



Monitoring report form (Version 03.0)

Monitoring report

Title of the project activity	Cerro de Hula Wind Project
Reference number of the project activity	5584
Version number of the monitoring report	1.0
Completion date of the monitoring report	12/12/2012
Registration date of the project activity	24/04/2012
Monitoring period number and duration of this monitoring period	1 24/04/2012 – 30/11/2012 (inclusive)
Project participant(s)	1. Energía Eólica de Honduras, S.A. 2. EcoSecurities International Limited
Host Party(ies)	Honduras
Sectoral scope(s) and applied methodology(ies)	Sectoral scope: 1 – Energy industries (renewable/non-renewable sources). Project type: Renewable Energy “ACM0002: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 12.2.0, EB 65)
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	136,817 tCO ₂ e ¹
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	117,235 tCO ₂ e

¹ Equivalent to 7.2 months, as per the length of the monitoring period

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The project consists on the first wind farm interconnected to the National Interconnected System of Honduras, located in the Municipalities of Santa Ana and San Buenaventura, Department of Francisco Morazán, 24 km South of Tegucigalpa. The elevation of the Project site is between 1,340 and 1,720m above sea level².

The main purpose of the Cerro de Hula Wind Project (hereafter, the "Project") is to provide affordable electricity to the Honduran grid by means of a renewable, clean, and inexpensive (i.e. zero marginal cost) source: the wind. For this purpose, the Project makes use of 51 GAMESA G87 – 2MW 60Hz wind turbines. The Project has a total installed capacity of 102 MW. The Project owner is Energía Eólica de Honduras, S.A. ("EEHSA") a Honduran legal entity. EEHSA is a subsidiary of Globeleq Mesoamerica Energy ("GME") a company dedicated to the development, construction and operation of renewable energy projects in Central America and adjacent region³.

The electricity generated, is sold to the National Power Utility in Honduras called Empresa Nacional de Energía Eléctrica ("ENEE"⁴) through a 20 year Power Purchase Agreement (PPA)⁵ No. 49/2008, between EEHSA and ENEE.

The Cerro de Hula Substation was completed in September 2011. Energy tests were performed as part of the commissioning process to assure the functionality and integration of key components of the Project (transformer, control systems, etc.) at the end of the same month (September 27th). Civil works were completed in December 2011 and full commercial operations started on the 21st December 2011. The following table summarizes the Project's main milestones:

Milestones	Date
Substation Completion	September 2011
Energy Tests	September 2011
Civil Work Completion	December 2011
Commercial operations start date	December 21, 2011

The total amount of emission reductions achieved in this monitoring period is summarized in the table below:

Monitoring period	Net electricity production	Total emission reductions
24/04/2012 – 30/11/2012	178,691 MWh	117,235 t CO _{2eq}

A.2. Location of project activity

Honduras
Department Francisco Morazán
Municipalities of Santa Ana and San Buenaventura

The Project is located in the hills of *Cerro de Hula* and Izopo, 24 km south of Tegucigalpa.

The geographical coordinates of the Project area are the following:

² Energía Eólica de Honduras, S.A. & Mesoamérica Energy. (2008). Feasibility Study. Eoloeléctrico Honduras 2000 Project. Original title in Spanish "Estudio de Factibilidad. Proyecto Eoloeléctrico Honduras 2000. Cerro de Hula".

³ See www.globeleqmesoamericaenergy.com

⁴ ENEE's web page: <http://www.enee.hn>

⁵ The PPA Title (in Spanish): Contrato de Suministro de 100 MW de Energía Asociada.

Table 1: Project Coordinates

Longitude	Latitude
87° 16' 21.508" W	13° 56' 36.776" N
87° 14' 26.612" W	13° 57' 58.275" N
87° 12' 46.619" W	13° 57' 58.368" N
87° 8' 23.221" W	13° 55' 43.472" N
87° 8' 23.165" W	13° 54' 10.701" N
87° 11' 59.759" W	13° 54' 10.55" N
87° 9' 43.032" W	13° 51' 37.66" N
87° 10' 32.975" W	13° 50' 55.308" N
87° 13' 53.031" W	13° 53' 47.664" N
87° 14' 59.663" W	13° 53' 37.883" N
87° 16' 21.439" W	13° 55' 38.184" N

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)
Honduras (host)	Energía Eólica de Honduras, S.A. (private entity)	No
United Kingdom of Great Britain and Northern Ireland	EcoSecurities International Limited (private entity)	No

A.4. Reference of applied methodology

1. The baseline and monitoring methodology applied is ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.2.0, EB 65).
2. The tool for demonstration and assessment of additionality used is: "Tool for demonstration and assessment of additionality" (Version 06.0.0, EB 65).
3. The tool for calculation the emission factor for an electricity system used is: "Tool to calculate the emission factor for an electricity system" (Version 2.2.0, EB 61).
4. The "Guidelines on additionality of First of its kind Project activities" (Version 01.0, EB 63).

A.5. Crediting period of project activity

Type: 10 years fixed crediting period

The crediting period of the project activity is from 24/04/2012 to 23/04/2022.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

On September, 25th 2011, the Cerro de Hula substation was energized and the Project was connected to the grid. The testing operation period went from 27/09/2011 until 20/12/2011 with the official commissioning of the plant for commercial operation as per the PPA was 21/12/2011. The Project Activity was registered as a CDM Project on 24/04/2012 under reference number 5584.

The Project uses state of the art wind power technology and has a total of 102 MW installed capacity, consisting of 51 Gamesa G87-2-MW 60Hz wind turbines. Assuming a net capacity factor of 39.5%, the total estimated net annual generation is 345,970 MWh/yr⁶. The specific Project data is shown in the following table:

Table 2: Project Data

Project Features	Total nominal capacity	102 MW
	Maximum contracted power⁷	100 MW
Turbine Features	Brand	GAMESA
	Model	G87
	Type	3 blades
	Capacity	2.0 MW
Generator data	Type	Doubly-fed with wound rotor and slip rings
	Nominal power	2000 kW (stator + rotor)
	Voltage	690 Vac
	Frequency	60Hz

During this monitoring period (24/04/2012 - 30/11/2012), the net electricity supply by the Project to the utility was 178,690,765.07 kWh. The monitoring in the Project is carried out as established in the Monitoring Plan by continuous metering of the received and delivered energy.

Regarding events that may impact the GHG emission reductions during the monitoring period, the following are mentioned:

Table 3: Event Log

Date	Start hour	Close hour	Timing	Event
11/05/2012	7:02	16:05	9:03	Shutdown of transformer and associated bus bar substation for maintenance of 230 KV equipment
16/05/2012	7:48	15:05	7:17	Replacement of metering transformer and meter billing
20/05/2012	10:02	11:33	1:31	General trip of 5 circuit breakers to the 34.5 kv collector system of the park
24/05/2012	9:58	14:58	5:00	Shutdown of transformer and associated bus bar substation for maintenance of 230 KV equipment
06/06/2012	7:05	17:25	10:20	General substation trip by failure in Suyapa's substation of ENEE

⁶ The estimation made in the "Energy Yield Assessment for Cerro de Hula Wind Farm, Honduras" (see above reference) is 352,889 MWh and includes the total project installed capacity (102 MW). Since the contracted capacity is 100 MW, the value used for ER calculations has been calculated as $[(352,889/102)*100]$ MWh.

⁷ The PPA with ENEE establishes in clause 2.1 an annual estimation of up to 361,788,000 kWh to be delivered to the ENEE with a 100 MW installed capacity. In order to cover energy production losses due to scheduled maintenance periods and unforeseen events an additional 2MW capacity is installed.

12/06/2012	8:05	11:48	3:43	Shutdown of wind farm due to metering transformer testing
01/07/2012	9:48	9:53	0:05	Trip circuit breaker 2 due to failure in WTG-3.05
11/07/2012	17:08	17:46	0:38	Trip circuit breaker 2 due to failure in WTG-3.06
24/08/2012	10:02	11:52	1:50	Trip circuit breaker 2 due to failure in WTG-3.07
27/08/2012	15:00	17:24	2:24	General wind farm shutdown due to works on 230 kv Substation
04/09/2012	12:44	13:41	0:57	General trip of the park by single phase failure. Bird impact on the aerial collector system CTO-5
16/09/2012	6:28	8:00	1:32	General trip of the park by single phase failure. Squirrel touched the aerial collector system of CTO-5
16/09/2012	12:18	13:08	0:50	General trip of the park by failure in the interconnection line Honduras-El Salvador
21/09/2012	10:03	10:51	0:48	Trip circuit breaker 2 due to failure in WTG-3.06
02/10/2012	15:46	23:59	8:13	Trip of 14 WTGs of area 9 and 10 due to surge by lightning
03/10/2012	0:00	8:46	8:46	Trip of 14 WTG area 9 and 10, due to lightning storm

B.2. Post registration changes

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

Not applicable

B.2.2. Corrections

Not applicable

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

Not applicable

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

Not applicable

B.2.5. Changes to start date of crediting period

Not applicable

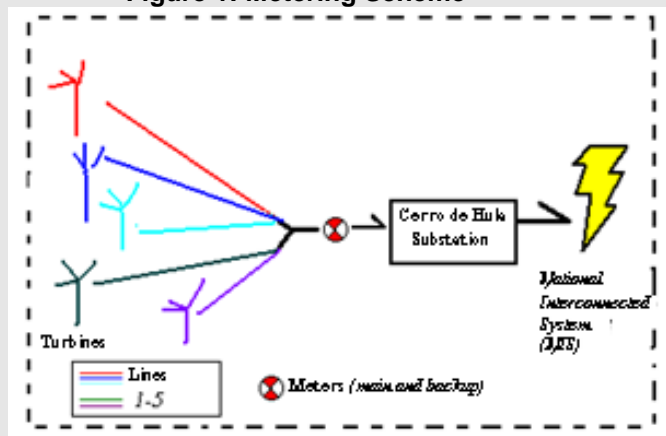
B.2.6. Types of changes specific to afforestation or reforestation project activity

Not applicable

SECTION C. Description of monitoring system

Electricity supplied to the grid by the Project will be monitored at the Metering Point through a Metering System. There are two independent bidirectional meters at Cerro de Hula substation - one meter acts as the main meter and the second one acts as a back-up meter.

Figure 1: Metering Scheme



The main meter used during the period 24/04/2012 to 16/05/2012 was the PT-0801A173-01 (Model ION 8600) and the backup meter used was MT-1101A260-01 (Model ION 8600). In order to comply with Annex C-VI “Commercial Measures System” of the PPA, in which it is stated that the meters have to include communication systems that allow off-site readings, new meters were installed to comply with this requirement. Hence, the main meter used following the replacement (during the period 16/05/2012 to 30/11/2012) was the MW-1111A186-01 (ION 8650), and the backup meter used was MW-1111A188-01 (ION 8650). This allowed access to the meters using the Suyapa Substation⁸ LAN network through the activated WAN link between Suyapa and Cerro de Hula Substations.

The latter explanation is described in the table below:

Table 4: Meters (main and back-up)

PERIOD	MAIN METER (MMED1)	BACKUP METER (MMED2)
24/04/2012 to 16/05/2012	PT-0801A173-01 Model: ION 8600. Security Seal No. 7083126	MT-1101A260-01 Model: ION 8600. Security Seal No. 7083127
16/05/2012 to 30/11/2012	MW-1111A186-01 Model: ION 8650 Security Seal No. 7084005	MW-1111A188-01 Model: ION 8650 Security Seal No. 7084006

As per the PPA the received and delivered energy is obtained primarily from the main meter at the Metering Point on a monthly basis. Only in case an anomaly is detected in the main meter is the data registered in the backup meter used instead, as agreed between EEHSA and ENEE⁹. Hence, as per the PPA, the data obtained from the main meter (which is also used to develop the sales invoices) will be used to calculate emission reductions of the Project in a specific monitoring period.

EEHSA's Operation Supervisor jointly with ENEE's operator, are in charge of reading the meter records the first day of each month¹⁰, during the morning, at the substation, as per the procedure established in the PPA.

⁸ Suyapa's Substation is located in Tegucigalpa and managed by ENEE. This Substation incorporates the National Center of Dispatch of ENEE.

⁹ Page 63 of the PPA

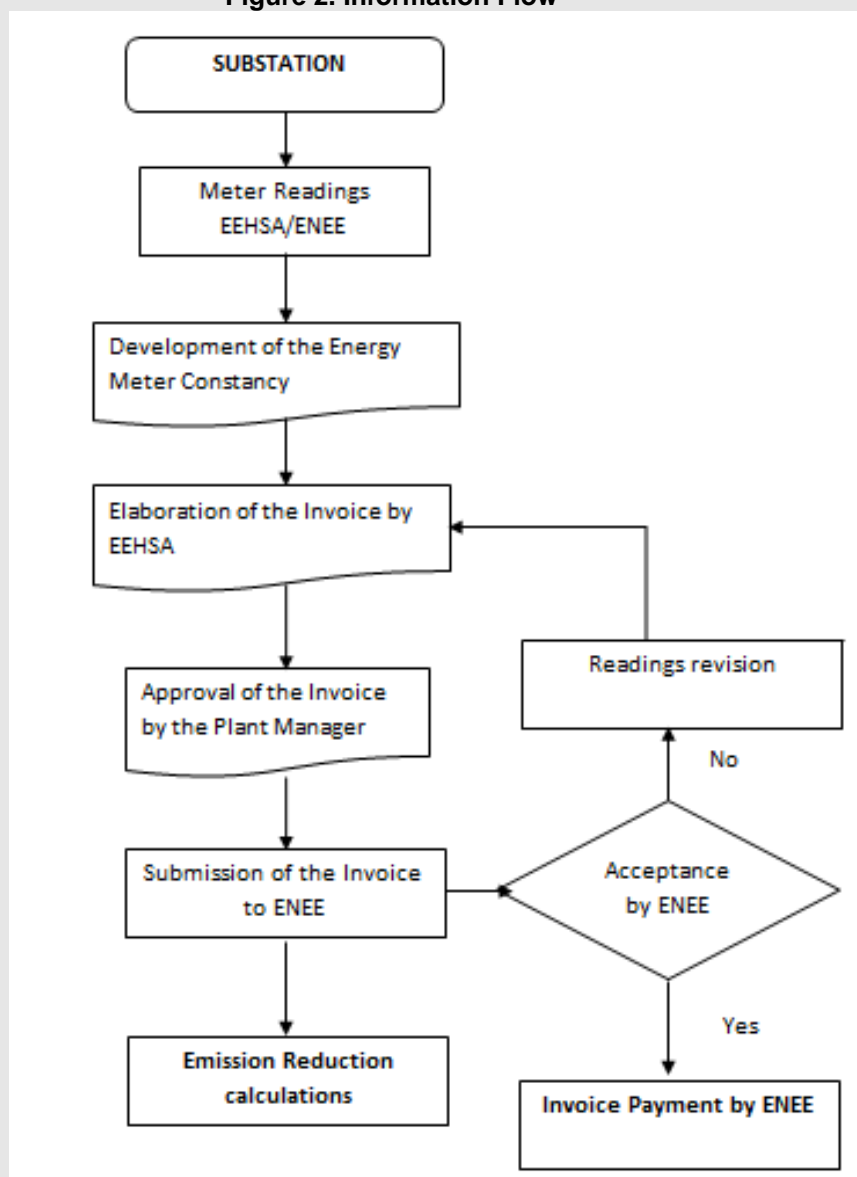
¹⁰ The meters are programmed to keep the reading from hour 24:00 of the last day of the previous month, so that this is the value that is reported and signed by both parties.

Afterwards, EEHSA and ENEE use the meter readings to elaborate an “Energy Meter Constancy” which is approved and signed by both parties and where the monthly generation is stated. This data is used by EEHSA to generate sales invoices to ENEE. The same data is used for emissions reductions calculations.

In addition, the invoices are submitted to ENEE for its revision and approval of the net energy established in the latter. The meter readings/invoices are readily accessible for DOE.

All meter readings are entered into a logbook and excel spreadsheet. The “meter’s load profile” is also stored on a hard disk and a CD-ROM (BACK UP). All Project documents related to the CDM project cycle will be kept on file for the entire crediting period duration plus two (2) additional years.

Figure 2. Information Flow



People involved in monitoring of this Project are showed in the following chat and listed on the following table.

Figure 3: Organizational structure of the Project

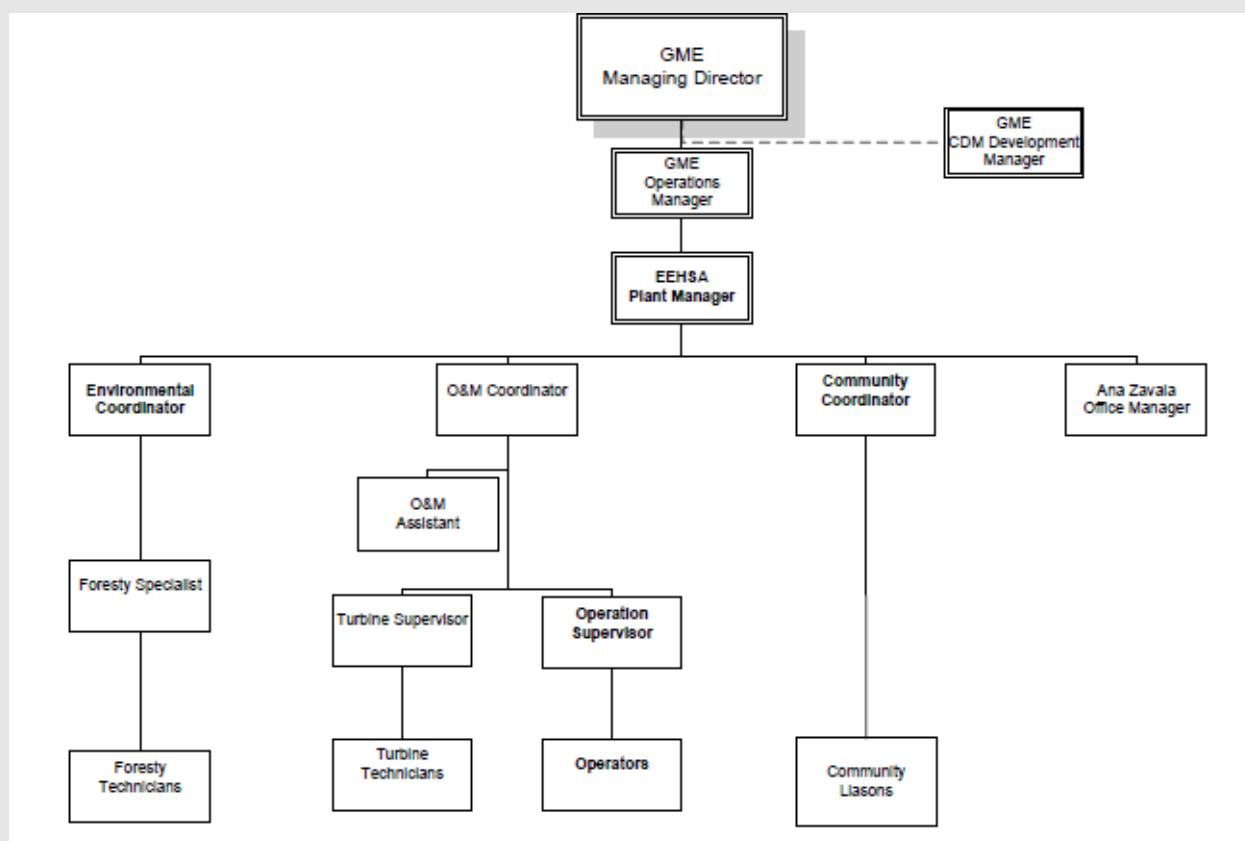


Table 5 - Responsibilities of personnel

Responsible	Tasks
Plant Manager	Responsible for quality assurance and control, including documentation and filing.
Operation Supervisor	Supervise operators and operating processes; coordinate activities and requirements with ENEE; collect data; take power meter readings and cross-check them with invoices.
Environmental Coordinator	Supervise environmental activities; secure, manage and store all information needed to complete the CDM cycle.
CDM Development Manager	Manage information needed to complete the Project's CDM cycle within GME, coordinate and participate in Project verifications; watch over required staff training on Clean Development Mechanism and Sustainable Development.
Manufacturer or service providing company	Calibrate both ENEE and plant power meters.
ENEE Operator	Take power meter readings; provide power meter maintenance and calibration.

Procedures for handling internal auditing and non-conformities

The metering arrangements and the required quality control procedures to ensure accuracy are defined within the PPA¹¹ between EEHSA and ENEE.

The Metering Point is located at the power transformer at the interconnecting substation, Cerro de Hula, built by the Project. An Operating Committee, established in the PPA, by both, EEHSA and ENEE, can define

¹¹ Please refer to Exhibit C-IV of the PPA.

additional/alternate Metering Points if necessary. Maintenance of the Metering System is the responsibility of EEHSA, who will conduct maintenance of said system only in the presence of representatives of ENEE.

The following table sets out the data collection procedures in case of extraordinary faults and events:

Table 6: Data collection procedures in case of extraordinary faults and events

Periodicity	Activity	Responsible	Documentation / Filing
Malfunction in any of ENEE power meters (main or backup)	Immediately report fault to Operations Management, Central Southern Transmission Department, and Operating Committee. Record the event in the logbook. Any equipment replacement or repair should have its own Statement of Work issued by the ENEE & EEHSA Operating Committee. The staff should make sure the new meter is properly installed and calibrated by a qualified company as soon as possible ¹² .	EEHSA Operation Supervisor & Plant Operator on Duty	Document events, dates, and actions taken on the logbook and in electronic format.
In case any turbine(s) or circuits need to be taken offline or in the event of plant downtime	Turbine/Project downtime should be recorded, as well as the reason for being offline and the time they were brought back in line.	EEHSA Plant Operator on Duty & EEHSA Operation Supervisor	Document events, dates, and actions taken on the logbook and in electronic format.
Unforeseeable cases	Any event preventing wind project operation should be promptly reported to Plant Management.	EEHSA Operation Supervisor & EEHSA Plant Operator on Duty	Document events, dates, and actions taken on the logbook and in electronic format.

Calibration of Meters and Metering

The accuracy and frequency of calibration for the meters is established by the manufacturer's specifications. Calibration test records will be maintained for verification. Testing must be conducted by a qualified independent laboratory.

The metering arrangements and the required quality control procedures to ensure accuracy are defined between EEHSA and ENEE. The precision class, requirements for meters and metering transformers, data recording and communication system, commissioning and periodic testing of the metering system, are agreed between Project Developer and the power utility.

Trainings on CDM

CDM training is given to EEHSA staff working in areas related with project monitoring and verification (i.e. management, operations, and environment). Two training process were held, the first one at the beginning of the Project cycle and the second was held on November 2012, for new employees involved in the process¹³.

Training will subsequently be provided to new EEHSA staff involved in the process by the CDM Development Manager of GME.

¹² All notification of installation and certificates calibration will be kept on file.

¹³ Certificates of attendance and the list of trained personnel are kept on file.

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

Data / Parameter:	EF_{grid}, CM, 2007, 2008, 2009
Unit:	tCO ₂ /MWh
Description:	Combined Margin Emission Factor of the Grid Calculated with the latest published official statistical data, using the default weights for wind projects $w_{OM} = 0.75$ and $w_{BM} = 0.25$
Source of data:	IPCC 1996 and ENEC data. Determined in the registered PDD.
Value(s) applied:	0.6561
Purpose of data:	Baseline emission calculation
Additional comment:	This parameter is fixed for the whole crediting period.

D.2. Data and parameters monitored

Data / Parameter:	$EG_{\text{facility},y}$
Unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the Project plant/unit to the grid in year y
Measured/ Calculated / Default:	Measured
Source of data:	Electricity meter reading
Value(s) of monitored parameter:	178,691 MWh (7.2 months)

Monitoring equipment:	<p>The energy is continuously metered at the Delivery Point by two electronic line meters. Originally, the PT-0801A173-01 (ION 8600) meter served as the main meter and the MT-1101A260-01 (ION 8600) as the back-up meter:</p> <p>Period from 24/04/2012 to 16/05/2012:</p> <ul style="list-style-type: none"> - Main (MMED1) - Series: PT-0801A173-01 - Brand: ION, Model: 8600 - Calibration date: 12/01/2011, valid until 11/01/2014 - Power Accuracy: 0,2% - Date of meter installation to the plant: 27/09/2011 - Back Up (MMED2) - Series: MT-1101A260-01, - Brand: ION, Model: 8600 - Calibration date: 13/01/2011, valid until 12/01/2014 - Power Accuracy: 0,2% - Date of meter installation to the plant: 27/09/2011 <p>On 16/05/2012, the meters were replaced by MW-1111A186-01 (ION 8650) meter which was designated as the main meter. The MW-1111A188-01 (ION 8650) meter became the back-up meter.</p> <p>Period from 16/05/2012 to 30/11/2012:</p> <ul style="list-style-type: none"> - Main (MMED1) - Series: MW-1111A186-01 - Brand: ION, Model: 8650 - Calibration date: 28/11/2011, valid until 27/11/2014 - Power Accuracy: 0,1% - Date of meter installation to the plant: 16/05/2012 - Back Up (MMED2) - Series: MW-1111A188-01 - Brand: ION, Model: 8650 - Calibration date: 28/11/2011, valid until 27/11/2014 - Power Accuracy: 0,1% <p>Date of meter installation to the plant: 16/05/2012</p>
Measuring/ Reading/ Recording frequency:	<p>Two bidirectional meters are installed at the Metering Point in the Cerro de Hula Substation, a main meter and a back-up meter. The bidirectional meters measures both electricity generated that is being imported to the grid (imports) and discount electricity that is consumed by the Project (exports). The data (net electricity supplied to the grid) will be read primarily from the main meter at the Project site (recording both imports and exports), as per the PPA. If an anomaly is detected in the data of the main meter, the data of the back-up meter will be used instead.</p> <p>The frequency of the readings will be done on a monthly basis.</p>
Calculation method (if applicable):	N/A

QA/QC procedures:	Meter readings are checked for completeness on a monthly basis by ENEE and EEHSA and cross checked with the sales invoices. Meters will be calibrated according to manufacturer's specifications.
Purpose of data:	Emission reductions calculations
Additional comment:	Data will be archived by means of electronic and paper backup for the full crediting period, plus two year years after the end of the crediting period or the last issuance of CERs, whichever occurs later.

D.3. Implementation of sampling plan

Not applicable

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

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

According to ACM0002, the baseline emissions of the project are equal to:

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

Where:

BE_y Baseline emissions in year y (tCO₂/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 y (MWh/yr) ($EG_{facility}$)

$EF_{grid,CM,y}$ 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" (tCO₂/MWh).

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

There are no project emissions attributable to wind projects. Consequently $PE_y = 0$.

E.3. Calculation of leakage

There is no leakage attributable to wind projects. Consequently $Ly = 0$.

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

According to ACM0002, emission reductions are given by:

$$ER_y = BE_y - PE_y$$

Where:

ER_y Emission reductions in year y (tCO₂/yr)

BE_y Baseline emissions in year y (tCO₂/yr)

PE_y Project emission reductions in year y (tCO₂/yr)

Therefore: $ER_y = BE_y$

As there are no project emissions or leakage attributable to wind projects, the total emissions reductions of the Cerro de Hula Wind Project are identical to the estimated baseline emissions.

The total of emission reduction achieved during the monitoring period is 117,235 tCO₂, after rounding down.

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	117,235	0.00	0.00	117,235

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	Item	Values estimated in ex-ante calculation of registered PDD
Emission reductions or GHG removals by sinks (t CO₂e)	136,817 ¹⁴	117,235	N/A	N/A

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

The actual values reached during the whole monitoring period are 19,582 tCO_{2e} lower than what is stated in the registered PDD (Section A.4.4), for the equivalent amount of time (7.2 months). The latter mainly because the months included during this monitoring period are those in the low wind season.

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

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 CO₂e)	117,235	0.00

¹⁴ Equivalent to 7.2 months, as per the monitoring period

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
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		
Keywords: monitoring report, performance monitoring		