

 Monitoring report form (Version 06.0)	
MONITORING REPORT	
Title of the project activity	Gunaydin WPP
UNFCCC reference number of the project activity	GS1178
Version number of the PDD applicable to this monitoring report	09
Version number of the monitoring report	02
Completion date of the monitoring report	04/09//2018
Monitoring period number	4 th Period
Duration of this monitoring period	01/08/2016 -30/06/2018 (23 Months)
Monitoring report number for this monitoring report	N/A
Project participant(s)	1- MANRES Elektrik Üretim A.Ş. (Private Entity, Project Owner) 2- GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık Ve Ticaret A.Ş. (Private Entity, Project Developer)
Host Party	Turkey
Sectoral scope(s)	Sectoral scope 1: Energy Industries (Renewable-/non-renewable sources)
Selected methodology(ies)	Applied methodology: ACM0002 v.14.0.0
Selected standardized baseline(s)	-
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	Annual estimated GHG emission reduction is 33,300 tCO ₂ in registered PDD. Therefore; 2016 –13,875 tCO ₂ (for 5 months) (01/08/2016 – 31/12/2016) 2017 –33,300 tCO ₂ (for 12 months) (01/01/2017 –31/12/2017) 2018-16,650 tCO ₂ (6 Months) (01/01/2018 – 30/06/2018) Total: 63,825 tCO ₂

Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	-	59,792 tCO ₂ (for 23 months)

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The project is a large scale wind power plant project located within the boundaries of Manyas District of Balıkesir province. The project has been initially implemented as having 12.5MWm/10MWe as per the license issued on 09/02/2012. Project has been commissioned on 20/11/2012. On 31/03/2014, installed capacity has been upgraded as 20.75 MWm/20MWe. Corresponding estimated electricity output and emission reduction increased from 36.7 GWh to 55.5 GWh and from 22,020 tCO₂ to 33,300 tCO₂ per year respectively (See Appendix 3). In total, the project involves eight installed turbines five of them with an installed capacity of 2.5 MW and three of them 2.75 MW. As per the license issued by Energy Market Regulatory Authority (EMRA) all legal rights of the project is given to MANRES Elektrik Üretim A.Ş. for 49 years including pre-construction and construction periods. Purpose of the proposed project is to generate electricity by utilizing the renewable energy potential to meet increasing electricity demand and thus reduce fossil fuel consumption.

Main goals of the project include;

- Utilization of the renewable energy potential of Turkey in order to meet rapidly increasing electricity demand and contributing to build energy security.
- Increasing the share of WPPs in electricity generation mix of Turkey and reduction of GHG emissions.
- Contributing to the national economic development by creating direct and indirect job opportunities during construction and operation phases.
- Reduce import dependency of fossil fuel dominated electricity sector and diversify generation mix through use of local resources.
- Contribution to sustainable development through supporting local community and local economy.

In terms of sustainable development project not only contributes to emission reduction through use of renewable resources and creating job opportunities. In terms of environmental impact, project is considered to have positive impact on air quality due to avoided NO_x, PM and SO₂ emissions whereas no negative impact on water quality other pollutants and biodiversity has been identified. As per the national regulations, a project introductory file (PIF) has been prepared for the project to assess the environmental impacts. In addition to national requirements, a full Environmental and Social Impact Analysis (ESIA) study has been carried out for the project for compliance with international standards.

In the current monitoring period a total of 99.656 GWh of net electrical energy was generated which leads to a reduction of 59,792 tCO₂ GHG emissions. Milestones for the project activity are given in Table 1.

Table 1: Project's Milestones

Milestone	Date
Preliminary EIA	February 2009
Contribution Fee Agreement	24/09/2011
License Issuance	11/11/2011
Collecting offers for carbon agreement	15/11/2011
EM Equipment Purchase Contract*	20/12/2011
Carbon Agreement	24/01/2012
EIA Exemption Letter	25/01/2012
License Revision	09/02/2012
LSC Meeting	21/02/2012
Connection Agreement	03/04/2012
Construction Subcontractor Agreement	03/04/2012
Forest Permission	20/04/2012
Commissioning Date	20/11/2012

1 st Monitoring Period	01/12/2012 – 30/04/2014
LSC meeting for capacity extension	31/10/2013
Loan Agreement for Extension	27/06/2013
EIA Exemption Letter for Capacity Extension	05/03/2014
Turbine Agreement for Capacity Extension	18/03/2014
Amended License for Capacity Extension	31/03/2014
Start of Construction for Extension	August 2014
Commissioning Date for Extension	20/12/2014 and 26/12/2014
2 nd Monitoring Period	01/05/2014 – 31/07/2015
3 rd Monitoring Period	01/08/2015 – 31/07/2016
4 th Monitoring Period	01/08/2016- 30/06/2018

A.2. Location of project activity

Project is located within the boundaries of Manyas district of Balıkesir Province. Nearest settlement to the project site is Yaylakoy Village (approximately 1 kilometer).



Figure 1: Project Location

Figure 1 illustrates the location of the project activity. The coordinates of the project are shown in Table 2.

Table 2: Turbine and Switchyard Coordinates

Zone(35S) (ED50)	Easting(m)	Northing(m)
T1	586478	4425918
T2	586566	4425088
T3	586463	4425636
T4	586268	4425305
T5	585994	4425329
EX1	586582	4426185
EX2	586792	4425776
EX3	586249	4425719
Switchyard	586009	4425184

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
Turkey	1- MANRES Elektrik Üretim A.Ş. (Private Entity, Project Owner) 2- GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık Ve Ticaret A.Ş. (Private Entity, Project Developer)	No

A.4. Reference of applied methodology and standardized baseline

The United Nations approved consolidated baseline methodology applicable to this project is ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources", Version 14.0.0 has been applied for the project.

ACM0002 refers to the following tools:

- "Tool for the demonstration and assessment of additionality", Version 06.0.0 and
- "Tool to calculate the emission factor for an electricity system", Version 02.2.1

A.5. Crediting period of project activity

The project uses two times renewable crediting periods. (7 years, 0 months)

Dates corresponding to this monitoring period:

01/08/2016 - 30/06/2018 (23 Months)

A.6. Contact information of responsible persons/entities

Contact Person	Company	Position	E-mail
Kader Vatansever	Manres Elektrik Üretim A.Ş.	Expert	kader.vatansever@finaenerji.com
M. Kemal Demirkol	GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık Ve Ticaret A.Ş.	Managing Director	kemal@gtecarbon.com

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

Wind Power Plants use wind energy converters (WEC), called wind turbines to convert the wind energy into electrical energy. Average annual wind speeds measured at the project site at 85 meters. Hub height is 8.2 meters per second. The project uses 5 WEC's of GE 2.5-100 MW and 3 GE 2.75-100 generators with total electrical output is 20MWe. The annual electricity generation from these turbines are estimated to be 55.5 GWh. This energy is converted to 34.5 kV at the site switchyard and connected to the national grid.

Table 3: Characteristics of the 2.5MW turbines used

Design Limits	
Rotor Diameter	100 m
Cut-in Wind Speed	3.0 m/s
Cut-out Wind Speed	25 m/s
Rated Power Output	2.5 MW
Minimum ambient temperature operation	-15 °C / -20°C
Maximum ambient temperature operation	+ 40 °C
Minimum Humidity	5 g/m ³
Maximum number of grid-induced disconnections per year	30
Maximum altitude with no deaerating	1000 m
Tower	
Type	Tubular Steel Tower
Hub Height	85 m
Yaw System	
Yaw rate	0.5 °/sec
Rotor	
Diameter	100 m
Number of rotor blades	3
Swept area	7854 m ²
Rotor speed range	5-14 min ⁻¹
Rotational Direction	Clockwise looking downwind
Maximum speed of the blade tips	73.6 m/s
Orientation	Upwind
Speed regulation	Pitch-controlled
Aerodynamic brake	Blades in feathering position
Cone angle	3°
Inclination angle of rotor axis	4°
Rotor Blades	
Length (blade root – tip)	48.7 m
Pitch System	
Principle	Single blade pitch control
Main Gearbox	
Rated Power	2750 kW
Type	Multi-stage system
Lubrication	1 mechanical and 1 electrical pump
Brake System	
Primary brake system	Single blade pitch control
Secondary brake system	Single blade pitch control
Holding brake	Hydraulically driven brake caliper on high-speed shaft
Generator	
Type	Permanent magnet generator
Rated output	2640 KW
Rated speed	1650 min ⁻¹
Rated voltage	710 V
Apparent Power	2808 kVA
Frequency at rated output	110 Hz
Protection Class	IP54
Insulation Class	F
Function type	S1
Standard	EN 60034-1
Converter System	
Type	Voltage source converter
Rated voltage, line side	690 V +/-10 %
Rated frequency	50 Hz / 60 Hz
Protection class of the electronics	IP54

Table 4 Technical characteristics of GE 2.75- 100 turbines

Power	
Rated Power	2,750 kW
Rated Wind Speed	13.5 m/s
Cut-in Wind Speed	3.0 m/s
Cut-out Wind Speed	25 m/s
Rotor	
Diameter	100.0 m
Swept Area	7,853.98 m ²
Number of Blades	3
Rotor Speed	4.7 – 14.8 rpm
Blade Material	Glass-fiber reinforced plastic
Gearbox	
Type	Combined spur / Planetary gear
Stages	3
Ratio	1:117
Generator	
Type	Synchronous, permanent magnet
Voltage	690 V
Grid Connection	Via converter
Grid Frequency	50/60 Hz
Control and Protection System	
Power Limitation	pitch
Speed Control	Variable via microprocessor, active blade pitch control
Second brake system	Disk brake
Yaw control system	4 electric gear motor(s)
Tower	
Hub Height	85.0 m
Type	Steel tubular
Shape	conical
Corrosion protection	Multi-coated

There is no FAR raised during the previous verification term. As per grievance mechanism, interview with local stakeholders were done during the site visit and it has been informed that stakeholders have no complaints about the project. Moreover, log book was checked and there was no any negative comment about the project on the book.

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

N/A

B.2.2. Corrections

Project owner has decided to use EPIAS records as the primary source of data for electricity generation since the billing is based on the EPIAS records. In detail, while, calculating the net electricity generated during this monitoring period, gross electricity generation recorded by main metering device belonged to billing purposes with EPIAS was taken into consideration. Moreover, for the electricity consumption of the project itself, the higher amount of monthly electricity usage was taken into consideration irrespectively it depends on site records or EPIAS records to be conservative. Details can be checked in excel calculation document.

B.2.3. Changes to start date of crediting period

N/A

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

N/A

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

N/A

B.2.6. Changes to project design of registered project activity

No design change has occurred compared to most recent registered PDD.

B.2.7. Types of changes specific to afforestation or reforestation project activity

N/A

SECTION C. Description of monitoring system

Monitoring plan has been applied according to the selected methodology (ACM0002). According to the applied methodology, all data collected as part of monitoring will be archived electronically and be kept at least for 2 years after the end of the last crediting period. Essential parameters will be monitored if not indicated otherwise in the tables below. All measurements will be conducted with calibrated measurement equipment according to relevant standards.

The results of the readings are saved electronically and made available by TEIAS via official website. Invoicing is based on the data published on the website.

The monitoring system organization chart is shown in Figure below, in which the authority and responsibility of project management are defined.

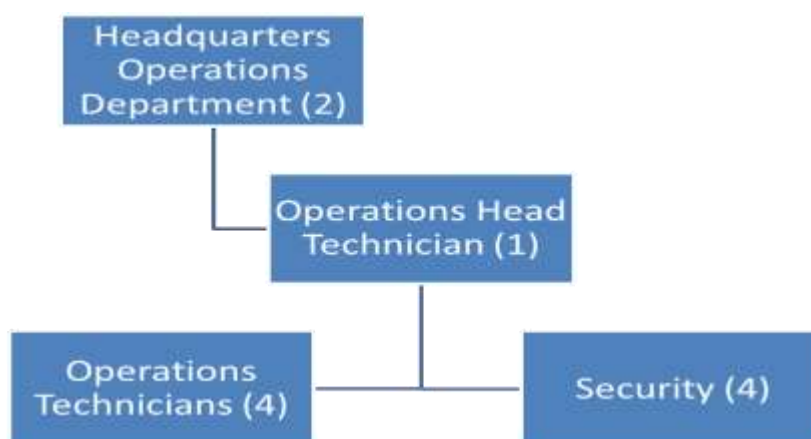


Figure 2: Monitoring System Organization Chart

Plant Manager (Operations Head Technician):

Operations head technician has been assigned as the overall responsible of compliance with VER monitoring plan. He is responsible for day to day running of plant, recording and monitoring of relevant data. Operation technicians will be assisting him with the gathering and reporting of the data.

Accounting Management (Headquarters Operations Department):

Since the company is a part of larger group, financial matters are managed from the headquarters. Operations Department is responsible for accounting, handling data about power sales, social security documents, invoicing and other personnel affairs.

GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık Ve Ticaret A.Ş. is responsible for emission reduction calculations, preparing monitoring report and periodical verification process.

Installation of meter and data monitoring has been carried out according to the regulations by TEIAS. Two metering devices (one of them used as spare) have been installed in project area and other two metering devices (one of them used as spare) have been installed at transformer center and responsibility of all of them is belonged to TEIAS. Although registered PDD indicates to use metering devices at project site to monitor electricity generation, project owner has decided to use EPIAS records as the primary source of data for electricity generation since the billing is based on the EPIAS records. Electricity generation of the Gunaydin WPP has been cross checked by using the records of metering devices at project site.

SECTION D. Data and Parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/parameter:	FC _{i,y}																																																
Unit	Tons or 1000 m3 for gases																																																
Description	Amount of fuels consumed by thermal power plants for electricity generation in terms of fossil fuel type i in year y																																																
Source of data	TEIAS Statistics																																																
Value(s) applied)	<table><tr><th rowspan="2">Fuel Type</th><th colspan="4">FC_{i,y} unit [Tons, except for Natural Gas (NG) (1000</th></tr><tr><th>2008</th><th>2009</th><th>2010</th><th>Total</th></tr><tr><td>Hard Coal</td><td>6,270,008</td><td>6,621,177</td><td>7,419,703</td><td>20,310,888</td></tr><tr><td>Lignite</td><td>66,374,120</td><td>63,620,518</td><td>56,689,392</td><td>186,684,030</td></tr><tr><td>Fuel Oil</td><td>2,173,371</td><td>1,594,321</td><td>891,782</td><td>4,659,474</td></tr><tr><td>Diesel Oil</td><td>131,206</td><td>180,857</td><td>20,354</td><td>332,417</td></tr><tr><td>LPG</td><td>0</td><td>111</td><td>0</td><td>111</td></tr><tr><td>Naphtha</td><td>10,606</td><td>8,077</td><td>13,140</td><td>31,823</td></tr><tr><td>Natural Gas</td><td>21,607,635</td><td>20,978,040</td><td>21,783,414</td><td>64,369,089</td></tr></table> Values applied are present in Appendix 4 of registered PDD (version 9)					Fuel Type	FC _{i,y} unit [Tons, except for Natural Gas (NG) (1000				2008	2009	2010	Total	Hard Coal	6,270,008	6,621,177	7,419,703	20,310,888	Lignite	66,374,120	63,620,518	56,689,392	186,684,030	Fuel Oil	2,173,371	1,594,321	891,782	4,659,474	Diesel Oil	131,206	180,857	20,354	332,417	LPG	0	111	0	111	Naphtha	10,606	8,077	13,140	31,823	Natural Gas	21,607,635	20,978,040	21,783,414	64,369,089
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Natural Gas	21,607,635	20,978,040	21,783,414	64,369,089																																													
Choice of data or measurement methods and procedures	Data from Grid Operator has been used																																																
Purpose of data	Data used for OM calculation																																																
Additional comments	-																																																

Data/parameter:	EG _y ,
Unit	GWh
Description	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must run power plants in year y

Source of data	For gross generation electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must run power plants in year y : http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/kgucunkullan%C4%B1m(13-21)/13.xls For net generation and imported electricity http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/uretim%20tuketim(22-45)/33(84-10).xls
Value(s) applied)	157,706.6 in 2008 151,144.7 in 2009 150,894.2 in 2010 459,745.428 GWh between 2008-2010 Values applied are present in page 26 of registered PDD (version 9)
Choice of data or measurement methods and procedures	Data from Grid Operator has been used
Purpose of data	Data used for emission reduction calculation (for calculation of OM, Net-to-Gross electricity ratio and share of low-cost must-run sources)
Additional comments	-

Data/parameter:	EF _{CO₂, i, y}																	
Unit	tCO ₂ /TJ																	
Description	CO2 emission factor of fossil fuel type “i” in year “y”																	
Source of data	IPCC values at the lower limit have been used.																	
Value(s) applied)	<table><tr><th>Fuel Source</th><th>EF(tCO2/Tj)</th></tr><tr><td>Coal</td><td>89,5</td></tr><tr><td>Lignite</td><td>90.9</td></tr><tr><td>Fuel Oil</td><td>75.5</td></tr><tr><td>Diesel</td><td>72.6</td></tr><tr><td>LPG</td><td>61.6</td></tr><tr><td>Naphtha</td><td>69.3</td></tr><tr><td>Natural Gas</td><td>54.3</td></tr></table> Values applied are present in page 27 of registered PDD (version 9)		Fuel Source	EF(tCO2/Tj)	Coal	89,5	Lignite	90.9	Fuel Oil	75.5	Diesel	72.6	LPG	61.6	Naphtha	69.3	Natural Gas	54.3
Fuel Source	EF(tCO2/Tj)																	
Coal	89,5																	
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Fuel Oil	75.5																	
Diesel	72.6																	
LPG	61.6																	
Naphtha	69.3																	
Natural Gas	54.3																	

Choice of data or measurement methods and procedures	According to the applied tool, IPCC default values at lower limit of 95% confidence interval can be used. Although, the actual emission reduction is expected to be higher due to high EF of fuels consumed in existing power plants, IPCC values have been used for conservativeness as requested by the methodology.
Purpose of data	EF calculations
Additional comments	-

Data/parameter:	$\eta_{m,y}$																
Unit	-																
Description	Average net energy efficiency of power unit m in year y																
Source of data	Default values provided in Annex I of the "Tool to calculate the emission factor for an electricity system".																
Value(s) applied)	<table border="1"> <thead> <tr> <th>Fuel Source</th><th>Generation Efficiency</th></tr> </thead> <tbody> <tr> <td>Coal</td><td>39%</td></tr> <tr> <td>Lignite</td><td>39%</td></tr> <tr> <td>Fuel Oil</td><td>39.5%</td></tr> <tr> <td>Diesel</td><td>39.5%</td></tr> <tr> <td>LPG</td><td>39.5%</td></tr> <tr> <td>Naphtha</td><td>39.5%</td></tr> <tr> <td>Natural Gas</td><td>60%</td></tr> </tbody> </table> Values applied are present in Appendix 4 of registered PDD (version 9)	Fuel Source	Generation Efficiency	Coal	39%	Lignite	39%	Fuel Oil	39.5%	Diesel	39.5%	LPG	39.5%	Naphtha	39.5%	Natural Gas	60%
Fuel Source	Generation Efficiency																
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Fuel Oil	39.5%																
Diesel	39.5%																
LPG	39.5%																
Naphtha	39.5%																
Natural Gas	60%																
Choice of data or measurement methods and procedures	Data source is selected as per the applied tool.																
Purpose of data	Data used for BM calculation																
Additional comments	-																

Data/parameter:	$NCVi,y$
Unit	TJ/kt
Description	Net calorific value (energy content) of fossil fuel type i in year y
Source of data	TEIAS web page http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/yak%C4%B1t46-49/49.xls

Value(s) applied)		
	Fuel Source	NCV (Tj/kt) (1000m³ for gas)
	Coal	22.26
	Lignite	6.78
	Fuel Oil	39.84
	Diesel	42.42
	LPG	46.47
	Naphtha	39.78
	Natural Gas	37.06
	Values applied are present in Appendix 4 of registered PDD (version 9)	
Choice of data or measurement methods and procedures	Data has been calculated from Grid Operator's(TEIAS) statistics	
Purpose of data	Data used for BM calculation	
Additional comments	-	

D.2. Data and parameters monitored

Data/parameter:	EG_{facility, y}
Unit	GWh
Description	Net Electricity generated and delivered to the grid by the proposed project in year y
Measured/calculated/default	Calculated
Source of data	Metering devices used in power plants, monthly generation records will be used.
Value(s) of monitored parameter	EG_{facility,2016} (5 months) = 26,162 MWh or 26.162 GWh EG_{facility,2017} (12 months) = 50,325MWh or 50.325 GWh EG_{facility,2018} (6 months) = 23,168 MWh or 23.168 GWh Total : 99.656 GWh While calculating the net electricity generated during this monitoring period, lower gross electricity generation and higher amount of monthly electricity usage recorded by main and back up meters were taken into consideration. Details can be checked in excel calculation document.

Monitoring equipment	Specifications of the metering devices are as follows:				
	Manufacturer	Device Model	Serial Number	Last Calibration	Accuracy Class
	ACTARIS (secondary)	SL7000	65000753	13.07.2012	0.5 S
	EMH (main)	LZQJ-XC	5944140	15.08.2017	0.5 S
Measuring/reading/recording frequency:	Continuous measuring, monthly recording				
Calculation method (if applicable):	Generation data will be recorded by two metering devices continuously. These records will provide the data for the monthly invoicing to TEIAS. This parameter is calculated by using the monthly gross generation and monthly internal consumption figures which are provided by the EPIAS via remote reading. On-site metering records are used for cross-checking purposes and the most conservative data set is opted for calculations where available. Main metering device changed in 15.08.2017. This meter replaced due to request of TEIAS since it was not compatible with the remote meter reading system. Apart from that, there is no problem of calibration of device and reading of electricity generation data. Model, serial number, first index protocol (calibration date) and accuracy information of both replaced main metering device and back-up device is given below in detail. Calibration for back-up meters was performed on 13/07/2012. As per the regulations, meters should not require calibration before 10 years (till 13/07/2022). In addition, main metering device has been renewed on the date of 15/08/2017 (date of first index protocol and calibration). As per the regulations, main metering device should not require calibration before 10 years (till 15/08/2027).				
QA/QC procedures:	Maintenance and test of the metering devices will be made by TEIAS periodically. In case of significant difference between two devices, maintenance will be done before waiting for periodical maintenance according to regulations of TEIAS.				
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks				
Additional comments:	-				

D.3. Implementation of sampling plan

N/A

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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

$$BE_y = (EG_{\text{facility},y} - EG_{\text{baseline}}) * EF_{\text{grid},\text{CM},y}$$

Where:

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

EG_{facility,y} = Electricity supplied by the project activity to the grid (MWh)

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

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

Realized baseline emissions

EF_{grid,CM,y} = 0,600 tCO₂/MWh = 600 tCO₂/GWh

EG_{facility,2016} (5 months) = 26.162 GWh

EG_{facility,2017} (12 months) = 50.325 GWh

EG_{facility,2018} (6 months) = 23.168 GWh

BE₂₀₁₅ = (26.162 GWh) x (600 tCO₂/GWh) = 15,697 tCO₂

BE₂₀₁₇ = (50,325GWh) x (600 tCO₂/GWh) = 30,195 tCO₂

BE₂₀₁₈ = (23,168 GWh) x (600 tCO₂/GWh) = 13,900 tCO₂

TOTAL: 59,792 tCO₂

Since the project is a Greenfield project, **EG_{baseline}** is considered zero.

E.2. Calculation of project emissions or actual net GHG removals by sinks

The project activity involves the generation of electricity by a wind power plant therefore project activity does not result in greenhouse gas emissions.

PE_y = 0

E.3. Calculation of leakage

The energy generating equipment is not transferred from or to another activity. Therefore leakage is also considered as "0".

$$LE_y = 0$$

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (t CO₂e/yr)

BE_y = Baseline emissions in year y (t CO₂e/yr)

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

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

$$ER_y = 59,792 - 0 - 0 = 59,792 \text{ tCO}_2$$

E.4. Summary of calculation of emission reductions or net GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂)	Project emissions or actual net GHG removals by sinks (t CO ₂)	Leakage (t CO ₂)	GHG emission reductions or net GHG removals by sinks (t CO ₂) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	59,792	0	0	-	59,792	59,792

E.5. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂)	01/08/2016-31/12/2016 -13,875 01/01/2017-31/12/2017 - 33,300 01/01/2018-30/06/2018 - 16,650 =63,825	01/08/2016-31/12/2016 -15,697 01/01/2017-31/12/2017 -30,195 01/01/2018-30/06/2018 -13,900 Total: 59,792

E.6. Remarks on difference from estimated value in registered PDD

Estimated and realized emission reduction amounts are quite in agreement. Wind energy is believed to be very consistent in the long term but might show little deviations in the monthly figures. Generated electricity is directly affected by the wind speed and seasonal effects. Since the annual generation estimations are based on a whole year and the monitoring report involves partial years, the differences are acceptable. As per the ex-ante calculations in the registered PDD, emission reductions corresponding to 23 months have been calculated as 63,825 tCO₂. In the current monitoring period between 01/08/2016 and 30/06/2018 the realized emission reductions have been observed to be 59,792 tCO₂, slightly below the expected amount. The deviation from the estimations was found to be around 6%. And the realized emission reductions are proved to be 94 % of the expected amount. It should be kept in mind that electricity generation may be affected negatively or slightly positively due to external weather conditions which are beyond project owner control.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	Manres Elektrik Uretim A.Ş.
Street/P.O. Box	Kısıklı Caddesi
Building	Sarkuysan–Ak İş Merkezi No:4 A-Blok Kat:1
City	Üsküdar – İstanbul
State/region	N/A
Postcode	34662
Country	Turkey
Telephone	+90 216 554 54 00
Fax	+90 216 474 52 52
E-mail	finaenerji@finaenerji.com
Website	www.finaenerji.com
Contact person	
Title	Manager
Salutation	Mrs.
Last name	Vatansever
Middle name	-
First name	Kader
Department	Business Development
Mobile	-
Direct fax	+90 216 474 52 52
Direct tel.	+90 216 554 54 00
Personal e-mail	

Project participant and/or responsible person/ entity	☒ Project participant ☒ Person/entity responsible for completing the CDM-MR-FORM
Organization name	GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık Ve Ticaret A.Ş.
Street/P.O. Box	Ehlibeyt Mah 1259. Sokak
Building	7/2
City	Ankara
State/region	-
Postcode	06520
Country	Turkey
Telephone	+90 312 472 35 00
Fax	+90 312 472 33 66
E-mail	gte@gtecarbon.com
Website	www.gtecarbon.com
Contact person	

Title	Director
Salutation	Mr.
Last name	Demirkol
Middle name	Kemal
First name	Mehmet
Department	Management
Mobile	-
Direct fax	+90 312 472 35 00
Direct tel.	+90 312 472 33 66
Personal e-mail	kemal@gtecarbon.com

Appendix 2. Monitoring of Sustainable Development Parameters

Indicator		1. Air Quality
Mitigation measure		N/A
Chosen Parameters		1- SO ₂ emissions from grid connected plants 2- NO _x emissions from grid connected plants
Current Situation of the Parameters		Total SO ₂ emission related to electricity generation is about 167.89 Gg in 2012 according to National Inventory of Turkey ¹ . Considering that electricity generation in 2012 is 239,496.80 GWh ² , SO ₂ emission per MWh is calculated as 0.70 kg/MWh. Total NO _x emission related to electricity generation is about 324.30 Gg in 2012 according to National Inventory of Turkey. NO _x emission per MWh is calculated as 1.35 kg. In parallel to the electricity generation of this monitoring period which is 99,656MWh, actual SO ₂ emission reduction has been realized as about 69 tons during monitoring period. NO _x emission reduction corresponding to realize generation is calculated as 134 tons.
Future Target for Parameters		SO ₂ and NO _x emission reductions corresponding to annual generation.
Way of Monitoring	How	Electricity generated by Gunaydin WPP, NO _x and SO ₂ emission data from GHG inventory of Turkey and TEIAS Statistics for yearly national electricity generation data will be used as reference in calculation of the emission reductions.
	When	Yearly
	By Who	Project Owner

Indicator		2. Quality of Employment
Mitigation measure		All recruited technical staff is trained for operation and maintenance of equipment and Health and safety measures. Also, staff working with high voltage equipment during operation phase will be certified (also required by regulations). The trainings will be renewed for new staff if necessary.
Chosen Parameters		Number of personnel certified/trained during operation phase

¹ http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/tur-2014-crf-15apr.zip 2012 tables, table 1s1

² [http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/uretim%20tuketim\(24-48\)/43\(06-14\).xls](http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/uretim%20tuketim(24-48)/43(06-14).xls)

Current Situation of the Parameters

Certified trainings given in this monitoring period:

#	Attendee	Provided By	Subject	Date
1	Mehmet Şenevren	Aksoy Group	Fire and emergency training	10.04.2018
2	Yalçın Başaran	Aksoy Group	Fire and emergency training	10.04.2018
3	Ümit Tanrıverdi	Aksoy Group	Fire and emergency training	10.04.2018
4	Fatih Tanrıverdi	Aksoy Group	Fire and emergency training	10.04.2018

#	Attendee	Provided By	Subject	Date
1	Salih Bircan	İLK DOST	Basic HSE	13/11/2017
2	Mehmet Şenevren	Ekoglobal, Süreç OSGB	Basic HSE	03-04.11.2016, 10.04.2017 and 21.07.2017
3	Yalçın Başaran	Ekoglobal, Süreç OSGB	Basic HSE	03-04.11.2016, 10.04.2017 and 21.07.2017
4	Ümit Tanrıverdi	Ekoglobal, Süreç OSGB	Basic HSE	03-04.11.2016, 10.04.2017 and 21.07.2017
5	Mehmet Ali Sarı	İLK DOST	Basic HSE	13/11/2017
6	Mesut Açıık	İLK DOST	Basic HSE	19/12/2017
7	Mehmet Selvi	İLK DOST	Basic HSE	13/11/2017
8	Ömer Özder	İLK DOST	Basic HSE	28/06/2017 04/05/2017 21/07/2017 and 21.06.2018
9	Levent Ömür Kavuncu	İLK DOST	Basic HSE	28/06/2017 and 14/07/2017
10	Volkan Başkaya	İLK DOST	Basic HSE	28/06/2017 and 14/07/2017

#	Attendee	Provided By	Subject	Date
1	Ahmet Gök (left work)	Ekoglobal, Süreç OSGB	Basic HSE	03-04.11.2016, 10.04.2017 and 21.07.2017

As it can be noticed from the table above, only Fatih Tanrıverdi (security staff) has not have HSE certificate since his start date of work is 06.04.2018 (start date of work document is shared with DOE). He is included in the staff list given in parameter "Quantitative employment and income generation" which belongs to June 2018. In fact, Fatih Tanrıverdi has stated to work instead "Ahmet Gök" (ex-security staff) who left work before April, 2018. HSE certificate information of Ahmet Gök is given above separately since he was the staff of project in the period of IV. Monitoring. Related certificates is also shared by DOE. In addition, Fatih Tanrıverdi will receive the HSE certificate to be realized as soon as possible.

Future Target for Parameters		Staff will be given necessary trainings Possible Training subjects are listed below: • ISO 9000:2008 Quality Management System • ISO 14001 Environment Management System and OHSAS 18001 Health and Safety Management System • Analysing and Assessment of Risk • Fire extinguishing The project owner holds the right to schedule or re-structure the trainings programme.
Way of Monitoring	How	Through review employment records and training documents/certificates
	When	Yearly
	By Who	Project owner

Indicator		3. Balance of payments and investment
Mitigation measure		Not required
Chosen Parameters		Currency saving due to avoided fuel import
Current Situation of the Parameters		In 2012, about 23.09 bn m³ natural gas been used³ for about 104,499.2 GWh electricity generation⁴ and about € 5.1 bn has been spent.⁵ During this monitoring period, about 22.020 million m³ NG has been saved which corresponds to around 4,864.705 million €.
Future Target for Parameters		An amount of natural gas is expected to be avoided which corresponds to \$ 4.4 million annually.
Way of Monitoring	How	Through comparing electricity generated by Gunaydin WPP and natural gas that would be used to produce the same amount of electricity according to baseline scenario.
	When	Yearly
	By Who	Project owner

Indicator		4. Water quality and quantity
Mitigation measure		Mitigation measure is not required
Chosen Parameters		Disposal of the wastewater
Current Situation of the Parameters		Waste water is kept and stored under confined conditions and disposed in line with the regulations. Accumulated waste water was removed by an authorized company on 20/12/2017, 23/02/2018, 11/05/2017, 06/09/2017 28/09/2016 and 06/02/2017 in this monitoring period
Future Target for Parameters		Disposal of wastewater as required by the relevant regulations

³ <http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/yak%C4%B1t49-54/50.xls>

⁴ [http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/uretim%20tuketim\(24-48\)/43\(06-14\).xls](http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/uretim%20tuketim(24-48)/43(06-14).xls)

⁵ BOTAS natural gas price and TCMB exchange rate for 12/2011 have been used in the calculations.

Way of Monitoring	How	Assessing disposal methods during site visits and checking waste disposal records.
	When	Annually
	By Who	Project Owner

Indicator	5. Soil Condition	
Mitigation measure	No mitigation measure is required	
Chosen Parameters	Amount of non-hazardous solid wastes during construction and operational phases. Appropriate management of all waste in line with regulations	
Current Situation of the Parameters	Wastes are being handled as per the regulations. Regular disposals or recycling practices are applied.	
Future Target for Parameters	Recyclable and non-recyclable wastes will be stored temporarily and will be disposed by the Manyas Municipality. Excavated soil will be used for landscaping.	
Way of Monitoring	How	Site visit and checking waste disposal records.
	When	Annually
	By Who	Project Owner and expert

Indicator	6. Access to affordable and clean energy services	
Mitigation measure	No mitigation action is required for this indicator.	
Chosen Parameters	Fossil fuel replaced	
Current Situation of the Parameters	22.020 bn m ³ natural gas been avoided comply with 99.656 GWh electricity generation for 23 months of this monitoring period (11.488 bn m ³ natural gas for 12 month basis).	
Future Target for Parameters	Approximately consumption of 12.26 million m ³ of natural gas is expected to be avoided as it was stated in registered passport yearly.	
Way of Monitoring	How	Through comparing electricity generated by proposed project and natural gas that would be used to produce the same amount of electricity by a thermal power plant
	When	Yearly
	By Who	Project Owner

Indicator		7. Quantitative employment and income generation																																							
Mitigation measure		Mitigation measure is not required																																							
Chosen Parameters		Payments made to staff																																							
Current Situation of the Parameters		Currently 11 personnel are employed by MANRES.																																							
		<table><tr><th>No</th><th>Name of Personnel</th><th>Social Security No</th></tr><tr><td></td><td></td><td></td></tr><tr><td>1</td><td>Mesut Aık</td><td>12907735138</td></tr><tr><td>2</td><td>Mehmet Ali Sarı</td><td>13195710906</td></tr><tr><td>3</td><td>Mehmet Selvi</td><td>15721640916</td></tr><tr><td>4</td><td>Salih Bircan</td><td>21028451216</td></tr><tr><td>5</td><td>Mehmet Senevren</td><td>21856457480</td></tr><tr><td>6</td><td>Levent mr Kavuncu</td><td>25613432512</td></tr><tr><td>7</td><td>mer zder</td><td>35347409926</td></tr><tr><td>8</td><td>Yalın Bařaran</td><td>27283255644</td></tr><tr><td>9</td><td>mit Tanrıverdi</td><td>26479282426</td></tr><tr><td>10</td><td>Volkan Bařkaya</td><td>37645768422</td></tr><tr><td>11</td><td>Fatih Tanrıverdi</td><td>26476282580</td></tr></table>	No	Name of Personnel	Social Security No				1	Mesut Aık	12907735138	2	Mehmet Ali Sarı	13195710906	3	Mehmet Selvi	15721640916	4	Salih Bircan	21028451216	5	Mehmet Senevren	21856457480	6	Levent mr Kavuncu	25613432512	7	mer zder	35347409926	8	Yalın Bařaran	27283255644	9	mit Tanrıverdi	26479282426	10	Volkan Bařkaya	37645768422	11	Fatih Tanrıverdi	26476282580
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10	Volkan Bařkaya	37645768422																																							
11	Fatih Tanrıverdi	26476282580																																							
Future Target for Parameters		Project will create new job opportunities compared to baseline scenario																																							
Way of Monitoring	How	Through evaluation documents for wages paid and social security documents.																																							
	When	Yearly																																							
	By Who	Project owner																																							

Indicator		8. Other Pollutants
Mitigation measure		Mitigation measure is not required. All turbines are located at a setback distance from any homestead considering noise criteria levels as described in latest passport.
Chosen Parameters		Level of noise
Current Situation of the Parameters		During the site visit, locals were interviewed to receive their comments about the level of noise caused by the project activity. As per the locals' opinions, it has been informed and confirmed that stakeholders have no complaints about noise pollution. Moreover, log book was checked and there were no negative comments about the project on the book.
Future Target for Parameters		Project will continue to be operated without causing any noise disturbance.
Way of Monitoring	How	By conducting surveys/interviews with the nearby residents to ensure that there are no concerns with respect to the noise from project activities.
	When	Yearly
	By Who	Project owner

Appendix 3. Summary of Post Registration Changes

GS1178-10 MW Gunaydin WPP Capacity Extension Memo

MANRES Elektrik Üretim A.Ş. (subsidiary of Fina Enerji Holding A.Ş.) built 12.5MWm and 10MWe capacity wind farm in Balıkesir Province of Turkey in 2012. Gunaydin WPP has been commissioned in November 2012. Fina Enerji now proposes to expand the capacity of Gunaydin WPP by building an additional 10MWe capacity, using 3 new wind turbines. Total installed capacity of the project will be 20MWe and the project is expected to generate a net electrical energy of 55.5 GWh annually. Hence, expected annual emission reduction will increase from 22,020 tCO₂ to 33,300 tCO₂ per year. The generated electricity will be fed to the Mustafa Kemal Pasa transmission center through a 34.5 kV overhead transmission line. Fina Enerji has acquired a “49-year electric power generation license” for the Gunaydin WPP.(License No. EÜ/3490-17/2141, dated November 11, 2011) from the Energy Market Regulatory Authority (EMRA). Fina Enerji has applied to EMRA on November 29, 2012 for the revision of the existing generation license for the proposed extension project.

A project description report, as required by the Turkish EIA Regulation was prepared and submitted to Balıkesir Provincial Directorate of Environment and Urbanization and the project had secured an “EIA not required” decision on March, 2009 for the initial phase of the project. Since the extension project is below the limits applied by the regulations in terms of total added capacity and number of turbines, it is also not subject to EIA procedures as per the decision taken by the same authority (decision dated March 05, 2014).

An Environmental and Social Impact Assessment (ESIA) report is prepared to identify the potential environmental and social impacts of the Project on the local environment and community during construction, operation and decommissioning of the turbines. The ESIA also aims to provide mitigation measures to eliminate potential adverse impacts and propose a management and monitoring plan. As per the GS requirements, this memo has been prepared to indicate the changes in design and discuss their impacts on relevant aspects of the project.

- a. **Additionality:** The project uses the same project site with the initial phase. Additionality has to be re-assessed for the proposed project as the design change involves capacity addition and an increase in total energy generation. In the registered project investment analysis was used to demonstrate additionality. For the initial phase of the project the equity IRR was calculated as 11.57%. In order to demonstrate the additionality after the capacity addition same method was used and updated version of the additionality tool was applied (Tool for the demonstration and assessment of additionality”, Version 07.0.0). The analysis has been performed using the references and data obtained from the Energy Assessment Report prepared by “GL Garrad Hassan”. The analysis yielded an overall equity IRR of 12.00% for the whole project after the capacity edition which is still below the benchmark equity of 15.00% determined by the World Bank for similar projects. Below is a summary of financial indicators.

Table 5: Comparison of Financial Indicators

Parameters	Unit	Initial Project	Final Design
Installed Capacity	MWe	12.5	20.0
Grid Connected output	MWh	36.7	55.5
Capital Investment	Million \$	18.6	27.9
Income tax rate	%	20	20
Expected Tariff	\$ Cents/kWh	7.3	7.3
Expected VERS price	\$/ tons CO ₂ e	6.5	6.5
Operation & Maintenance Cost	\$/Year	680	897
Equity IRR	%	11.57	12.00

- b. **Scale of the project:** Project capacity is extended to 20MWe from 10MWe. Therefore, as per the GS Requirements the scale of the project is changed to “Large” from “Small”. In the final design (after the capacity addition) the project is classified as a large scale project as the total installed capacity exceeds 15MWe threshold.
- c. **Applicability of methodology:** The project was registered using a large scale methodology (ACM0002: Grid-connected electricity generation from renewable sources), therefore no change in the applied methodology is required. Applied tools that the methodology refers and the version of the methodology is updated to the most recent versions available in the GS PDD and GS Passport which are prepared after the design change. Emission factor is assumed to remain the same over the first crediting period, therefore no changes are made.
- d. **Stakeholder feedback on design change:** Proposed project is a WPP capacity addition by means of numbering up the wind turbines. Three additional wind turbines are planned to be commissioned however the project will use the same site which is already designated for the project activities. Even though the extension project does not involve spreading into new sites, a physical stakeholder feedback meeting was arranged on 31/10/2013 in the Yaylakoy Village, where is the closest settlement to the project site. The meeting was held as per the GS Requirements and concluded positively since the locals were content with the project activities and their comments were taken into account by the project owner.
- e. **Sustainable Development Assessment:** As the scale of the project changes; 12 Sustainable Development (SD) and 11 Safeguarding principles were re-assessed after the capacity addition project. The extension activities involve the implementation of the same technology with an increased number of turbines within the same project site. An Environmental and Social Impact Assessment (ESIA) report is prepared to identify the potential environmental and social impacts of the Project on the local environment and community during construction, operation and decommissioning of the turbines. As indicated in the executive summary of the report, project does not expected to have any adverse effects on the society or environment. Therefore no change in the scoring of parameters is required. Also the extension project is below the limits applied by the regulations in terms of total added capacity and number of turbines; hence it is not subject to EIA procedures as per the decision taken by the Balıkesir Provincial Directorate of Environment and Urbanization (decision dated March 05, 2014).
- f. **Sustainable Development Monitoring Plan:** The extension project is the implementation of the same technology with an increased capacity; therefore no change is required in terms of monitoring plan. Same procedures will be applied in order to monitor the outputs of the extension turbines (i.e. same electrical meters, same transmission line) Stakeholder feedbacks revealed that the locals are happy with the project activities and they are aware of the importance of such investments both for the regional and national economy. Stakeholder comments and discussion of SD indicators are given in the relevant sections of GS PDD and GS Passport which are prepared after the capacity addition proposal.
- g. **Legislation:** Since the proposed project involves a change in capacity and output energy associated with it, the company had to apply for a revision in the legal generation license. Fina Enerji has applied to EMRA on November 29, 2012 for the revision of the existing generation license for the proposed extension project. The application was concluded positively and the amended license has been issued. Balıkesir Provincial Directorate of Environment and Urbanization had issued an “EIA not required” decision on March, 2009 for the initial phase of the project. Since the extension project is below the limits applied by the regulations in terms of total added capacity and number of turbines, it is also not subject to EIA procedures as per the decision taken by the same authority (decision dated March 05, 2014).

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		