



**Monitoring report form
(Version 05.1)**

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT

Title of the project activity	Cerro de Hula Wind Project	
UNFCCC reference number of the project activity	5584	
Version number of the monitoring report	1.0	
Completion date of the monitoring report	17/06/2016	
Monitoring period number and duration of this monitoring period	3 rd monitoring period 01/01/2014 – 31/12/2015 (inclusive)	
Project participant(s)	Energía Eólica de Honduras, S.A.	
Host Party	Honduras	
Sectoral scope(s)	Sectoral scope: 1 – Energy industries (renewable/non-renewable sources). Project type: Renewable Energy	
Selected methodology(ies)	"ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.2.0, EB 65)	
Selected standardized baseline(s)	N/A	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	2014 = 232,480 tCO ₂ e 2015 = 276,137 tCO ₂ e Total = 508,617 tCO ₂ e (equivalent to years of the monitoring period)	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0 tCO ₂ e	546,189 tCO ₂ e

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 level¹.

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 56 GAMESA G87 – 2MW 60Hz and 7 GAMESA G97 - 2MW 60Hz wind turbines. The Project has a total installed capacity of 126 MW. The Project owner is Energía Eólica de Honduras, S.A. ("EEHSA") a Honduran legal entity. EEHSA is a subsidiary of Globeleq Mesoamerica Energy (Wind) Limited ("GME") a company dedicated to the development, construction and operation of renewable energy projects in Central America and adjacent region².

The electricity generated by the Project, is sold to the National Power Utility in Honduras called Empresa Nacional de Energía Eléctrica ("ENEE"³) through a 25 year Power Purchase Agreement (PPA)⁴ No. 229-2012, 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 of the first phase (102 MW) were completed in December 2011 and full commercial operations started on the 21st December 2011. The civil works of the second phase (126 MW) started on January, 2014 and full commercial operations started on November 2014. The following table summarizes the Project's main milestones:

Milestones	Date
Substation Completion	September 2011
Energy Tests	September 2011
Civil Work Completion (Initial Phase-102 MW)	December 2011
Commercial operations start date	December 21, 2011
Civil Work Start Date (Second Phase-126 MW)	January, 2014
Commercial operations start date	November, 2014

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
01/01/2014 – 31/12/2015	832,494 MWh	546,189 tCO₂

A.2. Location of project activity

- a) Honduras
- b) Department Francisco Morazán

¹ 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".

² See www.globeleqmesoamericaenergy.com

³ ENEE's web page: <http://www.enee.hn>

⁴ The PPA Title (in Spanish): Contrato de Suministro de 124 MW de Energía Asociada.

- c) Municipalities of Santa Ana and San Buenaventura
- d) The Project is located in the hills of *Cerro de Hula* and Izopo, 24 km south of Tegucigalpa. The geographical coordinates of the Project boundary are the following:

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° 08' 23.221" W	13° 55' 43.472" N
87° 08' 23.165" W	13° 54' 10.701" N
87° 11' 59.759" W	13° 54' 10.550" N
87° 09' 43.032" W	13° 51' 37.660" 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 whether the Party involved wishes to be considered as project participant (yes/no)
Honduras (Host)	Energía Eólica de Honduras, S.A. (private entity)	No

A.4. Reference of applied methodology and standardized baseline

- a) 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).
- b) The tool for demonstration and assessment of additionality used is: "Tool for demonstration and assessment of additionality" (Version 06.0.0, EB 65).
- c) 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).
- d) The "Guidelines on additionality of First of its kind Project activities" (Version 01.0, EB 63). Reference to the UNFCCC CDM web site:

<http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT>

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.

A.6. Contact information of responsible persons/entities

Geo Ingeniería Ingenieros Consultores S.A., based in San José, Costa Rica, completed the CDM-MR-FORM.

- Phone number: +(506) 2290 4656 / Fax: + (506) 2290 5297
- E-mail: scaastro@geoingenieria.co.cr
- Web: www.geoingenieria.co.cr

This entity is not considered as a project participant.

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 (102 MW) 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 capacity of the project was eventually increased to a total of 126 MW (consisting of 63 wind turbines of 2 MW each), by installing 12 additional WTGs of 2 MW each. The Project Activity was registered as a CDM Project on 24/04/2012 under reference number 5584, and these changes were approved on 17/02/2014.

The Project uses state of the art wind power technology and has a total of 126 MW installed capacity, consisting of 56 Gamesa G87-2-MW 60Hz and 7 Gamesa G97-2-MW 60Hz wind turbines. Assuming a net capacity factor of 39.5%, the total estimated net annual generation is 420,876 MWh/yr⁵. The specific Project data is shown in the following table:

Table 2: Project Data

Project Features	Total nominal capacity	126 MW
	Maximum contracted power⁶	124 MW
Turbine Features	Brand	GAMESA
	Model	G87 and G97
	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 V ac
	Frequency	60Hz

During this monitoring period (01/01/2014 - 31/12/2015), the net electricity supply by the Project to the utility was 832,558 MWh (Applying the 0.2% error, it will be 832,494 MWh). 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
09/04/2014	13:05	13:20	00:15	Switch activation due to voltage gap in the grid
14/04/2014	11:10	12:00	00:50	Shoot on line L19, opening of 62L19 and 62E44 switches, general shoot of park
17/05/2014	06:33	08:10	01:37	Breaker activation due to voltage gap in the grid
27/06/2014	14:57	17:55	02:58	Breaker activation due to voltage gap in the grid
12/07/2014	17:51	19:14	01:23	Shoot of CKTO 4, 5 and 6. Gap on grid voltage, alarm activation on relays over current 50/51
	17:51	19:38	01:47	Shoot of CKTO 4, 5 and 6. Gap on grid voltage, alarm activation on relays over current 50/51

⁵ The estimation made in the "Energy Yield Assessment for Cerro de Hula Wind Farm, Honduras" (see above reference) is 420,876 MWh/year and includes the total project installed capacity (126 MW).

⁶ 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.

13/07/2014	00:00	08:47	08:47	This fail only carries time of 3 WTG of previous day (it was not operated any Metal Clad switch this day)
02/08/2014	06:04	18:41	12:37	Clearance for interconnection works of expansion CDH-2
02/08/2014	23:50	23:59	00:09	Clearance for interconnection works of expansion CDH-2
03/08/2014	00:00	18:20	18:20	Clearance for interconnection works of expansion CDH-2
11/08/2014	00:12	05:56	05:44	Clearance for interconnection works of expansion CDH-2
15/08/2014	05:12	07:31	02:19	Breaker activation due to voltage gap in the grid
15/08/2014	14:53	22:39	07:46	Clearance for interconnection works of expansion CDH-2
02/09/2014	06:30	18:01	11:31	Clearance for interconnection works of expansion CDH-2
03/09/2014	06:22	17:45	11:23	Clearance for interconnection works of expansion CDH-2
16/09/2014	06:25	18:03	11:38	Clearance for interconnection works of expansion CDH-2
17/09/2014	06:15	17:58	11:43	Clearance for interconnection works of expansion CDH-2
22/09/2014	06:29	17:17	10:48	Clearance for interconnection works of expansion CDH-2
23/09/2014	06:43	18:42	11:59	Clearance for interconnection works of expansion CDH-2
24/09/2014	06:29	18:40	12:11	Clearance for interconnection works of expansion CDH-2
26/09/2014	06:33	18:54	12:21	Clearance for interconnection works of expansion CDH-2
27/09/2014	06:36	19:16	12:40	Clearance for interconnection works of expansion CDH-2
30/09/2014	06:37	17:40	11:03	Clearance for interconnection works of expansion CDH-2
01/10/2014	06:50	17:36	10:46	Clearance for interconnection works of expansion CDH-2
02/10/2014	06:39	19:00	12:21	Clearance for interconnection works of expansion CDH-2
03/10/2014	06:41	19:40	12:59	Clearance for interconnection works of expansion CDH-2
04/10/2014	06:37	19:35	12:58	Clearance for interconnection works of expansion CDH-2
06/10/2014	06:35	19:03	12:28	Clearance for interconnection works of expansion CDH-2
07/10/2014	06:43	22:00	15:17	Clearance for interconnection works of expansion CDH-2
08/10/2014	08:18	20:05	11:47	Clearance for interconnection works of expansion CDH-2
09/10/2014	07:56	21:50	13:54	Clearance for interconnection works of expansion CDH-2
10/10/2014	08:00	18:10	10:10	Clearance for interconnection works of expansion CDH-2
11/10/2014	07:10	17:30	10:20	Clearance for interconnection works of expansion CDH-2
12/10/2014	07:03	21:40	14:37	Clearance for interconnection works of expansion CDH-2
13/10/2014	07:41	22:08	14:27	Clearance for interconnection works of expansion CDH-2
14/10/2014	08:59	11:36	02:37	Clearance for interconnection works of expansion CDH-2
14/10/2014	08:59	11:36	02:37	Clearance for interconnection works of expansion CDH-2
15/10/2014	07:55	15:30	07:35	Clearance for interconnection works of expansion CDH-2
18/10/2014	07:45	15:30	07:45	Clearance for interconnection works of expansion CDH-2
20/10/2014	08:08	14:05	05:57	Clearance for interconnection works of expansion CDH-2
20/10/2014	09:19	17:56	08:37	Clearance for interconnection works of expansion CDH-2, interconnection of AG-403.
21/08/2014	07:23	11:15	03:52	Clearance for charge distribution works of transformers
21/08/2014	13:12	15:08	01:56	Clearance for charge distribution works of transformers
23/10/2014	07:11	23:59	16:48	Clearance for interconnection works of expansion CDH-2, interconnection of AG-703.
23/10/2014	10:30	15:23	04:53	Transformer 1 maintenance
24/10/2014	00:00	13:50	13:50	Clearance for interconnection works of expansion CDH-2, interconnection of AG-403.
25/10/2014	05:32	11:06	05:34	General shoot of park due to transformer 2 failure
25/10/2014	17:28	23:59	06:31	Shoot cause of high generation, active power regulated of SGIPE
26/10/2014	00:00	23:59	23:59	Shoot cause of high generation, active power regulated of SGIPE

27/10/2014	00:00	17:51	17:51	Shoot cause of high generation, active power regulated of SGIPE
	14:03	17:52	03:49	Open switch due to circuit 6 repair
	14:02	17:52	03:50	Open switch due to circuit 6 repair
28/10/2014	13:42	13:52	00:10	Clearance for energization of transformer 2
01/11/2014	18:20	23:59	05:39	Overcurrent shoot 50/51, phase B to land
02/11/2014	00:00	11:45	11:45	Overcurrent shoot 50/51, phase B to land
	12:28	23:59	11:31	Overcurrent shoot 50/51, phase B to land
	18:20	23:59	05:39	Overcurrent shoot 50/51, phase B to land
03/11/2014	00:00	17:10	17:10	Overcurrents shoot 50/51, phase B to land. Area 8 isolation
	00:00	15:45	15:45	Overcurrent shoot 50/51, phase B to land
	13:35	15:10	01:35	Pruning season
04/11/2014	15:02	18:28	03:26	Phase C to land fail inspection of CKTO-5
				Phase C to land fail inspection of CKTO-5
	17:34	17:39	00:05	Empty tests for Circuit 6
	18:18	18:41	00:23	Empty tests for Circuit 6
06/11/2014	03:35	19:04	15:29	Overcurrent shoot 50/51, phase B to land
	07:44	19:04	11:20	Circuit 6 shoot, relocation of cell in Metal Clad.
		11:18		
		11:18		
		11:18		
		11:18		
	09:00	11:18	02:18	Switch opening for fail repair
07/11/2014	19:04	23:59	04:55	Circuit 6 shoot, relocation of cell on metal clad. Area 8 stays isolated
	00:00	23:59	23:59	Circuit 6 shoot, relocation of cell on metal clad. Area 8 stays isolated
	15:53	16:10	00:17	Circuit 6 shoot, relocation of cell on metal clad. Area 8 its energized
08/11/2014	15:48	18:22	02:34	Circuit 6 shoot, relocation of cell on metal clad. Area 8 its energized
	19:00	23:59	04:59	Area 8 stay in pause to protect Circuit 4 of any event
09/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
10/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
11/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
12/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
	06:14	19:47	13:33	Phase C to land fail inspection of CKTO-5
	06:14	20:30	14:16	Phase C to land fail inspection of CKTO-5
	06:14	20:30	14:16	Phase C to land fail inspection of CKTO-5
13/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
14/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
15/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
16/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
17/11/2014	00:00	23:59	23:59	Area 8 stay in pause to protect Circuit 4 of any event
	06:15	23:57	17:42	General clearance of park
	06:15	23:56	17:41	General clearance of park
	10:05	17:43	07:38	General clearance of park
	10:05	17:45	07:40	General clearance of park

	10:05	17:43	07:38	General clearance of park
	10:05	23:55	13:50	General clearance of park
18/11/2014	00:00	08:49	08:49	Fail on switch junction, affected area 8
	08:49	08:55	00:06	Open switch due to repair
24/11/2014	09:56	12:17	02:21	Extension of CDH2
	12:30	13:31	01:01	Area 8 stay in pause to protect Circuit 4 of any event
20/01/2015	13:22	15:00	01:38	Clearance of CKT-5 due to loose joint
11/02/2015	13:04	15:00	01:56	Pending works of construction CDH2
	13:09	15:00	01:51	Pending works of construction CDH2
12/06/2015	15:33	19:05	03:32	Circuits 4, 5 and 6 due to electric storm
	15:33	00:00	08:27	Circuits 4, 5 and 6 due to electric storm
	15:33	00:00	08:27	Circuits 4, 5 and 6 due to electric storm
13/06/2015	00:00	09:33	09:33	Circuits 4, 5 and 6 due to electric storm
	00:00	10:06	10:06	Circuits 4, 5 and 6 due to electric storm
	07:25	09:26	02:01	Open switch for air line inspection on area 8
24/06/2015	05:55	00:00	18:05	Clearance for back-up cells in T1 at 34.5 kV substation
	06:05	00:00	17:55	Clearance for back-up cells in T1 at 34.5 kV substation
	06:10	00:00	17:50	Clearance for back-up cells in T1 at 34.5 kV substation
	06:17	00:00	17:43	Clearance for back-up cells in T1 at 34.5 kV substation
	06:31	19:32	13:01	Clearance for back-up cells in T1 at 34.5 kV substation
25/06/2015	00:00	10:25	10:25	Clearance for back-up cells in T1 at 34.5 kV substation
	00:00	10:26	10:26	Clearance for back-up cells in T1 at 34.5 kV substation
	00:00	10:29	10:29	Clearance for back-up cells in T1 at 34.5 kV substation
	00:00	11:31	11:31	Clearance for back-up cells in T1 at 34.5 kV substation
	10:25	10:45	00:20	Shoot at end of clearance for back-up cells in T1 at 34.5 kV substation
	10:26	10:45	00:19	Shoot at end of clearance for back-up cells in T1 at 34.5 kV substation
	10:29	10:43	00:14	Shoot at end of clearance for back-up cells in T1 at 34.5 kV substation
27/06/2015	05:45	00:00	18:15	Clearance for back-up cells in T2 at 34.5 kV substation
	05:45	00:00	18:15	Clearance for back-up cells in T2 at 34.5 kV substation
	00:00	08:08	08:08	Clearance for back-up cells in T2 at 34.5 kV substation
	00:00	08:08	08:08	Clearance for back-up cells in T2 at 34.5 kV substation
28/06/2015	05:55	21:20	15:25	Improvement works for collector circuit
	05:55	19:32	13:37	Improvement works for collector circuit
29/06/2015	03:39	09:05	05:26	Shoot of T2 switch (low gas pressure on SF6)
	07:43	00:00	16:17	Improvement works for collector circuit
	13:45	00:00	10:15	Improvement works for collector circuit
30/06/2015	00:00	10:04	10:04	Improvement works for collector circuit
	00:00	10:03	10:03	Improvement works for collector circuit
	10:39	10:50	00:11	Clearance for transformer 2 energization
	10:26	10:53	00:27	Clearance for transformer 2 energization
	17:32	17:58	00:26	Clearance for transformer 2 energization
	17:35	17:58	00:23	Clearance for transformer 2 energization
01/07/2015	06:12	18:30	12:18	Improvement works for collector circuit
	06:12	18:27	12:15	Improvement works for collector circuit
14/08/2015	07:32	13:40	06:08	CKT-4 overcurrent shoot 50/51

	12:10	13:40	01:30	Clearance for change of isolator (pole 54)
	12:10	13:40	01:30	Clearance for change of isolator (pole 54)
25/08/2015	05:30	18:50	13:20	Clearance for reclamation of warranty on collector circuit
	05:50	18:52	13:02	Clearance for reclamation of warranty on collector circuit
26/08/2015	05:08	18:55	13:47	Clearance of circuits 4, 5 and 6 for inspections works of lightning rod on area 8, fiber repair on CA5 and poles repair
	05:04	19:40	14:36	Clearance of circuits 4, 5 and 6 for inspections works of lightning rod on area 8, fiber repair on CA5 and poles repair
	05:06	19:44	14:38	Clearance of circuits 4, 5 and 6 for inspections works of lightning rod on area 8, fiber repair on CA5 and poles repair
09/09/2015	05:56	16:17	10:21	Clearance for installation works of new poles on main road of Santa Ana
10/09/2015	07:25	14:12	06:47	Clearance for installation works of new poles on main road of Santa Ana
17/09/2015	06:05	18:59	12:54	Clearance for installation works of new poles on main road of Santa Ana
	06:05	18:59	12:54	Clearance for installation works of new poles on main road of Santa Ana
22/09/2015	13:25	14:57	01:32	Clearance for change pole works in main road of Santa Ana
25/09/2015	09:16	16:31	07:15	Clearance for repair works of optic fiber on area 8
30/09/2015	10:09	10:56	00:47	Clearance for pole extraction on main road of Santa Ana
04/11/2015	06:16	06:30	00:14	Clearance for Transformer 1 maintenance
	06:16	06:39	00:23	Clearance for Transformer 1 maintenance
	06:16	07:35	01:19	Clearance for Transformer 1 maintenance
	06:16	07:48	01:32	Clearance for Transformer 1 maintenance
	06:42	07:36	00:54	Clearance for Transformer 1 maintenance
05/11/2015	06:24	07:04	00:40	Clearance for Transformer 2 maintenance
	06:27	07:04	00:37	Clearance for Transformer 2 maintenance
	06:32	07:04	00:32	Clearance for Transformer 2 maintenance
	06:47	07:04	00:17	Clearance for Transformer 2 maintenance
	06:51	07:04	00:13	Clearance for Transformer 2 maintenance
	06:30	07:04	00:34	Clearance for Transformer 2 maintenance
06/11/2015	12:38	13:10	00:32	Clearance for Transformer 2 maintenance
	12:38	12:47	00:09	Clearance for Transformer 2 maintenance
04/12/2015	11:25	13:21	01:56	Total shut down of park, national shut down

B.2. Post-registration changes

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

Not applicable

B.2.2. Corrections

The Project Participant was updated in the revised PDD (approved on 17/02/2014) to coincide with the valid MoC. 5584. Post-registration change reference PRC-5584-001.

B.2.3. Changes to start date of crediting period

Not applicable

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

Not applicable

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

A Request for post-registration changes to the project activity (PRC ref No. PRC-5584-002) was submitted by the DOE to UNFCCC on 21/10/2015 and approved on 10/01/2016.

Information on this request and related documents are available as of today on the UNFCCC CDM web site < http://cdm.unfccc.int/Projects/DB/PJR_CDM1324448058.56/history>

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

A request for approval of changes to the project activity (PRC ref No. PRC-5584-001) was submitted by the DOE to UNFCCC on 07/01/2014 and approved on 17/02/2014.

Information on this request and related documents are available as of today on the UNFCCC CDM web site < http://cdm.unfccc.int/Projects/DB/PJR_CDM1324448058.56/history>

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

Not applicable

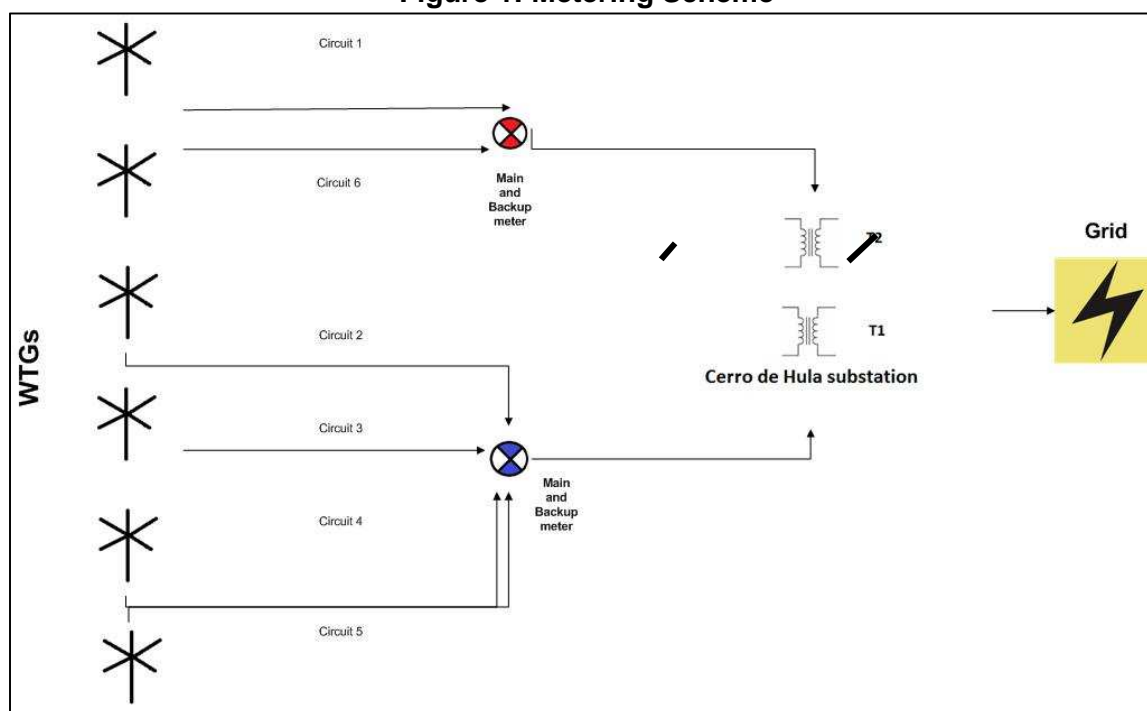
SECTION C. Description of monitoring system

As part of the expansion required at the Cerro de Hula Substation in order to adequately handle all the energy coming from the wind farm, an additional pair of bi-directional electricity meters were installed and verified. The provider of the new electricity meters is Power Logic and the model for both the main (MMED-1) and back-up (MMED-2) meters are ION 8650, series number MW-1308A261-01 and MW-1310A906-01 respectively.

Electricity supplied to the grid by the Project will be monitored at two Metering Points through a Metering System, each of which is comprised by a pair of bi-directional meters. Initially, the Metering Points will be located before each of the two power transformers at the interconnecting substation (*Cerro de Hula*). The total quantity of net electricity supplied to the grid results from the addition of the net electricity determined at each metering point.

As per Figure 1 below, the WTGs will deliver their energy to the 1st transformer via circuits 2, 3, 4 and 5 and to the 2nd transformer via circuits 1 and 6. In case of failure and/or maintenance works at one of the transformers, the energy will be delivered to the functional one; however, under this scenario (i.e. only one operational transformer) the capacity will be limited to 100 MW by the SCADA system.

Figure 1: Metering Scheme



The main meter used during the period 01/01/2014 to 31/12/2015 was the MW-1111A186-01 (Model ION 8650) and the backup meter used was MW-1111A188-01 (Model ION 8650). The additional pair of bi-directional electricity meters were installed and verified in 25/08/2014, and were used since 01/11/2014 until 31/12/2015. All meters 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.

The latter explanation is described in the table below:

Table 4: Meters (main and back-up)

PERIOD	MAIN METER (MMED1)	BACKUP METER (MMED2)
01/01/2014 – 31/12/2015	MW-1111A186-01 Model: ION 8650 Security Seal No. CS8-42016 ⁷	MW-1111A188-01 Model: ION 8650 Security Seal No. CS8-42017
01/11/2014 – 31/12/2015	MW-1308A261-01 Model: ION 8650 Security Seal No. 154574	MW-1310A906-01 Model: ION 8650 Security Seal No. 154575

As per table above, meters **MW-1111A186-01** and **MW-1111A188-01**, had a delayed verification as per the PPA (every 2 years), as it was valid up to 17/12/2015 (see Section D.2) and the verification of the calibration wasn't available at the time of developing this Monitoring Report. Hence an adjustment in the electricity generation readings has been applied to the month of December 2015 (even though the calibration only from 17th and on, the adjustment was applied to the entire month for simplicity). As explained above, the verification report wasn't available at the time of preparing the MR, hence the maximum permissible error of the meters of $\pm 0.2\%$ was applied for the period.

As mentioned above, there will be two pairs of independent bidirectional meters at Cerro de Hula Substation – each pair is comprised by a main and a back-up meter. As per the PPA, the data (received and delivered energy) will be read primarily from the main meter at each Metering Point on a monthly basis. If an anomaly is detected in the data of the main meter, the data of the respective

⁷ Security seals of both meters were changed on December 18, 2013

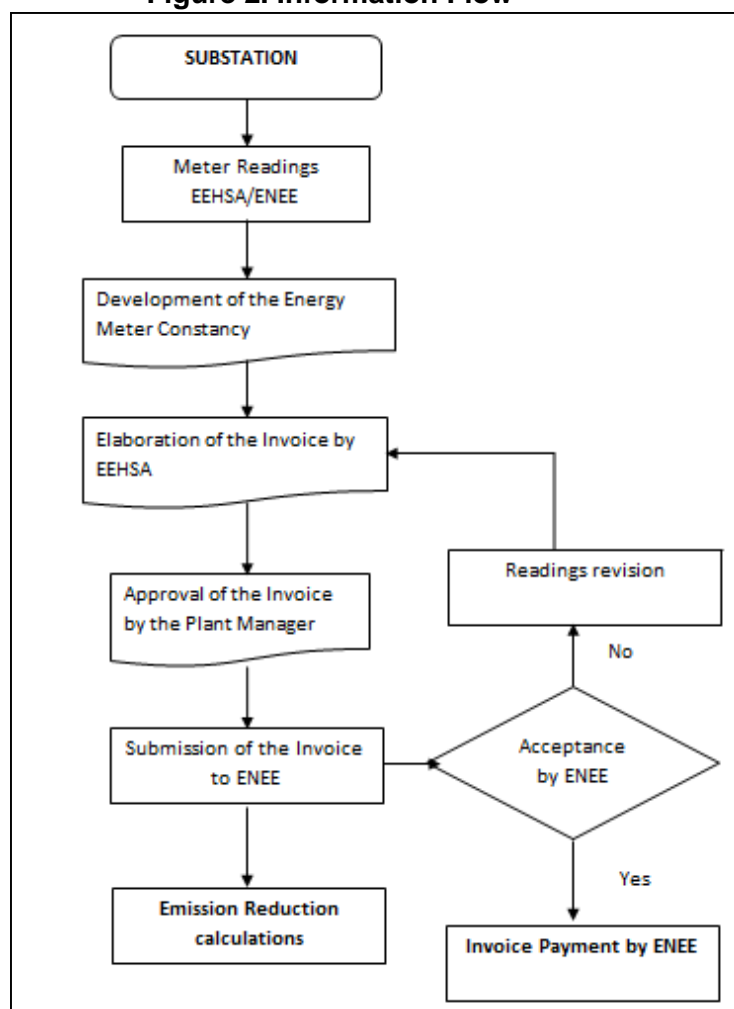
back-up meter will be used instead as agreed between EEHSA and ENEE⁸. Representatives of the Project and the power utility will read the meters each month as per the procedure agreed between them. Hence, as per the PPA, the data obtained from the main meters (which is also used to develop the sales invoices) 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 month⁹, during the morning, at the substation, as per the procedure established in the PPA. 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



⁸ Page 63 of the PPA

⁹ 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.

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

Figure 3: Organizational structure of the Project

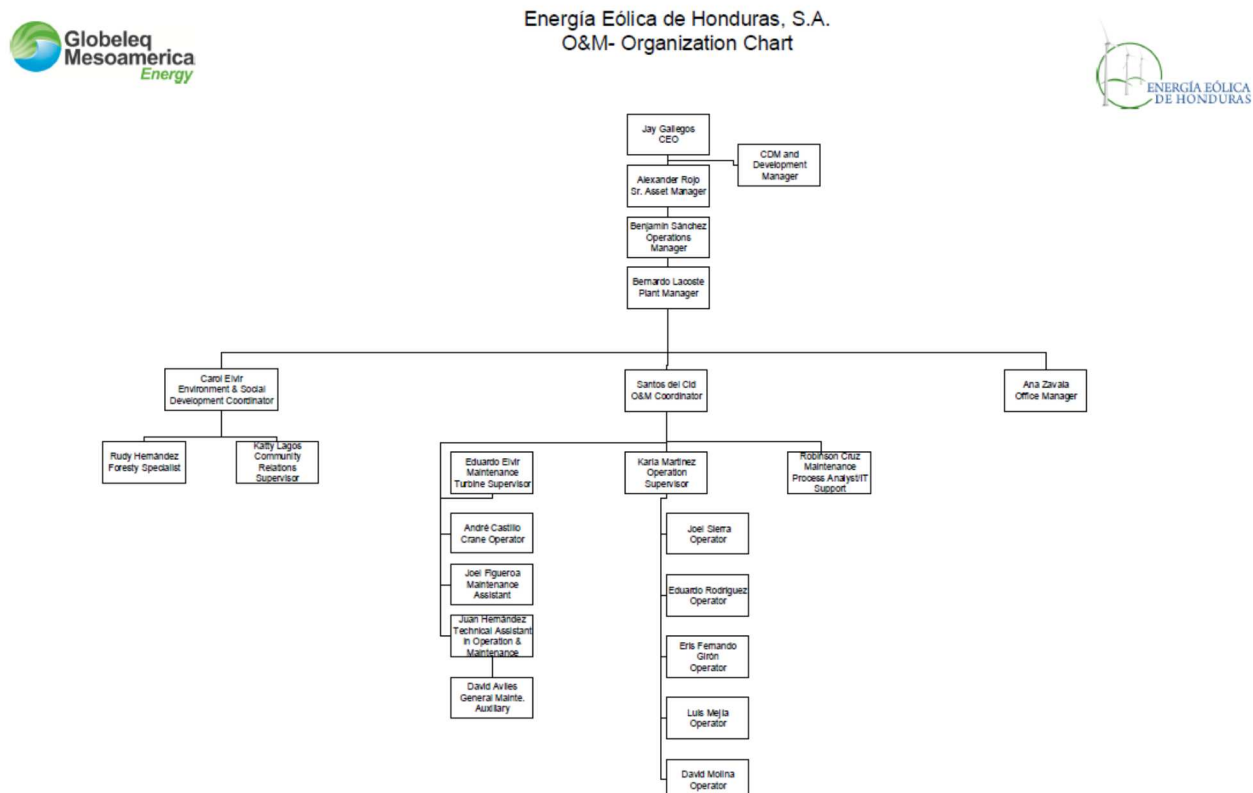


Table 5 - Responsibilities of personnel

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 PPA¹⁰ between EEHSA and ENEE.

The Metering Points are located at the power transformers 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 additional/alternate Metering Points if necessary. Maintenance of the Metering

¹⁰ Please refer to Exhibit C-IV of the PPA.

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 ¹¹ .	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

As established in the manufacturer's specifications the meters don't need to be calibrated. The accuracy and frequency of the verification of precision of the meters is established in the PPA between EEHSA and ENEE. Verification test records of the meters will be maintained for verification of the emission reductions by the DOE. 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 EEHSA and the power utility, too.

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). Three training process have been held, the first one at the beginning of the Project cycle, the second was held on November 2012, for new employees involved in the process and the third was held on June 8th, 2016 to the General Manager and the Senior Operator¹².

¹¹ All notification of installation and certificates calibration will be kept on file.

¹² Certificates of attendance and the list of trained personnel are kept on file.

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

SECTION D. Data and parameters

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

Data/parameter:	EFgrid, 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 ENEE data. Determined in the registered PDD.
Value(s) applied)	0.6561
Choice of data or measurement methods and procedures	
Purpose of data	Calculation of baseline emissions
Additional comments	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	C

Monitoring equipment	<p>The energy is continuously metered at the Delivery Point by two electronic line meters. The MW-1111A186-01 (ION 8650) meter served as the main meter and the MW-1111A188-01 (ION 8650) as the backup meter</p> <p><u>Period from 01/01/2014 to 31/12/2015</u></p> <p>Main (MMED1) Series: MW-1111A186-01 Brand: ION, Model: 8650 Calibration/verification dates: 28/11/2011 (valid until 15/05/2014; 2 years after meter installation to the plant) and 18/12/2013 (valid until 17/12/2015). Power Accuracy: 0.2% Date of meter installation to the plant: 16/05/2012</p> <p>Back Up (MMED2) Series: MW-1111A188-01 Brand: ION, Model: 8650 Calibration/verification dates: 28/11/2011 (valid until 15/05/2014; 2 years after meter installation to the plant) and 18/12/2013 (valid until 17/12/2015). Power Accuracy: 0.2% Date of meter installation to the plant: 16/05/2012.</p> <p><u>Period from 01/11/2014 to 31/12/2015</u></p> <p>Main (MMED1) Series: MW-1308A261-01 Brand: ION, Model: 8650 Calibration/verification dates: 27/08/2013 (valid until 24/08/2016; 2 years after meter installation to the plant) and 25/08/2014 (valid until 24/08/2016). Power Accuracy: 0.2% Date of meter installation to the plant: 25/08/2014</p> <p>Back Up (MMED2) Series: MW-1310A906-01 Brand: ION, Model: 8650 Calibration/verification dates: 25/10/2013 (valid until 24/08/2016; 2 years after meter installation to the plant) and 25/08/2014 (valid until 24/08/2016). Power Accuracy: 0.2% Date of meter installation to the plant: 25/08/2014.</p> <p>Verification frequency of the meters: every 2 years as per the PPA.</p>
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Measuring/reading/recording frequency:	<p>Two pairs of independent bidirectional meters are installed at the Metering Points in the Cerro de Hula Substation, each pair is comprised by 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 calculated from the readings from the main meter at each Metering Point at the Project site (recording both imports and exports that will be deducted to obtained the net electricity), as per the PPA. The total quantity of net electricity supplied to the grid results from the addition of the net electricity determined at each metering point. 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 energy is continuously metered, the recording is done every 15 minutes and the frequency of the readings will be done on a monthly basis.</p>
Calculation method (if applicable):	N/A
QA/QC procedures:	<p>Meter readings are checked for completeness on a monthly basis by ENEE and EEHSA and cross checked with the sales invoices.</p> <p>Meters will be verified according to the PPA.</p>
Purpose of data:	Calculation of baseline emissions.
Additional comments:	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).

<i>y</i>	<i>EG_{PJ,y}</i> (MWh)	<i>EF_{grid,CM,y}</i> (tCO ₂ / MWh)	<i>BE_y</i> (tCO _{2e}) ¹³
2014	372,837	0.6561	244,612
2015	459,657	0.6561	301,577
Total	832,494	-	546,189

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.

Summary of calculation of emission reductions or net GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO _{2e})	Project emissions or actual net GHG removals by sinks (t CO _{2e})	Leakage (t CO _{2e})	GHG emission reductions or net GHG removals by sinks (t CO _{2e}) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	546,189	0	0	0	546,189	546,189

E.4. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO _{2e})	508,617 tCO _{2e}	546,189 tCO _{2e}

E.5. Remarks on difference from estimated value in registered PDD

The actual values of emission reductions achieved during this monitoring period are 546,189 tCO_{2e}; 7.39% higher than the values estimated ex ante in the registered PDD for 2014 and 2015. However, in 2014, the ex-ante calculation considered the energy generation since December 2014, instead of November, which really was the case. Hence, for an equivalent amount of time, including month of November, the emission reductions achieved were 6.31% higher. This is a direct consequence of an equally higher electricity generation, as compared to the estimate used in the PDD for a same period of time (i.e. 832,494 MWh versus 783,056 MWh, including November).

Production at wind farms varies greatly from year to year due to changes in weather patterns and frequency distribution of wind speeds. This was the case of year 2015, where wind power generation was greatly affected in Honduras by means of the “*Fenómeno del Niño*”, which was reflected mainly in disorder of the rainy season and the behaviour of the temperature and wind. Because of “*El Niño*”, in 2015, Cerro de Hula, generated an increase in wind speeds compared to the estimated for that year, specifically during the months in which normally a slow wind speed is expected, for example May 2015 registered a generation of 35.8 GWh versus 20.2 GWh that were forecasted, more than 77%, as well as August 2015, where a generation of 42.1 GWh was registered versus 26.6 GWh forecasted, 58% more.

¹³ Total emission reductions after rounding down.

Figures with the wind behaviour and monthly generation of the Cerro de Hula Project, are available to the DOE, which show how in the rainiest months (May to September) the wind speed increased in comparison with previous estimates.

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

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	ENERGÍA EÓLICA DE HONDURAS, S.A.
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Country	Honduras
Telephone	+504 2264-0042
Fax	Fax.+504 2277-0804 ext. 2106
E-mail	cdm@mesoamericaenergy.com
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Title	Development and CDM Manager
Salutation	Mr.
Last name	Umana
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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		