Monitoring report form for CDM project activity
(Version 06.0)

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT		
Title of the project activity	Oaxaca III Wind Energy Project	
UNFCCC reference number of the project activity	5676	
Version number of the PDD applicable to this monitoring report	02	
Version number of this monitoring report	06	
Completion date of this monitoring report	27/10/2017	
Monitoring period number	Second monitoring period	
Duration of this monitoring period	01/02/2014 - 31/08/2017	
Monitoring report number for this monitoring report	01	
Project participants	CE Oaxaca Tres S. de R.L. de C.V.	
Host Party	Mexico	
Sectoral scopes	Sectoral Scope 1- Energy industries (renewable-/non-renewable sources).	
Applied methodologies and standardized baselines	ACM0002 version 12.1.0 – Consolidated methodology for grid-connected electricity generation from 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
	0	735,456
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	810,811	

SECTION A. Description of project activity

A.1. General description of project activity

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The objective of the project activity is the construction of a wind farm; the renewable energy is provided to the Mexican grid system and therefore results in the greenhouse gas (GHG) emissions reduction because in the absence of the project activity the power would have been generated by the Mexican grid system which depends mainly upon fossil fuels usage.

The Oaxaca III Wind Energy Project has a capacity of 102 MW, comprising 68 turbines generators, each with a capacity of 1.5 MW. The project was expected to generate approximately 399,228 MWh per year. This electricity is sold to the CFE.

- Brief description of the installed technology and equipment

Item	Oaxaca III Wind Energy Project
Unit	Acciona
Model	AW-1500
Individual capacity (MW)	1.5 MW
Number of turbines	68
Total Capacity	102 MW

A fixed crediting period of 10 years has been selected for the project, which lasts from March 9 2012 to March 8 2022.

The project has been registered with UNFCCC as a CDM project activity under article 12 of the Kyoto protocol. Submission of monitoring report and subsequent verification has been required mandatory by UNFCCC for issuance of Certified Emission Reductions (CERs) credits.

The monitoring period covered under the report is extending from *February 1, 2014 to July 31, 2017* including both days.

At the end of the first verification period **1,266,936 MWh** of electricity were produced and sent to the grid. Therefore, the total amount of reduced emissions is **735,456 tCO2e.**

A.2. Location of project activity

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The project is located in Juchitán de Zaragoza Municipality, windy region, in the Isthmus of Tehuantepec, state of Oaxaca, Mexico.

The project activity is established between the following coordinates 94° 50’ 17.80’’W and 16° 34’ 23.66’’ N and 94° 49’ 4.90’’ W and 16° 31’ 58.97’’ N (decimal coordinates: 16.57323858 latitude and -94.83827748 longitude; and 16.53304681 latitude and -94.81802829 longitude).

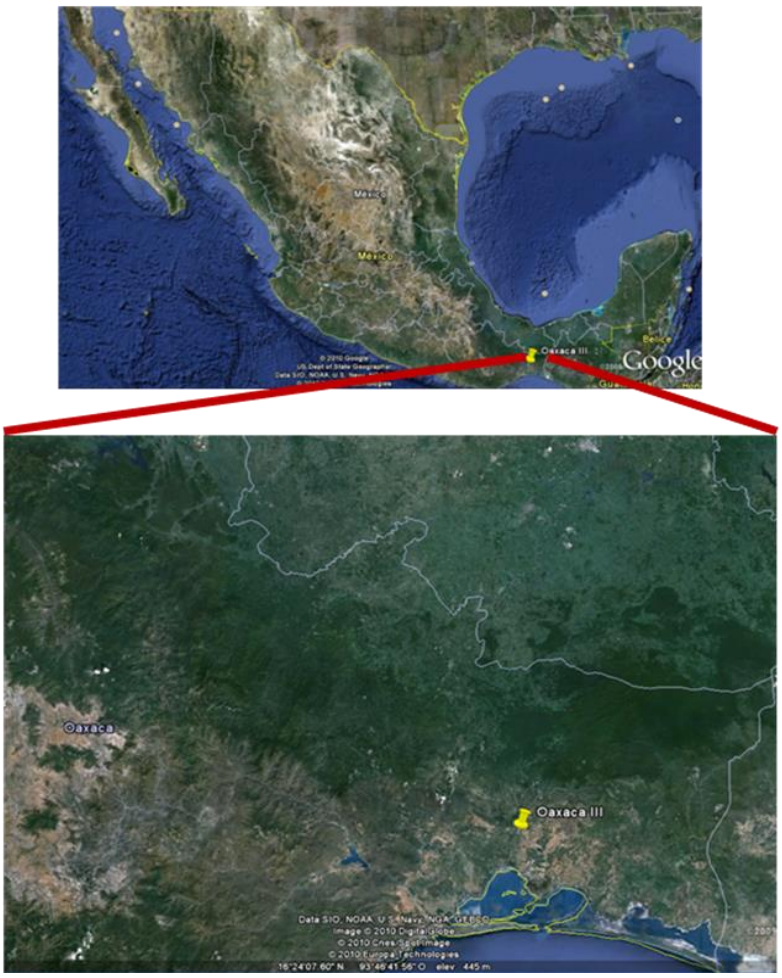

Figure 1. Localization of the project activity.

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Mexico (host Party)	CE Oaxaca Tres S. de R.L. de C.V. (Private entity)	No

A.4. Reference to applied methodologies and standardized baselines

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For this project, the baseline and monitoring methodology applied is the following: Consolidated methodology for grid-connected electricity generation from renewable sources (ACM0002 ver. 12.1.0).

This methodology also refers to the approved versions of the following tools

- Tool to calculate the emission factor for an electricity system (ver 0.02.2.1)
- Tool for the demonstration and assessment of additionality (ver. 05.2)
- Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (ver.02)

A.5. Crediting period type and duration

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A fixed crediting period of 10 years has been selected for the project. The project activity crediting period covers from March 09 2012 to March 08 2022, including both days.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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The project start date is the date when CE Oaxaca Tres S. de R.L. de C.V. won the CFE tender by the award of contract. This was on March, 8th 2010.

The operation of the 102 MW started on 30/01/2012 and the project activity is expected to have a minimum lifetime of 20 years from starting date; this is, until the year 2032.

The general characteristics of the project activity are resume in the next table:

Total Power	102 MW
Rated Power per turbine	1.5 MW
Cut in-cut-out wind	4 / 25 m/s
No. of turbines	68
Equivalent annual operating hours	3,914
Annual Production	399,228 MWh
Capacity factor	44.68%
Transmission line length	23.2 km
Transmission line Voltage	230 kV

Table 1. *Power plant characteristics*

AW – 1500 is a wind turbine fabricated by Acciona, a company with 20 years' experience of leadership in the sector, with 8,913 MW of renewable installed capacity, of which more than 7,000 MW installed correspond to wind power.

The AW-1500 is a 1500 kW power-rated horizontal shaft wind turbine, with three blades, variable speed, 12 kV rated voltage and frequency of 60 Hz.; Certified by Germanischer Lloyd (GL) for a wide range of wind types. The turbine is cover made of fiberglass-reinforced polyester that protect of weather inclemency.

The wind turbine has control software for monitoring and automatically managing the operation. A double-fed asynchronous generator of IGBT's (PMW) improves voltage and frequency stability, supplies reactive power to the grid when required and operates the power factor in inductive or capacitive power as required.

The line to be connected to the Federal Electricity Commission ("Comisión Federal de Electricidad", CFE) transformer will be a 230 kV and 23.2 km long line, running from the wind farm control house to the CFE transformer located in the Ixtepec substation.

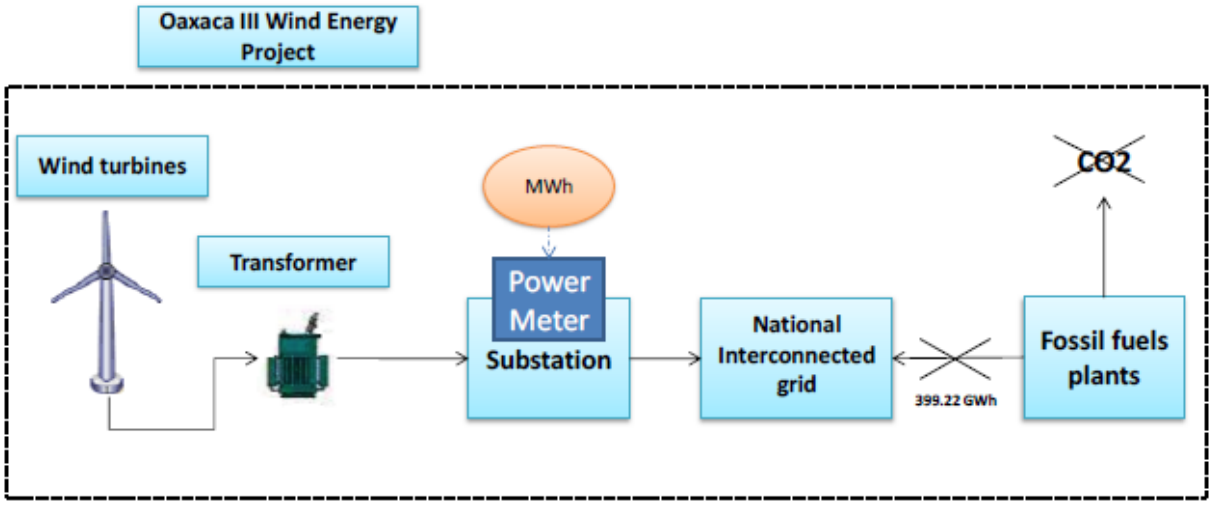

Figure 2. *Project Boundary*

Relevant dates for the project activity

Date	Event
08/03/2010	Date when CE Oaxaca Tres S. de R.L. de C.V. won the CFE tender by the award of contract.
08/04/2012	Date when CE Oaxaca Tres S. de R.L. de C.V. signed the PPA with CFE.
13/05/2010	Date when the Regulatory Energy Commission (CRE) gave the Independent Production permit.
15/07/2010	Start of the construction of Oaxaca III Wind Energy Project.
30/01/2012	Commissioning date of the project activity Oaxaca III Wind Energy Project .
09/03/2012	CDM Registration date of the project activity .

Events or situations which may impact on the applicability of the methodology
To date it has not happened any situation or event that affects or impacts the applicability of the methodology.

B.2. Post-registration changes

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

B.2.2. >>

N/A

B.2.3. Corrections

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N/A

B.2.4. Changes to the start date of the crediting period

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N/A

B.2.5. Inclusion of monitoring plan

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N/A

B.2.6. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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N/A

B.2.7. Changes to project design

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N/A

SECTION C. Description of monitoring system

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The monitoring consists mainly in using a power meter equipment to record the energy generated by the wind farm. All relevant data is collected continuously and stored during the whole crediting period.

The monitoring of the power generation from the project is done through monthly invoices which are sent at the beginning of each month by CFE. This data registers the energy generated by the project activity that is measured from the power meter located in the wind farm.

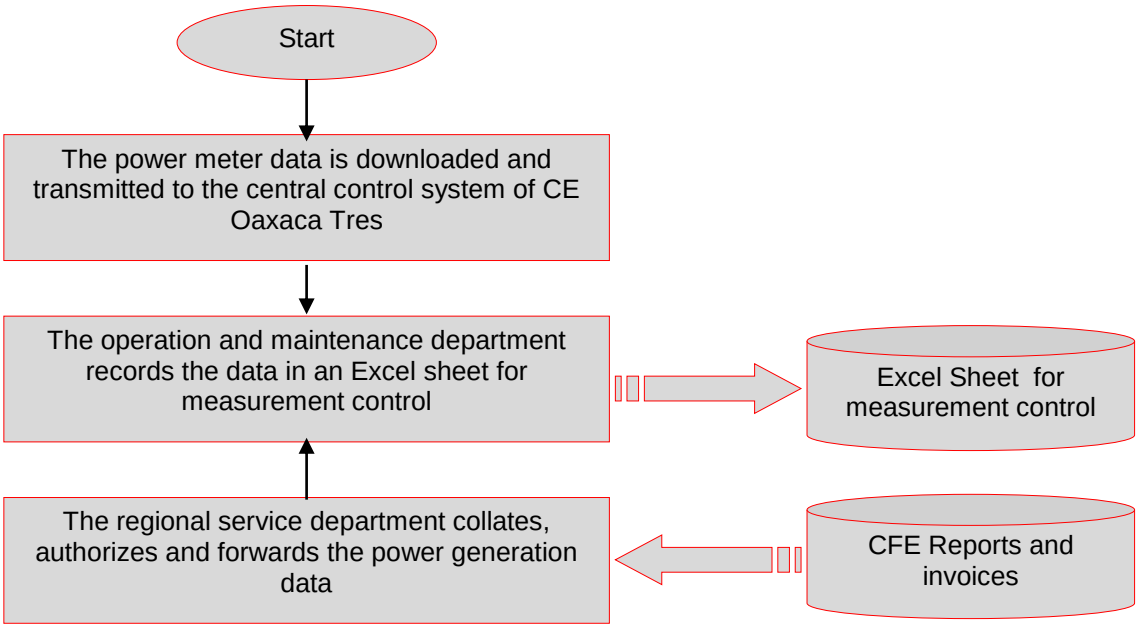


Figure 3. Diagram of Generated Electricity Monitoring System

The information related to the power meters equipment calibration is included in the following table:

Calibration Certificate

Equipment code	Equipment	Calibration Entity[1]	Calibration Certificates	Calibration Frequency	Calibration Dates
MT-1011A461-01	Main power meter Ixtepec Substation	LAPEM	20131847	Yearly	03/09/2013
			20141848	Yearly	26/08/2014
			20151392	Yearly	12/08/2015
			20161419	Yearly	26/07/2016

[1] CFE hired the Company LAPEM (Laboratorio de Pruebas de Equipos y Materiales); all the calibration certificates are delivered to the DOE.

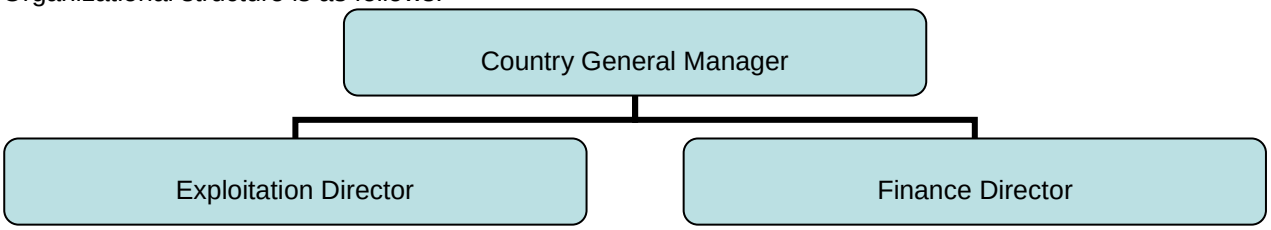
			20171330	Yearly	27/06/2017
MT-1011A562-01	Backup power meter Ixtepec Substation	LAPEM	20131848	Yearly	03/09/2013
			20141849	Yearly	26/08/2014
			20151393	Yearly	13/08/2015
			20131848	Yearly	26/07/2016
			20171331	Yearly	27/06/2017

The information is transmitted every 5 minutes to CFE central units.

In case the main meter(s) is found to be operating outside the permissible limits, the main meter will be either replaced or calibrated immediately. Whenever a main meter goes defective, the consumption recorded by the backup meter will be referred.

a) Roles and Responsibilities:

Organizational structure is as follows:



Responsible	Responsibility and competences
Country General Manager	Responsible for overseeing the CDM process
Exploitation Director	Responsible for monitoring, recording, reporting and archiving measured data. Responsible for checking data with the receipt of sales. Responsible for corrective and preventive actions
Finance Director	Responsible for performing the emission reduction calculations based on methodology and preparing the Monitoring Report as appropriate. Responsible for internal audit

Measuring and cross-check procedure.

Measuring. The person(s) responsible obtains the electricity generation information from the meters installed in the Ixtepec substation on a monthly basis, and reports them in the spreadsheet designed for measurement control and stores the data electronically.

Calculation of energy generation to be monitored. Oaxaca III Wind Farm has two CFE certified meters (1 main, 1 backup) in Ixtepec Substation; the meters in Ixtepec Substation are property of CFE.

Cross-check of net electricity supplied to the grid with receipt of sales: Net electricity supplied to the grid measured at the substation is cross-checked with receipts of sales.

If there is a mismatch, the person(s) responsible will solve it with CFE, explaining the discrepancy detected the origin of deviations and the corrective actions taken and file the evidence.

Quality control (QC) procedures and quality assurance procedures (QA).

1. Monitoring equipment
   a) Monitoring equipment is set up as per Mexican law and/or PPA.
   b) Monitoring equipment is authorized through a certificated formal process.
   c) After set up monitoring equipment is calibrated by CFE periodically as determined by the Mexican Law and/or PPA, and checked as necessary by CFE for accuracy.

2. Corrective and preventive actions are followed and properly documented.

Monthly hourly readings for main and check meters are stored in Excel sheets. Corrective and preventive actions have been made as per provision in CDM manual.
Internal audit will be done periodically as decided by management.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**$EF_{grid,CM,y}$**
Unit	tCO_2/MWh
Description	Baseline Emission factor of the Mexican Grid (calculated ex-ante)
Source of data	Registered PDD
Value(s) applied	0.5805 tCO_2/MWh
Choice of data or measurement methods and procedures	The data are used for Baseline emission calculations The value was calculated as per the “Tool to calculate the emission factor for an electricity system ver.02.2.1”
Purpose of data/parameter	Calculation Baseline Emissions
Additional comments	NA

D.2. Data and parameters monitored

Data/Parameter	**$EG_{facility,y}$**
Unit	MWh/yr
Description	Quantity of net electricity generation supplied by the project plant to the grid in year y
Measured/calculated/ default	Measured
Source of data	Energy Meters Installed in Ixtepec Substation

Value(s) of monitored parameter	1,266,936 MWh
Monitoring equipment	Main power meter and Backup power meter in Ixtepec Potencial Substation Type: Bidirectional Accuracy class: 0.2% Basic Serial number: MT-1011A461-01/ MT-1011A562-01 Calibration frequency: Annually Calibration dates: 03 September 2013, 26 August 2014, 12 August 2015, 26 July 2016 and 27 June 2017 Validity: 27 June 2018
Measuring/reading/recording frequency	Measurement equipment: Power meters Measuring: Continuos, with report every 5 minutes Recording: Monthly
Calculation method (if applicable)	N/A
QA/QC procedures	This data is directly used for calculation of emissions reduction. The metering equipment is properly calibrated and checked periodically for accuracy, to ensure that any error resulting from such equipment does not exceed +0.2% of full-scale rating. To guarantee QA/QC it is double checked by receipt of electricity sales.
Purpose of data/parameter	Calculation Baseline Emissions
Additional comments	

D.3. Implementation of sampling plan

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N/A

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

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Baseline emissions are CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due the project activity. In order to obtain those emissions it is necessary to calculate and emission factor *ex-ante*, which is the result from an Operative Margin and a Build Margin emission factor. As it is explained in the PDD, the results for these margins are obtained using the following formulas.

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}}{\sum_{j} GEN_{j,y}}$$

Where:

$EF_{OM,y}$ = Operative margin CO_2 emissions factor in year *y* (tCO_2/MWh)

$F_{i,j,y}$ = Consumption of fuel i (in TJ) by fuel sources j in year y.

$COEF_{i,j,y}$ = CO2 emission coefficient of fuel i in tCO_2/TJ.

$GEN_{j,y}$ = Electricity in MWh delivered to the grid by the j source.

j = Refers to the power sources delivering electricity to the grid, not including low-operating cost and must run power plants, and including imports to the grid.

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \times COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$

Where:

$EF_{BM,y}$ = Build margin CO_2 emissions factor in year *y* (tCO_2/MWh)

$F_{i,m,y}$ = Consumption of fuel i (in TJ) by fuel sources m in year y.

$COEF_{i,m,y}$ = CO2 emission coefficient of fuel i in tCO_2/TJ.

$GEN_{j,y}$ = Electricity in MWh delivered to the grid by the j source.

m = Refers to the power units included in the build margin.

Once determined these coefficients, the emission factor can be calculated using the formula:

$$EF_{grid,CM,y} = w_{OM} \times EF_{OM,y} + w_{BM} \times EF_{BM,y}$$

The values used for w_{OM} and w_{BM} are indicated by the methodology for wind farm projects.

The emission factor for the grid is finally calculated and there is no need to update it during the project crediting period. The grid emission factor value obtained was 0.5805 tCO_2/MWh.

To conclude this section, using the value mentioned before it is possible to calculate the baseline emissions in one year.

$$BE_y = EG_{facility,y} \times EF_{grid,CM,y}$$

Where:

BE_y = Baseline emissions in year *y* (tCO_2)

$EG_{facility,y}$ = Net electricity generated and delivered to the grid as a result of the implementation of the CDM project activity in year *y* (MWh).

$EF_{grid,CM,y}$ = Emission factor for the grid (tCO_2 / MWh)

Emission Reductions Oaxaca III Wind Energy Project			
PERIOD	$EG_{facility,y}$	Receipt of Sales	Minimum Value
FEBRUARY 2014	32,638	32,638	32,638
MARCH 2014	25,961	25,961	25,961
APRIL 2014	25,112	25,112	25,112
MAY 2014.	27,185	27,185	27,185
JUNE 2014	10,535	10,535	10,535
JULY 2014	46,490	46,490	46,490
AUGUST 2014	29,696	29,696	29,696
SEPTEMBER 2014	14,835	14,835	14,835
OCTOBER 2014	26,778	26,778	26,778
NOVEMBER 2014	40,621	40,621	40,621
DECEMBER 2014	53,946	53,946	53,946
JANUARY 2015	57,531	57,531	57,531
FEBRUARY 2015	41,424	41,424	41,424
MARCH 2015	41,351	41,351	41,351
APRIL 2015	17,556	17,550	17,550
MAY 2015.	20,504	20,504	20,504
JUNE 2015	30,396	30,396	30,396
JULY 2015	32,030	32,030	32,030
AUGUST 2015	32,531	32,531	32,531
SEPTEMBER 2015	16,449	16,449	16,449
OCTOBER 2015	24,586	24,586	24,586
NOVEMBER 2015	44,612	44,612	44,612
DECEMBER 2015	30,258	30,258	30,258
JANUARY 2016	42,519	42,519	42,519
FEBRUARY 2016	45,653	45,653	45,653
MARCH 2016	20,046	20,046	20,046
APRIL 2016	25,926	26,044	25,926
MAY 2016.	14,267	14,267	14,267
JUNE 2016	16,388	16,388	16,388
JULY 2016	30,164	30,261	30,164
AUGUST 2016	19,505	19,505	19,505
SEPTEMBER 2016	20,444	20,444	20,444
OCTOBER 2016	41,490	41,490	41,490
NOVEMBER 2016	50,721	50,721	50,721
DECEMBER 2016	42,778	42,778	42,778
JANUARY 2017	29,524	29,524	29,524
FEBRUARY 2017	28,700	28,700	28,700
MARCH 2017	44,041	44,041	44,041
APRIL 2017	25,531	25,508	25,508
MAY 2017.	7,492	7,528	7,492
JUNE 2017	4,851	5,143	4,851
JULY 2017	34,111	33,895	33,895
TOTAL			1,266,936

$EG_{facility,y}$	1,266,936	MWh
$EF_{grid,CM,y}$	0.5805	tCO_2/MWh
Baseline emissions	735,456	tCO_2

Reductions up to 31/12/2012		tCO_2
Reductions from 1/1/2013	735,456	tCO_2

BE_y = (1,266,936 MWh)*(.5805 tCO_2/MWh) = 735,456 tCO_2

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

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Oaxaca III Wind Energy Project is a renewable source of electricity generation and doesn't involve the use of fossil fuel for the energy production. Consequently, there are not emissions related to the activity of the project.

$$PE_y = 0\ tCO_2e$$

E.3. Calculation of leakage emissions

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For this kind of projects, the main emissions potentially giving rise to leakage are emissions due to activities such power plant construction and upstream emissions from fossil fuel (e.g. extraction, processing, and transportation). As a result these emissions sources are neglected and a zero emission leakage is considered for the project.

$$LE_y = 0\ tCO_2e$$

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

Using the values obtained before, the total amount of reduced emissions is calculated as follows:

$$ER_y = BE_y$$

Where:

ER_y = Reduced emissions in year *y* (tCO_2e)

BEy = Baseline emissions in year *y* (tCO_2)

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	735,456	0	0	0	735,456	735,456

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_2e)	Amount estimated ex ante (t CO_2e)
735,456	810,811

E.6. Remarks on increase in achieved emission reductions

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The actual emission reductions achieved during the current monitoring period is below the total estimated in the registered PDD. The main reasons from the variations are directly to the wind conditions during the monitoring period that reduces the electricity generation. The emission reductions of this monitoring period are 9.29% lower than the emission reductions that appear in the registered PDD.