



Monitoring report form (Version 03.1)

Monitoring report

Title of the project activity	Jepirachi Wind Power Project
Reference number of the project activity	0194
Version number of the monitoring report	1
Completion date of the monitoring report	04/03/2013
Registration date of the project activity	01/04/2006
Monitoring period number and duration of this monitoring period	1 st Monitoring Report 31/01/2011 – 31/12/2012
Project participant(s)	<p>Colombia: Empresas Publicas de Medellin (project developer and operator);</p> <p>Finland: Fortum Corporation, Government of Finland – Ministry of Foreign Affairs of Finland;</p> <p>France: GDF SUEZ;</p> <p>Germany: RWE Power AG;</p> <p>Japan: Chubu Electric Power Co., Inc; The Chugoku Electric Power, Co., Inc; Kyushu Electric Power Co., Inc; Mitsubishi Corporation; Shikoku Electric Power Co., Inc; Tohoku Electric Power Co., Inc; The Tokyo Electric Power Co., Inc; Japan International Cooperation Agency (JICA);</p> <p>Netherlands: Netherlands' Ministry of Infrastructure and the Environment (IenM); Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&I);</p> <p>Norway: Norsk Hydro ASA; Government of Norway – Ministry of Foreign Affairs; Statoil ASA;</p> <p>United Kingdom of Great Britain and Northern Ireland: BP Alternative Energy International Ltd; Deutsche Bank AG;</p> <p>Sweden: Government of Sweden – Swedish Energy Agency;</p> <p>Bilateral and Multilateral Funds: Prototype Carbon Fund (PCF) – Managing Company: International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF)</p>
Host Party(ies)	Colombia
Sectoral scope(s) and applied methodology(ies)	Sectoral Scope 1 : Energy industries (renewable - / non-renewable sources) ACM0002-version12.1.0 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	49,155 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	40,916 tCO ₂ e

SECTION A. Description of project activity**A.1. Purpose and general description of project activity**

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The project consists of the development of a wind based generation facility with a nominal power capacity rated at 19.5 MW, located in Wayuu Indigenous Territory in the Northeastern region of the Atlantic Colombian coast, within the Municipality of Uribia in the Department of Guajira. Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

All equipment in the project uses proven technology that has been successfully applied in similar projects in other regions of the world. The project installed a total of 15 wind generators with a rated capacity of 1.3 MW each, manufactured by Nordex (N60/1300). The Project site is connected to the national grid via an 8km standard transmission line.

All 15 units of the project were commissioned between 30/01/2004 and 30/03/2004. Since then, the wind generators delivered continuously renewable energy to the Colombian National Interconnected System (SIN) under a preferential dispatching scheme.

The total emission reductions achieved in the 1st monitoring period of the second crediting period from 31/01/2011 to 31/12/2012 are **40,916 tCO₂e**.

A.2. Location of project activity

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The project is located in the area between Cabo de la Vela and Puerto Bolivar, within the municipality of Uribia near Kasiwolin, Arutkajuy and Medialuna Communities, in the Department of Guajira in the northeast region of Colombia.

The geographical coordinates of the project are approximately: Latitude + 12.2472 and Longitude: - 71.9973.

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 if the Party involved wishes to be considered as project participant (Yes/No)
Colombia (host)	Empresas Publicas de Medellin (EPM)	No
Netherlands	The International Bank for Reconstruction and Development as the Trustee of the Prototype Carbon Fund (PCF); Ministry of Infrastructure and the Environment (IenM); Electrabel S.A.; Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&I)	Yes

Finland	Government of Finland - Ministry of Foreign Affairs of Finland; Fortum Corporation	Yes
Japan	Chubu Electric Power Co., Inc; Chugoku Electric Power Co., Inc; Kyushu Electric Power Co., Inc.; Mitsubishi Corporation; Tohoku Electric Power Co., Inc.; Tokyo Electric Power Co., Inc.; Shikoku Electric Power Co., Inc; Japan International Cooperation Agency (JICA); Mitsui & Co., Ltd	No
Norway	Government of Norway – Ministry of Foreign Affairs; Norsk Hydro ASA; Statoil ASA	Yes
United Kingdom of Great Britain and Northern Ireland	Deutsche Bank AG; BP Alternative Energy International Ltd	No
Sweden	Government of Sweden - Swedish Energy Agency	Yes
Germany	RWE Power AG	No
France	GDF SUEZ	No

A.4. Reference of applied methodology

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The project applies methodology ACM0002 version 12.1.0 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.

This methodology, as applied in this project activity, also refers to the following tools:

- “Tool to calculate the emission factor of an electricity system”, version 2;
- “Tool for the demonstration and assessment of additionality”, version 5.2.

A.5. Crediting period of project activity

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The second crediting period of the project activity, to which this monitored period applies, commenced on 31/01/2011 and runs for 7 years until 30/01/2018.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The project contributes to the transfer of technology, as it is the first wind power generation facility to operate in Colombia on a commercial basis. All equipment utilized in the project uses proven technology that has been successfully applied in similar projects in other regions of the world. Following a bidding process conducted during the summer of 2003, the nominal total power capacity of 19.5 MW is supplied by a total of 15 wind generators with a rated capacity of 1.3 MW each, manufactured by Nordex (N60/1300).

Table 1: Technical characteristics of the wind turbines installed in the project

Rotor 1300 kW	
Type	3-bladed, horizontal axis, upwind
Rotor Diameter	60 m
Swept Area	2828 m ²
RPM	19/12.7 RPM
Cut in-cut-out-wind	3-5/25 m/s
Nominal Output at velocity	15 m/s
Design conditions in terms of velocity	70 m/s (IEC)
Lifetime of turbine	20 years
Blades	
Manufacturer	LM, aerpac or similar
Blade Length	29 m
Material	Carbon/Glass fibre reinforced plastic/epoxy resin
Lightning Protection	Included, receptor in blade tips
Generator	
Nominal Power	1300/250 kW
Type	Asynchronous, liquid cooled
Synchronous speed	1515 / 1010 r.p.m.
Efficiency at 75% load	96.5%
Control	
Tipo	Micro-processor
Connection	Via soft power controller
Remote communication	Included
Towers	
Type	Tubular (cone-shaped)
Hub heights	50 m
Corrosion Protection	Sandblasted and painted with 250 mg epoxy paint

Status of implementation

All 15 units of the project were commissioned between 30/01/2004 and 30/03/2004, and were declared on commercial operation on 19/07/2004. The project has been operating as planned and described in the registered PDD since 31/01/2004.

Operation of the activity

During the current monitoring period 92,159 MWh of electricity delivered to the Colombian National Interconnected System (SIN). There have not been any events or situations that occurred during this monitoring period, which impact the applicability of the baseline and monitoring methodology.

In 2011, failures in the gear box of wind turbines number 1, 2 and 5, and problems of the tips of wind turbines number 6 and 15 caused unavailability and lost in generation of energy.

Due to the particular climatic conditions caused in 2011 by the climatic phenomenon called “La Niña”, there was a decrease in the average wind speed which was related with the decrease in the energy generated by the wind farm. In addition to this, an accelerated corrosion process of the welding seams of some turbines was observed. This led to urgent maintenance efforts of wind turbines 11 and 13 which had to be shutdown 5 hours a day during a two-week period. However, apart from this special event, all turbines of the project operated continuously in accordance with the regular operation and maintenance plan.

In 2012, another storm caused unavailability of wind turbines 4 and 6. The storm caused failures in the gear

box of wind turbine 4, and problems on the tips of wind turbine 6, which results in a decrease of the total electricity generated in 2012.

B.2. Post registration changes

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

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No temporary deviations have been applied during this monitoring period.

B.2.2. Corrections

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No corrections to project information or parameters fixed at the validation have been approved during this monitoring period or submitted with this monitoring report.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

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No permanent changes from the registered monitoring plan or applied methodologies have been approved during this monitoring period or submitted with this monitoring report.

B.2.4. Changes to project design of registered project activity

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No changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring report.

B.2.5. Changes to start date of crediting period

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No changes to the start of the crediting period have been approved during this monitoring period or submitted with this monitoring report.

B.2.6. Types of changes specific to afforestation or reforestation project activity

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N/A

SECTION C. Description of monitoring system

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Empresas Publicas de Medellin (EPM) has formed a multidisciplinary team, coordinated by the Power Operations Department (*Sub-Gerencia de Operación y Energía*) which is responsible for monitoring the parameters, and recording and analyzing the data obtained.

As per methodology ACM0002, version 12.1.0, the following parameter should be monitored:

- *Net electricity supplied to the grid by the project activity (EG_n);*

Figure 1 below show how the project is connected to the national power grid, as well as the main monitoring

points: #1 Transformador Jepirach 1(A) & (B), #2 Puerto Bolivar y #3 Puerto Cuestecitas.

Figure 1: Connection diagram of the Jepirachi Wind Park

Error! Reference source not found. Monitoring the electricity generation data is a relatively simple process, as the Colombian interconnected system relies on a highly regulated metering setup, which is required to make payments for electricity possible. This means that for the CDM project the main role for monitoring data is keeping copies of the hourly generation records that the central dispatch center maintains on file.

As per the metering, each of the generating units at Jepirachi is equipped with multi-function electronic metering devices, which register all information that needs to be monitored, such as exported energy, imported energy, power factor, electric voltage and current, etc. The monitoring is based on continuous metering of electricity generation on site using digital measurement equipment (All ION 8600) at the substation (interconnection facility to the grid). Such meters are used for commercial, and maintenance purposes, in addition to the CDM reporting requirements. The data is read remotely every 24 hours using tele-measurement technology via the MV-90i software, and uploaded to the *Commercial Generation Department*. This information is backed up by the Informatics Unit of EPM through the Grandes Clientes de Energía database ("Large Energy Consumers") on a daily basis through the SQL Server.

For QA/QC there is a day by day registration of wind speed, power generation, maintenance and special events (binnacle) in an Excel sheet. The data are cross-checked by the SCADA system ("Supervisory Control and Data Acquisition") comparing the generation measured in terminals vs. generation from XM (www.xm.com.co), a non-governmental agency acting as the market administrator, being in charge of the registration of contracts, the settlement and billing of all the transactions that take place in this market. XM is also in charge of the National Dispatch Center (*Centro Nacional de Despacho - CND*).

The Metering Team (*Equipo de Medidas – EM*) belongs to the Transmission and Distribution Business Unit (*Gerencia de Transmisión y Distribución de Energía*), and is in charge of the measurements in all plants. It is independent of the Power Generation Business Unit, and is the only accredited laboratory for power meter calibrations on site. *EM* is responsible for reporting the generation to XM.

The Power Planning Department keeps a periodical maintenance and calibration program according to the codes approved by law, and following recommendations by the equipment providers. Information recorded by the metering equipment is sent every 24 hours to the Commercial Exchange System (ASIC), operated by the National Dispatch Center. All energy transactions are registered every hour, in the first minute of each hour. EPM transmits every day, the recorded values of the day before. According to that information, the National Dispatch Center processes the bills and payments for all transactions performed in the wholesale market. All this information is available to the market agents and to the system control authorities.

All data for the verification is available at EPM. In addition, records of energy supplied to the grid are publicly available on the website of XM.

Roles and responsibilities for the CDM Project

In the Power Generation Business Unit at EPM (*Gerencia de Generación Energía*) there are several areas in charge of the CDM activities, which are responsible for data collection, depending on the phase of the project (Planning, Building, Operating and Marketing). Given that Jepirachi Wind Park has been in commercial operation since 2004, the main CDM activities are related to development actions included in the Monitoring Plan and in the Project Design Document (PDD). The roles and responsibilities for the CDM Project at the Power Generation Business Unit are the following:

- Power planning Department (*Area Planeación Generación*): It coordinates the different areas of EPM in order to prepare the monitoring report and facilitate the verification audit.

- Research & Development Department (*Subdirección Investigación y Desarrollo Generación*): It supports the application of the methodology, supervises the calculation of the emission reduction and has an integrated knowledge of the functioning of the dispatch in the Colombian electric system.
- Commercial Generation Department (*Subgerencia Comercial Generación*): It collects the raw data from the database of energy and makes the calculations about the real dispatch, and summarizes the power generation data.
- Power Operations Department (*Subgerencia Operación y Energía*): It operates the wind park. It is in charge of metering the energy, the transmission of the data, and support to the following of the environmental and social indicators for monitoring report.
- Metering Team of the Transmission and Distribution Business Unit (*Equipo de Medidas*): It receives the energy data and transmits it to ASIC; calibration of meters.

Table 2: Description of emergency procedures applicable to the monitoring system
(Ref: Resolution 025 of 1995, page 133)

ITEM	Action	Executed
1	Daily check-Team Link Jepirachi Measures at 12:00 am via a telephone communication between the supervisor on duty monitoring the wind farm and operator Team Shift Measurements in Medellín	Daily
2	Fault detection in communication Measurement Team. The available night operator, proceeds to review the communication modem, and if it is out of service applies a reset. In case of continuing failure to replace the modem, he must communicate the two parts that remain available at the wind farm, and then perform the functional test with measurement equipment.	Failure
3	Fault detection in the satellite signal and the data channel. If still active voice channel data is transmitted from the wind farm telephone to the Measurement Team. If the channel is simultaneous out of service on voice and data, information is transmitted by the signal from one of the two mobile operators operating in the area. Comcel and Movistar.	Failure
4	Detection of total failure of the satellite signal and the signal from both mobile operators. It uses AVANTEL (other signal operator) or get off the meter data and stored in a file, that is send to a satellite signal independent of Hotel Accommodation Operations Group, or if this channel is also out of service, support is solicited to Cerrejón Company to send the information via microwave. This situation has NOT occurred at the wind farm during its operation	Failure
5	There is a measurement code that protects all the generators that are included on the ASIC.	Failure
6	There is a redundant information of the tele-measurement at XM and ASIC	Failure

The above mentioned actions are part of the emergency procedures applicable to the monitoring system.

SECTION D. Data and parameters

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

Data / Parameter:	EG _{m,y} and EG _{k,y}
Unit:	MWh

Description:	Net electricity generated and delivered to the grid by power unit m or k in year y
Source of data:	Data recorded, archived and supplied by the Colombian National Dispatch Center (CND)
Value(s) applied):	It varies by plant and year. CND keeps records of this variable for its users.
Purpose of data:	Calculation of baseline emissions
Additional comment:	This parameter is used to calculate the grid emission factor as per the <i>“Tool to calculate the emission factor for an electricity system”</i>

Data / Parameter:	$EF_{CO_2, i, y}$, $EF_{EL, m, i, y}$, and $EF_{EL, k, i, y}$
Unit:	tCO ₂ /GJ
Description:	Emission factor of fossil fuel type i for power plant m or k in year y
Source of data:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value(s) applied):	Diesel Oil = 72,600 Residual Fuel Oil = 75,500 Natural Gas = 54,300 Subbituminous Coal = 92,800 Other Bituminous Coal = 89,500
Purpose of data:	Calculation of baseline emissions
Additional comment:	This parameter is used to calculate the grid emission factor as per the <i>“Tool to calculate the emission factor for an electricity system”</i>

Data / Parameter:	$\eta_{m, y}$ and $\eta_{k, y}$
Unit:	GJ/MWh
Description:	Average net energy conversion efficiency of power unit m or k in year y
Source of data:	XM – National Dispatch Center
Value(s) applied):	See Annex 3 of the approved PDD
Purpose of data:	Calculation of baseline emissions
Additional comment:	This parameter is used to calculate the grid emission factor as per the <i>“Tool to calculate the emission factor for an electricity system”</i>

Data / Parameter:	$EF_{grid, OM, y}$
Unit:	tCO ₂ /MWh
Description:	Operation margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the <i>“Tool to calculate the emission factor for an electricity system”</i> (version 2)
Source of data:	Ex-ante calculations
Value(s) applied):	0.4853
Purpose of data:	Calculation of baseline emissions
Additional comment:	-

Data / Parameter:	EF_{grid, BM,y}
Unit:	tCO ₂ /MWh
Description:	Build margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (version 2)
Source of data:	Ex-ante calculations
Value(s) applied:	0.3206
Purpose of data:	Calculation of baseline emissions
Additional comment:	-

Data / Parameter:	EF_{grid, CM,y}
Unit:	tCO ₂ /MWh
Description:	Build margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (version 2)
Source of data:	Ex-ante calculations
Value(s) applied:	0.4441
Purpose of data:	Calculation of baseline emissions
Additional comment:	-

D.2. Data and parameters monitored

Data / Parameter:	EG_{PJ, y} = EG_{facility, y}
Unit:	MWh
Description:	Quantity of net electricity supplied by the project plant/unit to the grid in year y
Measured/ Calculated / Default:	Measured. Electricity generation is measured hourly by EPM using electronic electricity meters. This information is backed up by the Informatics Unit of EPM through the Large Energy Consumers (<i>Grandes Clientes de Energía</i>) database on a daily basis through the SQL Server. The data is read remotely every 24 hours using tele-measurement technology and sent to the National Dispatch Center
Source of data:	Data supplied by the National Dispatch Center (<i>CND</i>)
Value(s) of monitored parameter:	92,159

Monitoring equipment:	Metering Point #1: Transformador Jepirachi				
	Model	Serial	Main / Back-up	Last calibration events	Remarks
	ION 8300	PS-0511A 080-01	Main	✓ 26/01/2011	Used for ER calculations *The meter was replaced by ION 8600 PT-0809A455-01 on 23/01/2012
	ION 8600	PT-0809A 455-01	Main	✓ 05/01/2012	Used for ER calculations from 23/01/2012 till the end of the monitoring period.
	ION 8300	PS-0511A 081-01	Back-up	✓ 26/01/2011	Used for cross checking until January 2012 when it was replaced by PS-0511A080-01
	ION 8300	PS-0511A 080-01	Back-up	✓ 26/01/2011 ✓ 12/06/2012	Used for cross checking from January 2012 till the end of the monitoring period
	Metering Point #2: Puerto Bolivar				
	Model	Serial	Main / Back-up	Last calibration events	Remarks
	ION 8300	PS-0511A 082-01	Main	✓ 26/01/2011 ✓ 12/06/2012	Used for ER calculations
	ION 8300	PS-0511A 083-01	Back-up	✓ 26/01/2011 ✓ 24/01/2012	Used for cross checking
	Metering Point #3: Puerto Cuestecitas				
	Model	Serial	Main / Back-up	Last calibration events	Remarks
	ION 8300	PS-0511A 084-01	Main	✓ 26/01/2011 ✓ 12/06/2012	Used for ER calculations
	ION 8300	PS-0511A 085-01	Back-up	✓ 01/04/2009 ✓ 05/03/2012	Used for cross checking. No back up meter exists for cross checking from 9/12/2009 till 05/03/2012. As these meter readings were not used for ER calculation, lack of calibration/meter during this period has no impact.

Measuring/ Reading/ Recording frequency:	Hourly measurement and monthly recording. Records of energy supplied to the grid are publicly available on the website of XM.
Calculation method (if applicable):	N/A
QA/QC procedures:	<p>All metering devices used to monitor and measure data follow rules that have been summarized in resolution number 025 of 1995, (<i>Resolución</i> 025 de 1995) from CREG. This resolution specifies the technical characteristics measurement, telecommunications and back-up equipment to meet installation, testing, certification, operation and maintenance procedures.</p> <p>To cross check the metering, the electricity generated is also measured at the plant substation at 13.8 kV, correcting the measure taking into account the transmission losses, estimated based on the technical specifications of the transmission line.</p> <p>All meters pursue the following accuracy classes:</p> <ul style="list-style-type: none"> • IEC 60687 1A 0.2S • IEC 60687 5A 0.2S • ANSI C12.20 Class 20 0.2 • ANSI C12.20 Class 2/10 0.2 • Accuracy measurements in the range of 10mA to 20A <p>Measurements follow Colombian regulations for electricity generation. Power generation of Jeparachi is monitored on site using metering equipment that is installed at the substation at the end of the 115 kV / 0.7 km transmission line that connects the wind park with the national interconnected system (commercial frontier). In Colombia, the measurement code (<i>Código de Medida</i>) establishes mandatory technical standards, reading procedures, registering and recording activities of electricity transactions performed in the energy market. This code is part of the CREG's resolution number 025 of 1995, which specifies the particular technical characteristics that measurement, telecommunications and associated back-up equipment have to meet. Installation, tests, certification, operation and maintenance procedures are specified by this resolution as well.</p> <p>Although ION meters do not require calibration, only verification of their accuracy, the meters are calibrated approximately once a year depending on the registration of tendencies variations (error, standard variation), affected by the working conditions. Calibration is conducted by Laboratory of Calibration (Laboratorio de Calibración de equipos de medida de energía y gas), a special department of the Energy Distribution Business Unit that sets up all the meters.</p> <p>Calibration tasks follow national standards and are in accordance with the calibration instructive specified in Colombian standard NTC 4856 for electricity metering devices. EPM is the provider of this type of calibration services for the rest of the country. EPM has adopted its own procedure based on the Colombian technical norm NTC-ISO-IEC 17025 and NTC 4856, under the so-called</p>

	<p>“Instructive to perform on-site electricity meter proofs with a pattern metering device” (DIS-EM-LE-IN-009-01). This procedure is carried out to verify that the meters are working properly with the corresponding accuracy. They are also checked for alarms. The patterns used to calibrate the electricity meters in-situ could be any of the following:</p> <ul style="list-style-type: none"> • Portable Standard MTE N° 16, 17, 18 (accuracy 0.05) for on-site calibration • Calibration Bench LANDIS TALOGYR 6061 for calibration at EPM laboratory • Calibration Bench ZERA ED 6816 for calibration at EPM laboratory <p>The accreditation of the laboratory is achieved by the Secretary of Industry and Commerce of Colombia (<i>Superintendencia de Industria y Comercio de Colombia</i>). All reports of calibration and certifications, readings and data are kept in the headquarters of EPM in Medellín.</p>
Purpose of data:	Calculation of baseline emissions
Additional comment:	

D.3. Implementation of sampling plan

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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

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According to the methodology used in the registered PDD (ACM0002 version 12.1.0), baseline emissions are calculated using the following formula:

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

Where,

BE_y : Baseline emissions in year “y” (tCO₂e)

$EG_{PJ,y}$: 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 y (MWh/yr)

$EF_{grid, CM, y}$: Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “*Tool to calculate the emission factor for an electricity system*” ver. 2, (tCO₂e/MWh)

Likewise, the CO₂ emission factor of the national connected grid ($EF_{grid, CM, y}$) is calculated ex-ante using the formula for the Combined Margin Emission Factor, consisting of the weighted average Operating Margin emission factor ($EF_{grid, OM, y}$) and Build Margin emission factors ($EF_{grid, BM, y}$), as follows:

$$EF_{grid, CM, y} : W_{OM} * EF_{grid, OM, y} + W_{BM} * EF_{grid, BM, y}$$

The CO₂ emission factor is calculated ex-ante (0.4441 tCO₂e/MWh for the 2nd crediting period) and will be reviewed at the beginning of the next crediting period based on the official and publicly available data.

Table 3: Calculation of Baseline Emissions

	<i>Unit</i>	<i>31/01/2011-31/12/2012</i>
<i>Net Electricity supplied to the grid by the project activity (EGy)</i>	MWh.	92,159
<i>CO₂ emission facto of the national connected grid (EFy)</i>	tCO ₂ e/MWh	0.4441
<i>Baseline emissions (BEy)</i>	tCO ₂ e	40,916

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

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The proposed CDM project activity is a wind power system that does not generate project GHG emissions according to the methodology. A value of zero emissions is assigned to the project emissions, $PE_y = 0$.

E.3. Calculation of leakage

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No leakage emissions are considered: $LE_y = 0$.

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	40,916	0	0	40,916

E.5. Comparison of actual emission reductions or net anthropogenic 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 CO₂e)	49,155	40,916

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

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As it can be seen in Section E.5. above, the actual value of ERs achieved during this monitoring period is below the estimated value in the ex-ante calculation of the registered PDD. This is mainly to the

meteorological phenomenon of “La Niña” and the problems in the gear box of some wind turbines in 2011.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

This is not applicable to this monitoring period as it ends on 31/12/2012.

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO ₂ e)		

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Document information

Version	Date	Description
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 anthropogenic 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		
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