



**Verified Carbon
Standard**

DENIZLI WIND POWER PROJECT, TURKEY

Project title	<i>Denizli Wind Power Project, Turkey</i>
Project ID	<i>1908</i>
Crediting period	<i>13-September-2019 to 12-September-2029</i>
Original date of issue	<i>29-July-2019</i>
Most recent date of issue	<i>04-September-2026 (Project Design Deviation)</i>
Version	<i>11</i>
VCS Standard Version	<i>VCS Project Standard 4.7</i>
Prepared by	<i>Life İklim ve Enerji Ltd. Şti.</i>

CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Project	4
1.2	Audit History.....	5
1.3	Sectoral Scope and Project Type	5
1.4	Project Eligibility	6
1.5	Project Design	7
1.6	Project Proponent	7
1.7	Other Entities Involved in the Project	8
1.8	Ownership.....	8
1.9	Project Start Date	8
1.10	Project Crediting Period	8
1.11	Project Scale and Estimated GHG Emission Reductions or Removals	9
1.12	Description of the Project Activity	10
1.13	Project Location	12
1.14	Conditions Prior to Project Initiation	17
1.15	Compliance with Laws, Statutes and Other Regulatory Frameworks	17
1.16	Double Counting and Participation under Other GHG Programs	19
1.17	Double Claiming, Other Forms of Credit, and Scope 3 Emissions.....	19
1.18	Sustainable Development Contributions	20
1.19	Additional Information Relevant to the Project	22
2	SAFEGUARDS AND STAKEHOLDER ENGAGEMENT	22
2.1	Stakeholder Engagement and Consultation.....	22
2.2	Risks to Stakeholders and the Environment.....	25
2.3	Respect for Human Rights and Equity	26
2.4	Ecosystem Health	29
3	APPLICATION OF METHODOLOGY.....	31
3.1	Title and Reference of Methodology	32
3.2	Applicability of Methodology	32
3.3	Project Boundary	36

3.4	Baseline Scenario	36
3.5	Additionality	40
3.6	Methodology Deviations	51
4	QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS.....	51
4.1	Baseline Emissions	52
4.2	Project Emissions	62
4.3	Leakage Emissions	62
4.4	Estimated GHG Emission Reductions and Carbon Dioxide Removals	62
5	MONITORING	65
5.1	Data and Parameters Available at Validation	65
5.2	Data and Parameters Monitored.....	69
5.3	Monitoring Plan.....	72
	APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION.....	75

1 PROJECT DETAILS

1.1 Summary Description of the Project

VCS Monitoring Report Template, v4.4

Korda Enerji Üretim Pazarlama İthalat ve İhracat A.Ş. (hereafter referred to as “**Korda**”) invested into a new Wind Power project called **Denizli Wind Power Project** (hereafter referred to as the “**Project**” or “**Denizli WPP**”), which involves installation and operation of 3 MWe wind turbines. The project is involved of 22 wind turbines. The generated energy will be fed to the grid Tavas TM and Denizli Batı 380 TM.¹

In the initial design of the project estimated electricity net generation was 186,100 MWh² per year. Through the efficient utilization of available wind energy, the project activity will replace grid electricity, which is generated from various fuel sources, mainly fossil fuels. The electricity produced by project activity will result in a total emission reduction of 105,622 tonnes of CO₂e/year. The total emission reduction by the project activity is estimated to be 1,056,220 tonnes of CO₂e for the first crediting period, which is 13/09/2019 to 12/09/2029.

The original design of the Project has been revised with the addition of five additional turbines to the original design and an additional solar unit. With the increase in the number of turbines from 22 to 27 and the addition of a solar unit, the project license has been updated accordingly.

The initial installed capacity of the Project was 66 MW. Following the solar equipment agreement signed on 03/04/2024, an additional 5.7629 MWm³ solar unit was incorporated into the Project. Subsequently, under the turbine supply agreement signed with Nordex for the five additional turbines on 23/07/2024, the total installed capacity of the Project was revised to 104.5629 MWm/ 90 MWe and the project license was updated accordingly. The solar unit was partially commissioned on 23/01/2025 and 04/09/2025. A capacity of 4.5188 MWm was commissioned on 23/01/2025, while the remaining 1.2441 MWm was commissioned on 04/09/2025⁴. Additional turbines T23-T6 have been commissioned on 22/08/2025, T27 turbine and solar unit has been commissioned on 04/09/2025⁵. As a result of these additions, the estimated annual electricity generation of the Project was revised to **360,000 MWh/year**⁶. The annual estimated emission reduction amount will be **151,382 tCO₂e** during the first crediting period. The total emission reduction by the project activity is estimated to be **1,513,821 tonnes** of CO₂e for the first

¹ Please See; License of the project

² Please See; Energy yield report. The details are given in the CM Calculation Excel.

³ The project's licensed capacity is 5.7629 MW AC, which is the maximum power that can be delivered to the grid. The installed solar PV capacity under the EPC agreement is stated as 6.320 MW DC, which refers to the total rated capacity of the solar panels under standard test conditions. DC/AC ratio of 1.097 reflects a common design practice to slightly oversize the DC capacity to improve energy production under real operating conditions. However, the grid export is always limited to 5.7629 MW AC in accordance with the license and inverter control settings and cannot exceed 5.7629 MW.

⁴ Provisional acceptance documents of solar unit.

⁵ Provisional acceptance documents.

⁶ Revised License of the Project

crediting period, which is 13/09/2019-12/09/2029. Moreover, project activity will contribute further dissemination of wind and solar energy and extension of national power generation. Changes related to capacity addition have been given in Table 1 below.

Table 1: Project information related to before and after design deviation of Denizli 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	22 WTG	66 MWm/MWe	13-September-2019	186,100	105,622
After Design Deviation	27 WTG	104.5629 MWm-90 MWw (5.7629 MWm Solar Part; 98.8 MWm Wind/90 MWe Wind)	Partial Comissioning ; -from T23 to T26; 22-August-2025 -T27; 04-September-2025	360,000	151,382

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/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 and 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	13-Sept-2019 to 12-Sept-2029	VCS	RINA Services S.p.A	10 years
1 st Verification	13-Sept-2019 to 31-May-2022	VCS	Earthood	2 years 8 months

2 nd Verification	01-June-2022 to 31-Dec-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 ⁷	No. 1 "Energy Industries (renewable/non-renewable)"
Project activity type	Renewable Energy (REN), wind power project

1.4 Project Eligibility

General eligibility

1.4.1 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 4.7⁸, the Denizli 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 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.

⁷ 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>

⁸ <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, the Denizli 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

1.5.1 ☐ Multiple locations or project activity instances (but not a grouped project)

☐ Grouped project

Grouped project design

N/A

1.6 Project Proponent

Organization name

Korda Enerji Üretim Pazarlama İthalat ve İhracat A.Ş

Contact person	Melis Ünal Yılmaz
Title	Energy and Carbon Markets Manager
Address	Akfen Yenilenebilir Enerji A.Ş. Turan Güneş Bulvarı Galip Erdem Cad. No: 3 Çankaya/ANKARA
Telephone	+90 312 408 10 00-14 34
Email	munal@akfen.com.tr

1.7 Other Entities Involved in the Project

Organization name	Life İklim ve Enerji Ltd. Şti.
Role in the project	General Manager
Contact person	Ramazan Aslan
Title	Carbon Deputy Director
Address	Oğuzlar Mah. 1377. Sk. No:19/9 Balgat, Çankaya/Ankara
Telephone	+90 312 481 21 42
Email	info@lifeenerji.com

1.8 Ownership

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

1.9 Project Start Date

Project start date	13-September-2019
Justification	Official start and commissioning date of Denizli 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 Version V.3)
Start and end date of first or fixed crediting period	13-September-2019 to 12-September 2029

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)
13-September-2019 to 31-December-2019	31,831
01-January-2020 to 31-December-2020	105,622
01-January-2021 to 31-December-2021	105,622
01-January-2022 to 31-December-2022	105,622
01-January-2023 to 31-December-2023	105,622
01-January-2024 to 31-December-2024	105,622
01-January-2025 to 31-December-2025*	198,116
01-January-2026 to 31-December-2026*	204,336
01-January-2027 to 31-December-2027*	204,336
01-January-2028 to 31-December-2028*	204,336
01-January-2029 to 12-September-2029*	142,755
Total estimated ERRs during the first or fixed crediting period	1,513,821
Total number of years	10
Average annual ERRs	151,382

*Since there is a capacity addition has been realized in Denizli WPP, estimated ER amounts have been revised to reflect the increased installed capacity. Accordingly, since solar unit has been operational as

of 23/01/2025, the updated ER calculations incorporate the contribution of the newly added capacity and have been adjusted as of 2025⁹.

VCS Monitoring Report Template, v4.4

1.12 Description of the Project Activity

The technology being employed, converts wind energy into electrical energy and it will be supported by SPP that converts sunlight into electricity, which can be used when wind energy is not sufficient. The technology is an environment friendly technology since there are no GHG emissions associated with the electricity generation. The proposed project will use wind turbines. Since the project activity is a Greenfield installation there was no electricity generation at the project site prior to its implementation. The key parameters about the technical design of the selected model **Siemens SWT-3.4-108 and Nordex N133** of the turbines are listed below in Table 1 and Table 2. Technical specifications of the added SPP are listed Table 3.

Table 2: Technical specifications of Siemens SWT-3.4-108 Curtailed to 3MW¹⁰

Specifications	Siemens SWT-3.4-108
Rated Power (kW)	3000
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 N133/4800¹¹

⁹ A detailed calculation of the revised emission reduction (ER) estimates is provided in the ER Excel file.

¹⁰ 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

¹¹ Provisional acceptance documents of added WTGs

Specifications	Nordex
Rated Power (kW)	4800
Rotor Diameter (m)	133
Hub Height (m)	83
Num. of Blades	3
Cut-in wind speed (m/s)	3
Cut-out wind speed (m/s)	28

Table 4: Technical specifications of solar unit¹²

Specifications	SPE 550 Half Cut Biafacial
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

¹² Agreement w/Asunim

Technical life time of Denizli WPP is determined by using the “Tool to determine the remaining lifetime of equipment” (v. 1)¹³. In the tool it is stated that;

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

VCS Monitoring Report Template, v4.4

- (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 warranty¹⁴.

1.13 Project Location

The project is located in Denizli Province, Babadağ District, Demirli Village Location of the project is given in Figure 1. Some parts of the plant are located in Aydın Province, Karacasu District. Moreover, the coordinates of the project activity are given under Table 4.

¹³ Please see <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-10-v1.pdf>

¹⁴ Please see EPC agreement.

Table 5: Geographic coordinates of the project activity of Denizli WPP¹⁶

¹⁶ Please see Production License for the coordinates and <https://rcn.montana.edu/resources/Converter.aspx> for the conversion.

Wind Turbine No.	Latitude (N)	Longitude (E)
1	37° 47' 20.6232''	28° 46' 23.1853''
2	37° 47' 12.2208''	28° 47' 01.8137''
3	37° 47' 03.9120''	28° 47' 14.8588''
4	37° 47' 01.2264''	28° 47' 27.2621''
5	37° 47' 00.8664''	28° 47' 48.5921''
6	37° 46' 57.2304''	28° 48' 07.8802''
7	37° 46' 48.7524''	28° 48' 21.2862''
8	37° 46' 40.6128''	28° 48' 27.3013''
9	37° 46' 28.7040''	28° 48' 38.1288''
10	37° 46' 27.5160''	28° 49' 06.7112''
11	37° 46' 22.2780''	28° 49' 16.2287''
12	37° 46' 20.9208''	28° 49' 30.3374''
13	37° 46' 16.3164''	28° 49' 51.1912''
14	37° 46' 10.6140''	28° 50' 03.2709''
15	37° 46' 12.4608''	28° 50' 38.6291''
16	37° 46' 03.8532''	28° 50' 43.5239''
17	37° 45' 55.1196''	28° 50' 46.0450''
18	37° 45' 45.2808''	28° 50' 54.7502''
19	37° 45' 36.4392''	28° 51' 02.1310''
20	37° 45' 28.4112''	28° 51' 11.2480''
21	37° 45' 19.0440''	28° 51' 25.1119''
22	37° 45' 24.4980''	28° 51' 55.5690''
23*	37° 47' 1.0356''	28° 47' 37.6815''
24*	37° 46' 31.8208''	28° 48' 29.6212''
25*	37° 46' 21.0153''	28° 49' 41.2116''

26*	37° 45' 23.7637"	28° 51' 18.0379"
27*	37° 45' 10.4044"	28° 51' 54.5612"
*Added WTGs to the initial design of the Project		
Geographic coordinates of added SPP unit		
SPP Unit 1	Latitude (N)	Longitude (E)
K1	37° 47' 37.0873"	28° 46' 54.4802"
K2	37° 47' 37.0785"	28° 46' 54.5188"
K3	37° 47' 35.9515"	28° 46' 54.9107"
K4	37° 47' 36.0288"	28° 46' 57.1293"
K5	37° 47' 34.8799"	28° 46' 57.0174"
K6	37° 47' 34.4573"	28° 46' 54.5902"
K7	37° 47' 27.2754"	28° 46' 57.3648"
K8	37° 47' 25.8656"	28° 46' 55.2079"
K9	37° 47' 26.1120"	28° 46' 48.5536"
K10	37° 47' 26.5015"	28° 46' 47.9080"
K11	37° 47' 29.2010"	28° 46' 48.8992"
K12	37° 47' 30.7026"	28° 46' 48.9580"
K13	37° 47' 36.2633"	28° 46' 50.2473"
SPP Unit 2	Latitude (N)	Longitude (E)
K1	37° 47' 16.3749"	28° 46' 57.3883"
K2	37° 47' 14.4754"	28° 46' 59.5621"
K3	37° 47' 13.9880"	28° 47' 0.1083"
K4	37° 47' 13.9821"	28° 46' 59.5380"
K5	37° 47' 12.9731"	28° 46' 59.5545"
K6	37° 47' 13.0703"	28° 46' 58.6604"
K7	37° 47' 13.3706"	28° 46' 57.8217"

K8	37° 47' 15.6175"	28° 46' 55.6201"
SPP Unit 3	Latitude (N)	Longitude (E)
K1	37° 47' 13.4879"	28° 47' 7.3821"
K2	37° 47' 12.6854"	28° 47' 7.4285"
K3	37° 47' 12.3416"	28° 47' 6.0076"
K4	37° 47' 9.0239"	28° 47' 7.4517"
K5	37° 47' 8.9534"	28° 47' 6.0722"
K6	37° 47' 9.2122"	28° 47' 5.1633"
K7	37° 47' 10.4561"	28° 47' 3.5712"
K8	37° 47' 10.4615"	28° 47' 4.0910"
K9	37° 47' 11.9905"	28° 47' 4.0660"
SPP Unit 4	Latitude (N)	Longitude (E)
K1	37° 47' 2.7914"	28° 47' 17.1254"
K2	37° 47' 2.5258"	28° 47' 17.6747"
K3	37° 47' 0.8932"	28° 47' 19.1418"
K4	37° 47' 0.9899"	28° 47' 19.4411"
K5	37° 46' 58.9743"	28° 47' 21.6171"
K6	37° 46' 58.6924"	28° 47' 21.5563"
K7	37° 46' 57.6006"	28° 47' 19.1971"
K8	37° 46' 57.6000"	28° 47' 18.0616"
K9	37° 46' 55.2844"	28° 47' 16.8121"
K10	37° 46' 55.2418"	28° 47' 16.5529"
K11	37° 46' 55.5362"	28° 47' 16.2601"
K12	37° 46' 57.7307"	28° 47' 15.2909"
K13	37° 47' 2.1043"	28° 47' 15.6121"
K14	37° 47' 2.1372"	28° 47' 15.5979"
K15	37° 47' 2.1530"	28° 47' 17.1358"

SPP Unit 5	Latitude (N)	Longitude (E)
K1	37° 47' 2.8377"	28° 47' 21.1665"
K2	37° 47' 0.5038"	28° 47' 23.3825"
K3	37° 47' 0.4346"	28° 47' 22.6395"
K4	37° 47' 0.5070"	28° 47' 22.0074"
K5	37° 47' 0.8303"	28° 47' 21.2069"
K6	37° 47' 1.8231"	28° 47' 19.7220"
SPP Unit 6	Latitude (N)	Longitude (E)
K1	37° 47' 0.7675"	28° 47' 20.2744"
K2	37° 47' 0.3899"	28° 47' 20.8333"
K3	37° 46' 59.8612"	28° 47' 22.1119"
K4	37° 46' 59.9178"	28° 47' 23.9389"
K5	37° 46' 59.0981"	28° 47' 24.7172"
K6	37° 46' 57.2438"	28° 47' 23.5094"
K7	37° 46' 58.3409"	28° 47' 22.4552"
K8	37° 46' 59.6063"	28° 47' 21.2393"

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) ¹⁷

- 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

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

company, distribution company or consumer. For the Denizli WPP, connection agreement documents have been provided. Also, Denizli 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.

VCS Monitoring Report Template, v4.4

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

- 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. Denizli WPP is using wind and solar as a source and called renewable energy project. Denizli 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) ¹⁹

- According to the relevant Environmental Impact Assessment Regulation for Denizli 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.
- The EIA Positive Decision was granted on 14/07/2020 by the Ministry of Environment, Urbanization and Climate Change, General Directorate of EIA for the additional wind turbines to the original project design.
- For the additional solar unit to be integrated into the Denizli WPP, a “No EIA Required” decision was issued by the Provincial Directorate of Environment, Urbanization and Climate Change on 19/01/2022. Accordingly, the project continues to remain fully compliant with the applicable environmental regulations and permitting requirements.

(4) Occupational Health and Safety Regulation (6331, 30/6/2012) ²⁰

- 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 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 in line with this law.

¹⁸ See: <https://www.epdk.org.tr/Detay/DownloadDocument?id=kvZVO0DFQ3E=>

¹⁹ See <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf>

²⁰ See: <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.6331.pdf>

1.16 Double Counting and Participation under Other GHG Programs

No Double Issuance

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

☐ Yes ☒ No

1.16.1

Registration in Other GHG Programs

Has the project registered under any other GHG programs?

☐ Yes ☒ No

1.16.2

Is the project active under the other program?

☐ Yes ☒ No

Projects Rejected by Other GHG Programs

1.16.3

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 0 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?

VCS Monitoring Report Template, v4.4

☐ 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

Denizli WPP has been implemented to contribute to the sustainable social and economic development of the region while supporting national and global climate objectives. By harnessing wind-solar energy, a clean and renewable natural resource, the project generates electricity without consuming fossil fuels or causing direct greenhouse gas emissions during operation. The environmental, social, and economic benefits achieved through the project can be summarized under the following Sustainable Development Goals (SDGs):

SDG 7 – Affordable and Clean Energy

The expected electricity generation is **360,000 MWh/y** through the utilization of wind and solar resources. The electricity generated was supplied to the national grid, increasing the share of renewable energy in Türkiye's electricity mix and reducing dependence on fossil fuel-based power generation. By utilizing sustainable energy resources, the project contributes to energy security, diversification of electricity generation sources, and the long-term development of a clean energy sector.

SDG 13 – Climate Action

The renewable electricity generated by the project displaced electricity that would otherwise have been produced by grid-connected power plants, including fossil fuel-fired generation units. As a result, the project achieved an emission reduction of **151,382 tCO₂e** during the monitoring period. By avoiding greenhouse gas emissions associated with conventional electricity generation, the project contributes to climate change mitigation and supports national and international decarbonization efforts.

SDG 8 – Decent Work and Economic Growth

The project contributes to sustainable economic growth by creating and maintaining employment opportunities throughout its operational lifetime. The project is expected to create and sustain **at**

least 10 jobs, thereby supporting regional employment and income generation. In addition to direct employment, the project supports local businesses and service providers involved in operation, maintenance, logistics, transportation, and other ancillary activities. Through long-term investment in renewable energy infrastructure, the project stimulates regional economic development while promoting environmentally sustainable growth.

1.19 Additional Information Relevant to the Project

VCS Project Description Template, v4.4

Leakage Management

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: $ER_y = BE_y$

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.

Further Information

Not applicable.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1.12.1 Stakeholder Engagement and Consultation

Stakeholder Identification

Stakeholder Identification	<i>The local residents of the nearby, affected village, i.e. Ataköy Village.</i>
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 Ataköy village, which is approximately 11.2 km away from the project site.
Location of resources	The local village nearby which is Ataköy village.

Stakeholder Consultation and Ongoing Communication

2.1.2

Date of stakeholder consultation	<i>31-July-2019</i>
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 and mitigation measures to prevent the roads from being damaged.
Ongoing communication	A logbook is available for comments of local stakeholders. What's more, thanks to the Grievance Mechanism, local stakeholders will have a chance to submit their requests and complaints to the project owner about the project. The logbook and contact information of the authorized person from the owner company is available at village head's office so that the local stakeholders can reach these people whenever they have any complaints, suggestions or ideas about the project.

Stakeholder input	During the meetings held with local stakeholders on 09 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.
--------------------------	---

Free Prior and Informed Consent

2.1.3

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. The public comment period was between 27-June-2019 and 27-July-2019.

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.

VCS Project Description Template, v4.4

2.2 Risks to Stakeholders and the Environment

Management Experience

The management team has experience in identifying risks to stakeholders and the environment since the project start date which is 13-September-2019.

2.2.1

Risk Assessment

2.2.2

	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. Trainings will be given to employees related to health, safety and emergency drill.
Risks to stakeholder participation	No risk identified	There are no risks for stakeholder participation. Türkiye has ratified ILO convention 155 and about work safety and precautions.
Working conditions	No risk identified	Türkiye has ratified ILO convention 155 and about work safety and precautions.
Safety of women and girls	No risk identified	Türkiye 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, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	Prevention of wastewater discharge to environment.	The wastewater is stored in a septic tank and transferred to wastewater treatment plant. Hazardous materials will be collected regularly and are disposed of.
---	--	---

2.3 Respect for Human Rights and Equity

Labor and Work

2.3.1

	Risks identified ²¹	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	Türkiye 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	Türkiye 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

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.

		legislations. There is no forced labour.
Child labor	No risk identified	Türkiye 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.
Human trafficking	No risk identified	Türkiye 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.

Human Rights

2.3.2

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. Türkiye 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.

Property Rights

2.3.4

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.

Benefit Sharing

2.3.5

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 Denizli WPP personnel during the operation phase. Monitoring is conducted by assigned personnel to observe nests and carcasses.

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 Denizli Wind Power Project.
Usage of fertilizers	No risks identified	The project activity does not use fertilizers.

2.4.1

Rare, Threatened, and Endangered Species

Species and habitat	4 endemic plant species were identified in the project site.²²These species are <i>Centaurea cadmea</i> Boiss., <i>Picris olympica</i> Boiss., <i>Draba bruniifolia</i> Stev. subsp. <i>heterocoma</i> (Fenzl) Coode & nana (Stapf) Schulz and <i>Muscari aucheri</i> (Boiss.) Baker. Whenever these species are detected the following are applied: The peeling of the fertile part of the soil should be kept according to the method and this soil should be laid as the top layer again in order to restore the route. In the sections where the turbines are located, the vegetation in a circle of approximately 100 m diameter were
---------------------	--

²² Please see Ecosystem Report.

	cleaned and these sections was preferably covered with gravel. It was recommended that the towers of wind turbines be painted in light color and the ends of the wind turbines be painted in a contrasting manner. It was also recommended to place a light source at the top of the tower.
Areas needed for habitat connectivity	The project area does not contain or impact any critical areas needed for habitat connectivity for birds or bats. ²³ • 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.

	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.

²³ Please see Ornithology Report.

Introduction of Species

2.4.2

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.

2.4.3

	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.

Ecosystem Conversion

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

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

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	ACM0002 (Version 19.0) ²⁴	Grid Connected Electricity Generation from Renewable Sources	Version 19.0 ²⁵
Tool	Tool 07	Tool to calculate the emission factor for an electricity system	Version 07.0 ²⁶
Tool	Tool 01	Tool for the demonstration and assessment of additionality	Version 07.0.0 ²⁷
Tool	Tool 02	Combined tool to identify the baseline scenario and demonstrate additionality	Version 07.0 ²⁸
Tool	Tool 03	Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion	Version 03.0 ²⁹
Tool	Tool 10	Tool to determine the remaining lifetime of equipment	Version 01.0 ³⁰
Tool	Tool 24	Common Practice Analysis	Version 03.1 ³¹

3.2 Applicability of Methodology

Methodology ID ³²	Applicability condition	Justification of compliance
------------------------------	-------------------------	-----------------------------

²⁵ Please see ACM0002 Version 19: <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

²⁶ Please see <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

²⁷ Please see <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

²⁸ Please see <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.pdf>

²⁹ Please see <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf>

³⁰ Please see <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>

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

³² 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

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.
ACM0002	The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.	The project activity is the installation of 27 wind turbine generators (WTVCS) and a solar unit. Hence, it meets this criterion.
ACM0002	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.	The project activity only involves capacity addition of solar and wind. Hence, this criterion is not applicable to the project activity.
ACM0002	In case of hydro power plants, one of the following conditions shall apply:	The project activity is not a hydro power plant. Hence, this criterion

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.

	(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 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.	is not applicable to the project activity.
--	--	---

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 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	The project is not a retrofit, rehabilitations, replacements or capacity addition; hence, this criterion is not applicable to the project activity

	implementation of the project activity and undertaking business as usual maintenance”.	
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

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 6** and **Figure 2** are examined, electricity demand is expected to exceed 420 billion kWh in 2027 with an average increase of 3.9%³³ for the low scenario, for the baseline scenario, electricity

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

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.³⁴

VCS Project Description Template, v4.4

Table 6: Low and High Demand Projection Scenarios for Ten Years Period (TWh)

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

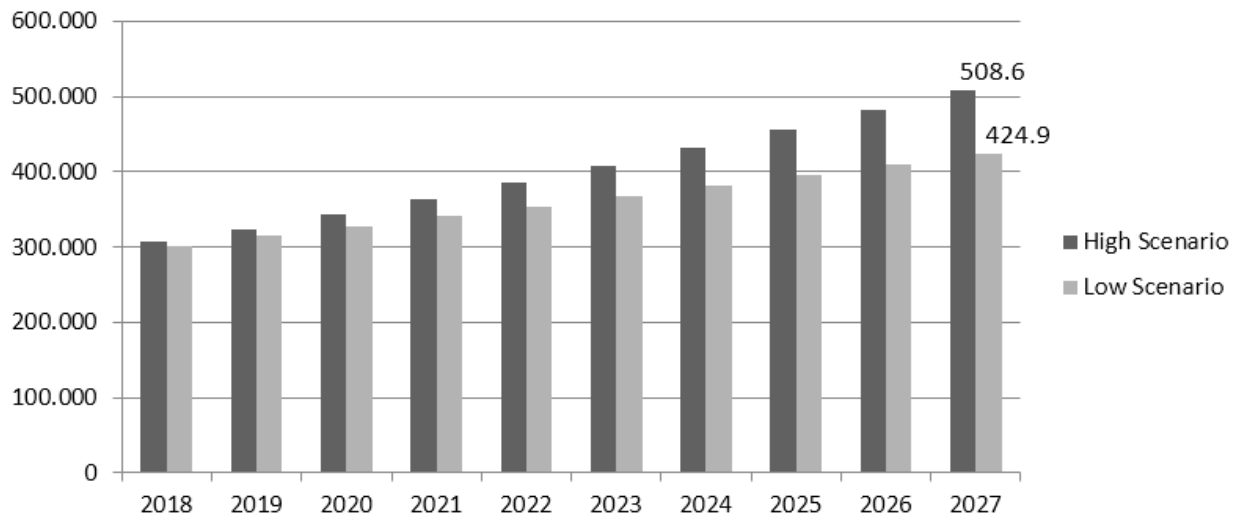


Figure 2: Electricity Demand Projections for Ten Years

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 7:**

³⁴ Please see: https://www.teias.gov.tr/sites/default/files/2018-02/Taleprapor_2017.pdf

Table 7: Projection of Total Generation Capacity by Fuel Types (TWh)³⁵

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
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
GEO THERMAL	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 3**.

³⁵ Please see: https://www.teias.gov.tr/sites/default/files/2018-09/Kapasite_Projeksiyonu_2018_2022.pdf

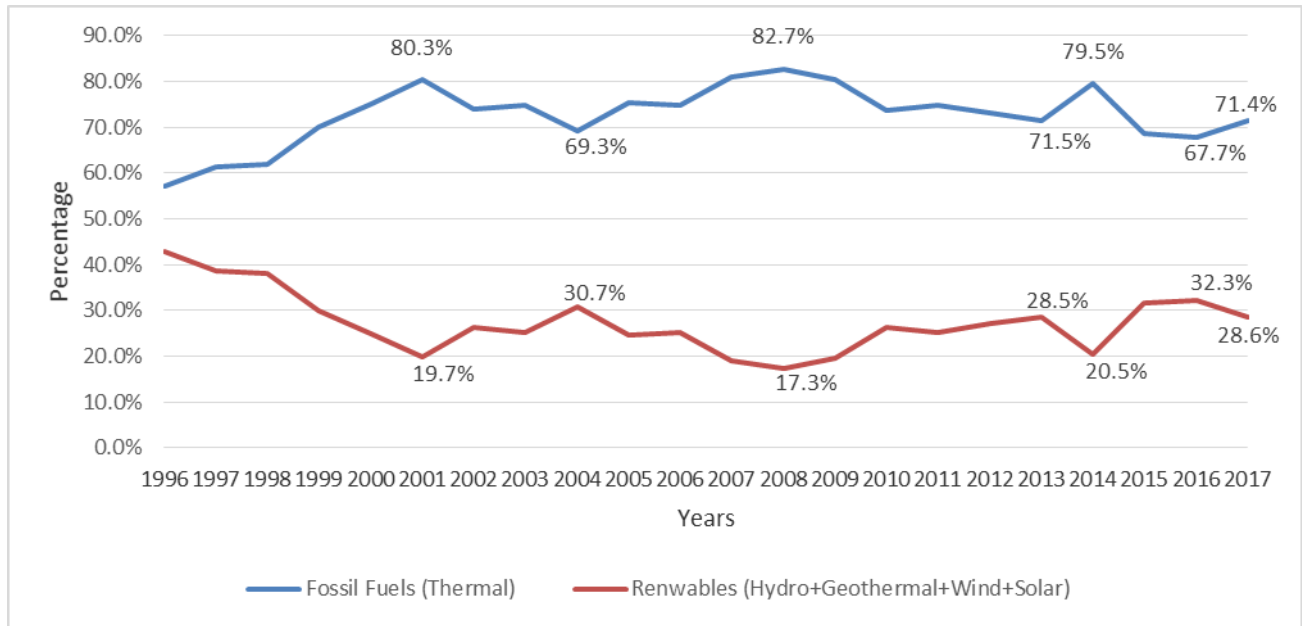


Figure 3: Fossil Fuels and Renewable in Turkish Electricity Mix (1996-2017)³⁶

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.³⁷ 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.

³⁶ Please see: <http://www.teias.gov.tr/sites/default/files/2018-10/46.xls>

³⁷ Please see: https://www.teias.gov.tr/sites/default/files/2018-09/Kapasite_Projeksiyonu_2018_2022.pdf

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

VCS Project Description Template, v4.4

3.5 Additionality

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”³⁸ 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 Denizli 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 analyze 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, Denizli doesn't have to invest power investments even proposed project activity. Also, since Denizli 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.

³⁸ Version 7, <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf> (Page7)

c) Continuation of the current situation, i.e. Denizli 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 Denizli WPP are independent from the question whether Denizli 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 Denizli 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 Denizli 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.*

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

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 Law³⁹

(2) Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy⁴⁰

(3) Environment Law⁴¹

Table 8: Project Implementation Schedule

Date (DD/MM/YYYY)	Activity
15/07/2011	"EIA is not required" certificate
18/08/2011	Issuance of the License

³⁹ See: <https://www.epdk.org.tr/Detay/Icerik/23-2-3/mevzuat> (Enactment Date:2013)

⁴⁰ See: <https://www.epdk.org.tr/Detay/Icerik/23-2-3/mevzuat> (Enactment Date: 2005)

⁴¹ See <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf> (Enactment Date: 1983)

20/10/2014	Site Related Wind Potential Analysis and Energy Yield Assessment Report at the Babadağ Site
19/03/2018	EPC Agreement VCS Project Description Template, v4.4
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
13/09/2019	Commissioning date of the turbines, start date of the operation and start date of the first crediting period
13/09/2019	Start of the first monitoring period
14/07/2020	"EIA Positive" decision regarding capacity addition (Addition of 5 turbines to Denizli WPP)
19/01/2022	"EIA is not required" certificate regarding addition of solar unit
31/05/2022	End of the first monitoring period
01/06/2022	Start date of the second monitoring period
31/12/2023	End date of the second monitoring period
01/01/2024	Start date of the third monitoring period
03/04/2024	Investment Decision Date for solar capacity addition (EPC Agreement)
23/07/2024	Investment Decision Date for wind capacity addition (EPC Agreement)
31/12/2024	End date of the third monitoring period
01/01/2025	Start date of the fourth monitoring period
23/01/2025	Commissioning date of SPP unit 1-2-3-5-6
22/08/2025	Commissioning date of additional wind turbines (T23-T26)
04/09/2025	Commissioning date of additional wind turbines (T27)
04/09/2025	Commissioning date of additional solar unit
31/12/2025	End date of the fourth monitoring period
12/09/2029	End of the first crediting period

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 Denizli WPP started to consideration of VCU from the beginning of the project implementation and VCU 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 VCU.

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

Step 2. Investment analysis

“Tool 27: Investment Analysis⁴²” 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 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.

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

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 Analysis⁴³” 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 Ba2.⁴⁴ Moreover, Moody’s credit rating for Georgia is Ba2 after 11 September 2017.⁴⁵ After the reference given in Tool 27 which is updated in January 2019⁴⁶ 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%.

⁴³ See, <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-27-v8.pdf>

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

⁴⁵ Please see, <https://countryeconomy.com/ratings/georgia>

⁴⁶ 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 (186,100 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’⁴⁷ 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 9: IRR inputs

Initial IRR Inputs of Denizli WPP				
Item	Value	Units	Source	Date of The Source Document
Installed Power	66	MWe	License of the Project	18/08/2011
Technical lifetime of the project	25	years	Tool to determine the remaining lifetime of equipment (v.1) ⁴⁸	16/10/2009
Gross Generation	186,100	MWh	Denizli Wind Data Analysis and Energy Production Generation Assessment Report	20/10/2014

⁴⁷ See, http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf (Page 3)

⁴⁸ See; <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>

Electricity tariff	55.5	EUR Per MWh	Feed-in-tariff ⁴⁹	18/05/2005
--------------------	------	-------------	------------------------------	------------

VCS Project Description Template, v4.4

Technical life time of the Denizli 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 Denizli 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 chart below.

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	13/09/2019
Investment Decision Date	19/03/2018
USD/TL	3.9362
EUR/USD	1.228
EUR/TL	4.8335
Corporate Tax Rate	20%

⁴⁹ 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.

Since there is a project design deviation, IRR analysis has been reassessed for the added capacity. IRR analysis has been reassessed in terms of added capacity, additional capital expenses, operational cost. Revised IRR inputs related to capacity addition has been given below⁵⁰.

Item	Value	Units	Source	Date of The Source Document
Installed Power	90	MWe	Official Generation License of the Project	18/08/2011
Technical lifetime of the project	25	years	Tool to determine the remaining lifetime of equipment (v.1) ⁵¹	16/10/2009
Gross Generation	360,000	MWh	Official Generation License of the Project	18/08/2011
Electricity tariff	55.5	EUR Per MWh	Feed-in-tariff ⁵²	18/05/2005
Investment Cost (Additional Solar Unit)	4.6	MI EUR	EPC Agreement	03/04/2024
Investment Cost (Additional 5 Wind Turbines)	17.75	MI EUR	EPC Agreement	23/07/2024

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.

⁵⁰ Revised IRR Excel in terms of added capacity has been provided to DOE.

⁵¹ See; <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-10-v1.pdf>

⁵² 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.

The resulting IRR for 25 years is stated in below table.

Table 10: IRR value for project activity (after tax) (after project design deviation)

Period	IRR
25 years	9.37 %

v4.4

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)
 =186,100/66*8760
 =0.321 (before design deviation)

PLF= Annual Gen. / Installed Cap. * (working hours)
 =360,000/90*8760
 = 0.457 (after design deviation)

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 **Table 11111** and **Table 12** both for before and after project design deviation.

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 (12.08%) is below the benchmark, which is 12.72%.

Table 111: Equity IRR results according to different parameters (initial project registration)

Parameter	Electricity Price			Investment Cost			Energy Yield			Operating Cost		
Variance	-10%	0%	10%	-10%	0%	10%	-10%	0%	10%	-10%	0%	10%
IRR	4.93 %	7.74%	10.63 %	7.69%	7.74%	7.76%	4.93 %	7.74%	10.63%	9.12 %	7.74%	6.24%

Table 122: 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	6.70 %	9.37 %	12.08 %	10.08 %	9.37 %	8.72 %	6.70 %	9.37 %	12.08 %	10.97 %	9.37 %	7.62 %

Table 13: IRR Breaching Values for Denizli WPP after design deviation

Parameter	IRR Breaching Values	IRR Result
Power Price	12.35%	12.73%
Investment Cost	-40%	12.73%
Energy Yield	12.38%	12.74%
Operating Cost	22.35%	12.73%

The IRR breaching analysis demonstrates that achieving the benchmark would require highly unrealistic assumptions, including significant increases in electricity prices, substantial reductions in both investment and operating costs, and overly optimistic energy generation levels.

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 03.1⁵³.

Step 1. Calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity: Within the added capacity, the Project has a capacity of 90 MWe. Per the guideline of +/-50%, the applicable output range for the project is **45 MW to 135 MW**. Thus, Common Practice analysis has been reassessed in line with the revised capacity.

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

⁵³ Please see <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-24-v1.pdf>

- (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; (45 MW to 135 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; (investment decision date has been revised in line with the most recent additional capacity EPC agreement date which is 23/07/2024)

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} .

$N_{all} = 28$

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} .

$N_{diff} = 24$

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.

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

$$= 1 - (24/28)$$

Factor F equals to 0.14.

3.5.1 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.

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

Although $N_{all} - N_{diff}$ equals to 4, since F is not greater than 0.2; Denizli WPP is not common practice.

Regulatory Surplus

☒ 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?

VCS Project Description Template, v4.4

☐ Yes

☐ No (N/A)

Additionality Methods

3.5.2

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, Grid-connected electricity generation from renewable sources.

- **Identification of realistic and credible alternatives to the project activity;**
The assessment follows the applicable steps of the tool and includes:
- 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.

There is no methodology deviation.

3.6 Methodology Deviations

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 186,100 MWh of clean energy per annum. The expected electricity generation has been revised as 360,000 MWh per annum within 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” (v7) (Tool)⁵⁴ 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 Center⁵⁵”.*

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 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.⁵⁶ 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)

⁵⁴ Please see: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

⁵⁵ Please see, www.enermet.com.tr/upload/mce/.../1. electricity market licensing regulation.doc (Page 21)

⁵⁶ Please see, <http://www.epdk.org.tr/TR/Dokumanlar/Elektrik/YayinlarRaporlar/UretimKapasiteProjeksiyonlari>

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.

VCS Project Description Template, v4.4

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 TEIAS).

Table 14: Share of Low-Cost Resource (LCR) Production 2013-2017 (Production in GWh)⁵⁷

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

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

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 CO₂ emission factor in year y (tCO₂/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 14**.

Table 15: CO₂ emissions from electricity production 2015-2017 (ktCO₂)

	2015	2016	2017
CO₂-Emissions	113,727	123,437	133,025

Table 16 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 16: Gross electricity production by fossil energy sources 2015-2017 (GWh)⁵⁸

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

⁵⁸ 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]			
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 17: Net/gross electricity production 2015-2017 (GWh)⁵⁹

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

Table 18: 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
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

⁵⁹ Please see: <http://www.teias.gov.tr/sites/default/files/2018-10/56%2893-2017%29.xls>

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 19: 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.⁶⁰

While determining the sample group, energy investments data from Ministry of Energy and Natural Sources website⁶¹ 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:

⁶⁰ 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.

⁶¹ 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:

$$EF_{EL,m,y} = \frac{EF_{CO_2,m,i,y} \times 3.6}{\eta_{m,y}} \quad (3)$$

Where:

$EF_{EL,m,y}$	=	CO ₂ emission factor of power unit m in year y (tCO ₂ /MWh)
$EF_{CO_2,m,i,y}$	=	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 is given in **Table 19**. 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.

VCS Project Description Template, v4.4

Table 20: $EF_{EL,m,y}$ calculation by using equation (3)

Fuels Used in Set Sample	Effective CO ₂ emission factor (tCO ₂ /GJ)	Average Efficiency ($\eta_{m,y}$)	$EF_{EL,m,y}$ (tCO ₂ /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 20** 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 21: 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 para 86 (a) for **wind** power generation project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$.

$$\begin{aligned} EF_{grid,CM,y} &= 0.6601 \text{ tCO}_2/\text{MWh} * 0.75 + 0.2900 \text{ tCO}_2/\text{MWh} * 0.25 \\ &= 0.5676 \text{ tCO}_2/\text{MWh} \end{aligned}$$

According to the Tool 07 para 86 (a) for **solar** power generation project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$. Accordingly, $EF_{grid,CM,y}$ has been calculated as;

$$\begin{aligned} EF_{grid,CM,y} &= 0.6601 \text{ tCO}_2/\text{MWh} * 0.75 + 0.2900 \text{ tCO}_2/\text{MWh} * 0.25 \\ &= 0.5676 \text{ tCO}_2/\text{MWh} \end{aligned}$$

Accordingly, the same CM emission factor of 0.5676 tCO₂/MWh is obtained for both the wind and solar components, as the same OM/BM weighting factors ($w_{OM} = 0.75$ and

wBM = 0.25) specified in Tool 07 apply to both technologies. Therefore, the resulting grid emission factor ($EF_{grid,CM,y}$) for the project is 0.5676 tCO₂/MWh.

VCS Project Description Template, v4.4

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.

VCS Project Description Template, v4.4

$EF_{grid,CM,y}$ = 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 hybrid wind-solar 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).

VCS Project Description Template, v4.4

$ER_y = BE_y = EG_y * EF_{grid,CM} = 186,100 \text{ MWh/year} * 0.5676 \text{ tCO}_2/\text{MWh} = 105,622 \text{ tCO}_2/\text{year}$ (Before design deviation)

$ER_y = BE_y = EG_y * EF_{grid,CM} = 360,000 \text{ MWh/year} * 0.5676 \text{ tCO}_2/\text{MWh} = 204,336 \text{ tCO}_2/\text{year}$ (After design deviation)

Project emissions

The proposed project activity involves the generation of electricity by development of a hybrid wind-solar 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

$ER_y = ER_y = BE_y - PE_y - LE_y = 105,622 - 0 - 0$

$ER_y = 105,622 \text{ tCO}_2$ ($ER_y = BE_y$) (Before design deviation)

$ER_y = ER_y = BE_y - PE_y - LE_y = 204,336 - 0 - 0$

$ER_y = 204,336 \text{ tCO}_2$ ($ER_y = BE_y$) (After design deviation)

Vintage period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated reduction VCUs (tCO ₂ e)	Estimated total VCUs (tCO ₂ e)
13-September-2019 to 31-December-2019	31,831	0	0	31,831	31,831
01-January-2020 to 31-December-2020	105,622	0	0	105,622	105,622
01-January-2021 to 31-December-2021	105,622	0	0	105,622	105,622

01-January-2022 to 31-December-2022	105,622	0	0	105,622	105,622
01-January-2023 to 31-December-2023	105,622	0	0	105,622	105,622
01-January-2024 to 31-December-2024	105,622	0	0	105,622	105,622
01-January-2025 to 31-December-2025*	198,116	0	0	198,116	198,116
01-January-2026 to 31-December-2026*	204,336	0	0	204,336	204,336
01-January-2027 to 31-December-2027*	204,336	0	0	204,336	204,336
01-January-2028 to 31-December-2028*	204,336	0	0	204,336	204,336
01-January-2029 to 12-September-2029*	142,755	0	0	142,755	142,755
Total	1,513,821	0	0	1,513,821	1,513,821

* Since there is a capacity addition has been realized in Denizli WPP, estimated ER amounts have been revised to reflect the increased installed capacity. Accordingly, since solar unit has been operational as of 23/01/2025, the updated ER calculations incorporate the contribution of the newly added capacity and have been adjusted as of 2025⁶².

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

⁶² A detailed calculation of the revised emission reduction (ER) estimates is provided in the ER Excel file.

	http://www.teias.gov.tr/sites/default/files/2018-10/59%282000-2017%29.xls
Value applied	See Table 14, Table 15, Table 16
Justification of choice of data or description of measurement methods and procedures applied	TEIAS is the national electricity transmission company, which makes available the official data of all power plants in Turkey. Thus, for reliability, TEIAS 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) Error! Reference source not found.
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 Error! Reference source not found.
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	-
----------	---

VCS Project Description Template, v4.4

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	tCO₂/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	No plant specific and national emission factor data is available in Turkey. So, IPCC default data is used.

description of measurement methods and procedures applied	
Purpose of data	
Comments	-

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	Four electricity meters will be placed (two main and two back up) at the substation. These meters are sealed by TEIAS and intervention by project proponent is not possible. The fact that back up 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 data. TEIAŞ reciprocal agreement meter records will be used for cross checking. For the SPP and the additional turbines, monitoring will be carried out through main meters at the point of grid connection; however, the electricity generation of each turbine will be individually monitored via the SCADA system, allowing detailed performance tracking and internal verification of operational data.												
Frequency of monitoring/recording	Continuous measurement and at least monthly recording												
Value applied	186,100 MWh/year (before design deviation) 360,000 MWh/year (after design deviation)												
Monitoring equipment	Readings of the four electricity meters. Main data source will be the EPIAŞ data. TEIAŞ reciprocal agreement meter records will be used for cross checking. Two main meters are installed at the site, supported by two backup meters to ensure redundancy and continuous monitoring in case of primary meter failure or data discrepancies. Details of the installed parameters are 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>Main Meter</td><td>ITRON & SL761W071</td><td>84051056</td><td>0.2S</td><td>10-June-2021 02-June-2023</td><td>13-September-2019</td></tr></table>	Name	Brand & Model	Serial Number	Accuracy Class	Meter Test Date	Protocol Date	Main Meter	ITRON & SL761W071	84051056	0.2S	10-June-2021 02-June-2023	13-September-2019
Name	Brand & Model	Serial Number	Accuracy Class	Meter Test Date	Protocol Date								
Main Meter	ITRON & SL761W071	84051056	0.2S	10-June-2021 02-June-2023	13-September-2019								

					17-August-2025	
	Main Meter-II	ITRON & SL761W071	84051121	0.2S	10-June-2021 02-June-2023 17-August-2025	13-September-2019
	Back-up Meter	ITRON & SL761W071	84051120	0.2S	10-June-2021 02-June-2023 17-August-2025	13-September-2019
	Back-up Meter-II	ITRON & SL761W071	84051122	0.2S	10-June-2021 02-June-2023 17-August-2025	13-September-2019

QA/QC procedures to be applied

According to the Article 2 of the Communiqué of Meters in Electricity Sector⁶³: ‘*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.*’ 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'⁶⁴ (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 into the grid by Denizli 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.

⁶⁴ See, <http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch=>

The delivered electricity is being metered at 154 kV high voltage side of the step-up transformer installed at the project site. The meters measure the electricity delivered to the grid and also the electricity traction from the grid. Based on these measurements, the net electricity supplied to the grid will be calculated from the EPIAS records and this amount will determine the emission reduction figures.

Officials from TEİAŞ (Turkish Electricity Transmission Company) will perform data readings remotely. A meter reading record (OSF form) is prepared by TEİAŞ and sent to the project participant for each month. The data provided by TEİAŞ will be used for cross-check of the electricity generation data of Denizli WPP.

Denizli WPP 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 Denizli 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 Denizli during the crediting period and until two years after the last issuance of VCUs for the Denizli 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

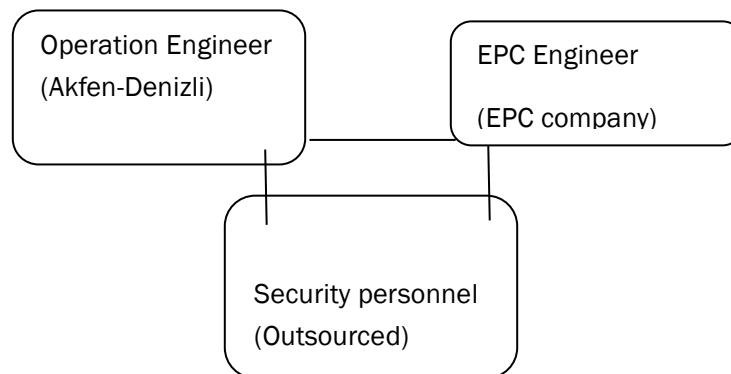
As described before, there are two main factors important for the calculation of emission reductions. The only relevant data that have to be monitored is only net electricity generation ($EG_{m,y}$) per year. Since project emission is zero no additional monitoring is required. The generation data are subject to the strict internal quality control systems of both parties. The monthly meter reading documents are stored by Denizli 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 Denizli 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.

VCS Project Description Template, v4.4

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.

Denizli 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 Denizli 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. For the additional turbines, Nordex will be responsible for the operation and maintenance (O&M) of the wind turbines, whereas Schmid will be responsible for all operation, maintenance, and service activities related to the solar components.

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.

VCS Project Description Template, v4.4

Name of entity determining the baseline:

Ramazan Aslan

Life İklim ve Enerji Ltd. Şti (Life Climate) (Project Consultant)

Tel : +90 312 481 21 42

Fax : +90 312 480 88 10

e-mail: ramazan.aslan@life-climate.com

Contributor: Korda Enerji Üretim Pazarlama İthalat ve İhracat A.Ş.

Life Enerji is not a project participant.

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

N/A