



Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT

Title of the project activity	Killik Wind Power Plant	
UNFCCC reference number of the project activity	GS 947	
Version number of the PDD applicable to this monitoring report	5	
Version number of this monitoring report	65	
Completion date of this monitoring report	173 /042/2020	
Monitoring period number	2	
Duration of this monitoring period	28/08/2016-12/10/2018	
Monitoring report number for this monitoring period	1	
Project participants	Tokat Enerji A.Ş.	
Host Party	Turkey	
Applied methodologies and standardized baselines	ACM0002: Grid-connected electricity generation from renewable sources - Version. 12.1.0	
Sectoral scopes	Energy industries (renewable - / non-renewable sources)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	-	120,867 tCO ₂
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	110,738 tCO ₂	

SECTION A. Description of project activity

A.1. General description of project activity

“TOKAT ENERJİ A.Ş is the project developer of the Killik Wind Power Plant with 40.0 MWe installed capacity in borders of central district of Tokat. Killik WPP has 16 turbines each having an installed capacity of 2.5 MWe.. The connection of the project to the National Electricity System was done via 15 km transmission line to the 154 kV Tokat OSB Transformer Station. The purpose of the project is to utilize wind energy potential in Turkey and to compensate energy requirement through a sustainable, environmentally and cost-effective way.

There are sixteen N100 type of Nordex turbines, each having a capacity of 2.5 MWs. The commissioning of the project realized in parts. Construction works started in 24/09/2010, and operation of the plant started on 13/10/2011. First, 8 turbines (20 MW) were commissioned on 13/10/2011. Secondly, 6 turbines were commissioned (15 MW) on 01/12/2011 and the last two turbines were commissioned on 17/12/2011.

The purpose of the project is to produce renewable electricity using wind as the power source and to contribute to Turkey's growing electricity demand through a sustainable and low carbon technology. The project will displace the same amount of electricity generated by the grid dominated with fossil fired power plants.

As the generation license has been revised for capacity extension, eighteen turbines were added to the project on 21/07/2017, 04/08/2017 and 08/09/2017. The installed capacity of the project has been raised to 94 MWm/85MWe with the revision. As the registered capacity of the project is considered, the electricity generation and the emission reduction of the added units are ignored for this monitoring period. The new turbine numbers' are T17,18,19,20,21,22,23,24, 25, 26, 27, 28, 29, 30,31,32,33 and 34. The newly added turbines type is N117/3000. The commissioning dates of the newly added turbines are as below:

Table-1: The commissioning dates of the added turbines¹

Date	Turbine No
21/07/2017	17,18,19,28,29,32 and 34
04/08/2017	25,26,27 and 33
08/09/2017	20,21,22,23,24,30 and 31

The project has produced positive environmental and economic benefits through the following aspects:

- Displacing the electricity generated by fossil fuel fired power plants by utilising the renewable resources so as to avoid environmental pollution and GHG emissions,
- Contributing the economic development of the region by providing sustainable energy resources,
- Increasing the income and local standard of living by providing job opportunities for the local people.
- Reducing the blackout because of low voltage by lowering required capacity of the transformer.

Total electricity generation and emission reduction in this monitoring period has been calculated as 198,765.64 MWh and 120,867 tCO₂eq, respectively.

¹ The Ministry Acceptance Protocol is available to the DOE.

A.2. Location of project activity

Killik Wind Power Project (Killik WPP) is located in the northeast of Turkey, in borders of central district of Tokat. The nearest settlements to the project site are Killik, Cayoren and Tekneli villages. The closest turbines to Killik, Cayoren and Tekneli villages.

Project location may be seen through Figure 1.

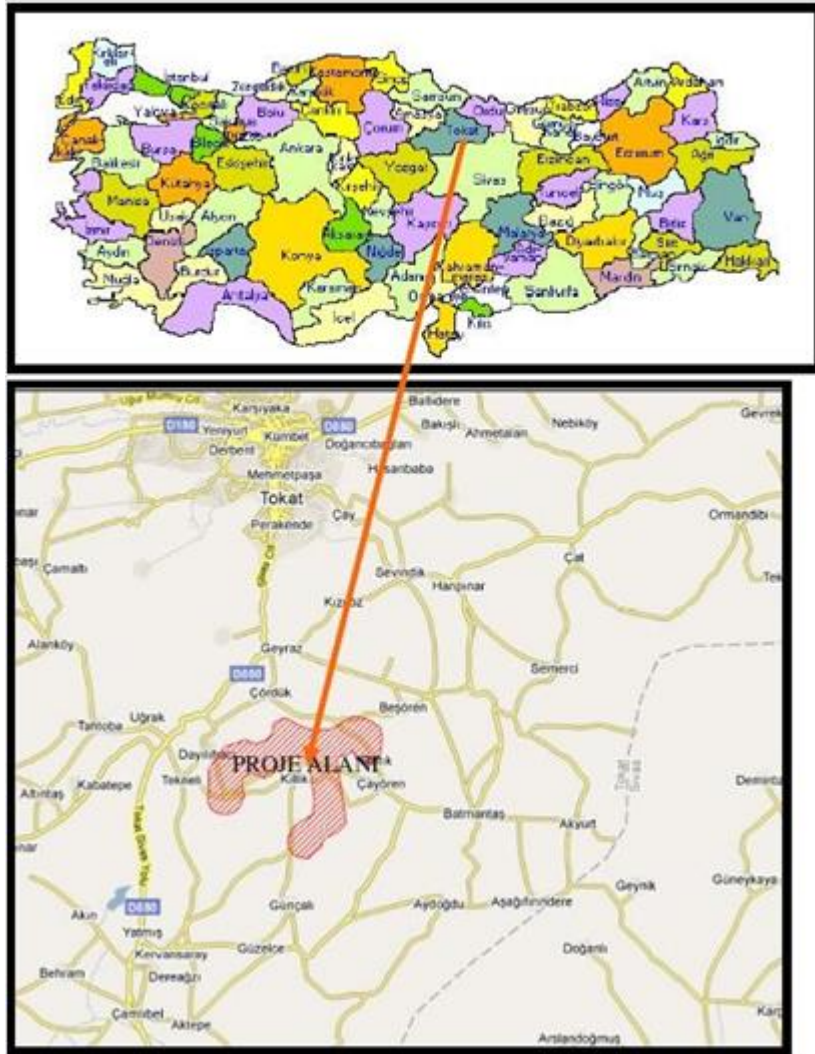


Figure 1. Project location

The coordinates of the project (including the added capacity) may be seen in Table 2:

Table 2- Geographical coordinates of the wind turbines of the project activity²

² Generation license is available to the DOE.

	E	N		E	N
T1	289390,000	4450211,000	T18	292396,000	4451674,000
T2	289778,000	4450597,000	T19	292222,000	4451785,000
T3	289974,000	4450522,000	T20	295710,000	4451426,000
T4	290167,000	4450752,000	T21	295590,000	4451715,000
T5	290650,000	4450774,000	T22	295374,000	4451831,000
T6	291042,000	4450993,000	T23	295048,000	4451762,000
T7	291416,000	4450883,000	T24	294844,000	4451818,000
T8	291753,000	4450504,000	T25	289620,000	4450713,000
T9	292090,000	4451322,000	T-26	289505,000	4450886,000
T10	292792,000	4451560,000	T27	291027,000	4450509,000
T11	292732,000	4450876,000	T28	290859,000	4450855,000
T12	292878,000	4450730,000	T29	293835,000	4451510,000
T13	293091,000	4451296,000	T30	294441,000	4451045,000
T14	293338,000	4451435,000	T31	294678,000	4451168,000
T15	294023,000	4451205,000	T32	291684,000	4451052,000
T16	294246,000	4451426,000	T33	289287,000	4450518,000
T17	292606,000	4451633,000	T34	291880,000	4451276,000

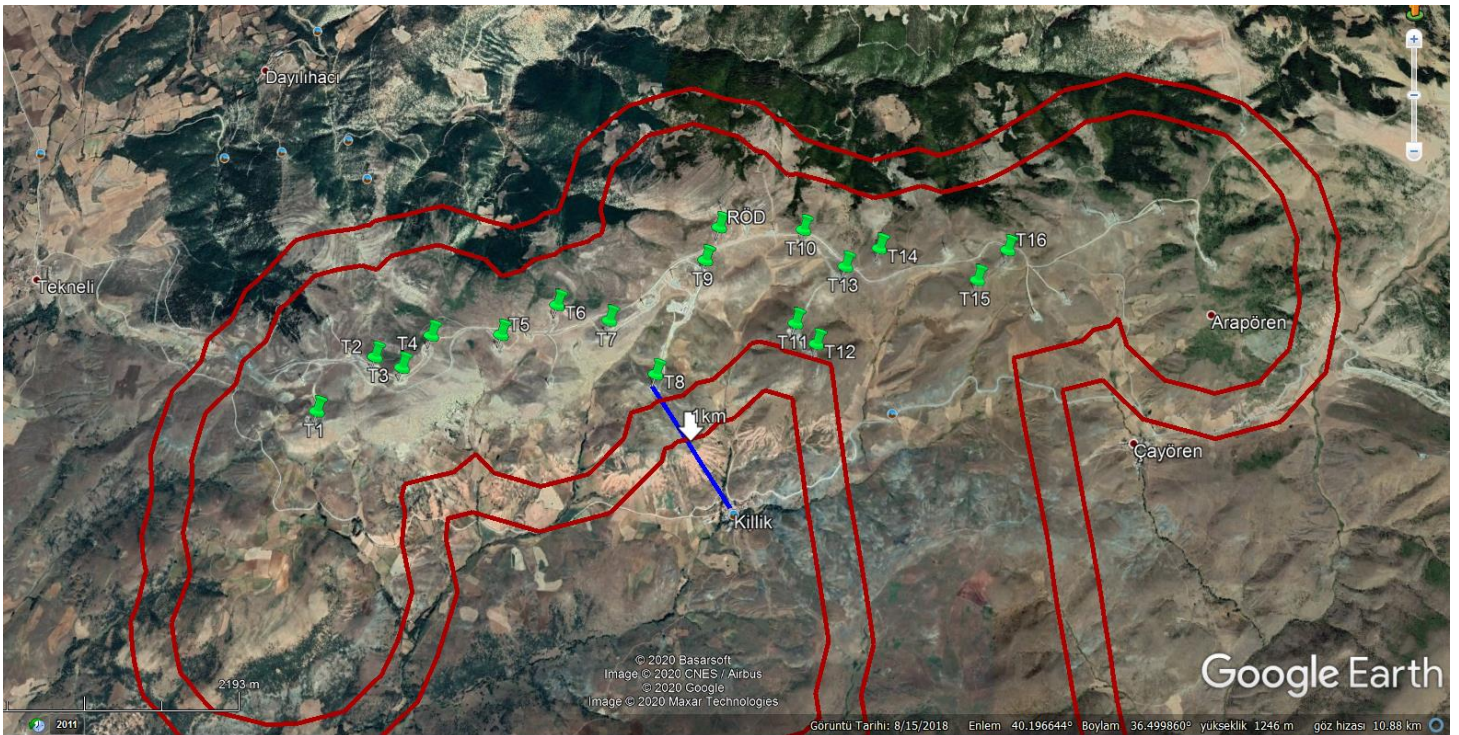




Figure 2. Lay-out of the project activity before and after the capacity increase

	E	N
T1	289390,000	4450211,000
T2	289778,000	4450597,000
T3	289974,000	4450522,000
T4	290167,000	4450752,000
T5	290650,000	4450774,000
T6	291042,000	4450993,000
T7	291416,000	4450883,000
T8	291753,000	4450504,000
T9	292090,000	4451322,000
T10	292792,000	4451560,000
T11	292732,000	4450876,000
T12	292878,000	4450730,000
T13	293091,000	4451296,000
T14	293338,000	4451435,000
T15	294023,000	4451205,000
T16	294246,000	4451426,000

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
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Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Turkey (host Party)	Tokat Enerji A.Ş.	No

A.4. References to applied methodologies and standardized baselines

Applied approved baseline and monitoring methodologies:

Approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 12.1.0

Used tools:

- “Tool for the demonstration and assessment of additionality” version 05.2.
- “Tool to calculate the emission factor for an electricity system” version 2.

For more information regarding the methodology please refer to:

<https://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD>

A.5. Crediting period type and duration

13/10/2011 to 12/10/2018 (both days included)

The first crediting period is 7 years and renewable twice

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The project is implemented as defined in Section A.1 above. “Killik Wind Power Plant” has 40 MW installed capacity with sixteen Nordex N100 turbines, each having a capacity of 2.5 MWs. The electricity is transmitted to substation Tokat OSB TM, 154 kV.

The key parameters about the technical design of the selected model Nordex N100 2.5MW turbines are listed below in Table 3:

Table 3- Technical specifications of Nordex N100/2500 HS model

Specifications	Nordex N100 2.5 MW
Rated Power (kW)	2500
Rotor Diameter (m)	100
Hub Height (m)	80
Num. of Blades	3
Cut in/cut out wind speed (m/s)	4.0 – 20.0 m/s
Wind Speed at rated power(m/s)	14.0-20.0
Generator type	Double-fed asynchronous
Rotor Blade Material	Glass fibre-reinforced polyester, integrated lightening protection

Technical Lifetime	20 years
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As the generation license has been revised for capacity extension, eighteen turbines were added to the project on 21/07/2017, 04/08/2017 and 08/09/2017. The installed capacity of the project has been raised to 94 MWm/85MWe with the revision. As the registered capacity of the project is considered, the electricity generation and the emission reduction of the added units are ignored for this monitoring period. The new turbine numbers' are T17,18,9,20,21,22,23,24, 25, 26, 27, 28, 29 30,31,33 and 34. The newly added turbines type is N117/3000. No design change process has been initiated, yet.

The project was operational on 13/10/2011 and registered on 14/09/2012 under the Gold Standard Registry with the registration number GS 947. The project timeline is given in the table below:

Table 4- Project timeline

Date	Activity
30/10/2007	Acquisition of the Project by Iltek Group
24/07/2008	License obtained from EMRA
05/12/2008	System Connection Agreement with TEIAS
01/06/2009	Board decision for investment and carbon finance support (Prior consideration)
28/12/2009	EIA Not Required
December 2009	Project Description Document
08/06/2010	Feasibility Report
21/06/2010	Agreement with the Carbon Finance Consultant
10/08/2010	Local Stakeholder Consultation Meeting
16/09/2010	PEM's declaration of non-use of ODA funding
24/09/2010	Subcontractor Agreement for the Construction of Transmission Line (start date of construction) (Project activity start date)
24/09/2010	Subcontractor Agreement for the Excavation And Ground Works (Project activity start date)
06/10/2010	Agreement with the turbine supplier
08/10/2010	Opinion for Construction Permit by Development and Public Works of Tokat Governorship)
08/10/2010	Construction Permit by Tokat Provincial Council
17/10/2010	Leasing Agreement with the financial institution
20/10/2010	Subcontractor Agreement for the Electromechanical Works
27/10/2010	Wind and Energy Yield Estimation Report
09/12/2010	Subcontractor Agreement for General Construction Works
15/12/2010	Revised Feasibility Report
11/01/2011	Agreement With the DOE
09/02/2011	Service Agreement for Work Security Services
15/03/2011	Start of VER Validation
29/04/2011	Positive EIA Decision for Transmission Line
13/10/2011	First Index Protocol
13/10/2011	Commissioning date of first 8 turbines (20 MW)
01/12/2011	Commissioning date of 6 turbines (15 MW)
17/12/2011	Commissioning date of first 2 turbines (5 MW)

29/05/2012	Final Validation Report
14/09/2012	Date of Gold Standard Registration
04/08/2016	The last revision of the Generation License
21/07/2017	Commissioning date of 7 turbines of added capacity (21 MW)
04/08/2017	Commissioning date of 4 turbines of added capacity (12 MW)
08/09/2017	Commissioning date of 7 turbines of added capacity (21 MW)
13/10/2011	Start date of the 1 st Monitoring Period
31/12/2013	End date of the 1 st Monitoring Period
28/08/2016	Start date of the 2 nd Monitoring Period
12/10/2018	End date of the 2 nd Monitoring Period

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

N/A

B.2.2. Corrections

N/A

B.2.3. Changes to the start date of the crediting period

The crediting period start date is defined in line with the Gold Standard Requirements, Section V.a.2.1: "For VER project activities proceeding under the regular project cycle, the start date of the Gold Standard Crediting Period shall be the date of start of operation or a maximum of two years prior to Gold Standard registration, whichever occurs later". The commissioning date of the project activity is 13/10/2011 and the registration date of the project is 14/09/2012 so there is no need to change the start date of the crediting period.

B.2.4. Inclusion of monitoring plan

N/A

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

Killik Wind Power Plant was registered as Voluntary Emission Reduction under Gold Standard scheme on 14/09/2012. As the generation license has been revised for capacity extension, eighteen turbines were added to the project on 21/07/2017, 04/08/2017 and 08/09/2017. The installed capacity of the project has been raised to 94 MW with the revision. As the registered capacity of the project is considered, the electricity generation and the emission reduction of the added units are ignored for this monitoring period.

During this period, the project contributed to decreased fossil fuel consumption as well as a more sustainable development by generating 355,459.10 MWh and thus the reduction of 216,154 tonnes of CO₂eq. These values represent the generation and emission reduction of the power plant including also the capacity increase. For the aim of reaching the actual values derived from the registered capacity, the generation of the added turbines taken from SCADA system³ of the project activity will be subtracted from the total generated amount which could be monitored through EPIAS records. Thus, baseline emissions will be based on the adjusted net electricity supplied to the grid. The adjusted net electricity is 198,765.64 MWh and the baseline emissions total to 120,867 tonnes of CO₂eq for this monitoring period.

The 'adjusted net electricity supplied to the grid' is calculated as below:

Adjusted net electricity supplied to the grid = $EG_{PJ,y}$ - Generation of Added Capacity Taken From the SCADA System⁴

In addition to this, as per GS guidelines, the Project Owner can only claim credits generated in the period of three years prior to second verification site visiting date so, the generated electricity and the baseline emissions between the dates 28/08/2016 and 12/10/2018 are considered, since the site visit for the second monitoring period was realized on 28/08/2019 and the first crediting period ends on 12/10/2018.

Considering the net electricity exported to the grid, EPIAS records are used as the main source rather than the Meter Reading Forms. The reason is that the Meter Reading Forms were issued by the governmental officers and signed by both parties. Currently, the forms are filled by the project owner and approved by the governmental officers. Additionally, the remote reading by the governmental body is also available. Since the system has changed, EPIAS records are preferred as the main source by the DOE.

B.2.6. Changes to project design

Eighteen turbines were added to the project on 21/07/2017, 04/08/2017 and 08/09/2017. The installed capacity of the project has been raised to 94 MW with the revision. As the registered capacity of the project is considered, the electricity generation and the emission reduction of the added units are ignored for this monitoring period.

B.2.7. Changes specific to afforestation or reforestation project activity

N/A

SECTION C. Description of monitoring system

The objective of the monitoring plan is to ensure the complete, consistent, clear, and accurate monitoring and calculation of the emissions reductions during the whole crediting period. The Project Owner is responsible for the implementation of the monitoring plan.

³ SCADA screenshot are available to the DOE.

⁴ The calculation may be seen through the Baseline Emissions sheet of ER calculations file.

Monitoring Organization and System

The Project Owner is responsible for the overall management of the monitoring procedures including recording, data collection, calculating emission reductions and project emissions.

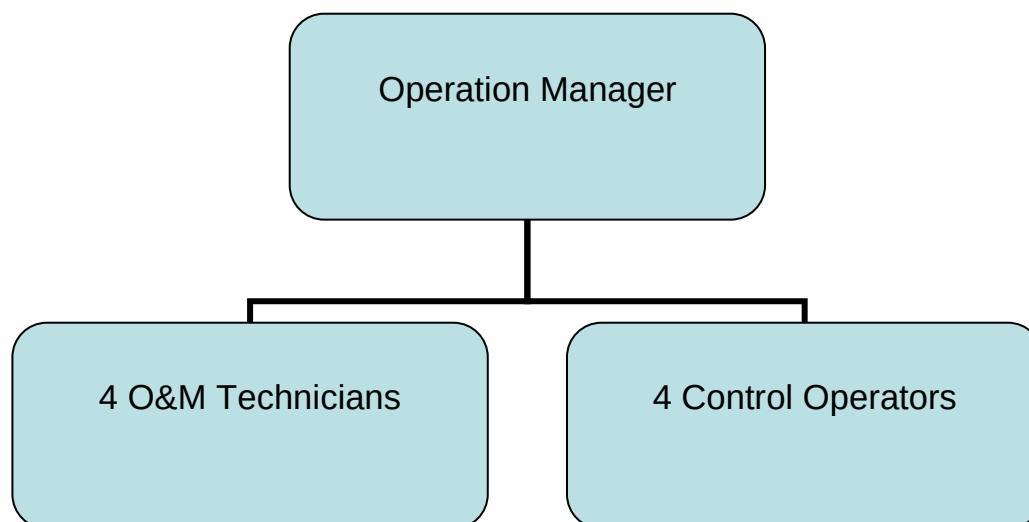


Figure 32. The management structure for the plant operation

The operation manager is responsible for the whole management of the Project Activity and the O&M technicians are responsible for the implementation of the Project Activity. In addition to the technicians, there are four control operators working for data monitoring.

TEIAS is performing remote reading of the meters and monthly power meter readings are the basis for monitoring net electricity fed into the grid. A measuring protocol is prepared including day, peak and night hour electricity generation by the project owner and approved by governmental officers at the end of each month.⁵

EPIAS⁶ records are the main source for the quantity of the net electricity. EPIAS is the financial settlement centre of TEIAS (the national grid operator). The website of EPIAS is accessible to Project owner with their unique user ID and password. Once accessed, the Project owner is able to call electricity generation and consumption reports of their own projects. The same reports are used by the Project owner for invoicing TEIAS. The electricity generation data is reported monthly basis. The EPIAS records are crosschecked with the meter reading forms.

Moreover, there are always internal reviews of the meters data which is checked by different parties. First of all, data of the meters is collected by technicians daily in written forms. The data collected daily is saved in plant manager computer and backed up and shared by headquarter of the Project owner in Istanbul. Besides the data that can be get from meters, production amount can be checked from SCADA system of Nordex.

⁵ The monthly reading protocols are available to the DOE.

⁶ PMUM has been replaced by EPIAS as of 01/09/2015 in Turkey. Retrospective data is accessible via EPIAS.

The electricity is transmitted to substation Tokat OSB TM, 154 kV. The single line diagram of Killik Wind Power Plant is provided below:

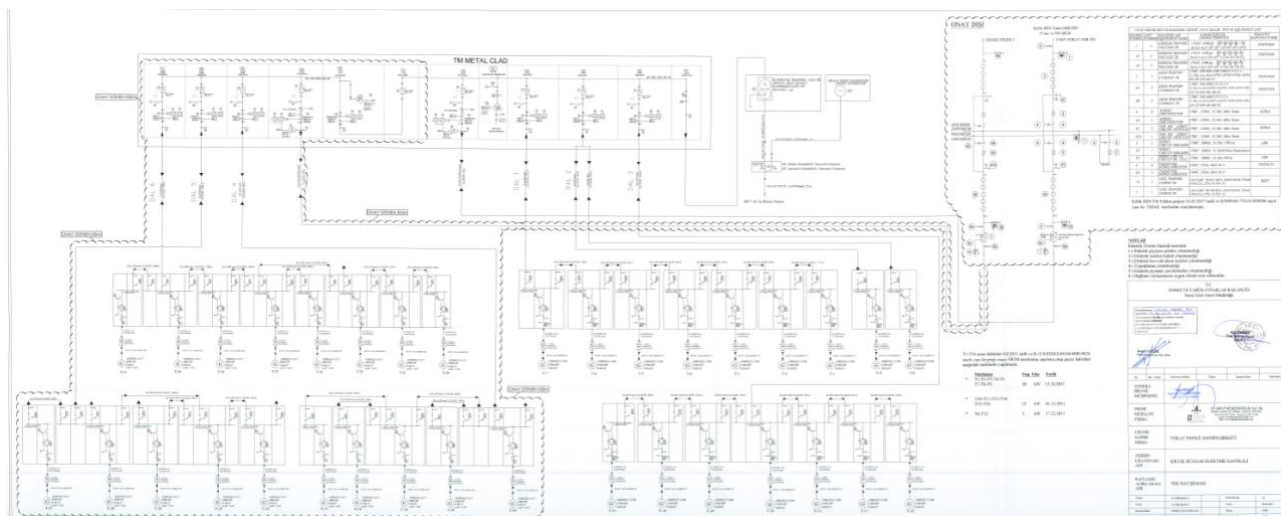


Figure 42. The Single Line Diagram of Killik Wind Power Plant

Monitoring parameters

According to the methodology applied, the electricity supplied to the national grid by the project and the electricity consumed by the project activity shall be monitored. The net electricity is the difference of the electricity supplied and consumed by the project and shall be taken into account for emission reduction calculations.

Data Management and Quality Control

Two type of power meters are installed at the grid interface of the project. One is the main meter and the other is back-up meter of the main meter for cross-checking. Both meters are jointly inspected and sealed in order to be protected from interference by any of the parties. The data is hourly recorded by the personnel on the plant. There is a logbook for the purpose.

The capacity of the transmission line connected is 154 kVA. There are two main and two back-up power meters at the project site. Since there has been a capacity extension, two additional power meters have been installed. The additional power meters were installed on 14/07/2017. In addition to this, the previous power meters indicated in the first monitoring report (ELSTER A-1500 model) were changed on 18/08/2017⁷. For the details of the power meters, please see Section D.2.

The accuracy class for main power meters has been defined in the Communiqué for Power Meters as 0.2S class. The back-up meters have the same accuracy class of 0.2S. The calibration will be implemented in accordance with the related standard procedures (IEC-EN 60687) by either TEIAS or the provider company in the name of TEIAS. TEIAS conducts remote reading. And operative manager, employee of Killik, conducts reading from the project site and sends to TEIAS. By this way, a cross-check is done. Also, with the readings from project site, continuously these two

⁷ Related protocols from TEIAS are available to the DOE.

meters are compared with each other and if any differences are detected the necessary control measures are taken.

As the measuring devices are sealed by TEİAŞ, the Project Participant cannot intervene with the devices. In case of unforeseen problems or failures of the meters or if any differences occur between main and back-up devices TEİAŞ has to be informed for necessary maintenance and calibration. In case of a problem or failure of the meters TEİAŞ reacts as fast as possible to solve the problem.

The Project Participant 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 GS VERs for the project activity.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	EG _{gross,y}
Unit	GWh
Description	Gross Electricity supplied to the grid by relevant sources (2006-2008)
Source of data	Turkish Electricity Transmission Company (TEİAŞ), Annual Development of Turkey's Gross Electricity Generation of Primary Energy Resources (2005 - 2009) TEİAŞ https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri
Value(s) applied	Please see registered PDD (Table 15)
Choice of data or measurement methods and procedures	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of data/parameter	Data used for emission reduction calculation
Additional comments	-

Data/Parameter	FC _{i,y}
Unit	Mass or volume unit
Description	Amount of fuel type i consumed in the project electricity system between years 2007-2009
Source of data	Annual Development of Fuels Consumed in Thermal Power Plants In Turkey By The Electric Utilities, TEİAŞ. https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri
Value(s) applied	Please see registered PDD (Annex 3)
Choice of data or measurement methods and procedures	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of data/parameter	Data used for emission reduction calculation
Additional comments	-

Data/Parameter	NCV _{i,y}
Unit	TJ/Ton (TJ/m ³ for Natural Gas)
Description	Net Calorific Value of each fossil fuel type between the years 2007, 2008 and 2009
Source of data	Turkish Electricity Transmission Company (TEIAS) https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri
Value(s) applied	Please see Annex 3 of registered PDD
Choice of data or measurement methods and procedures	TEIAS is the national electricity transmission company, which makes available the official data of power plants in Turkey.
Purpose of data/parameter	Data used for emission reduction calculation
Additional comments	-

Data/Parameter	EF _{CO₂ i, y}
Unit	tCO ₂ /GJ
Description	CO ₂ emission factor of fossil fuel type i
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(s) applied	Please see Annex 3 of registered PDD
Choice of data or measurement methods and procedures	There is no information on the fuel specific default emission factor in Turkey. Hence, IPCC values have been used as per the “Tool to calculate the emission factor for an electricity system (version 02)”.
Purpose of data/parameter	Data used for emission reduction calculation
Additional comments	-

Data/Parameter	Electricity Imports
Unit	GWh
Description	Electricity imported to the grid from other countries
Source of data	Turkish Electricity Transmission Company (TEIAS) https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri
Value(s) applied	Please refer to the link above for Turkey’s electricity imports
Choice of data or measurement methods and procedures	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to-date and accurate information available
Purpose of data/parameter	Data used for emission reduction calculation
Additional comments	-

Data/Parameter	Capacity additions
Unit	Name of the plant; Installed capacity (MW); Fuel type; Commissioning date
Description	Set of power capacity additions in the electricity system that comprise 20% of the system generation (in GWh) and that have been built most recently.

Source of data	Turkish Electricity Transmission Company (TEIAS) Generation units put into operation in 2004, 2005, 2006, 2007 and 2008 The Annex 2 of TEIAS Capacity Projection Reports for years 2008, 2007, 2006, 2005 and 2004 are applied for the capacity additions: https://www.epdk.org.tr/Detay/Icerik/3-0-66/elektrikuretim-kapasite-projeksiyonlari
Value(s) applied	Please see Annex 3 of registered PDD
Choice of data or measurement methods and procedures	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to-date and accurate information available
Purpose of data/parameter	Data used for emission reduction calculation
Additional comments	-

Data/Parameter	EF _{grid,CM,y}
Unit	tCO ₂ /MWh
Description	Emission factor of the Turkish grid determined ex- ante. Calculated specific emission factors based on the carbon emission data and the electricity production of the grid
Source of data	Please see registered PDD
Value(s) applied	0.6081
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Data used for emission reduction calculation
Additional comments	

D.2. Data and parameters monitored

Data/Parameter	EG _{facility,y}
Unit	MWh/yr
Description	Net electricity exported to the grid in the year y
Measured/calculated/default	Measured
Source of data	EPIAS ⁸ records as mentioned in Section C

⁸ PMUM has been replaced by EPIAS as of 01/09/2015 in Turkey during the verification period.

Value(s) of monitored parameter	28,036.43 MWh for 2016 95,929.70 MWh for 2017 74,799.51 MWh for 2018 Net electricity exported is crosschecked with Meter Reading Forms issued by Project owner and approved by governmental officers. The Meter Reading Forms were issued by the governmental officers and signed by both parties. Currently, the forms are filled by the project owner and approved by the governmental officers. Additionally, the remote reading by the governmental body is also available. EPIAS records are considered as the main source.																																																			
Monitoring equipment	The net electricity is measured continuously by two electricity meters at the grid interface and recorded monthly. Electricity meters: TR1 <table border="1" data-bbox="525 804 1441 999"> <thead> <tr> <th></th><th>Main Meter</th><th>Back-up Meter</th></tr> </thead> <tbody> <tr> <td>Manufacturer</td><td>ITRON</td><td>ITRON</td></tr> <tr> <td>Serial Number</td><td>3574743</td><td>3574744</td></tr> <tr> <td>Date of Installation</td><td>18/07/2017</td><td>18/07/2017</td></tr> <tr> <td>Latest Test Date of the Meters</td><td>27/08/2018</td><td>27/08/2018</td></tr> <tr> <td>Accuracy of meters</td><td>0.2S class</td><td>0.2S class</td></tr> </tbody> </table> TR 2 <table border="1" data-bbox="525 1088 1441 1283"> <thead> <tr> <th></th><th>Main Meter</th><th>Back-up Meter</th></tr> </thead> <tbody> <tr> <td>Manufacturer</td><td>ITRON</td><td>ITRON</td></tr> <tr> <td>Serial Number</td><td>3574741</td><td>3574742</td></tr> <tr> <td>Date of Installation</td><td>14/07/2017</td><td>14/07/2017</td></tr> <tr> <td>Latest Test Date of the Meters</td><td>27/08/2018</td><td>27/08/2018</td></tr> <tr> <td>Accuracy of meters</td><td>0.2S class</td><td>0.2S class</td></tr> </tbody> </table> The power meters that were changed on 18/07/2017⁹ <table border="1" data-bbox="525 1373 1441 1541"> <thead> <tr> <th></th><th>Main Meter</th><th>Back-up Meter</th></tr> </thead> <tbody> <tr> <td>Manufacturer</td><td>ELSTER</td><td>ELSTER</td></tr> <tr> <td>Serial Number</td><td>424798</td><td>424799</td></tr> <tr> <td>Date of Disassembly</td><td>18/07/2017</td><td>18/07/2017</td></tr> <tr> <td>Accuracy of meters</td><td>0.5S class</td><td>0.5S class</td></tr> </tbody> </table>		Main Meter	Back-up Meter	Manufacturer	ITRON	ITRON	Serial Number	3574743	3574744	Date of Installation	18/07/2017	18/07/2017	Latest Test Date of the Meters	27/08/2018	27/08/2018	Accuracy of meters	0.2S class	0.2S class		Main Meter	Back-up Meter	Manufacturer	ITRON	ITRON	Serial Number	3574741	3574742	Date of Installation	14/07/2017	14/07/2017	Latest Test Date of the Meters	27/08/2018	27/08/2018	Accuracy of meters	0.2S class	0.2S class		Main Meter	Back-up Meter	Manufacturer	ELSTER	ELSTER	Serial Number	424798	424799	Date of Disassembly	18/07/2017	18/07/2017	Accuracy of meters	0.5S class	0.5S class
	Main Meter	Back-up Meter																																																		
Manufacturer	ITRON	ITRON																																																		
Serial Number	3574743	3574744																																																		
Date of Installation	18/07/2017	18/07/2017																																																		
Latest Test Date of the Meters	27/08/2018	27/08/2018																																																		
Accuracy of meters	0.2S class	0.2S class																																																		
	Main Meter	Back-up Meter																																																		
Manufacturer	ITRON	ITRON																																																		
Serial Number	3574741	3574742																																																		
Date of Installation	14/07/2017	14/07/2017																																																		
Latest Test Date of the Meters	27/08/2018	27/08/2018																																																		
Accuracy of meters	0.2S class	0.2S class																																																		
	Main Meter	Back-up Meter																																																		
Manufacturer	ELSTER	ELSTER																																																		
Serial Number	424798	424799																																																		
Date of Disassembly	18/07/2017	18/07/2017																																																		
Accuracy of meters	0.5S class	0.5S class																																																		
Measuring/reading/recording frequency	Monthly readings																																																			
Calculation method (if applicable)	The net electricity is the difference of the electricity supplied and consumed by the project and shall be taken into account for emission reduction calculations. For the aim of reaching the actual values derived from the registered capacity (40 MW), the generation of the added turbines taken from SCADA system of the project activity will be subtracted from the total generated amount which could be monitored through EPIAS records. Thus, baseline emissions will base on the adjusted net electricity supplied to the grid.																																																			

⁹ Change form from TEIAS is available to the DOE.

QA/QC procedures	- Back-up meter is used for crosschecking the accuracy and both meters are calibrated if required. - EPIAS records are considered as the main source for the net electricity and the values are crosschecked with the data measured by meters. - TEIAS is responsible for calibration and maintenance of the devices. The periodical calibration or maintenance is under the responsibility of TEIAS and has been fixed as once in 10 years.¹⁰ Since TEIAS meters are sealed by TEIAS, the project proponent cannot intervene with the devices. The periodic tests are executed on annual basis. - Last three metering tests were performed on 27/08/2018, 14/07/2017 and 18/07/2017¹¹
Purpose of data/parameter	Calculation of emission reductions
Additional comments	-

Sustainable Development Matrix Indicators

Data/Parameter	Air Quality (SDI 1)
Unit	N/A
Description	The project caused dust emission just during the construction phase. It was calculated by the investor that the dust emission will be below legal limits ¹² . All necessary precautions to ensure the air quality were taken by the investor. These precautions included, warning drivers about speed limits, sprinkling the circulation roads of trucks, covering the truckloads, loading and discharging of soil without swinging.
Measured/calculated/default	N/A
Source of data	On site observation and interview with Local People / Mukhtar
Value(s) of monitored parameter	Dust emissions during the construction phase
Monitoring equipment	N/A
Measuring/reading/recording frequency	Continuously (Only applicable for the initial verification))
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Sustainability monitoring parameters
Additional comments	There isn't any complain regarding the dust emissions. Also, during the site visit, local people did not state any complaint about this.

Data/Parameter	Water Quality and Quaintity (SDI 2)
Unit	N/A

¹⁰ <http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch>

¹¹ Tests for 2016, 2017 and 2018 are available to the DOE.

¹² Please see Project Identification File (PIF) was prepared by Mimko, dated 2009, pages 22-24

Description	Wastewater produced by workers during construction and operation was collected in a sealed septic tank and later discharged by the local authority. The company has not discharged any waste water to the surface or ground water.
Measured/calculated/default	N/A
Source of data	Wastewater disposal invoice and records ¹³
Value(s) of monitored parameter	N/A
Monitoring equipment	N/A
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Sustainability monitoring parameters
Additional comments	-

Data/Parameter	Other Pollutants (Noise) (SDI.3)
Unit	N/A
Description	The noise level in the region after the project implementation
Measured/calculated/default	N/A
Source of data	Noise Level Measurement Report (dated as December 2011 and was submitted during 1 st Monitoring Period)
Value(s) of monitored parameter	N/A
Monitoring equipment	N/A
Measuring/reading/recording frequency	In case of a complaint
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Sustainability monitoring parameters
Additional comments	Since there isn't any complaint regarding the noise, no additional report has been prepared.

Data/Parameter	Biodiversity (SDI.4)
Unit	N/A
Description	According to the EIA Report of the project, there is no endangered flora or fauna in the region. Although the project is not located on a bird migration route and the bird collision risk is very low, the blades were painted by reflecting colour and appropriate lighting of the wind turbines were provided. In addition, appropriate storm water management measures were implemented to avoid creating small ponds which can attract birds and bats for feeding or nesting near the wind farm.

¹³ For the second monitoring period the invoices and the records are available to the DOE.

Measured/calculated/default	N/A
Source of data	Painting and lighting the turbines after the installation and controlling the project site continuously. The picture from painted turbines: 
Value(s) of monitored parameter	N/A
Monitoring equipment	N/A
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Sustainability monitoring parameters
Additional comments	Controlling project site regularly by the project manager. Furthermore, an ornithology report was prepared, 22.02.2010 by an ornithologist which was submitted during validation. ¹⁴

Data/Parameter	Quality of employment (SDI.5)
Unit	N/A
Description	All staff will have trainings on Occupational Health and Safety issue
Measured/calculated/default	N/A
Source of data	Training attendance list and/or certificates
Value(s) of monitored parameter	Health and Safety trainings have been provided to the employees. ¹⁵ Please also see Annex I.

¹⁴ The ornithology report is available to the DOE.

¹⁵ The attendance list is available to the DOE.

Monitoring equipment	N/A
Measuring/reading/recording frequency	Once for each monitoring period
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Sustainability monitoring parameters
Additional comments	-

Data/Parameter	Quantitative employment and income generation (SDI.6)
Unit	N/A
Description	The company has been provided job opportunities and as a result, increase income generation has been realized. Project participant gives priority to employees from local region. For number of local employees, Social Security System records are provided.
Measured/calculated/default	N/A
Source of data	Social Security System records ¹⁶
Value(s) of monitored parameter	16 personnel are working for the Killik: • 1 Operation Manager • 4 O&M Technicians • 4 Control Operators • 2 Administrative Personnel • 4 Security Staff (Subcontractor-Atak Security) • 1 O&M Technician (Nordex) 12 personnel are from local region.
Monitoring equipment	N/A
Measuring/reading/recording frequency	Each monitoring period
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Sustainability monitoring parameters
Additional comments	

Data/Parameter	Tree Plantation (SDI.7)
Unit	N/A
Description	In order to mitigate the effect of the project on flora in the region, the company planted trees after the saplings are provided by Forestry Directorate of Tokat.

¹⁶ The records are available to the DOE.

Measured/calculated/default	N/A
Source of data	Sapling invoice from Forestry Directorate
Value(s) of monitored parameter	Currently, 1900 trees have been planted by the project company
Monitoring equipment	N/A
Measuring/reading/recording frequency	Before the initial verification (In GS Passport, it's stated as the initial verification)
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	
Additional comments	-

Data/Parameter	Domestic Waste (SDI.8)
Unit	N/A
Description	Domestic wastes are transported to the waste disposal areas of the municipality. No waste is disposed to the nature
Measured/calculated/default	N/A
Source of data	Agreement with the municipality, waste disposal records, existence of waste transportation vehicles or interview with the municipality
Value(s) of monitored parameter	N/A
Monitoring equipment	N/A
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Sustainability monitoring parameters
Additional comments	The domestic waste of the Project Activity is transported to the waste disposal area by the project owner. The current letter with regards to this is available to the DOE.

Data/Parameter	Waste Oil (SDI.9)
Unit	N/A
Description	Waste oils are stored in the project area by the company and collected by the authorised companies accredited by the ministry. No waste is disposed to the nature.
Measured/calculated/default	N/A

Source of data	Waste oil declaration forms ¹⁷
Value(s) of monitored parameter	N/A
Monitoring equipment	N/A
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Sustainability monitoring parameters
Additional comments	-

D.3. Implementation of sampling plan

N/A

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

The baseline emission BE_y (tCO₂e) during the monitoring period results from:

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

Where:

BE_y	Baseline emissions in year y (tCO ₂ e/y)
$EG_{PJ,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{grid,CM,y}$	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated by using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO ₂ /MWh)

$EF_{grid,CM,y}$ value is fixed as 0.6081 tCO₂/MWh for the crediting period of seven years.

Since the registered capacity of the project activity is different from the installed capacity due to design change, the baseline emissions and thus emissions reductions will be based on the ‘adjusted net electricity supplied to the grid’. This value will be calculated as below:

¹⁷ Forms are available to the DOE.

Adjusted net electricity supplied to the grid = $EG_{PJ,y}$ - Generation of Added Capacity Taken From the SCADA System¹⁸

For the calculation of the adjusted net electricity supplied to the grid (generation of the registered capacity), gross electricity generation of the added turbines which is obtained from Scada has been subtracted from the net electricity supplied to the grid (the generation of the whole capacity) which can be seen through EPIAS records.

Table 4 shows the baseline emissions for the verification period:

Table 4- Baseline Emissions¹⁹

Month	(A) Electricity supplied to the grid [MWh]	(B) Electricity consumption from the grid [MWh]	(C) = (A) - (B) EG (ID 8) Net electricity supplied to the grid	EF [tCO ₂ /MWh]	Baseline emission: ER = EG * EF [t CO ₂ -eq]	Adjusted net electricity supplied to the grid [MWh]	Adjusted baseline emission: ER = EG * EF [t CO ₂ -eq]
Aug-16 (28/08/2016-31/08/2016)	1,554.439	1.135	1,553.30	0.6081	945	1,553.30	945
Sep-16	6,569.182	15.119	6,554.06	0.6081	3,986	6,554.06	3,986
Oct-16	3,891.419	32.593	3,858.83	0.6081	2,347	3,858.83	2,347
Nov-16	7,188.542	19.925	7,168.62	0.6081	4,359	7,168.62	4,359
Dec-16	8,949.479	47.860	8,901.62	0.6081	5,413	8,901.62	5,413
Jan-17	8,832.162	41.768	8,790.39	0.6081	5,345	8,790.39	5,345
Feb-17	7,586.905	34.317	7,552.59	0.6081	4,593	7,552.59	4,593
Mar-17	10,132.119	16.136	10,115.98	0.6081	6,152	10,115.98	6,152
Apr-17	7,986.905	19.844	7,967.06	0.6081	4,845	7,967.06	4,845
May-17	5,891.609	17.495	5,874.11	0.6081	3,572	5,874.11	3,572
Jun-17	3,527.887	24.905	3,502.98	0.6081	2,130	3,502.98	2,130
Jul-17	11,667.051	8.762	11,658.29	0.6081	7,089	10,172.49	6,186
Aug-17	20,933.280	15.070	20,918.21	0.6081	12,720	12,682.13	7,712
Sep-17	8,080.800	47.940	8,032.86	0.6081	4,885	3,352.36	2,039
Oct-17	16,513.280	41.010	16,472.27	0.6081	10,017	6,846.92	4,164
Nov-17	18,805.650	40.210	18,765.44	0.6081	11,411	7,289.75	4,433
Dec-17	27,926.110	19.570	27,906.54	0.6081	16,970	11,782.94	7,165
Jan-18	21,639.540	71.030	21,568.51	0.6081	13,116	9,244.23	5,621
Feb-18	21,761.210	24.910	21,736.30	0.6081	13,218	8,864.79	5,391
Mar-18	26,359.440	25.990	26,333.45	0.6081	16,013	10,232.16	6,222
Apr-18	14,199.080	52.270	14,146.81	0.6081	8,603	6,013.20	3,657
May-18	10,132.920	52.950	10,079.97	0.6081	6,130	4,096.68	2,491
Jun-18	10,711.280	62.740	10,648.54	0.6081	6,475	4,419.83	2,688
Jul-18	25,761.100	22.130	25,738.97	0.6081	15,652	11,025.63	6,705
Aug-18	28,875.800	10.450	28,865.35	0.6081	17,553	12,225.56	7,434
Sep-18	15,933.220	33.630	15,899.59	0.6081	9,669	6,676.02	4,060
Oct-18 (01/10/2018-12/10/2018)	4,866.898	18.449	4,848.45	0.6081	2,948	2,001.40	1,217
2016 Vintage (28.08.2016-31.12.2016)	28,153.06	116.63	28,036.43	0.6081	17,049	28,036.43	17,048
2017 Vintage (01.01.2017-31.12.2017)	147,883.76	327.03	147,556.73	0.6081	89,729	95,929.70	58,334
2018 Vintage (01.01.2018-12.10.2018)	180,240.49	374.55	179,865.94	0.6081	109,376	74,799.51	45,485
Total	356,277.31	818.21	355,459.10	0.6081	216,154	198,765.64	120,867

E.2. Calculation of project emissions or actual net removals

Project emissions are taken as zero as per the methodology

¹⁸ The calculation can be seen in more detail via the ER calculations excel spreadsheet which is available to the DOE.

¹⁹ ER calculations excel spreadsheet is available to the DOE.

E.3. Calculation of leakage emissions

No leakage needs to be considered.

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	120,867	0	0	0	120,867	120,867

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e)
120,867	110,738

E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

Estimated emission reduction in ex ante calculation of registered PDD is 52,087 tCO₂e/yr, which corresponds to 110,738 tCO₂e for 776 days. And actual emission reduction achieved during this monitoring period is 120,867 tCO₂e (for 28/08/2016-12/10/2018, 776 days).²⁰

E.6. Remarks on increase in achieved emission reductions

Actual emission reduction in the second monitoring period is higher (10,129 CO₂e) than the ex-ante value estimated in the registered PDD. The amount causing difference can be explained as the generation increase of 9.1% than the expected generation of the project activity. The actual ERs in vintage 2016 is 5% less than the estimated ERs. In 2017 and 2018, the actual ERs are 12% higher than the estimated ERs during the same period. It's obvious that the generation is volatile considering the differences between the years. The vintage wise and total comparison may be seen in Table 5:

Table 5- Comparison of Emission Reductions

²⁰ The calculation can be seen in more detail via the file, ER calculations excel spreadsheet which is available to the DOE.

Vintage	Period	Amount achieved during this monitoring period (tCO ₂ e)	Amount estimated ex-ante (tCO ₂ e)
2016	28.08.2016-31.08.2016	17,048	17,980
2017	01.01.2017-31.12.2017	58,334	52,087
2018	01.01.2018-12.10.2018	45,485	40,671
Total		120,867	110,738

E.7. Remarks on scale of small-scale project activity

N/A

Annex I

Participant	Training	Date
İbrahim Köten	Health and Safety	10.03.2016
Ahmet Arslan	Health and Safety	10.03.2016
Onur Karakuş	Health and Safety	10.03.2016
Serdal Ser	Health and Safety	10.03.2016
İbrahim Okur	Health and Safety	10.03.2016
Rıza Şanver	Health and Safety	10.03.2016
Emin Akburak	Health and Safety	10.03.2016
Uğur Sanca	Health and Safety	10.03.2016
Mikail Yıldız	Health and Safety	10.03.2016
Rıza Şanver	Health and Safety	02.06.2016
Serkan Alim	Health and Safety	02.06.2016
Mikail Yıldız	Health and Safety	02.06.2016
Murat Şahin	Health and Safety	02.06.2016
Onur Karakuş	Health and Safety	02.06.2016
Ahmet Arslan	Health and Safety	10.02.2017
Emin Akburak	Health and Safety	10.02.2017
İbrahim Köten	Health and Safety	10.02.2017
Olgun Koldaş	Health and Safety	10.02.2017
Onur Karakuş	Health and Safety	10.02.2017
Rıza Şanver	Health and Safety	10.02.2017
Salih Odabaş	Health and Safety	10.02.2017
Serdal Ser	Health and Safety	10.02.2017
Serkan Alim	Health and Safety	10.02.2017
Uğur Sanca	Health and Safety	10.02.2017

Serkan Alim	Health and Safety	11.05.2017
Serdal Ser	Health and Safety	11.05.2017
Uğur Sanca	Health and Safety	11.05.2017
Emin Akburak	Health and Safety	11.05.2017
Ahmet Arslan	Health and Safety	11.05.2017
Olgun Koldaş	Health and Safety	11.05.2017
Onur Karakuş	Health and Safety	11.05.2017
İbrahim Köten	Health and Safety	11.05.2017
Rıza Sanver	Health and Safety	11.05.2017
Salih Odabaş	Health and Safety	11.05.2017
Mikail Yıldız	Health and Safety	11.05.2017
Uğur Sanca	Health and Safety	16.03.2018
Olgun Koldaş	Health and Safety	16.03.2018
Onur Karakuş	Health and Safety	16.03.2018
Serdal Ser	Health and Safety	16.03.2018
Ahmet Arslan	Health and Safety	16.03.2018
İbrahim Köten	Health and Safety	16.03.2018
Rıza Sanver	Health and Safety	16.03.2018
Mikail Yıldız	Health and Safety	16.03.2018
Serkan Alim	Health and Safety	16.03.2018
Salih Odabaş	Health and Safety	16.03.2018