MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

1.1 CONTENTS

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 01
09/04/2012
Bii Nee Stipa
Reference number: 0107
1st monitoring period (31/12/2008-31/08/2011)

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

>>
The project is a wind farm located in Juchitán de Zaragoza council, Oaxaca State, Mexico, which consists of three phases with a total capacity of 170.35 MW[1]. The first phase of the project, for which this monitoring report is made, involves the installation of a capacity of 26.35 MW. Specifically, this first phase of the wind farm consists of 31 turbines of 850 kW of capacity, which are expected to generate approximately 99.10 GWh per year which are going to be sold to a partner in a self-supplying scheme.

The project helps to reduce GHG emissions generated from the fossil-fuel based Mexican power generation. Also, it contributes to sustainable development in the region by reducing pollution, creating employment opportunities, giving an income to land owners and improving the living standard of local people. At a larger scale, the project assists Mexico in stimulating and accelerating the commercialization of grid-connected renewable energy technologies and markets.

The starting date of the Project was February 2008, when the technology supply contract was signed. This first 26.35 MW phase of the project started its operation in April 1st 2010. The expected technical lifetime of the Project is 20 years, as stated in the registered PDD.

This Monitoring Report is made for the 1st phase of monitoring period, which is from December 31st 2008 to August 31st 2011. The total emission reduction achieved in this monitoring period is of **57,066 tCO_2e.**

A.2. Project Participants

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The project participants of the project are shown next:

[1] Project capacity has been modified after being registered: the original project was of 200 MW of capacity, divided into a first 50 MW phase, a second 50 MW phase and a third phase of 100 MW.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Spain	Gamesa Energía S.A.	No
Mexico	Zopiloapán	No
Mexico	STIPA NAYAA, S.A. de C.V.	No

Table 1. Project participants.

A.3. Location of the project activity:

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The project is located in La Ventosa area, in Juchitán de Zaragoza Council, Tehuantepec Isthmus, in the Pacific Coast of Oaxaca State, Mexico.

Figure 1. Wind Farm Location

The UTM coordinates (WGS84) of the wind turbines of the project are the following ones:

Nº. (*)	Easting (m)	Northing (m)
D1	289410.53	1832030.30
D2	289541.10	1832055.68
D3	289668.73	1832080.49
D4	289796.36	1832105.30
D5	289925.57	1832130.42
D6	290035.34	1832148.01
D7	290197.05	1832181.09
D8	290332.02	1832183.46
D9	290452.27	1832218.04
D10	290581.79	1832239.93
D11	289842.12	1831550.92
D12	289969.44	1831578.01
D13	290096.80	1831603.61
D14	290224.92	1831628.12
D15	290352.54	1831653.30
D16	290480.28	1831674.97
D17	289916.74	1831043.34
D18	290045.65	1831074.67
D19	290161.05	1831088.76
D20	290307.80	1831166.67
D21	290437.21	1831195.57
D22	290562.46	1831205.24
D23	289864.58	1830419.58
D24	289992.17	1830450.40
D25	290118.36	1830485.43
D26	290244.54	1830510.64
D27	290363.72	1830527.46
D28	290049.14	1829937.16
D29	290181.80	1829937.23
D30	290309.82	1829960.63
D31	290428.08	1829984.60

Table 2. UTM coordinates of the phase I of the project.

A.4. Technical description of the project

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The 1st phase of the project involves the installation of 31 G52 turbines of 850 kW of capacity each one, resulting in a total capacity of 26.35 MW for this phase. These wind turbines are manufactured by the Spanish firm GAMESA, and are three-bladed rotor machines, with a rated voltage of generator of 690 V, assuring optimal performance, maximum output from existing wind resource, robustness and reliability. The output transformer of this phase is of 34.5/115 KV and 25/30 MVA. The line to connect this phase to the grid will be a 115 kV and 4.8 km long line, from the 1st phase of the wind farm control house to the national grid.

Next, a simplified diagram of the 1st phase of the project is shown:

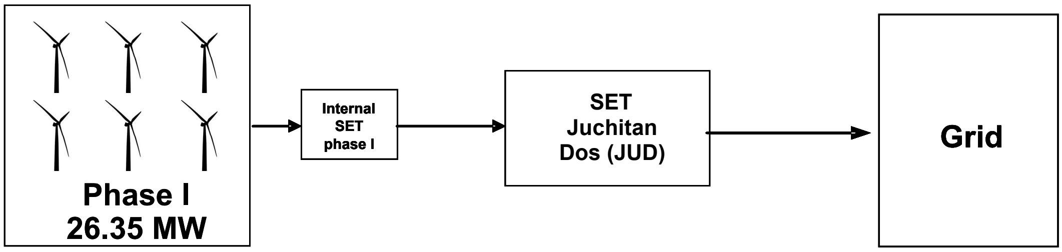

Figure 2. Simplified diagram of the 1st phase of the project.

As it can be seen in **Figure 2**, the electric lines that evacuate the power generation of the wind farm come to a first electrical substation, inside the wind farm perimeter, and then they come to "Juchitán Dos" electrical substation, where the power is finally switched to the grid.

The 2nd phase will consist of 37 G80 wind turbines, with 2 MW of capacity each one (which results in a total capacity of 74 MW for this phase). A 3rd phase is also expected with 20 G87 turbines and 15 G80 turbines, with a total capacity of 70 MW. The commissioning of the second and third phases will be expected for January 1st 2012 and January 1st 2013, and so these two phases have not been generating electricity during this monitoring period.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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At the time when PDD was registered the next documents were available:

- Approved consolidated baseline methodology ACM0002, "*Consolidated methodology for grid-connected electricity generation from renewable sources"*, version 2.
- For demonstrating its additionality, the "*Tool for demonstration and assessment of additionality*", version 1.

However, for the calculation of the emission reductions of the project during the monitoring period, the following more updated tools and methodologies were used:

- Approved consolidated baseline methodology ACM0002, "*Consolidated methodology for grid-connected electricity generation from renewable sources"*, version 12.2.0.
- For the ex-post calculation of the emission factor of the Mexican National Grid, in order to determine the baseline emissions: "*Tool to calculate the emission factor for an electricity system*", version 02.2.1.

A.6. Registration date of the project activity:

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The project was registered as CDM in December 25th 2005 (25/12/2005).

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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The crediting period in the registered PDD is from January 1st 2007 to December 31st 2016 (ten years fixed). Nevertheless, due to a delay in the construction of transmission line and substation by CFE, the evacuation line could not be ready on schedule, and the delay of the starting date of

the crediting period was requested for 2 years. The request for delay was approved and the single 10-year crediting period covers the period from 31/12/2008 to 30/12/2018..

A.8. Name of responsible person(s)/entity(ies):

>>
Responsible person and entity of completing the monitoring report:

Mr. Oswaldo Alvarez García
Market Regulation Dept.
Wind Farm Development & Sales
Gamesa
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E-mail: osalvarez@gamesacorp.com

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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The PDD of the project was registered in December 25th 2005 (25/12/2005). The starting date of the initial crediting period was January 1st 2007 (01/01/2007). Due to a delay in the construction of a transmission line and electrical substation by the CFE, the start of operation of the project was inevitably postponed. Therefore, a delay on the start of the crediting period was requested, in a way that this date was moved from to December 31st 2008 (31/12/2008).

The first phase of the project (for which this monitoring report is made) started its operation in April 1st 2010 (01/04/2010). During the monitoring period no special events or situations which could impact the applicability of the methodology have been detected.

As it was pointed before, the commissioning of the 2nd and 3rd phases of the project will take place in January 2012 and January 2013 respectively. As they are still under construction and have not started to operate, they have not been monitored.

B.2. Revision of the monitoring plan

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There is no revision to the monitoring plan.

B.3. Request for deviation applied to this monitoring period

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There is no deviation applied to the monitoring period.

B.4. Notification or request of approval of changes

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There is no notification or request of approval of changes from the proposed project as described in the registered CDM-PDD.

SECTION C. Description of the monitoring system

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As the Mexican power grid relies on a regulated metering setup established by the Federal Electricity Commission (CFE), which is required for the invoicing of power generation, monitoring will be carried out by CFE and project participant will keep copies of the bills provided by CFE. In those bills, CFE provides the project participant with generation data measured by the main meter located at the sub-station.

Since no leakage is expected from the project activity, the emission reductions will be equivalent to the recorded value monitored by CFE periodically checked meters, according to Mexican standards.

The quality of the net generation (Quality Control and Quality Assurance) is assured by carrying out double measurement by means of a main meter and secondary or back-up meter. These meters are located at the entrance of the electrical substation "Juchitán Dos", for the first phase of the project. The meters location is shown in the next figure:

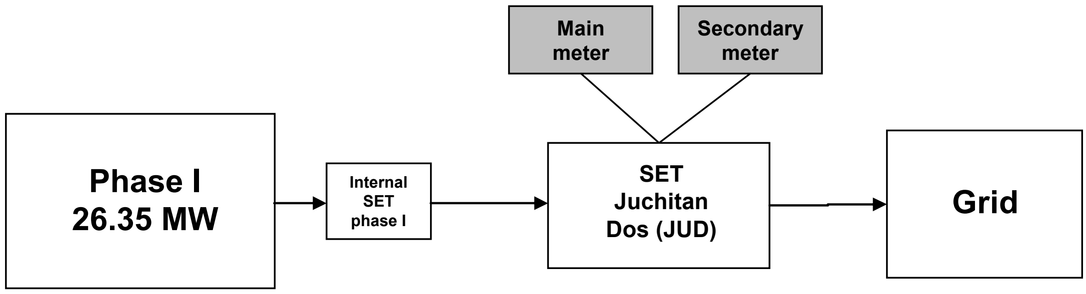

Figure 3. Meters location of the first phase of the project.

<u>Monitoring procedures:</u>

The characteristics of the meters which measure the electricity generation of the farm are shown in the **Table 3**:

METER	TYPE OF METER	SERIES NUMBER	PRECISION CLASS
Main meter (1^{st} meter)	Schneider ION 8600	PT-0903A042-01	0.2
Secondary meter (2^{nd} meter)	Schneider ION 8600	PT-0903A108-01	0.2

Table 3. Series numbers of the meters.

The meters meet all the CFE[2] requirements. Measurements have been made each hour and each quarter hour. The readings of the main meter have been used in the calculations of the emissions reductions (see section E), through CFE bills providing the net amount of electricity provided to the grid.

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[2] *Comisión Federal de la Electricidad,* Federal Comission of Electricity, the Mexican entity which is in charge of the electrical grid operation

Data storage and management:

Data storage and registration is performed by the SCADA-SGIPE system each ten minutes and daily for each turbine.

Data are kept archived during the crediting period and until two years later.

Organisational structure and responsibilities:

The supervisor of Operation and Maintenance of the project will collect CFE bills providing net generation data. Later, the CDM supervisor will write the monitoring report, which will be finally approved by the Bii Nee Stipa Wind Farm manager. The responsible of the calculation of the baseline each year will be the responsible of coordination of CDM projects of Gamesa Energía in Madrid.

The responsibilities structure is shown in the Figure 4:

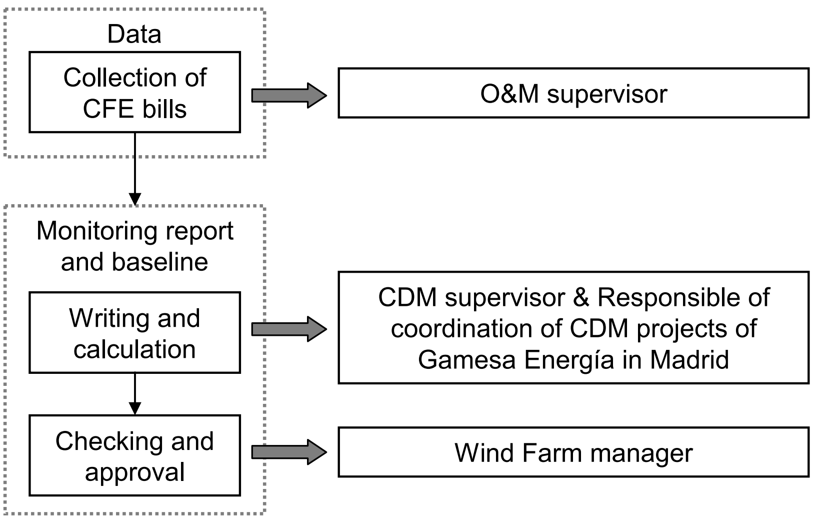

Figure 4. Monitoring responsibilities structure.

Calibration:

Meters were initially calibrated by CFE when they were installed (07/08/2009). An annual calibration has been carried out in both main and secondary meters with positive results. Last calibration was held by CFE on 24/06/2011, showing meters were still working correctly.
CFE is the only responsible and authorised entity to have access to the meters.

Emergency procedure:

Monitoring will be carried out by CFE and project participant will keep copies of the monthly bills which provide net generation supplied to the grid data necessary for calculations.

In the cases of failure of the main meter, back up meter would be used for power generation measurements. If both main and back up meters fail, CFE is expected to carry out a conservative and reliable estimation.

It should be pointed that, from the beginning to the end of the monitoring period, no failure of the meters occurred.

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	W_{OM}
Data unit:	Fraction
Description:	Weight of Operating Margin Emission Factor in the emission factor used for the proposed CDM project activity
Source of data used:	"Tool to calculate the emission factor for an electricity system" (version 02.2.1)
Value(s) :	0.75
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculation
Additional comment:	This is in accordance with the methodology ACM0002 version 12.2.0.

Data / Parameter:	W_{BM}
Data unit:	Fraction
Description:	Weight of Build Margin Emission Factor in the emission factor used for the proposed CDM project activity
Source of data used:	"Tool to calculate the emission factor for an electricity system" (version 02.2.1)
Value(s) :	0.25
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculation
Additional comment:	This is in accordance with the methodology ACM0002 version 12.2.0.

D.2. Data and parameters monitored

Ex-post grid emission factor:

To calculate the ex-post operating margin emission factor, data from the year in which the project generation displaces the grid electricity shall be used. As no data were available for year 2010 at the time of writing the monitoring report, 2009 data were used to calculate the emission factor.

Data / Parameter:	$FC_{i,y}$
Data unit:	TJ/day
Description:	Amount of fossil fuel type *i* consumed in the project electricity system in year 2009
Measured /Calculated /Default:	Calculated
Source of data:	*Prospectiva del Sector Eléctrico 2010-2025*, page 167, graph 56, for 2009 data, published each year by SENER: http://www.sener.gob.mx/res/1825/SECTOR_ELECTRICO.pdf
Value(s) of monitored parameter:	4,613 TJ/day (for 2009), fuel share being: (see table below)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation (OM ex-post emission factor).
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Official national data published by SENER (Energy Secretariat of the Mexican Government) in *Prospectiva del Sector Eléctrico 2010-2025* document.
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Fuel	Share in the total 2009 consumption
Fuel Oil	23.9%
Natural Gas	45.3%
Natural Gas Liquids	12.4%
Diesel	0.9%
Coal	17.5%

Data / Parameter:	NCV_i
Data unit:	kJ/kg
Description:	Net calorific value (energy content) of fossil fuel type *i* in year 2009.
Measured /Calculated /Default:	Default
Source of data:	National Commission for Energy Savings (CONUEE) webpage: http://www.conae.gob.mx/wb/CONAE/CONA_694_a2_tablas_y_figura?page=2 The density of the fuel oil was given as well in this source (0.982 kg/l).
Value(s) of monitored parameter:	(see table below)
Indicate what the data are used for (Baseline/ Project/ Leakage emission	Baseline emission calculations (OM ex-post emission factor).

	NCVi [kJ/kg]
Fuel oil	40,112.1

calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Official national data published by National Commission for Energy Savings (CONUEE).
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	**$EF_{CO2,i,y}$ and $EF_{CO2,m,i,y}$**
Data unit:	tCO_2/TJ, tCO_2/m^3
Description:	CO_2 emission factor of fossil fuel type *i* used in power unit *m* in year 2009
Measured /Calculated /Default:	Default
Source of data:	▪ Mexican National GHG Inventory, 2006, table 1.3.3., page 29 (for coal), given in tCO_2/TJ (http://www.ine.gob.mx/descargas/cclimatico/inf_inegei_energia_2006.pdf) ▪ Mexican Fourth National Communication to the United Nations Framework Convention on Climate Change, table V.8, page 185 (for natural gas, natural gas liquids and diesel), given in tCO_2/TJ (http://unfccc.int/resource/docs/natc/mexnc4s.pdf) ▪ Atmospheric Pollution Emissions Calculation from the Use of Fossil Fuels in the Mexican Electric Sector, table 1, page 10 (for fuel oil): 3.04 tCO_2/m^3 (http://www.bvsde.paho.org/bvsacd/cd47/calculo.pdf).
Value(s) of monitored parameter:	(see table below)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations (OM ex-post emission factor and BM ex-post emission factor)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if	-

Fuel type	**CO_2 emission factor (tCO_2/TJ)**
Fuel oil	77.2
Natural Gas	56.1
Natural Gas Liquids	63.1
Diesel	74.1
Coal	92.7

applicable):	
QA/QC procedures applied:	-

Data / Parameter:	($\eta_{m,y}$) Efficiency power plants
Data unit:	%
Description:	Average net energy conversion efficiency of power unit *m* in year 2009
Measured /Calculated /Default:	Calculated by CFE
Source of data:	Private Communications with IFAI and CFE, which are the most recent data available.
Value(s) of monitored parameter:	Please, see Table 4.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations (Ex-post BM emission factor)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	$EG_{m,y}$ and EG_y
Data unit:	GWh
Description:	In OM calculation (EG_y): net electricity generated and delivered to the grid by all power sources serving the system, not including low cost/must run power plants/units, in year 2009. In BM calculation ($EG_{m,y}$): net quantity of electricity generated and delivered to the grid by power unit *m* in year 2009.
Measured /Calculated /Default:	Measured by SENER
Source of data:	For electricity generated in OM: SENER, "*Prospectiva del Sector Eléctrico 2010-2025*" (table 20, page 117; table 5, page 203). For electricity generated by power units in BM, SENER, "*Prospectiva del Sector Eléctrico 2010-2025*" (table 5, page 203); private information request to IFAI (*Instituto Federal de Acceso a la Información*, Federal Institute of Access to Information) and private communication with CFE.
Value(s) of monitored parameter:	(see table below)
Indicate what the data are	Baseline emission calculations (OM ex-post emission factor and BM

	2009
EG_y (GWh)	174,406
$EG_{m,y}$	See Table 4.

used for (Baseline/ Project/ Leakage emission calculations)	ex-post emission factor)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

	Power plants characteristics					Gross generation (GWh)	Self-use rate (%)	Net generation (GWh)	Accumulated net generation (GWh)	Accumulated net generation (%)
	Name of the power plant	Start of operation	Technology *	Fuel	Installed capacity (MW)					
Additions 2009	San Lorenzo Potencia	30/12/2009	CC	Natural Gas	116	93	5.1%	88	88	0.04%
	San Lorenzo Potencia	30/12/2009	CC	Natural Gas	133	74	0.4%	73	162	0.08%
	San Lorenzo Potencia	30/12/2009	CC	Natural Gas	133	68	0.5%	68	230	0.11%
	Coapa	24/09/2009	GT	Natural Gas	32	50	4.2%	48	277	0.13%
	Santa Cruz	24/09/2009	GT	Natural Gas	32	50	4.2%	48	325	0.15%
	Magdalena	24/09/2009	GT	Natural Gas	32	50	4.2%	48	373	0.17%
	Iztapalapa	20/08/2009	GT	Natural Gas	32	50	4.2%	48	421	0.20%
	Presidente Juárez	15/07/2009	CC	Natural Gas	185					
	Presidente Juárez	12/07/2009	CC	Natural Gas	92					
Additions 2008	Humeros	07/04/2008	GEO	-	5.00	41	1.7%	39	460	0.21%
	Ciudad del Carmen	01/05/2008	GT	Diesel	16.00	21	0.2%	26	487	0.23%
	Ciudad del Carmen	01/05/2008	GT	Diesel	17.00	22	0.2%	22	509	0.24%
Additions 2007	Santa Rosalía	01/10/2007	IC	Diesel	1.60					
	Santa Rosalía	01/10/2007	IC	Diesel	1.60					
	Santa Rosalía	01/10/2007	IC	Diesel	1.60					
	Vallejo (LFC)	09/08/2007	GT	Natural Gas	32.00	170	4.5%	162	670	0.31%
	Holbox	01/07/2007	IC	Diesel	0.80	1	0.0%	1.08	672	0.31%
	Holbox	01/07/2007	IC	Diesel	0.80	2	0.0%	1.99	674	0.31%
	Tamazunchale (PIE)	21/06/2007	CC	Natural Gas	1,135.00			7,903	8,576	4.00%
	Baja California Sur I	11/06/2007	IC	Diesel	41.90					
	El Cajón (Leonardo Rodríguez Alcaine)	01/06/2007	HY	-	375.00	297	0.6%	296	8,873	4.14%
	El Cajón (Leonardo Rodríguez Alcaine)	01/03/2007	HY	-	375.00	273	0.03%	273	9,145	4.26%
	Coyotepec (LFC)	30/01/2007	GT	Natural Gas	32.00	170	4.5%	162	9,307	4.34%
	Coyotepec (LFC)	30/01/2007	GT	Natural Gas	32.00	170	4.5%	162	9,469	4.41%
	Cuautitlán (LFC)	30/01/2007	GT	Natural Gas	32.00	170	4.5%	162	9,631	4.49%
	La Venta II	05/01/2007	EOL	-	83.30					
	Villa de las Flores (LFC)	04/01/2007	GT	Natural Gas	32.00	170	4.5%	162	9,793	4.57%
	Victoria (LFC)	04/01/2007	GT	Natural Gas	32.00	170	4.5%	162	9,954	4.64%
	Remedios (LFC)	04/01/2007	GT	Natural Gas	32.00	170	4.5%	162	10,116	4.72%
	Ecatepec (LFC)	04/01/2007	GT	Natural Gas	32.00	170	4.5%	162	10,278	4.79%
Additions 2006	Atenco (LFC)	2006	GT	Natural Gas	32.00	161	5.8%	152	10,430	4.86%
	Chihuahua II (El Encino)	2006	CC	Natural Gas	65.30	551	26.9%	403	10,833	5.05%
	Los Cabos	2006	GT	Natural Gas	27.20					
	Altamira V (PIE)	2006	CC	Natural Gas	1,121.00			7,958	18,790	8.76%
	Tuxpan V (PIE)	2006	CC	Natural Gas	495.00			3,902	22,692	10.58%
	Valladolid III (PIE)	2006	CC	Natural Gas	525.00			3,643	26,335	12.28%
Additions 2005	Hermosillo	2005	CC	Natural Gas	93.30	561	35.5%	362	26,696	12.45%
	Ixtaczoquitlan	2005	HY	-	1.60	11	0.16%	11	26,707	12.45%
	Yecora	2005	IC	Diesel	0.70	1	1.9%	1	26,709	12.45%
	Baja California Sur I	2005	IC	Diesel	42.90					
	Botello	2005	HY	-	9.00	52	0.7%	51	26,760	12.48%
	Rio Bravo IV PIE	2005	CC	Natural Gas	500.00			2,675	29,435	13.72%
	La Laguna II PIE	2005	CC	Natural Gas	498.00			3,676	33,111	15.44%
	Holbox	2005	IC	Diesel	0.80	2	0.0%	2.15	33,113	15.44%
Additions 2004	Guerrero Negro II	2004	IC	Diesel	10.80					
	El Sauz	2004	CC	Natural Gas	128.00	1,006	24.0%	764	33,877	15.79%
	Tuxpan (Pdte. Adolfo López Mateos)	2004	GT	Natural Gas	163.00	935	5.1%	888	34,765	16.21%
	San Lorenzo Potencia	2004	GT	Natural Gas	266.00	403	7.7%	372	35,137	16.38%
	Rio Bravo III PIE	2004	CC	Natural Gas	495.00			2,149	37,286	17.38%
	Chicoasén (Manuel Moreno Torres)	2004	HY	-	900.00	1,197	8.6%	1,094	38,380	17.89%
Additions 2003	Transalta Campeche	2003	CC	Natural Gas	252.00			843	39,223	18.29%
	Naco Nogales	2003	CC	Natural Gas	258.00			2,024	41,247	19.23%
	Transalta Chihuahua III (PIE)	2003	CC	Natural Gas	259.00			1,630	42,876	19.99%
	Mexicali (PIE)	2003	CC	Natural Gas	489.00			2,180	45,057	21.01%

Table 4. Latest generation of the newest power plants covering 20% of the system generation from 2009 backwards. Source: SENER, "Prospectiva del sector eléctrico 2010-2025", "Prospectiva del sector eléctrico 2009-2024", "Prospectiva del sector eléctrico 2008-2017", "Prospectiva del sector eléctrico 2007-2016", "Prospectiva del sector eléctrico 2006-2015", "Prospectiva del sector eléctrico 2005-2014",

"Prospectiva del sector eléctrico 2004-2013", Private communications with CFE, private information request to IFAI.

Data / Parameter:	$\mathbf{EF_{OM,y}}$
Data unit:	tCO_2/GWh
Description:	Operating Margin Emission Factor for Mexican grid in year 2009
Measured /Calculated /Default:	Calculated
Source of data:	SENER, "*Prospectiva del sector eléctrico 2010-2025*" (table 20, page 117, table 16, page 101, graph 56, page 167), National Commission for Energy Savings (CONAE) webpage, Mexican National GHG Inventory, 2006, Mexican Fourth National Communication to the United Nations Framework Convention on Climate Change, and Atmospheric Pollution Emissions Calculation from the Use of Fossil Fuels in the Mexican Electric Sector study, performed by MIT.
Value(s) of monitored parameter:	661.67 tCO_2/GWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculations (CM ex-post emission factor)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	Following the "Tool to calculate the emission factor for an electricity system" (version 02.2.1): Simple OM, *ex-post*
QA/QC procedures applied:	-

Data / Parameter:	$\mathbf{EF_{BM,y}}$
Data unit:	tCO_2/GWh
Description:	Build Margin Emission Factor for Mexican grid in year 2009
Measured /Calculated /Default:	Calculated
Source of data:	SENER, "*Prospectiva del sector eléctrico 2010-2025*" (Table 52, page 185), "*Prospectiva del sector eléctrico 2009-2024*" (Table 18, page 96; table 47, page 159), "*Prospectiva del sector eléctrico 2008-2017*" (Table 19, page 101), "*Prospectiva del sector eléctrico 2007-2016*" (table 19, page 77), "*Prospectiva del sector eléctrico 2006-2015*" (table 13, page 57), "*Prospectiva del sector eléctrico 2005-2014*" (table 14, page 51), "*Prospectiva del sector eléctrico 2004-2013*" (table 9, page 44); CFE, "Programa de Obras e Inversiones en el Sector Eléctrico, 2011-2025" (table 2.2, page 2-5), private information request to IFAI (*Instituto Federal de Acceso a la Información*, Federal Institute of Access to Information), private Communications with CFE,

	Mexican Fourth National Communication to the United Nations Framework Convention on Climate Change and CFE 2003 Annual Report available at http://www.cfe.gob.mx/QuienesSomos/publicaciones/Paginas/Publicaciones.aspx
Value(s) of monitored parameter:	421.63 tCO_2/GWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculations (CM ex-post emission factor)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	Following the "Tool to calculate the emission factor for an electricity system" (version 02.2.1): build margin
QA/QC procedures applied:	-

Data / Parameter:	**$EF_{grid\ CM,y}$**
Data unit:	tCO_2/GWh
Description:	Combined margin CO_2 emission factor in the year 2009 for the proposed CDM project activity.
Measured /Calculated /Default:	Calculated
Source of data:	Formula given by the "Tool to calculate the emission factor for an electricity system" (version 02.2.1)
Value(s) of monitored parameter:	601.66 tCO_2/GWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	Following the "Tool to calculate the emission factor for an electricity system" (version 02.2.1): weighted average CM (w_{OM}=0.75 and w_{BM}=0.25, because the project is a wind farm)
QA/QC procedures applied:	-

Electricity generation:

<table>
<tr><th>Data / Parameter:</th><th>$EG_{,facility,y}$</th></tr>
<tr><td>Data unit:</td><td>MWh</td></tr>
<tr><td>Description:</td><td>Electricity supplied to the grid by the project in the monitoring period (December 31^{st} 2008-August 31^{st} 2011).</td></tr>
<tr><td>Measured /Calculated /Default:</td><td>Measured</td></tr>
<tr><td>Source of data:</td><td>CFE bills providing readings of the main meter located at “Juchitán Dos” electrical substation. All data were monitored and electronically archived.</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td>94,864 MWh</td></tr>
<tr><td>Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)</td><td>Baseline emissions calculations</td></tr>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>The meters are of Schneider ION 8600 type, and they are periodically calibrated by the CFE.
<table>
<tr><th>Meter</th><th>Kind and serial number</th><th>Accuracy class</th><th>Last calibration</th></tr>
<tr><td>Main meter</td><td>Schneider ION 8600</td><td>0.2</td><td>24/06/2011</td></tr>
<tr><td>Back-up meter</td><td>Schneider ION 8600</td><td>0.2</td><td>24/06/2011</td></tr>
</table></td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>CFE is responsible for meter measurement and provide generation data to the project participant by means of electric bills.
Data storage and registration is performed by the SCADA-SGIPE system each ten minutes and daily for each turbine.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>-</td></tr>
<tr><td>QA/QC procedures applied:</td><td>Data are kept archived during the crediting period and until two years later.
In the cases of failure of the main meter, CFE will use the back up meter measurement. In case that both meters would not work correctly, net generation supplied to the grid will be estimated by CFE in a conservative and reliable way.</td></tr>
</table>

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

The baseline scenario represents the electricity that would have otherwise been generated by the operation of the grid-connected power plants and by the addition of new generation sources.

According to the methodology ACM0002 (version 12.2.0), the baseline emissions are to be calculated as follows:

$$BE_y = EG_{pj,y} \cdot EF_{grid,CM,y}$$

Where:

BE_y = Baseline emissions in year 2010 (tCO_2/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year 2010 (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year 2010 calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

As it can bee seen, to determine the baseline emissions, it is necessary to know the combined margin emission factor of the grid and the net quantity of electricity generation fed into the grid by the project. The combined margin is calculated *ex-post*, and next is shown how this parameter has been obtained:

Calculation of $EF_{grid,CM,y}$

Operating margin (OM) emission factor

The methodological tool "Tool to calculate the emission factor for an electricity system" (version 02.2.1) provides four methods to calculate the operating margin. For the Bii Nee Stipa Project, option (a) "Simple OM" has been chosen because:

i) sufficient data is not available for using the Dispatch Data Analysis option, and

ii) low-cost/must-run resources in Mexico have represented less than 50% of total grid generation over the most recent years (see **Table 5**). It is worth pointing out that the most recent data available are related to 2005-2009 period.

The Operating Margin calculation is based on yearly statistics provided by SENER (Mexican Energy Secretariat).

Mexican electric mix	2005	2006	2007	2008	2009	Average
Fuel-oil	29.7%	23.1%	21.3%	18.37%	18.34%	
Combined Cycle	33.5%	40.5%	44.2%	45.72%	48.45%	
Renewable + Hydro	15.9%	16.5%	14.9%	19.59%	14.22%	
Coal	8.4%	8.0%	7.8%	7.54%	7.18%	
Dual (coal + fuel oil)	6.5%	6.2%	5.8%	2.92%	5.23%	
Turbogas	0.6%	0.7%	1.1%	1.19%	1.59%	
Nuclear	4.9%	4.8%	4.5%	4.16%	4.47%	
Diesel	0.4%	0.4%	0.5%	0.52%	0.53%	
Low-cost/must run	**21%**	**21%**	**19%**	**24%**	**19%**	**21%**
Net generation (GWh)	**199,167**	**205,878**	**211,454**	**215,276**	**214,488**	

Table 5. Percentage of electricity generation by energy source. Source: SENER "Prospectiva del Sector Eléctrico 2010-2025" (table 20, page 117)

As shown in the Table 5, the average share of low-cost/must run generation (e.g.; hydro, geo/wind and nuclear plants) for the last five years has been 21%, significantly below 50%.

As it was pointed in the project PDD, the Simple OM emission factor is calculated ex-post for each year in which the project generation displaces grid electricity.

The Simple OM Emission Factor ($EF_{OM,simple,y}$) is calculated as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. It has been calculated following the "Option B" mentioned in the Step 4 of the "Tool to calculate the emission factor for an electricity system" (version 02.2.1) and considering the emission factor of the electricity imports as 0 tCO_2/GWh.

Option B is used because:

(a) total net electricity generation of all power plants serving the system as well as the fuel types and total fuel consumption of the project electricity system are available; conversely, data for option A are not; and
(b) only nuclear and renewable power generation are considered as low-cost/ must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) off-grid power plants have not been included in the calculation (see Option I chosen in Step 2).

Option B addresses the calculation based on data on fuel consumption and net electricity generation of each power plant / unit, resulting in the equation below.

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{EG_y} \quad (tCO_2e/MWh)$$

Where:

$EF_{grid,OMsimple,y}$	is the simple operating margin CO_2 emission factor in year y (tCO_2/MWh);
$FC_{i,y}$	refers to the amount of fossil fuel type *i* consumed in the project electricity system in year *y* (mass or volume unit);
$NCV_{i,y}$	refers to the net calorific value (energy content) of fossil fuel type *i* in year *y* (TJ/Gg);
$EF_{CO2,i,y}$	refers to the CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ);
EG_y	refers to the net electricity generated and delivered to the grid by all power sources serving the system, not including low cost/ must run power plants/units, in year y (MWh);
i	refers to all fossil fuel types combusted in power sources in the project electricity system in year *y*.
y	refers to the relevant year as per the data vintage chosen in step 3.

The fuel consumptions provided were expressed in TJ. As almost all the emission factors for the different fuels were given in tCO_2/TJ, the NCV factors for these fuels were not needed to calculate their consumption corresponding emissions. The exception case was the fuel oil: its emissions factor was provided per unit of volume, so its density and NCV were used to obtain its emission factor in tCO_2/TJ, and then they were employed to calculate the emissions due to fuel oil consumption.

Applying the above formula, the following emissions were obtained for each kind of fuel in the year 2009:

	2009			
	Fuel share	Fuel consumption ($FC_{i,y}$) [TJ]	CO_2 emission factor ($EF_{CO2,i,y}$) [tCO2/TJ]	CO_2 emission [tCO_2]
Fuel oil	23.9%	402,415	77.2	31,049,361
Natural Gas	45.3%	762,736	56.1	42,789,517
Natural Gas Liquids	12.4%	208,784	63.1	13,167,404
Diesel	0.9%	15,154	74.1	1,122,389
Coal	17.5%	294,655	92.7	27,314,553
Total	100.0%			**115,443,225**
FC_y [TJ/day]	4,613			
FC_y [TJ/year]	1,683,745			

Table 6. Operating margin emission factor for the year 2009.

The calculation of the operating margin includes electricity imports to the grid.

Dividing the total emissions due to fuel consumptions between the net power generation of the Mexican SIN, excluding low-cost/must-run resources and including imports, an operating margin emission factor of 661.7 tCO_2/GWh is obtained:

<u>Build margin (BM) emission factor</u>

In accordance with the "Tool to calculate the emission factor for an electricity system", no capacity additions from retrofits are included in the calculation of the Build Margin emission factor.

The sample group of power units m used to calculate the Build Margin has been determined as per the procedure of the mentioned tool, which is shown next:

(a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5\text{-units}}$) and determine their annual electricity generation ($AEGSET_{5\text{-units}}$, in MWh);

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total}, in MWh).

Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEGSET_{\geq 20\%}$, in MWh);

(c) From $SET_{5\text{-units}}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid.

If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the Build Margin. Ignore steps (d), (e) and (f).

Otherwise:

(d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than 10 years ago. Include in that set the power units registered as CDM project activity, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) to the extent is possible. Determine for the resulting set ($SET_{sample\text{-}CDM}$) the annual electricity generation ($AEGSET_{sample\text{-}CDM}$, in MWh);

If the annual electricity generation of that set comprises at least 20% of the annual electricity generation of the project electricity system (i.e. $AEGSET_{sample\text{-}CDM} \geq 0.2 \times AEG_{total}$), then use the sample group $SET_{sample\text{-}CDM}$ to calculate the Build Margin. Ignore steps (e) and (f).

Otherwise:

(e) Include in the sample group $SET_{sample\text{-}CDM}$ the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation);

(f) The sample group of power units m used to calculate the Build Margin is the resulting set ($SET_{sample\text{-}CDM>10yrs}$).

Once followed paragraphs (a), (b) and (c), it was found that $SET_{\geq 20\%}$ had a larger production than $SET_{5\text{-units}}$, so $SET_{\geq 20\%}$ is considered the sample set (SET_{sample}). As none of the plants started supplying electricity to the grid more than 10 years ago, the sample group of power units m used to calculate the Build Margin is the resulting set: $SET_{\geq 20\%}$.

The BM emission factor has been addressed following the equation below, as indicated by the "Tool to calculate the emission factor for an electricity system" (version 02.2.1).

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$	= Build Margin CO_2 emission factor in year y (t CO_2/MWh)
$EG_{m,y}$	= Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	= CO_2 emission factor of power unit m in year y (t CO_2/MWh)
m	= Power units included in the Build Margin
y	= Most recent historical year for which power generation data is available (2009).

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \cdot 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL, m, y}$	refers to the CO_2 emission factor of power unit m in year y (tCO_2/MWh)
$EF_{CO2, m, i, y}$	refers to the average CO_2 emission factor of fuel type i used in power unit m in year y (tCO_2/GJ)
$\eta_{m, y}$	average net energy conversion efficiency of power unit m in year y (%).
y	refers to the most recent historical year for which power generation data is available (2009).

According to the definition and the formulae to calculate the Build Margin, the newer power plants installed in Mexico that comprise the yearly last 20% system generation are those indicated in the following **Table 7**:

	Power plants characteristics			Net generation (GWh)	Accumulated net generation (GWh)	Accumulated net generation (%)	(?$_{m,y}$) Efficiency (%)	$EF_{(CO2,m,i,y)}$ [tCO_2/GJ]	$EF_{(EL,m,y)}$ [tCO_2/MWh]	[tCO_2]
	Name of the power plant	Technology *	Fuel							
Additions 2009	San Lorenzo Potencia	CC	Natural Gas	88	88	0.04%	47.8%	0.056	0.423	37,294
	San Lorenzo Potencia	CC	Natural Gas	73	162	0.08%	30.7%	0.056	0.658	48,363
	San Lorenzo Potencia	CC	Natural Gas	68	230	0.11%	30.9%	0.056	0.653	44,311
	Coapa	GT	Natural Gas	48	277	0.13%	36.2%	0.056	0.558	26,686
	Santa Cruz	GT	Natural Gas	48	325	0.15%	36.2%	0.056	0.558	26,686
	Magdalena	GT	Natural Gas	48	373	0.17%	36.2%	0.056	0.558	26,686
	Iztapalapa	GT	Natural Gas	48	421	0.20%	36.2%	0.056	0.558	26,686
	Presidente Juárez	CC	Natural Gas							
	Presidente Juárez	CC	Natural Gas							
Additions 2008	Humeros	GEO	-	39	460	0.21%	9.8%	0.000	0.000	0
	Ciudad del Carmen	GT	Diesel	26	487	0.23%	18.1%	0.074	1.472	38,968
	Ciudad del Carmen	GT	Diesel	22	509	0.24%	18.9%	0.074	1.413	31,281
Additions 2007	Santa Rosalía	IC	Diesel							
	Santa Rosalía	IC	Diesel							
	Santa Rosalía	IC	Diesel							
	Vallejo (LFC)	GT	Natural Gas	162	670	0.31%	36.2%	0.056	0.558	90,268
	Holbox	IC	Diesel	1.08	672	0.31%	34.0%	0.074	0.784	843
	Holbox	IC	Diesel	1.99	674	0.31%	34.4%	0.074	0.775	1,539
	Tamazunchale (PIE)	CC	Natural Gas	7,903	8,576	4.00%	47.3%	0.056	0.427	3,373,651
	Baja California Sur I	IC	Diesel							
	El Cajón (Leonardo Rodríguez Alcaine)	HY	-	296	8,873	4.14%		0.000	0.000	0
	El Cajón (Leonardo Rodríguez Alcaine)	HY	-	273	9,145	4.26%		0.000	0.000	0
	Coyotepec (LFC)	GT	Natural Gas	162	9,307	4.34%	36.2%	0.056	0.558	90,268
	Coyotepec (LFC)	GT	Natural Gas	162	9,469	4.41%	36.2%	0.056	0.558	90,268
	Cuautitlán (LFC)	GT	Natural Gas	162	9,631	4.49%	36.2%	0.056	0.558	90,268
	La Venta II	EOL	-							
	Villa de las Flores (LFC)	GT	Natural Gas	162	9,793	4.57%	36.2%	0.056	0.558	90,268
	Victoria (LFC)	GT	Natural Gas	162	9,954	4.64%	36.2%	0.056	0.558	90,268
	Remedios (LFC)	GT	Natural Gas	162	10,116	4.72%	36.2%	0.056	0.558	90,268
	Ecatepec (LFC)	GT	Natural Gas	162	10,278	4.79%	36.2%	0.056	0.558	90,268
Additions 2006	Atenco (LFC)	GT	Natural Gas	152	10,430	4.86%	35.9%	0.056	0.563	85,384
	Chihuahua II (El Encino)	CC	Natural Gas	403	10,833	5.05%	50.6%	0.056	0.399	160,692
	Los Cabos	GT	Natural Gas							
	Altamira V (PIE)	CC	Natural Gas	7,958	18,790	8.76%	47.3%	0.056	0.427	3,397,749
	Tuxpan V (PIE)	CC	Natural Gas	3,902	22,692	10.58%	46.9%	0.056	0.431	1,681,194
	Valladolid III (PIE)	CC	Natural Gas	3,643	26,335	12.28%	48.8%	0.056	0.414	1,506,268
Additions 2005	Hermosillo	CC	Natural Gas	362	26,696	12.45%	47.3%	0.056	0.427	154,445
	Ixtaczoquitlan	HY	-	11	26,707	12.45%		0.000	0.000	0
	Yecora	IC	Diesel	1	26,709	12.45%	32.2%	0.074	0.829	1,122
	Baja California Sur I	IC	Diesel							
	Botello	HY	-	51	26,760	12.48%		0.000	0.000	0
	Rio Bravo IV PIE	CC	Natural Gas	2,675	29,435	13.72%	45.6%	0.056	0.443	1,186,255
	La Laguna II PIE	CC	Natural Gas	3,676	33,111	15.44%	44.5%	0.056	0.454	1,670,084
	Holbox	IC	Diesel	2.15	33,113	15.44%	34.3%	0.074	0.776	1,669
Additions 2004	Guerrero Negro II	IC	Diesel							
	El Sauz	CC	Natural Gas	764	33,877	15.79%	46.6%	0.056	0.434	331,413
	Tuxpan (Pdte. Adolfo López Mateos)	GT	Natural Gas	888	34,765	16.21%	32.4%	0.056	0.624	554,407
	San Lorenzo Potencia	GT	Natural Gas	372	35,137	16.38%	29.7%	0.056	0.680	252,722
	Rio Bravo III PIE	CC	Natural Gas	2,149	37,286	17.38%	45.0%	0.056	0.449	964,482
	Chicoasén (Manuel Moreno Torres)	HY	-	1,094	38,380	17.89%		0.000	0.000	0
Additions 2003	Transalta Campeche	CC	Natural Gas	843	39,223	18.29%	48.9%	0.056	0.413	348,277
	Naco Nogales	CC	Natural Gas	2,024	41,247	19.23%	48.6%	0.056	0.416	841,035
	Transalta Chihuahua III (PIE)	CC	Natural Gas	1,630	42,876	19.99%	43.5%	0.056	0.464	756,823
	Mexicali (PIE)	CC	Natural Gas	2,180	45,057	21.01%	47.1%	0.056	0.429	934,928
	Tuxpan III y IV (PIE)	CC	Natural Gas	7,314	52,370	24.42%	48.1%	0.056	0.420	3,072,732
	Altamira III y IV (PIE)	CC	Natural Gas	6,559	58,930	27.47%	47.1%	0.056	0.429	2,811,960
				45,056.85						18,997,375

Table 7. Latest generation of the newest power plants covering 20% of the system generation from 2009 backwards and their emissions due to fuel consumption.

Plants included in Baja California and Baja California Sur isolated grids have been excluded as well as CDM registered projects (in cells with grey shading in the **Table 7**).

<u>Combined margin (CM) emission factor.</u>

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

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

As the simplified CM calculation option requirements are not fulfilled by this project, option (a) ***Weighted average CM*** is chosen:

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

Where:

$EF_{grid,BM,y}$	= Build Margin CO_2 emission factor in year y (t CO_2/MWh)
$EF_{grid,OM,y}$	= Operating Margin CO_2 emission factor in year y (t CO_2/MWh)
w_{OM}	= Weighting of Operating Margin emissions factor (%)
w_{BM}	= Weighting of Build Margin emissions factor (%)

The following default values should be used for w_{OM} and w_{BM}:

- Wind and solar power generation project activities: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods;

- All other projects: w_{OM} = 0.5 and w_{BM} = 0.5 for the first crediting period, and w_{OM} = 0.25 and w_{BM} = 0.75 for the second and third crediting period, unless otherwise specified in the approved methodology which refers to the "Tool to calculate the emission factor for an electricity system" (version 02.2.1).

As the project is a wind farm, during the first crediting period w_{OM} = 0.75 and w_{BM} = 0.25 will be used. Thus, the obtained *ex-post* baseline emission factor which applies for this monitoring period is:

Quantity of net electricity generation fed into the grid by the project in the monitoring period

The electricity exported to the grid by the project during the monitoring period was measured by CFE electricity meters located at the CFE sub-station. Monitored data are shown next:

Month	Net Energy Exported to the Grid (MWh)
Jan-09	0
Feb-09	0
Mar-09	0
Apr-09	0
May-09	0
Jun-09	0
Jul-09	0
Aug-09	0
Sep-09	0
Oct-09	0
Nov-09	0
Dec-09	0
Jan-10	0
Feb-10	0

Month	Net Energy Exported to the Grid (MWh)
Mar-10	0
Apr-10	4,140
May-10	4,501
Jun-10	3,785
Jul-10	3,200
Aug-10	2,311
Sep-10	2,244
Oct-10	9,466
Nov-10	9,548
Dec-10	10,648
Jan-11	8,900
Feb-11	8,853
Mar-11	8,761
Apr-11	3,406
May-11	3,970
Jun-11	3,621
Jul-11	4,704
Aug-11	2,807
Total	**94,864**

Table 8. Electricity exported to the grid by the project.

The total electricity exported to the grid by the project during the monitoring period is of 94,864 MWh.

Baseline emissions

The total baseline emissions of the project from December 31st 2008 to August 31st 2011 are calculated as per the following formula:

$$BE_y(tCO_2) = EF_{grid,CM,y}(CO_2 / MWh) \cdot EG_{PJ,y}(MWh)$$

In the table below, the monthly and total baseline emissions are calculated and shown:

Month	Net Energy Exported to the Grid (MWh)	Emission Factor *ex-post* (tCO_2/MWh)	Baseline Emissions (tCO_2)
Jan-09	0	0.6017	0
Feb-09	0	0.6017	0
Mar-09	0	0.6017	0
Apr-09	0	0.6017	0
May-09	0	0.6017	0
Jun-09	0	0.6017	0
Jul-09	0	0.6017	0

Month	Net Energy Exported to the Grid (MWh)	Emission Factor *ex-post* (tCO_2/MWh)	Baseline Emissions (tCO_2)
Aug-09	0	0.6017	0
Sep-09	0	0.6017	0
Oct-09	0	0.6017	0
Nov-09	0	0.6017	0
Dec-09	0	0.6017	0
Jan-10	0	0.6017	0
Feb-10	0	0.6017	0
Mar-10	0	0.6017	0
Apr-10	4,140	0.6017	2,491
May-10	4,501	0.6017	2,707
Jun-10	3,785	0.6017	2,277
Jul-10	3,200	0.6017	1,925
Aug-10	2,311	0.6017	1,389
Sep-10	2,244	0.6017	1,349
Oct-10	9,466	0.6017	5,695
Nov-10	9,548	0.6017	5,744
Dec-10	10,648	0.6017	6,406
Jan-11	8,900	0.6017	5,354
Feb-11	8,853	0.6017	5,326
Mar-11	8,761	0.6017	5,271
Apr-11	3,406	0.6017	2,049
May-11	3,970	0.6017	2,388
Jun-11	3,621	0.6017	2,178
Jul-11	4,704	0.6017	2,830
Aug-11	2,807	0.6017	1,688
Total	**94,864**	**0.6017**	**57,066**

Table 9. Baseline emissions of the project.

As it can be seen, the total baseline emissions are 57,066 tons of CO_2.

E.2. Project emissions calculation

>>
According to the methodology ACM0002, the project emissions are 0 tons of CO_2.

E.3. Leakage calculation

>>
According to the methodology ACM0002, the leakage is 0 tons of CO_2.

E.4. Emission reductions calculation / table

>>
According to methodology ACM0002, the emission reductions of the proposed project are calculated as follows:

$$ER_y = BE_y - PE_y - L_y$$

Total baseline emissions (BE_y): 57,066.25 tCO_2e
Total project emissions (PE_y): 0 tCO_2e
Total leakage (L_y): 0 tCO_2e

Therefore, the total emission reductions (ER_y) are **57,066 tCO_2e**

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

Item	Values applied in ex-ante calculation of the registered and revised CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	**69,635**[3]	**57,066**

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

The real calculated emission reductions are 18% lower than those estimated in the revised CDM-PDD.

The ex-post Combined Margin Emission Factor (EF_{CM}), calculated with the last available data and applicable in this monitoring report (0.6017 tCO_2/MWh ex-post EF_{CM}), is higher than the ones estimated in the registered PDD for 2010 and 2011 (0.4991 tCO_2/MWh and 0.4925 tCO_2/MWh, respectively). Nevertheless, the calculated emissions for the monitoring period represent the 82% of those estimated in the revised CDM-PDD.

This is due to the fact that the electricity generated during the monitoring period has been 33% lower than the expected by the wind study when writing the PDD (revised version with 26.35 MW/year and 3,761 hours/year). This lower electricity generation than expected took place because of an unexpected lack of wind in the project area during the monitoring period. So, while the PDD expected a generation for the monitoring period of 140,395 MWh (representing 69,632 tCO_2), the actual generation has been 94,864 MWh (representing 57,066 tCO_2).

[3] The value obtained in the ex-ante calculation of the revised CDM-PDD corresponds to the emissions released from April 1st 2010 to August 31st 2011. That is to say: 9 months generation in 2010 multiplied by the estimated 2010 emission factor and 8 months generation in 2011 multiplied by the estimated 2011 emission factor:

- Emission reductions in 2010:
  (26.35 MW * 3,761 h/year * 9 months/ 12 months) * 0.4991 tCO_2/MWh = 37,096 tCO_2
- Emission reductions in 2011:
  (26.35 MW * 3,761 h/year * 8 months/ 12 months) * 0.4925 tCO_2/MWh = 32,539 tCO_2
- Total emission reductions for the crediting period: 37,096 + 32,539 = **69,635 tCO_2**