Table 20: Net/gross electricity production 2015-2017 (GWh)⁵⁸

Relation Net/Gross Electricity Production 2015-2017			
Gross Production [GWh]	261,783.30	274,407.70	297,277.50
Net Production [GWh]	249,889.50	261,936.80	284,257.50
Relation	95.46%	95.46%	95.62%

Multiplying these overall gross/net relation percentages with the fossil fuels generation amount does in fact mean an approximation. However this is a conservative approximation as the consumption of plant auxiliaries of fossil power plants is higher than for the plants that are not included in the baseline calculation. In the end this would lead to a lower net electricity generation and therefore to a higher OM emission factor and higher emission reductions.

Table 21 shows the resulting net data for fossil fuel generation and adds electricity imports.

Table 21: Electricity supplied to the grid, relevant for OM (GWh)

Net El. Production by fossil fuels and Import 2015-2017 [GWh]			
Net El. Prod. by fossil fuels	169,538.9	175,090.4	200,005.3

⁵⁸ Please see: <http://www.teias.gov.tr/sites/default/files/2018-10/56%2893-2017%29.xls>

Electricity Import	7,135.5	6,330.3	2,728.3
Electricity supplied to grid by relevant sources	176,674.4	181,420.7	202,733.6

Electricity import is added to the domestic supply in order to fulfill the Baseline Methodology requirements. Imports from connected electricity systems located in other countries are weighted with an emission factor of 0 (zero) tCO₂/MWh.

The last step is to calculate $EF_{grid,OMsimple,y}$:

Table 22: Calculation of Weighted $EF_{grid,OMsimple,y}$ (ktCO₂/GWh)

	2015	2016	2017
CO ₂ -Emissions (ktCO ₂)	113,727	123,437	133,025
Net Electricity Supplied to Grid by relevant sources (GWh)	176,674.4	181,420.7	202,733.6
$EF_{grid,OMsimple,y}$ (ktCO ₂ /GWh)	0.6437	0.6804	0.6562
3-year Generation Weighted Average $EF_{grid,OMsimple,y}$ (ktCO ₂ /GWh)	0.6601		

$$EF_{grid,OMsimple,y} = 0.6601 \text{ (ktCO}_2\text{/GWh)}$$

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

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.

Again, the project proponents can chose between two options according to the calculation tool: calculate the BM *ex-ante* based on the latest available data or update the BM each year *ex post*. Option 1, the *ex-ante* approach, is again chosen.

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. There is no official data available on plant-based annual electricity production for years 2013, 2014, 2015, 2016 and 2017. The most recent official data available on plant-based annual electricity production belongs to year 2012. In order to update the BM to the year 2017, the only data which can used to estimate the annual production is the installed capacity of plants. It can be assumed that every power plant operates with full capacity all around the year in order to tackle this data problem. It should be noted that the usage of capacity is a CDM Executive Board approved deviation from the methodology AM005 for a similar situation. According to the CDM-EB-approved deviation, in the absence of annual production data use of weights estimated using installed capacity in place of annual electricity generation is permitted.⁵⁹

While determining the sample group, energy investments data from Ministry of Energy and Natural Sources website⁶⁰ is used. VER plants are excluded from sample group. While identifying the sample group dismantled, revised, retrofits are not included. Only new capacity additions (power plants / units) are taken into account. All power plants put in operation until the end of 2017 are given in Excel Table 12 Sample Group for BM Factor Calculation (Latest Power Plants put in Operation in Turkey). Total installed capacity at the end of 2017 is 85,200.1 MW and 20% of this capacity is 17,040.02 (AEGSET->20%) MW and total installed capacity of last five power plants put in operation in 2017 is 856.15 MW (AEGSET-5-units). Since AEGSET->20% is bigger than AEGSET-5-units, SET->20% is chosen as SETsample. Also, in the sample group there is no power plant started supply electricity to grid more than 10 years ago, steps d, e and f are ignored.

The build margin emissions factor is the generation-weighted average emission factor (tCO₂/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (2)$$

Where:

⁵⁹ Please see: http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ and Request for clarification on use of approved methodology AM0005 for several projects in China document.

⁶⁰ Please see: <http://www.enerji.gov.tr/tr-TR/EIGM-Raporlari>

$EF_{grid,BM,y}$	=	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	=	CO ₂ emission factor of power unit m in year y (tCO ₂ /MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which data is available

Since fuel consumption and electricity generation data is not available for the Turkey's case, *Option A2* of Simple OM method is used to calculate emission factor. The formulation of emission factor is given below:

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}} \quad (3)$$

Where:

$EF_{EL,m,y}$	=	CO ₂ emission factor of power unit m in year y (tCO ₂ /MWh)
$EF_{CO2,m,i,y}$	=	Average CO ₂ emission factor of fuel type i used in power unit m in year y (tCO ₂ /GJ)
$\eta_{m,y}$	=	Average net energy conversion efficiency of power unit m in year y (%)
m	=	All power units serving the grid in year y except low-cost/must-run power units
y	=	Most recent year for which data is available at the time of submission of the PDD to the DOE

$EF_{EL,m,y}$ calculation and results are given in **Table 23**. For BM factor calculation, since no official emission factors for different fuel types are available, lower confidence default values of IPCC Guidelines are applied. Explanation of emission factor selection for each energy sources and references are given in EF Calculation Excel.

Table 23: $EF_{EL,m,y}$ calculation by using equation (3)

Fuels Used in Set Sample	Effective CO2 emission factor (tCO2/GJ)	Average Efficiency ($\eta_{m,y}$)	EF _{EL,m,y} (tCO2/MWh)
Natural Gas	0.0543	62.00%	0.3153
Lignite	0.0909	50.00%	0.6545
Import Coal	0.0895	50.00%	0.6444

For the calculation of EF_{grid,BM,y}, since there is no data available on plant-based annual electricity generation, it can be assumed that every power plant operates with full capacity all around the year. Moreover, since this assumption affects both numerator and denominator of equation (2), multiplication of installed capacity with 8760 hours/year would cancel each other. Therefore, by using data on **Table 24** and using the equation (2), EF_{grid,BM,y} is calculated and presented below. Lastly, Gross/Net Electricity Generation difference is taken into account while calculating EF_{grid,BM,y}.

Table 24: Data used for EF_{grid,BM,y} calculation

	Total Natural Gas Capacity Addition (MW)	Emission Addition of NG (MW*tCO ₂ /MWh)	Total Lignite Capacity Addition (MW)	Emission Addition of Lignite (MW*tCO ₂ /MWh)	Total Import Coal Capacity Addition (MW)	Emission Addition of Import Coal (MW*tCO ₂ /MWh)
Sample Group						
Total	6130.921	1933.020	925.8	605.917	3479.7	2242.318

$$EF_{grid,BM,y} = 0.2900 \text{ tCO}_2/\text{MWh}$$

Step 6. Calculate the combined margin emission factor

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:

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

The combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM} \quad (4)$$

Where:

- $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)
- $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh)
- w_{OM} = Weighting of operating margin emissions factor (%)
- w_{BM} = Weighting of build margin emissions factor (%)

According to the Tool for wind power generation project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$.

$$EF_{grid,CM,y} = 0.6601 \text{ tCO}_2/\text{MWh} * 0.75 + 0.2900 \text{ tCO}_2/\text{MWh} * 0.25$$

$$= 0.5676$$

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (5)$$

Where:

- ER_y = Emission reductions in year y (t CO₂/yr).
- BE_y = Baseline emissions in year y (t CO₂/yr).
- PE_y = Project emissions in year y (t CO₂/yr).
- LE_y = Leakage emissions in year y (t CO₂/yr).

Project emissions

The proposed project activity involves the generation of electricity by development of a wind plant. The generation of electricity does not result in greenhouse gas emissions and therefore is taken as 0 tCO₂/year.

Leakage

No Leakage emissions are considered. The main emission potentially giving rise to leakage in the context of electrical sector projects is emission arising due to activities arising such as power plant construction and upstream emission from fossil fuel use (e.g. extraction, processing, and transport). These emission sources are neglected.

Then: $ER_y = BE_y$

Baseline emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

$$BE_y = (EG_y - EG_{baseline}) \times EF_{grid,CM,y} \quad (6)$$

Where:

BE_y = Baseline emissions in year y (tCO₂/yr).

EG_y = Electricity supplied by the project activity to the grid (MWh).

$EG_{baseline}$ = Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For new power plants this value is taken as zero.

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system (v6)”.

The project activity is the installation of a new grid-connected renewable power plant so, $EG_{baseline} = 0$

4.2 Project Emissions

The proposed project activity involves the generation of electricity by development of a wind power plant. The generation of electricity does not result in greenhouse gas emissions and therefore is taken as 0 tCO₂/year.

4.3 Leakage Emissions

Leakage emissions in this project are considered to be negligible. There are no project emissions in this kind of project. The main emission potentially giving rise to leakage in the context of electrical sector

projects is emission arising due to activities arising such as power plant construction and upstream emission from fossil fuel use (e.g. extraction, processing, and transport). These emission sources are neglected.

Then: $ER_y = BE_y$

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plant by renewable electricity. The emission reduction ER_y by the project activity during a given year y is the difference between Baseline emission and Project emission & Leakage emission. Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (5)$$

Where:

ER_y = Emission reductions in year y (t CO₂/yr).

BE_y = Baseline emissions in year y (t CO₂/yr).

PE_y = Project emissions in year y (t CO₂/yr).

LE_y = Leakage emissions in year y (t CO₂/yr).

$ER_y = BE_y = EG_y * EF_{grid,CM} = 317,500 \text{ MWh/year} * 0.5676 \text{ tCO}_2/\text{MWh} = 180,199 \text{ tCO}_2/\text{year}$ (before design deviation)

$ER_y = BE_y = EG_y * EF_{grid,CM} = 363,254 \text{ MWh/year} * 0.5676 \text{ tCO}_2/\text{MWh} = 206,183 \text{ tCO}_2/\text{year}$ (after design deviation)

Project emissions

The proposed project activity involves the generation of electricity by development of a wind power plant. The generation of electricity does not result in greenhouse gas emissions and therefore is taken as 0 tCO₂/year.

Leakage

No leakage emissions are applicable.

Emission reductions

$ER_y = BE_y - PE_y - LE_y = 180,199 - 0 - 0$
 $ER_y = 180,199 \text{ tCO}_2$ ($ER_y = BE_y$) (before design deviation)

$ER_y = BE_y - PE_y - LE_y = 206,183 - 0 - 0$
 $ER_y = 206,183 \text{ tCO}_2$ ($ER_y = BE_y$) (after design deviation)

Vintage period	Estimated baseline	Estimated project	Estimated leakage	Estimated total VCUs (tCO ₂ e)
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	emissions (tCO ₂ e)	emissions (tCO ₂ e)	emissions (tCO ₂ e)	
18-June-2019 to 31-Dec-2019	97,258	0	0	97,258
01-Jan-2020 to 31-Dec-2020	180,199	0	0	180,199
01-Jan-2021 to 31-Dec-2021	180,199	0	0	180,199
01-Jan-2022 to 31-Dec-2022	180,199	0	0	180,199
01-Jan-2023 to 31-Dec-2023	180,199	0	0	180,199
01-Jan-2024 to 31-Dec-2024	180,199	0	0	180,199
01-Jan-2025 to 31-Dec-2025	203,546	0	0	203,546
01-Jan-2026 to 31-Dec-2026	206,183	0	0	206,183
01-Jan-2027 to 31-Dec-2027	206,183	0	0	206,183
01-Jan-2028 to 31-Dec-2028	206,183	0	0	206,183
01-Jan-2029 to 17-Jun-2029	94,901	0	0	94,901
Total	1,915,249	0	0	1,915,249

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	EG _y
Data unit	MWh
Description	Net electricity generated by power plant/unit m, k or n (or in the project electricity system in case of EG _y) in year y or hour h
Source of data	Turkish Electricity Transmission Company (TEIAS), Annual Development of Turkey's Gross Electricity Generation by Primary Energy Sources (2000-2017) TEIAS, see http://www.teias.gov.tr/sites/default/files/2018-10/59%282000-2017%29.xls
Value applied	See Table 13, Table 14, Table 15

Justification of choice of data or description of measurement methods and procedures applied	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey. Thus, for reliability, TEİAŞ data is used. Net electricity generation is calculated using gross and net production for all fuel types. This data is used to find relation between the gross and net electricity delivered to the grid by fossil fuel fired power plants (Table 14). Also, gross and net electricity production for related fuel types and Import and Export data are used to find total net electricity fed into the grid in the years of 2015, 2016 and 2017 (Table 15).
Purpose of data	Data used for emission reduction calculation
Comments	

Data / Parameter	HVi,y
Data unit	Mass or volume unit
Description	Heating Values of fuels consumed for electricity generation in the years of 2015, 2016 and 2017
Source of data	Heating Values Of Fuels Consumed In Thermal Power Plants In Turkey By The Electric Utilities, TEİAŞ. See: https://www.teias.gov.tr/tr/iv-turkiye-termik-santrallarinda-kullanilan-yakit-miktarlari-isil-degerleri-ve-kojenerasyon-0 (Excel File 75)
Value applied	See, Excel Table 7: Heating Values of Fuels (Tcal) Hata! Başvuru kaynağı bulunamadı.
Justification of choice of data or description of measurement methods and procedures applied	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey. There is no national NVC data in Turkey. However, TEİAŞ announces Heating values of fuels. This data is used to calculate annual NCVs for each fuel type.
Purpose of data	Data used for emission reduction calculation
Comments	

Data / Parameter	FC _{i,y}
Data unit	Mass or volume unit
Description	Amount of fuel type i consumed in the project electricity system in year y
Source of data	Heating Values Of Fuels Consumed In Thermal Power Plants In Turkey By The Electric Utilities, TEİAŞ. See: https://www.teias.gov.tr/tr/iv-turkiye-termik-santrallarinda-kullanilan-yakit-miktarlari-isil-degerleri-ve-kojenerasyon-0 (Excel File 73)
Value applied	See, Excel Table 8: Fossil Fuel Consumption Amounts Hata! Başvuru kaynağı bulunamadı.
Justification of choice of data or description of measurement methods and procedures applied	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of data	Data used for emission reduction calculation
Comments	

Data / Parameter	NCV _{i,y}
Data unit	GJ/mass or volume unit
Description	Net Calorific Value of fuel types in the years of 2015, 2016 and 2017
Source of data	Calculated by using HVi,y to FC _{i,y} as Net Calorific Values of fuel types are not directly available in Turkey.
Value applied	See, Excel Table 7: Heating Values of Fuels, Excel Table 8: Fossil Fuel Consumption Amount , Excel Table 9: Net Calorific Values of Fuels and Emission Factor
Justification of choice of data or description of measurement methods and procedures applied	TEİAŞ is the national electricity transmission company, which makes available the official data of power plants in Turkey. Calculation of NCVs from national HVi,y and FC _{i,y} data is preferred to default IPCC data as these are more reliable.
Purpose of data	-
Comments	-

Data / Parameter	Sample Group for BM emission factor
Data unit	Company names, plant names, licence dates, licence numbers, fuel types, plant capacities in MW and provisional acceptance dates.
Description	Most recent power plants which compromise 20% of total capacity
Source of data	Energy Investments, Ministry of Energy and Natural Sources: http://www.enerji.gov.tr/tr-TR/EIGM-Raporlari
Value applied	See, Excel Table 11: Sample Group for BM
Justification of choice of data or description of measurement methods and procedures applied	Ministry of Energy and Natural Sources is the governmental authority for energy investments and natural sources in Turkey.
Purpose of data	For determining sample group for BM calculation
Comments	-

Data / Parameter	EF _{CO₂,i,y}
Data unit	tCO ₂ /GJ
Description	CO ₂ emission factor of fuel type i in year y
Source of data	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the IPCC Guidelines on National GHG Inventories. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Value applied	See, Excel Table 10: Total CO ₂ Emission due to Fossil Fuels for Electricity Generation
Justification of choice of data or description of measurement methods and procedures applied	No plant specific and national emission factor data is available in Turkey. So, IPCC default data is used.
Purpose of data	-

Comments	-
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Data / Parameter	$\eta_{m,y}$
Data unit	-
Description	Average energy conversion efficiency of power unit m in year y
Source of data	Appendix, Table 2 of the “Determining the baseline efficiency of thermal or electric energy generation systems”(v.02)
Value applied	See, Excel Table 11: Sample Group for BM
Justification of choice of data or description of measurement methods and procedures applied	For efficiency rates of Natural Gas, Coal and Lignite Power Plants See Appendix, Table 2 of the Tool (highest rate is applied to be conservative): https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-09-v2.0.pdf
Purpose of data	
Comments	

5.2 Data and Parameters Monitored

Data / Parameter	$EG_{m,y}$
Data unit	MWh
Description	Net quantity of electricity generated and delivered to the grid by power unit m in year y
Source of data	On site measurement from the meters.
Description of measurement methods and procedures to be applied	Two electricity meters will be placed (one main and one reserve) at the substation. These meters are sealed by TEIAS and intervention by project proponent is not possible. The fact that two meters are installed in a redundant manner keeps the uncertainty level of the only parameter for baseline calculation low. High data quality of this parameter is not only in the interest of the emission reduction monitoring, but paramount for the business relation between the plant operator and the electricity buyers.

	Main data source will be the EPIAŞ (previously named as PMUM) data. TEIAŞ reciprocal agreement meter records will be used for cross checking.																								
Frequency of monitoring/recording	Continuous measurement and at least monthly recording																								
Value applied	317,500 MWh/year (Before project design deviation) 363,254 MWh/year (After project design deviation)																								
Monitoring equipment	Readings of the one main and one back-up electricity meters for both solar and wind generation separately (6 in total). Main data source will be the EPIAŞ (previously PMUM) data. TEIAŞ reciprocal agreement meter records will be used for cross checking.																								
	After project design deviation, electricity generation from solar and wind sources will be monitored separately through dedicated main and back-up meters installed for each source. EPIAŞ data will be used as the primary data source, while TEİAŞ reciprocal agreement meter records will be utilized for cross-checking and verification purposes. The use of both main and back-up meters enables continuous monitoring and verification of electricity generation data, ensuring data consistency and minimizing the risk of data loss or measurement errors.																								
	Technical specifications of the meters have been given below:																								
	<table><tr><th>Name</th><th>Brand & Model</th><th>Serial Number</th><th>Accuracy Class</th><th>Meter Test Date</th><th>Protocol Date</th></tr><tr><td rowspan="4">Main Meter (Generation from WTGs)</td><td rowspan="4">ITRON & SL761W071</td><td rowspan="4">84051115</td><td rowspan="4">0.2S</td><td>12-July-2021</td><td rowspan="4">19-June-2019 (First Index Protocol)</td></tr><tr><td>26-April-2023</td></tr><tr><td>30-April-2024</td></tr><tr><td>24-April-2025</td></tr><tr><td rowspan="4">Back-up Meter (Generation from WTGs)</td><td rowspan="4">ITRON & SL761W071</td><td rowspan="4">84051116</td><td rowspan="4">0.2S</td><td>12-July-2021</td><td rowspan="4">11-May-2019 (First Index Protocol)</td></tr><tr><td>26-April-2023</td></tr><tr><td>30-April-2024</td></tr><tr><td>24-April-2025</td></tr></table>	Name	Brand & Model	Serial Number	Accuracy Class	Meter Test Date	Protocol Date	Main Meter (Generation from WTGs)	ITRON & SL761W071	84051115	0.2S	12-July-2021	19-June-2019 (First Index Protocol)	26-April-2023	30-April-2024	24-April-2025	Back-up Meter (Generation from WTGs)	ITRON & SL761W071	84051116	0.2S	12-July-2021	11-May-2019 (First Index Protocol)	26-April-2023	30-April-2024	24-April-2025
	Name	Brand & Model	Serial Number	Accuracy Class	Meter Test Date	Protocol Date																			
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				26-April-2023																					
				30-April-2024																					
				24-April-2025																					

	Main Meter (Generation from WTGs)	ITRON & SL761W071	84051117	0.2S	12-July-2021 26-April-2023 30-April-2024 24-April-2025	19-June-2019 (First Index Protocol)
	Back-up Meter (Generation from WTGs)	ITRON & SL761W071	84051118	0.2S	12-July-2021 26-April-2023 30-April-2024 24-April-2025	11-May-2019 (First Index Protocol)
	Main Meter (Generation from solar unit)	EMH&LZQ J-CX	13808069	C Class	14/02/2025	14/02/2025
	Back-up Meter (Generation from solar unit)	EMH&LZQ J-CX	13808070	C class	14/02/2025	14/02/2025
The metering setup has been arranged to monitor the wind and solar generation separately. The ITRON meters are used for monitoring the energy generated by the WTGs, while the EMH meters are dedicated to the SPP generation. In this way, the electricity produced from wind and solar sources can be tracked independently. The EMH meters installed for the SPP are intended for internal monitoring and operational follow-up purposes only. They are used to observe and verify the solar generation performance, but they are not included in the billing or commercial settlement process⁶¹.						

⁶¹ The meter IDs presented in the EPIAŞ records (69210955 and 69210956) are system-assigned identification numbers used for market settlement and generation monitoring purposes within the integrated monitoring structure of the project, which includes both wind and solar electricity generation.

QA/QC procedures to be applied	According to the Article 2 of the Communiqué of Meters in Electricity Sector⁶²: <i>'The meters to be used in the electricity market shall be compliant with the standards of Turkish Standards Institute or IEC and have obtained "Type and System Approval" certificate from the Ministry of Trade and Industry.</i> Therefore, Ministry of Trade and Industry (Ministry) is responsible from control and calibration of the meters. Also, according to Article 11 of this Communiqué, meters shall be in class of 0.5s, which means error interval for measuring is in $\pm 0.5\%$ range which is well acceptable according to rules. Paragraph b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems'⁶³ (Regulation) of Ministry states that: <i>' b) Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done every 10 years.</i> Therefore, periodic calibration of the meters will be done every 10 years according to the regulation. Also according to Article 67 (page 20) of this regulation, the calibration shall be done in calibration stations which have been tested and approved by Ministry of Trade and Industry. Article 10 d) of Communiqué requires the meters shall be three phase four wire and Article 64 of Regulation clearly states how calibration shall be performed for this kind of meters. As above mentioned, the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan.
Purpose of data	Calculation of Baseline and Project Emission
Calculation method	-
Comments	Plant manager will be responsible for monitoring the data

5.3 Monitoring Plan

As the necessary baseline emission factors are all defined ex ante (Operating and Built Margin, see baseline description), the most important information to be monitored is the amount of electricity fed

⁶² See, www.epdk.org.tr/TR/Dokuman/3156

⁶³ See, <http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch=>

into the grid by Üçpınar WPP. This value will be monitored continuously by redundant metering devices, one of them being the main one in the substation, which provides the data for the monthly invoicing to TEİAŞ.

Under data handling process, the meter is read remotely at the end of every month and published through website of TEİAŞ which can be accessed by project owner to check the correctness of the data. Besides, project owner carries monthly protocol to cross-check the data. By this way a cross check is done. Once the meter data is correct then the amount is accessible on EPIAŞ which is also accessible by project owner. When all data is correct, an invoice (receipt of sale) is prepared by Üçpınar and delivered to TEİAŞ. The electricity generation amount, the collected data, are kept in both hardcopy and softcopy in daily and monthly basis indefinitely. Moreover, these data are submitted to several authorized people. Thus, several additional copies of these data are stored at different computers. The collected data during the monitoring period will be kept by the project owner at least two years after the last issuance of VCUs.

Personnel at the plant keep records for electricity generation amount and reports to operation manager on a monthly basis. Records are kept in electronic format for 2-years basis. The data is monitored via electricity meters. Meter is read by Üçpınar WPP staff monthly. Yearly electricity generation will be calculated by summing up monthly meter reading records. Data monitored will be kept in electronic form and hard copy until the end of second year after the end of crediting period. These records can be used for monitoring in case of any problem will arise in meters.

The collected data will be kept by Üçpınar during the crediting period and until two years after the last issuance of VERs for the Üçpınar WPP activity for that crediting period.

Given a data vintage based on ex ante monitoring and selection of a renewable 10-year crediting period, the Combined Margin will be recalculated at any renewal of the crediting period using the valid baseline methodology.

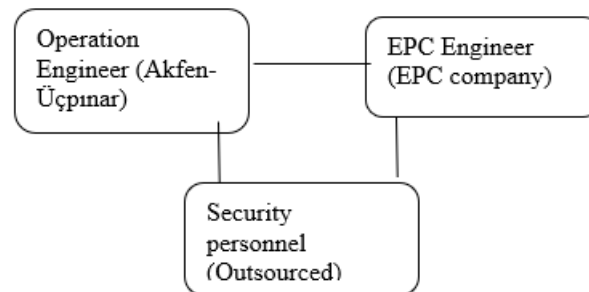
Potential leakage emissions in the context of power sector projects are emissions arising due to activities such as power plant construction, fuel handling and land inundation. However, according to the methodology, those emission sources do not need to be taken into account.

Operational and Management Structure

As described before, there are two main factors important for the calculation of emission reductions. The only relevant data that have to be monitored is only net electricity generation ($EG_{m,y}$) per year. Since project emission is zero no additional monitoring is required. The generation data are subject to the strict internal quality control systems of both parties. The monthly meter reading documents are stored by Üçpınar and TEİAŞ. The settlement notification, which is issued by TEİAŞ and includes the meter reading data, is stored on a TEİAŞ file server and accessible for Üçpınar via a secured website. The meters themselves can always be read as plausibility check for verification. The other important parameter is the emission factor. It is approved according to strict quality control parameters from an independent external party. With this, no additional structures or processes have to be implemented to insure the availability and high quality of the necessary data for monitoring.

At the end of each monitoring period, which is planned to generally last one year, from the monthly meter reading records the net electricity generation amounts as calculated by electricity supplied to the grid minus withdrawn from the system, will be added up to the yearly net electricity generation and total project emissions will be subtracted from this amount and result data will be multiplied with the combined margin emission factor with the help of an excel spread sheet that also contains the combined margin calculation. Thus, the complete baseline approach is always transparent and traceable. For the elaboration and quality assurance of the monitoring report, **Life Enerji**, an expert in the project mechanisms who already supported in the project design, is assigned. However, in order to continue improving the monitoring procedures and therefore also the future monitoring reports, internal quality check shall be fulfilled by **Life Enerji**. The monitoring reports are checked and in cases of mistakes and inconsistencies in the monitoring report, revisions with improvements shall be done. Furthermore, external year verification assures that the emission reductions calculations are transparent and traceable.

Üçpınar will keep all the data needed for the calculation of emission reductions during the crediting period and until two years after the last issuance of VCS VCUs for Üçpınar WPP. Organizational structure is as follows:



The operation and maintenance of the wind farm will be conducted by Siemens company, while Akfen will be controlling the switches, during the first 10 years of the project. Because of the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan. Dedicated emergency procedures are not provided, as there is no possibility of overstating emission reductions due to emergency cases.

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Contributor: Derbent Enerji Üretim Pazarlama İthalat ve İhracat A.Ş. Life Enerji is not a project participant.

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

N/A