

**MONITORING REPORT NUMBER 1**

**Version 20 July 2007**

**JEPİRACHI WIND POWER PROJECT  
LA GUAJIRA, COLOMBIA**

**CDM REGISTRATION REFERENCE NUMBER 0194**

**MONITORING PERIODS**

**From January 31/2004 to July 31/2004**

**From August 1/2004 to July 31 /2005**

**From August 1/2005 to July 31/2006**

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## Introduction

This is the first Monitoring Report of this project. The document reports the Emission Reduction (ERs) generated by the Jepirachi Wind Park, CDM project, for producing renewable energy with registration number 00194, of April 1, 2006, covering the following monitoring periods

- ✓ From January 31 /2004 to July 31/2004
- ✓ From August 1/2004 to July 31 /2005
- ✓ From August 1/2005 to July 31/2006

The project operation has been monitored in accordance with the requirements of the applicable Monitoring Method as described in its Project Design Document (PDD), and the Project Monitoring Plan (MP), including social benefit indicators.

With the implementation of this project, EEPPM sells electricity to the national grid, avoiding the dispatch of same amount of energy produced by fossil fuelled thermal plants to the grid. By that, the project avoids CO<sub>2</sub> emissions, and contributes to the regional sustainable development.

The project participants are Empresas Publicas de Medellin (EE.PP.M) as owner, developer and operator of the Wind park, and the INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT AS TRUSTEE OF THE PROTOTYPE CARBON FUND (PCF) of the World Bank as buyer of the emissions reductions (ERs).

The project activity consists of a 19.5 MW Wind Park, located in a desert area inhabited by the Wayuu indigenous communities, at La Guajira Department, north of Colombia. The wind mills were supplied by Nordex Company (Germany). Further information on this project can be found in website of the Empresas Publicas de Medellin (EEPPM) w.w, w.eppm.com

The different units of the project were commissioned between 30 of January and 30 of March, 2004 and were declared on commercial operation in 19 of July of same year. The project has been completed as planned and described in the PDD.

This document replaces the October 2006 version, since it was detected a edition mistake, in the emission factor for the third monitoring period (1 August 2005 to 31 July of 2006).

In the present version, the modification introduced is in the page three (Emission Reduction Calculation), changing the incorrect value of 0.282 for the correct emission value of 0.2802, according to the emission calculation report for the period. It doesn't modify the total amount of emissions reductions presented in this document (page four), because as shown in the annex, and in page four (Table 2), the emission calculation reduction for that period (16492 tons), was calculated with the correct value.

For a easy visualization of the change introduced, this version is paged.

### 1. Emissions Reduction Calculation Formula

Emissions reductions of CO<sub>2</sub> generated by the project are calculated with consolidated methodology ACM002 c option, for power generation projects connected to the grid. It considers:

Net CO<sub>2</sub> emissions avoided at grid (Ton CO<sub>2</sub>e) = Net generation during the monitoring period (MWh)  
\* factor emission (Ton CO<sub>2</sub>e/MWh)

The weighing factors considered for construction and operation margins are 0.5 for each one. The emission factors during monitoring are:

- ✓ 1 Period time baseline (2004) : 0.359 Ton CO<sub>2</sub>/MWh
- ✓ 2 Period(1 August 2004 to 31 July of 2005 ): 0.387 Ton CO<sub>2</sub>/MWh
- ✓ 3.Period (1 August 2005 to 31 July of 2006): 0.2802 Ton CO<sub>2</sub>/MWh

## 2. Dispatched energy to the grid in the monitoring period

Power generation data for emissions reduction is take of XM company, a enterprise of ISA group which offers services in operation, management and development of electric markets, and in particular by Centro Nacional de Despacho (CND) a special, division charged of planning, coordination, supervision and control of the integrated operation of the power generation and transmission resources of the Colombian electric system. It provides data hour by hour and day by day for all plants of energy market in Colombia (see Annex 1 for Jepirachi generation). The factors of plant for Jepirachi have been 0.33 (in 2004), 0.29 (in 2005) and 0.43 (to July 31 of 2006). A monthly summary of power generation is presented in Table 1:

**Table 1. Monthly power generation**

YEAR	2004 Real Power generation KWh	2005 Real Power generation KWh	2006 Real Power generation KWh
ENERO	14,951.63	4,397,983	5,030,369
FEBRERO	1,723,427.87	4,760,455	6,179,175
MARZO	4,366,789.60	6,189,684	7,233,905
ABRIL	5,078,088.94	4,806,654	5,025,652
MAYO	6,572,313.91	4,101,747	5,386,714
JUNIO	9,169,209.88	3,608,994	6,027,382
JULIO	6,921,338.78	5,263,834	7,761,522
AGOSTO	7,140,135.06	5,408,106	
SEPTIEMBRE	2,113,074.30	4,179,454	
OCTUBRE	2,525,174.28	829,246	
NOVIEMBRE	2,870,198.12	2,251,921	
DICIEMBRE	3,496,354.67	3,560,560	
<b>TOTAL</b>	<b>51,991,057.04</b>	<b>49,358,637.36</b>	<b>42,644,719</b>

## 3. Data Monitoring

The basis for the calculation of emissions reduction are the monitoring plan in the Project Design Document - PDD - and the Monitoring Protocol - MP -. The validated monitoring plan has been made operational by the project developer (EE.PP.M) in the Monitoring Protocol (June 30, 2002). The calculation of emission reduction applies methodology ACM002.

Monitoring is based on continuous metering of electricity production. According to the monitoring plan were monitored: the electricity output on site, using measured equipment at the substation (interconnection facility to the grid).

To ensure results there are three main and three backup meters for power, located in panel TM 1 at the substation of energy in the area of the wind park. They were installed in December of 2005, and are

calibrated annually by Equipo de Medición (Measurement Team). Last calibration was made on 14 of December of 2005 and the readings are kept by this team in the headquarters of EE.PP.M in Medellin, and in the binnacle registration of power meters in park.

In accordance with ERPA between PFC and EEPPM, the verification period is from August to July, but for future verifications it has been modified and it will be from January 1 to December 31 of each year, as agreed between EE.PP.M and World Bank in September 2006.

The energy supplied to the grid is put on line at the Centro Nacional de Despacho, therefore it is not necessary to process, to complete or to correct the generation data by EE.PP.M. Fuels Fossil have not been used during the period review, so that, no leakage calculation is required according to the PDD.

#### 4. Emissions reduction generated in the Monitoring Period

For the first period of verification, the emission reductions were calculated with a preliminary methodology as considered in the PDD amounted 418 tons of CO<sub>2</sub>e. During the second period the same methodology was used, amounted 938 ton of CO<sub>2</sub>e, but then, it was changed for a new one, more representative for Colombian electricity system, which was approved by Meth panel of UNFCCC, amounted 12.150 tons of CO<sub>2</sub>e. As it was accorded with the Prototype Carbon Fund, once the methodology of emission calculation was approved by Meth panel, it would be paid the retroactivity from the first period. In accordance with the formula in section 1 the calculation emission reductions amount to 48.485 ton CO<sub>2</sub> e (forty eight thousand four hundred eighty five tons)

**Table 2. Emission reductions for the Jepirachi Wind Park**

Calculation of ERs		Monitoring Periods		
		First Period	Second Period	Third Period
Description	Unit	From 31 / 01 /2004 To 31 / 07 /2004	From 01 / 08 /2004 To 31/07 /2005 /	From 01/08/2005 To 31/07/2006
Metered Electricity Supply	MWh	33.846	51.274	58.867
Baseline Emission Factor	Ton Co2e/Mwh	0.359	0.387	0.2802
Emissions Reduction	TCO <sub>2</sub> e	12.150	19.843	16.492

The process for calculation emissions reduction for this project are presented separately for each one of the three periods and each one includes information related to:

- Building Margin
- Operating Margin
- Emissions Factors

#### 5. Sustainability- Economic and social well being

The project company has been aware of his social responsibility and has contributed to social programs for benefits in the community. Furthermore of the compensations plan for social impacts, in the agreement signing with the Prototype Carbon Fund for the reduction of emissions (ERPA), it was defined to give to EEPPM a extra paid of US \$0.50 for each equivalent ton reduced, with a exclusive destination to projects and programs that contributes in an effective way to the local development of the communities and institutions and for improving quality life of the population in the project area. This is included in The Community and Institutional Strength Plan (PFIC), with specific indicators for social, cultural, economic.

Institutional and organization issues and focused in self management process. The indicators for the monitoring period are included in Section 6 Social Benefits Indicators.

During the monitoring period there have been different agreements between EE.PP.M, communities and government agencies, in order to achieve, activities related to child nutrition, educative and health care, vaccination, oral fluoridation, personal hygienic, food handling, garbage and excrete disposals ,and supply of scholar kits, and equipment for restaurant and kitchen at the Nutritional Recovery Centers (CEREN).

The project has contributed to conform two organized groups of young native people with training in order to guide visitors to the wind park in especial focus as technological aspects of the mills, and complemented with cultural subjects of indigenous communities. Fishers have been qualified in techniques for fish handling and meat conservation, and other people in maintenance of desalinization equipments and hand crafts elaboration. In order to strength the cultural identity of the indigenous community, it has been done different cultural, historical and archeological publications in wayuunaiki language, which have been distributed and explained in the schools of the region.

During the construction of the park almost 150 native workers were employed by the project, while in the operation an average of 15 people of the communities of the area of local influence are employed during every year.

#### **5. Roles and Responsibilities**

The complete implementation and monitoring plan is responsible of EE.PP.M. A CDM team comprising planning, operative and environmental areas is in charged of calculation emissions reductions and to attend monitoring and verifying activities.

6. Social Benefits Indicators

1. FIRST PERIOD OF ACCOMPLISHMENT (2004)

INDICATOR	PERFORMANCE OR UNIT OF MEASUREMENT	GOALS FOR THE FIRST 7 YEARS PERIOD	DESCRIPTION	BENEFICIARY	VALUE OF THE INDICATOR OR COMMENTS
Water Desalination	A desalination plant installed	One desalination plant in operation in the first year	A desalination plant with a capacity of 4 cubic meters by hour, with complementary building and equipment for operation as pumps, well, tank for water, interconnection wire, panels for control.	A population of almost 1000 people, at indigenous communities of Kasiwolin, Arutkjuy and Media Luna	The desalination plant was installed on October 2003, and transferred to the local authorities of Uribia municipality in December, 2003 for operation and care. Cost: \$743.242.019 Colombian pesos
	Energy supply	Number of kw/h supplied by the wind park	163.5 kw/h * 40 (9 multiplier factor)		Cumulative reading of the power meter, at 5 of august, 2004. Number of registration for calibration: 23309.
	Operation and Maintenance Manual	One manual finalized in the first year	The manual with technical specifications and conditions for the plant operation		The manual was handed over to the local authorities of Uribia town in December 19 of 2003
	Monitoring and metering water quality and quantity in the desalination plant	Two sampling by year	Taking water samples for physics, chemical and bacteriological analysis. Results: adequate for human consumption		Dates of water analysis: December 11 of 2003 and July 22 Of 2004
		Two reports of water analysis for the local	To send the water analysis results to local authorities at Uribia town		Date of reporting to local authorities: December of 2003

		authorities			and august 4 of 2004.
					Date of installation of the water meter: June 30 of 2004. Reading of the water meter: 193.16 m <sub>3</sub>
Water use	Improved access to water; use of water storage facilities. Monitoring the familiar water consumption	Two familiar polls by year about water consumption	Design the instrument for data collection in the families about water distribution, storage and consumption.		
Water storage	Number of water reservoirs	Two water reservoir built in the first year		77 people at Arutkjuj and 761 people at Medialuna communities	Acts handing over the reservoirs to the communities on August 28, of 2003 and November 13 of 2003. Cost: \$132.510.000 Colombian pesos
		Two water reservoirs rehabilitated in the first year	To repair or clean water reservoirs in Kasiwolin community	111 people at Kasiwolin community	Acts handing over the reservoirs to the communities on February 14, of 2003 and May 7 of 2003 Cost: \$21.380.000 Colombian pesos
Rehabilitation of school	Enlargement of the indigenous school	Provision of infrastructure in the first year.	Includes shelter, dorms for out of town students, laboratory, roof reparation, enclosure, bathrooms.	300 students	A handing over act for infrastructure, in 19 December of 2003 Cost: \$39.294.785 Colombian pesos
	Endowment for the indigenous school	Provision of school facilities in the first year	Supply of didactic material and laboratory facilities and logistic		A handing over act with endowment in June 5 of 2003 Cost: \$54.962.228

					Colombian pesos
Rehabilitation of health center in Media Luna site	Endowment for medical equipments according to the necessities	Provision of equipment and facilities , in the first year with a handing over act	Includes chirurgical, medical, and office elements, refrigeration facility and solar panels	949 people	A handing over act in June 4 and December 19 of 2003. Cost: \$27.136.251 Colombian pesos
Enclosure of graveyard	Enclosure	Enclosure	Built according specifications agreed with the community		A handing over act in July 14 of 2003 Cost: \$22.494.000 Colombian pesos
Institutional and communal strengthening program	Number of programs and projects developed	To be defined	Development of training programs in cultural, social economic, institutional and organizing areas.		
	Number of participants	To be defined			

## 2. SECOND PERIOD OF ACCOMPLISHMENT (2005)

INDICATOR	PERFORMANCE OR UNIT OF MEASUREMENT	GOALS FOR THE FIRST 7 YEARS PERIOD	DESCRIPTION	BENEFICIARY	VALUE OF THE INDICATOR OR COMMENTS
Water Desalinization	Monitoring and metering water quality and quantity in the desalinization plant	Two sampling by year	Taking water samples for physics, chemical and bacteriological analysis.	116 people in Kasiwolin. 77 people in Arutkjuy and 761 people in Medialuna communities	Date of analysis: March 17 of 2005
		Two reports of water analysis for the local authorities	To send the water analysis results to local authorities at Uribia town		Date of report: March 23 and August 12, of 2005
Water use	Improved access to water; use of water storage facilities. Monitoring the familiar water consumption	Two familiar polls by year about water consumption			Done
	Energy supply	Number of kw/h supplied by the wind park	298.8 kw/h * 40 (9 multiplier factor)		11.952 kw/h
Institutional and communal strengthening program	Number of programs and projects developed	To be defined	Development of training programs in cultural, social economic, institutional and organizing areas.		Training for native tourists guide Job creation Child nutrition
	Number of participants	To be defined			

### 3. THIRD PERIOD OF ACOMPLISHMENT (2006)

INDICATOR	PERFORMANCE OR UNIT OF MEASUREMENT	GOALS FOR THE FIRST 7 YEARS PERIOD	DESCRIPTION	BENEFICIARY	VALUE OF THE INDICATOR OR COMMENTS
Water Desalination	Monitoring and metering water quality and quantity in the desalination plant	Two sampling by year	Taking water samples for physics, chemical and bacteriological analysis. Results: adequate for human consumption	116 people in Kasiwolin. 77 people in Arutkjuj and 761 people in Medialuna communities	Date of analysis: March 29 of 2006
		Two reports of water analysis for the local authorities	To send the water analysis results to local authorities at Uribia town		Date of reporting to local authorities: February 23, and July 17 of 2006
Water use	Improved access to water; use of water storage facilities. Monitoring the familiar water consumption	Two familiar polls by year about water consumption			The polls are done periodically by Guajira University
	Energy supply	Number of kw/h supplied by the wind park	748.5 kw * 40 (9 multiplier factor)		29.940 kw/h* \$220 kw=\$6.586.800 Colombian pesos contributed in energy for operation of the desalination plant
Institutional and communal strengthening program	Number of programs and projects developed		Development of training programs in cultural, social economic, institutional and organizing areas.		Training for native tourists guide Job creation Child nutrition Archeological researches and cultural heritage management
	Number of participants	People of Arutkajuy Kasiwolin, Medialuna communities			

