CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

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SECTION A. General description of project activity

A.1 Title of the project activity:

Jepirachi Wind Power Project
Document version number 1.4
Document version date: 15 December 2005

A.2. Description of the project activity:

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 region of Uribia in the Department of Guajira. Since commissioning in January 2004, the wind generators have delivered around 80 GWh to the Colombian National Interconnected System (SIN) under a preferential dispatching scheme.

In accordance with the official indicative expansion plan, options to meet increasing energy demand in Colombia are mostly thermal. Due to the small size of the Jepirachi Wind Power Project (19.5 MW) relative to the net installed capacity (0.15% of the 13.2 GW available), the proposed project has no effect on the planned expansion of the SIN.

The Project contributes to the sustainable development of Colombia in various ways. First, it demonstrates at a commercial level, the potential for wind based generation in the region thereby facilitating future investments to capture the relatively large aeolic potential (estimated at over 5 GW). Second, it increases the share of renewable energy in the national grid, thereby contributing to the national private expertise in the installation and operation of such technology. These indirect benefits may stimulate further the development of the renewable option in the Colombian power system. Third, as the project sits in land belonging to a very poor indigenous community, it contributes to the development of this community through the support of community-driven projects financed by a system of transfers and compensation agreed to by the project sponsor. In this project, the benefits to the host Indigenous Community are monitored in accordance with a set of indicators as outlined in the Monitoring Plan. Finally, the project also contributes to an increase in economic activity during the construction period, injecting $21 million in the Colombian economy.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) Project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (YES/NO)
The Republic of Colombia (host) (Misterio de Medio Ambiente)	Empresas Publicas de Medellin (EEPPM)	No
The Republic of Finland (Ministry of Foreign Affairs)	International Bank for Reconstruction and Development (IBRD) as the Trustee of the Prototype Carbon Fund (PCF)	Yes
The Netherlands	International Bank for Reconstruction and Development (IBRD) as the Trustee of the Prototype Carbon Fund (PCF)	Yes

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.
Note: *When the PDD is filled in support of a proposed new methodology* (forms CDM-NMB and CDM-NMM), at least the host Party(ies) and any known project participant (e.g. those proposing a new methodology) shall be identified.

Empresas Públicas de Medellín (EEPPM), which is one of the biggest utilities in Colombia, is the project sponsor and operator, and will contribute 100% of project financing.
The Prototype Carbon Fund (PCF). The PCF is a CDM project facility. The International Bank for Reconstruction and Development is the Trustee of the PCF, and purchases Certified Emission reductions on behalf of the Participants in the Fund, comprised of several Annex I Parties and international corporations.
The Republic of Colombia, through its *Ministerio del Medio Ambiente*, which is the officially designated national authority, and through the *Colombian Energy Planning Unit* (UPME) that reports to the Ministry of Mines and Energy.

The PCF is the contact for the CDM project activity.
(Please see Annex 1 for detailed contact information).

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party (ies):

Colombia

A.4.1.2. Region/State/Province etc.:

Department of Guajira

A.4.1.3. City/Town/Community etc:

Area between Cabo de la Vela and Puerto Bolivar, within the region of Uribia

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

The Wayuu Indigenous Territory covers some 10,675 km^2 which was established through Resolution 015/1984 and amended by Resolution 28/1994 to protect the local indigenous population, and represents 51% of a sparsely populated area of the Department of La Guajira, in Colombia.

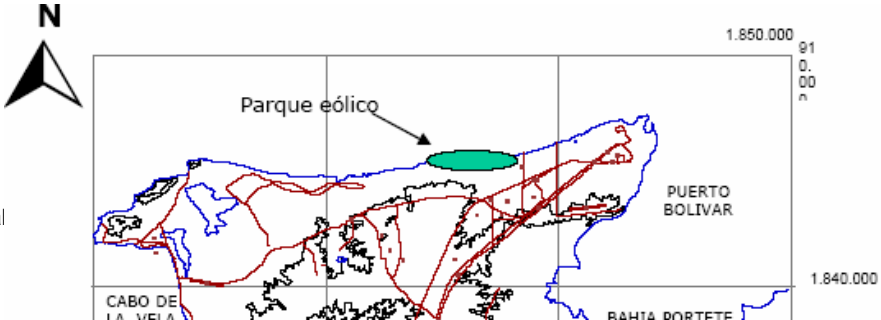

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Fig. A.4.1. Location of Jepirachi Wind Project

The Project is located within the Wayuu Indigenous Territory in the North-eastern region of the Atlantic Colombian coast, in the area between Cabo de la Vela and Puerto Bolivar, within the region of Uribia in the Department of Guajira. The topographic characteristics of the area provide the necessary conditions to maximize the power generation potential of the wind farm, that is, a regime of high and constant wind. Otherwise, the area has very low population density, and it is semi-arid with sparse vegetation.

A.4.2. Category (ies) of project activity:

Grid connected power generation. According to the UNFCC, the Jepirachi Wind Project fits in Sectoral Scope 1, Energy Industries (renewable/non renewable).

A.4.3. Technology to be employed by the project activity:

The project contributes to 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 is 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 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 A.4.3.1 provides all technical information for Jepirachi Wind Turbines. The Project site is connected to the national grid via an 8km standard transmission line.

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	96.50%
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 my epoxy-paint

Table A.4.3.1. Technical Characteristics of Wind Turbines for Jepirachi

A.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed CDM project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

The project employs a non-GHG emitting technology (wind power). In the absence of the Jepirachi Wind Power Project, the same level of demand for electricity would be met by the combined production of plants in the National Interconnected System (SIN), thus emitting GHG. Jepirachi, considered as a *Minor plant*[1] (10-20 MW), has the right to participate in and benefit from the wholesale electric market under a preferential dispatching option (e.g. spinning reserve). It can access the electricity market by selling all its available output at the wholesale market price ("precio de bolsa") and is exempt from penalties on non-delivery of electricity. It will preferentially dispatch its energy, and will displace those generating units that are programmed for dispatching according to their price bids. It is estimated that the total emission reductions to be achieved by the project are 378,603 tons of CO_2 over the proposed crediting period (21 years, by year 2024).

The total net installed capacity of the Colombian National Interconnected System (SIN) in 2001 was 13.2 GW. Most of this installed capacity is hydro-based (about 67%) making the country highly reliant on hydropower. After severe droughts, registered during the 1990s (i.e. 1992, 1997), that caused power shortages with associated forced rationing, the system has encouraged the development of more thermal generation capacity, specifically with the intention of increasing capacity and enhancing the system's reliability. The increase in thermal share of the SIN has also been the indirect result of the withdrawal of the public sector from large investments and the reluctance of private generators to invest in hydro electric generation with the associated environmental and social requirements. Therefore, future additions to the power mix to attend the projected growth in demand are anticipated to be mostly thermal-based. While this responds to the need for flexibility and robustness of the system, the increase in thermal share

[1] Please refer to Annex 5 to see definition of "Minor Plant"

contributes to the gradual increase of GHG emissions by the sector and the release of local criteria pollutants (such as NOx and, SOx particulates and volatile hydrocarbons), which have been linked to health of exposed populations).

This trend is expected to continue according to the indicative expansion plan presented by the Energy and Mines Planning Unit (UPME)[2]. The government of Colombia defined the indicative electric power expansion path based on projects selected applying three main considerations: (i) those projects already approved and under construction; (ii) project inscribed at UPME for implementation in the near future; and, (iii) analysis of the demand growth and least costs expansion of the interconnected grid base upon already inscribed power plants.

A.4.4.1.Estimated amount of emission reductions over the chosen crediting period:

Delivery of Emission reductions

Year	Annual estimate of emission reduction in tonnes CO2e
2004 (Jan-Dec)	17,723
2005 (Jan-Dec)	18,044
2006 (Jan-Dec)	18,044
2007 (Jan-Dec)	18,044
2008 (Jan-Dec)	18,044
2009 (Jan-Dec)	18,044
2010 (Jan-Dec)	18,044
2011 (Jan-Dec)	18,044
2012 (Jan-Dec)	18,044
2013 (Jan-Dec)	18,044
2014 (Jan-Dec)	18,044
2015 (Jan-Dec)	18,044
2016 (Jan-Dec)	18,044
2017 (Jan-Dec)	18,044
2018 (Jan-Dec)	18,044
2019 (Jan-Dec)	18,044
2020 (Jan-Dec)	18,044
2021 (Jan-Dec)	18,044
2022 (Jan-Dec)	18,044
2023 (Jan-Dec)	18,044
2024 (Jan-Dec)	18,044
Total CERs	378,603
Number of crediting years	21
Average annual CERs	18,028

[2] Please refer to Annex 5 for additional information on UPME's Expansion Plan

A.4.5. Public funding of the project activity:

This project is not funded by international Official Development Assistance (ODA) or other sources earmarked for development assistance.

SECTION B. Application of a baseline methodology

B.1. Title and reference of the approved baseline methodology applied to the project activity:

According to the modalities and procedures of the CDM, project participants should select the baseline approach that is most relevant for the proposed project. Therefore ACM0002-"Consolidated baseline methodology for grid-connected electricity generation from renewable sources" is chosen as the most relevant to the project activity.

B.1.1. Justification of the choice of the methodology and why it is applicable to the project activity:

The consolidated baseline methodology ACM0002 has been chosen because of its versatility and relevance to grid connected renewable power generation project activities. This methodology is applicable to the project activities described because:

1. The proposed project activity involves electricity capacity additions of a renewable energy source to an electricity grid.
2. The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.

B.2. Description of how the methodology is applied in the context of the project activity:

This section describes how the emission factor (EF_y) of Jepirachi wind project has been determined, following the steps described in the consolidated baseline methodology for grid connected electricity generation projects (ACM0002).

It is relevant to mention that both The Energy and Mines Planning Unit (UPME) and The National Dispatch Center (CND) have facilitated official data that has been used throughout the calculations of the Operating and Build Margin Emissions Factors. A short description of each one of these agencies follows.

Energy and Mines Planning Unit (UPME). UPME has the mandate for planning the sustainable development for the energy and mining sectors in Colombia, and for providing technical support for policy formulation and decision making in energy and mining issues. The UPME estimates the energy requirements of the different private and public economic agents operating in the nation considering demand projections based on most probable economic and demographic prospective. In addition, the UPME develops the National Energy Plan or Sector Strategy in consistency with the National Development Plan. It also provides information related to power plants' emissions factors (tCO2/MWh).

Centro Nacional de Despacho (CND). The National Dispatch Center (CND) is in charge of the planning, supervision and control of the integrated operation of generation, transmission and distribution that are part of the national interconnected system. The CND also supervises and provides with instructions to the Regional Dispatch Centers (CRDs) in order to ensure system's coordination and reliability. It applies the preferential dispatch to the Jepirachi project. The National Energy Dispatch Agency (CND) additionally registers and archives power plants generation data by the hour in a state of the art database that can be fully accessible through the Internet.

The steps followed to calculate the Operating and Build Margin emissions factors are as follows,

Step 1- Calculation of the Operating Margin emission factor (OM)

The ACM0002 consolidated methodology provides four options to calculate the operating margin. According to ACM0002, the first choice to calculate this factor should be the Dispatch Data Analysis (c) unless it is demonstrated that this method is not applicable.
The dispatch Data OM emission factor ($EF_{OM, Dispatch\ Data, y}$) is calculated as follows,

$$EF_{OM,DispatchData,y} = \frac{E_{OM,y}}{EG_y} \qquad \text{(B.2.1)}$$

Where,
EG_y is the generation of the project (in MWh) in year *y,* and $E_{OM,y}$ are the emissions (tCO2) associated with the operating margin calculated as,

$$E_{OM,y} = \sum_h EG_h * EF_{DD,h} \qquad \text{(B.2.2)}$$

Where,
EG_h is the generation of the project (in MWh) in each hour *h*, and $EF_{DD,h}$ is the hourly generation-weighted average emissions per electricity unit (tCO2/MWh) of the set of power plants (*n*) in the top 10% of grid system dispatch order during hour *h*:

$$EF_{DD,h} = \frac{\sum_n EF_{n,y} * GEN_{n,h}}{\sum_n GEN_{n,y}} \qquad \text{(B.2.3)}$$

Where,
$GEN_{n,y}$ is the generation for every plant within the group of *n* plants in the top 10% of grid system dispatch order during hour *h*.
$EF_{n,y}$ is the emissions factor of every plant within the group of plants *n* in the top 10% of grid system dispatch order per MWh. This variable is supplied directly by UPME and is considered official information. UPME procedures for the calculation of this emission factor are fully compatible with the expression indicated in ACM0002 for the calculation of COEF.

Following ACM0002 methodology, an import from an international connected electricity system is considered one power source. Since the amount of imports is consider insignificant (less than 0.01%), option "*a*" (0 tCO2/MWh for the net electricity imports) from ACM0002 is chosen for $EF_{DD,h}$ calculation.

Step 2- Calculation of the Build Margin emission factor (BM)

According to ACM0002, two options are available for calculating the build margin for the project. For this project, option 1 (*ex ante*) has been selected (i.e. calculate the build margin emission factor based on

the most recent information available on the group of plants *m* already built at the time of PDD submission). Data for 2004 is used to calculate the Build Margin.
Following instructions by ACM0002, the group of plants *m* is, for the case of Jepirachi Wind Project, the power electricity additions to the national interconnected electricity system that represent 20% of the system generation (in MWh) and that have been built most recently. Data on the selected power plants is presented in Annex 3.

The Build Margin is calculated using the following formula,

$$EF_{BM,y} = \frac{\sum_m EF_m * GEN_{m,y}}{\sum_m GEN_{m,y}} \qquad \text{(B.2.5)}$$

Where,
$GEN_{m,y}$ is the yearly (year *y*) generation for every plant within the group of *m* plants which corresponds to the power plants capacity additions in the electricity system that compromises 20% of the system generation (in MWh) and that have been built more recently.
$EF_{m,y}$ is the emissions factor of every plant within the group of plants *m* which corresponds to the power plants capacity additions in the electricity system that compromises 20% of the system generation (in MWh) and that have been built more recently. This variable is supplied directly by UPME and is considered official information. UPME procedures for the calculation of this emission factor follow the same principles as has been exposed in ACM0002 for the calculation of COEF.

Equation (B.2.5) is considered exactly equivalent to equation (B.2.6) presented in ACM0002,

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} * COEF_{i,m}}{\sum_m GEN_{m,y}} \qquad \text{(B.2.6)}$$

Step 3- Calculation of the Baseline emission factor (EF_y)

Finally, the last step in applying ACM0002 for the baseline determination of Jepirachi wind project is to calculate the baseline emission factor. It is calculated as the weighted average of the Operating Margin emission factor ($EF_{om,y}$) and the Build Margin emission factor ($EF_{bm,y}$):

$$EF_y = W_{OM} * EF_{OM,y} + W_{BM} * EF_{BM,y} \qquad \text{(B.2.7)}$$

As already indicated Jepirachi is defined in Colombia legislation as a minor power development, with special benefits in consideration of its minimum impact in the SIN. Jepirachi's power capacity represents 0,15% of the national installed capacity; its expected electricity output is one tenth of one percent of energy delivered by SIN. Taking as benchmark the set of plants used to estimate the Build Margin emission factor, Jepirachi throughput is just one half of one percent. All the above arguments point to considering Jepirachi as a CDM activity with no effect in the electric system expansion plan. Therefore, we suggest giving nil weight to the Build Margin emission factor, and setting W_{OM} = 1.0. However, estimates presented in this PDD (Section E), use the default weights (W_{OM} = 0.5, W_{BM} = 0.5). The suggested relative weights require to be assessed by the CDM EB. If the EB does not accept the suggested

weights the project accepts the default values, or the result of applying the recommendations of the ongoing analysis on this subject requested by the EB when available.

The proposed weights differ from the default values contemplated in ACM0002, but the expression $W_{OM} + W_{BM} = 1$ is preserved. The proposed weights are consistent with the fact that the CDM activity is marginal to the existing interconnected system, has no impact in the system expansion path, and therefore the BM does not adequately portraits the CDM activity contribution to GHG emissions reduction. The emission factor is determined by dispatch analysis which, by definition, is the Operating Margin. It is worth noting that Jepirachi receive no capacity payments because its size, under 20 MW for the Colombian system. In addition, the intermittency and uncertainty of the resource (wind) does not allow programming its output and therefore it is not counted for short and long term planning.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity:

The determination of additionality is done by using the *Tool for the demonstration and assessment of additionality*, as published in Annex 1 of the 16th meeting of the Executive Board. This tool includes the following steps:

Step 0. Preliminary screening of projects started after January 2000 and prior to 31 December 2005

In accordance with the guidance provided in decision 18/CP.9 the Jepirachi Wind Farm Project seeks to have the crediting period starting prior to the registration of the project activity. Supporting documentation includes:

a) The Jepirachi Wind Farm construction was initiated on January 2003 and was commissioned on the 31st January 2004 which falls between 1 January 2000 and the date of registration of a first CDM project activity, which is September 2005. Please refer to Annex 5 (Letter from Mr. Luis Carlos Rubiano announcing the starting date of Jepirachi's commercial operation). In this letter, dated October 8/2003, the installation-schedule of the first 10 aerogenerators for December 2003 is confirmed and the starting date of commercial operations is also given as February 2004.

b) EEPPM seriously considered the incentive from the CDM in the decision to proceed with the project activity. This can be confirmed in Annex 6. This Annex presents a series of three sequential documents issued during the process followed by EEPPM to be able to present the Project as a CDM activity to the Prototype carbon fund (PCF). Thus confirming their serious intention at an early stage of the project in considering the incentive from the CDM in the decision to proceed with the project activity. The first document is a letter from EEPPM to the Colombian Environment Ministry asking to include Jepirachi in the CDM Colombian Ministry Portfolio; the second document is the Letter from the Ministry of Environment of Colombia submitting the Jepirachi Carbon Off-set project to the Prototype Carbon Fund. This letter sent to the Prototype Carbon Fund by MMA (Colombian Environment Ministry) on behalf of EEPPM, shows the interest of EEPPM in registering Jepirachi Wind Project as a CDM project activity before the project started. The third document corresponds to the national approval of the project as an eligible activity for the Clean Development Mechanism of the Kyoto Protocol, sent by the Colombian Environment Ministry (MMA) to EEPPM , dated December 10/2002.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

The electric system in Colombia is defined as a competitive sector with national regulations. Although UPME prepares indicative plans, actual generation capacity expansion is in the hands of independent power producers.

Sub step 1a. Define alternatives to the project activity

The following alternatives to the project have been considered:

1) The system expansion would occur as defined by UPME, without the Project (BAU scenario)
2) The system expansion plan with the Project without CERs.
3) The system expansion plan with the Project with CERs.

The following table lists capacity additions in a "business as usual" scenario as expected by UPME, in its expansion plan published in 2001. Under the business as usual scenario, most capacity additions will be thermal (gas-based) which offer the lower investment costs and faster entry into operation. Some medium-sized hydro-based units are also tentatively scheduled to enter into the system in the short term. However, no wind energy facilities are being considered in the reference expansion plan.

Power Plant	Units	Fuel	Capacity	Entrance Date
Colegio	3	Water	50	April 2nd 2002
Chivor	1	Water	125	May 1st 2002
Miel 1	1	Water	125	June 12th 2002
CC-Costa 1	1	Gas	150	January 1st 2006
CC-Costa 2	1	Gas	250	January 1st 2007
CC-Costa 3	1	Gas	250	January 1st 2010
CC-Costa 4	1	Gas	250	January 1st 2012
CC-Costa 5	1	Gas	250	January 1st 2012
Carbon 1	1	Coal	150	January 1st 2012
Carbon 2	1	Coal	150	January 1st 2013
Carbon 3	1	Coal	150	January 1st 2013
Carbon 4	1	Coal	150	January 1st 2014
Carbon 5	1	Coal	150	January 1st 2014
CA-Llanos	1	Gas	215	January 1st 2015

Table B.3.1. Expected Capacity Additions, Period 2002-2015
Source, UPME "Evolucion del Comportamiento de la Demanda de Energía Electrica, 2001"

Sub step 1b. Enforcement of applicable laws and regulations
Power generation is a mature and consolidated sector in Colombia, with a long tradition of environmental regulations and strict sector technical codes. All proposed alternatives including the project comply with all the laws and regulatory requirements for electricity generation in Colombia.

Step 3. Barrier analysis

Barriers analysis is used to demonstrate that the project is additional. In this step, it is determined whether the proposed project activity faces barriers that: a) prevent the implementation of this type of proposed project activity and b) do not prevent the implementation of at least at one of the alternatives.

Sub step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity

- Technological Barriers: Jepirachi is the first Wind farm project in Colombia. For this reason there is a lack of skilled and/or properly trained labour to operate and maintain the technology. No education/training institution in the host country provides the needed skills, leading to equipment disrepair and malfunctioning. There is always a need of bringing international experts for consultation on operation, maintenance and machinery adjustments. Moreover there is a lack of infrastructure for implementation of the technology. Thus the project is additional.
- Barrier due to prevailing practice: As it has been mentioned before, Jepirachi Wind Project is the first commercially operational wind project in Colombia. Thus there is no experience in the country with this type of technology. This particular project is considered as a 'not common practice' and therefore additional.
- Resources uncertainty: Due to the fact that wind is an intermittent source of power, wind energy involves relatively high risk compared with fossil fuel forms of energy or hydro energy. Wind records are sparse and measures are made at standard elevations, very different from the high towers built to house the generator units. There is uncertainty in the wind measuring data and assumptions made during output estimation. By the time of the implementation of the project there were only wind point estimates.

Sub step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)

As it has been explained in Sub-step 1b, one of the alternatives would be to follow UPME indicative Expansion Plans (BAU scenario). UPME expansion plan shows that potential candidates for capacity expansions are mostly thermal options: coal based steam power plants, gas based combined cycle plants (CCGT) and gas based open cycle turbines (OCGT), in addition to hydropower. However, hydropower generation has become a less likely investment option in Colombia for various reasons related to site availability and its effect on costs, environmental and social impacts associated to reservoirs and flooding, and also due to high up-front capital investment. Nevertheless, UPME has developed indicative scenarios for the expansion of the electricity supply industry considering specific assumptions on demand (i.e. medium growth rate), fuel prices (i.e. low price scenarios) and lower than average hydrologic conditions, as well as perceived trends and registered intentions by private and public generators. These have been presented in section A.4.4. The type of technologies presented in UPME Expansion Plan will not face the barriers described in section 3a for Wind Farms in Colombia; therefore Jepirachi Project is additional.

In addition, by selling CERs the project promoter will benefit from government incentives for clean production and export sales of CERs. The incentive includes, import tax exemption on foreign equipment and accelerated depreciation that amounts approximately to US$ 19 million.

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to Jepirachi Wind Project

There are currently no existing wind farms in Colombia or Guajira region other than Jepirachi. Up to the date there are no new wind projects on the planning stage in Colombia. Therefore this sub-step is satisfied.

Sub-step 4b. Discussion of similar options that occur

No similar activities are widely observed in Colombia since Jepirachi will be the first commercially operational wind farm in Colombia. Therefore this sub-step is also satisfied, allowing further analysis (step 5).

Step 5. Impact of CDM Registration

The Jepirachi Wind Project presents high uncertainty (wind regime is variable and may change in the future), lack of local experience (new technology for Colombia), few wind records, and wind data limitations. In addition to this, the expansion planning in Colombia calls for an increase in the thermal generation, given the high reliance on uncertain hydroelectric capacity, in order to provide a more secure supply of energy.

By selling certified emissions reductions (CERs) from the project activity, the project developer (EEPPM) would benefit from the additional revenue generated by carbon sales, what would make the project more attractive. In addition, by selling CERs the project promoter will benefit from government incentives for clean production and export sales of CERs. The incentive includes, import tax exemption on foreign equipment and accelerated depreciation that amounts approximately to US$ 19 million during the lifetime of the project.

The Jepirachi wind farm project will contribute to the development of the international carbon market in Colombia through the supply of Emission Reductions (ERs), developed under the Clean Development Mechanism (CDM) as set forth under Article 12 of the Kyoto Protocol. By linking the global issue with local development concerns the project truly reflects the spirit of the CDM. The ERs are classified as high quality because of the reliability of the project and the social benefits represented by the social program for the indigenous people.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity:

As referred in ACM0002 the project boundary has to be assessed in terms of the emission sources and spatial extent.

- *Emission sources*: Jepirachi Project presents zero emissions, since it is a Wind farm Project. For the baseline determination only CO2 emissions from electricity displaced due to the project are accounted for.
- *Spatial extent*: The spatial extent of Jepirachi Project boundary includes the project site and all power plants connected physically to the electricity system Jepirachi is connected to. The Colombian grid is a national grid, connected to Jepirachi through a 0.7 km long transmission line.

Therefore, all power plants providing electricity to the Colombian grid system are included in the project boundary.

B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity (ies) determining the baseline:

The CDM project developer is The World Bank acting on behalf of Empresas Públicas de Medellín (EEPPM). This PDD was completed on July 2005, under the guidance of Walter Vergara by Alejandro Deeb, Alfred H. Gruenwaldt, Seraphine Haeussling, and Carla Asuad.

Sources of information in Colombia, for the interconnected grid, are: (i) the operational database updated, operated and managed by the National Dispatch Centre, CND, in ISA (www.isa.com.co ; contact: Ms. Silvia Cossio, tel: +57 (4) 315-7885; and, (ii) UPME (www.upme.gov.co ; Mr. Ismael Concha. Tel: +57 (1) 287-5354) the planning unit for the energy sector in the Ministry of Mines and Energy.

Access to CND database is available only upon agreement with the CND. The operational data collected includes: National Energy Demand, Hourly/Daily National Generation by plants, Hourly/Daily Plants Energy Bid prices, Energy generated to cover constraints, National Hydraulic Generation, Dams water levels among others.

All the information required to estimate the emission reductions of GHG by CDM activities, associated with the electric interconnected system in Colombia, is found in the archives operated by CND and UPME

UPME publishes most of its data in its website (www.upme.gov.co) and includes: Indicative Energy and Mines Expansion Plans, Energy and Mines Statistics Bulletins, International Analysis of Electricity Prices, Colombian Electricity Market Magazine, among others. UPME high technical capacity has been used to estimate expected carbon emission reduction through advanced simulation methods, and periodically estimates individual plants emission factors based on detailed technical information and chemical analysis of all fuels used within the country.

Information from all stakeholders in the interconnected system is subjected to regulation by the CERG, the national regulatory commission for energy. A well-developed, high quality, internationally accepted measuring standards have been enacted. Audits are commonplace to ensure the quality of the data, plus multiple interest groups have access to the data, as the transactions only can use official data. QC/QA methods are regularly enforced. Colombia offers very good, accurate and reliable data from its interconnected electric grid.

SECTION C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

The project started commissioning on January 2004 and initiated commercial operations on March 2004.

C.1.2. Expected operational lifetime of the project activity:

21 years: The operational lifetime of the project is estimated as 21 years, as is common for wind power plants.

C.2 Choice of the crediting period and related information:

The project will use a renewable crediting period of up to 21 years.

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

The first crediting period will start with the generation and monitoring of the first emission reductions. The start date was: 31January 2004.

C.2.1.2. Length of the first crediting period:

7 years.

C.2.2. Fixed crediting period:

N/A Option C.2.1 has been selected.

C.2.2.1. Starting date:

N/A Option C.2.1 has been selected.

C.2.2.2. Length:

N/A Option C.2.1 has been selected.

SECTION D. Application of a monitoring methodology and plan

D.1. Name and reference of approved monitoring methodology applied to the project activity:

Approved Monitoring Methodology ACM0002, which is the consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources.

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The monitoring methodology is used in conjunction with the approved baseline methodology ACM0002 (Consolidated baseline methodology for grid-connected electricity generation from renewable sources) and applies to electricity capacity additions from wind energy sources. Geographic and system boundaries

for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available. The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity.

D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario

N/A. Option 2 has been selected. Please see section D.2.2. below.

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

N/A. Option 2 has been selected. Please see section D.2.2. below.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

N/A. Option 2 has been selected. Please see section D.2.2. below.

D. 2.2. Option 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1. EG_h	*Net electricity supplied to the grid by the project activity*	*Data supplied by the Colombian National Dispatch Center (CND)*	*MWh*	*(m)*	*Hourly measured and daily recorded*	*100%*	*Both electronic and paper. Data will be archived for the crediting period plus 3 years.*	*Data is monitored following CND QA procedures.*
2. EF_y	*CO2 emission factor of the national connected grid*	*Energy and Mines Planning Unit (UPME)*	*tCO2/MWh*	*(c)*	*yearly*	*100%*	*Both electronic and paper. Data will be archived for the crediting period plus 3 years.*	*Calculated as a weighted sum of the Operating Margin emissions factor(OM) and the Build Margin emission factor (BM)*
3. $GEN_{j/k/n,y}$	*Electricity generation of each power source /plant j,k or n*	*Data supplied by the Colombian National Dispatch Center (CND)*	*MWh/a*	*(m)*	*Hourly, yearly*	*100%*	*Both electronic and paper. Data will be archived for the crediting period plus 3 years.*	*Includes data from the latest three years.*
4. Plant Name	*Identification of power source/plant for the OM*	*Data supplied by the Colombian National Dispatch Center (CND)*	*Text*	*(e)*	*yearly*	*100% of set of plants*	*Electronic. Data is kept during the crediting period and two years after*	*Identification of plants (j,k or n) to calculate Operating Margin emission factors*

7. $EF_{n/m, y}$	*Emissions factor (tCO2/MWh) of every plant in the group (n/m) connected to the national grid.*	*Energy and Mines Planning Unit (UPME)*	*tCO2 /MWh*	*(c)*	*yearly*	*100%*	*Electronic. Data is kept during the crediting period and two years after*	*This is considered audited and official information facilitated by a national agency (UPME)*
9. $GEN_{j/k/ll,y}$ IMPORTS	*Electricity imports to the project electricity system*	*Data supplied by the Colombian National Dispatch Center (CND)*	*MWh*	*(m)*	*Hourly yearly*	*100%*	*Both electronic and paper. Data will be archived for the crediting period plus 3 years.*	*Obtained form the latest statistics. CND provides official information of public availability.*
10. Merit Order	*Bidding price used to define the dispatch merit order*	*Data supplied by the Colombian National Dispatch Center (CND)*	*Text*	*(m)*	*Hourly yearly*	*100%*	*Electronic. Data will be archived for the crediting period plus 3 years.*	*Required to stack the plants in the dispatch data analysis*

Electricity output's measurements

The electricity generation arising from the project will be monitored by on site metering equipment at the substation. In Colombia, The Measurement Code "Codigo de Medida" establishes mandatory high technical standards, conditions and procedures for the purposes of reading, registering and recording and all other necessary activities for accounting electricity transactions performed in the Colombian Energy Market. This code is part of the 025 CREG's resolution of 1995, which is being followed for electricity output measurements. CREG stands for Comisión de Regulación de Energía y Gas or Energy and Gas Regulation Commission.

Calibration of meters & metering dispute resolution procedures

All metering devices used to monitor and measure data follow certain rules that have been summarized in resolution 025 of 1995, "Resolucion 025 de 1995" from CREG. This resolution 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.

D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

As a wind farm power activity the project is not expected to directly produce GHG emissions**.**

D.2.3. Treatment of leakage in the monitoring plan

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

N/A. Such emissions can result from project construction, transportation of materials and fuel, and other up-stream activities. In the case of the proposed Project, these emissions are thought to be negligible, because similar or higher life cycle emissions would result from the eventual construction and operation of alternative capacity. The life cycle emissions of alternative power generation plants, in particular of fossil fuel power plants, are typically higher than from wind power plants when including emissions due to the mining, refining and transportation of fossil fuel. The Project does not claim emission reductions from these activities. Therefore, no significant net leakage from the above activities was identified.

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

N/A. No sources of leakages have been defined for the Jepirachi project.

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

The formula used to estimate CO_2 emissions reductions is the following,

$$ER_y = BE_y - PE_y - L_y$$

Where,
ER_y: Emission reductions of the project activity during the year in tons of CO_2
BEy: Baseline emissions due to displacement of electricity during the year *y* in tons of CO_2

PEy: Project emissions associated with Jepirachi
Ly: Emissions sources as leakage

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored		
Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1. EG_h (2.2.1.1)	*Low*	*This data will be directly used for calculation of emission reductions. The metering equipment will be properly calibrated using manufacturers' standards and checked periodically for accuracy, to ensure that any error resulting from such equipment shall not exceed +0.2% of full scale rating.*
3. $EF_{n/m,y}$ (2.2.1.7)	*Low*	*The Colombian Agency for Energy Mining and Planning (UPME) provides this official information following their own QC and QA procedures.*

Note: Under the Colombian National Interconnected System (or NIS), the Centro Nacional de Despacho (CND) is responsible for managing and operating the NIS dispatch. The CND programs the dispatch of generators by strict economic order, considering the need to satisfy the demand within the technical parameters of reliability and continuity defined by CREG.. The outcome is the hourly generation program for each power unit and the hourly marginal cost for the NIS (the cost of producing an additional kWh of energy in the system equals the highest operational cost of units in operations at a particular time). On the basis of daily scheduling, the CND then coordinates in real time the dispatch of power units. The CND prepares daily and monthly reports of the actual operation of the NIS, including in those reports the hourly generation for each power unit and the marginal cost for each hour. The information required for ex post determination of the baseline is thus made available by CDN to all market agents, including the Project developer, and a summary is available publicly through the CND website. All monitored and collected data is subject to auditing and verification.

D.4 Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

Empresas Públicas de Medellin (EEPPM) has formed a multidisciplinary team from relevant departments, which will be responsible for monitoring all the parameters mentioned in this section. They will be responsible also of recording and analyzing all data.

D.5 Name of person/entity determining the monitoring methodology:

1- Fernando Cubillos, Prototype Carbon Fund, c/o World Bank, 1818 H Street, NW, Washington D.C., 20433, USA, Tel: +1-202-4730836; Fax: +-202-473 0836; sgreiner@worldbank.org; jheister@worldbank.org; ccormier@worldbank.org

2. Walter Vergara/ Alejandro Deeb/ Alfred Grünwaldt, Latin America Environment Department, World Bank, 1818 H Street NW, Washington DC 20433 (wvergara@worldbank.org.Adeeb@worldbank.org). The World Bank conducted due diligence on the project.

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

Zero

The project is a wind power project; it does not give rise to direct GHG emissions. Therefore, no formula is provided here.

E.2. Estimated leakage:

Leakage is defined as the net change of anthropogenic emissions by sources of greenhouse gases that occurs outside the project boundary, which can be measured and directly attributed to the CDM project activity. No leakages were identified. Therefore, no formula is provided here.

E.3. The sum of E.1 and E.2 representing the project activity emissions:

Given that the project emissions are zero and no leakages have been identified for Jepirachi, the sum of E.1 and E.2 is Zero emissions.

E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

The equation used to calculate the emissions in the baseline ($\mathbf{BE_y}$) is:

$$BE_y = EG_Y * EF_y \quad \text{(E.4.1)}$$

Where,

$\mathbf{BE_y}$: Baseline emissions (tCO_2e)
$\mathbf{EG_y}$: Annual electricity supplied by the Jepirachi project to the grid (MWh)
$\mathbf{EF_y}$: Baseline emission factor (tCO_2e/MWh)
y: refers to a given year

The baseline emission factor calculation will be determined using equation B.2.7 (section B.2). This combined margin equation is written as:

$$EF_y = W_{OM} * EF_{OM,y} + W_{BM} * EF_{BM,y} \quad \text{(E.4.2)}$$

Where,
$\mathbf{EF_{OM,Dispatch,y}}$ is the Operating Margin emission factor in year *y*
$\mathbf{EF_{BM,y}}$ is the Build Margin emission factor in year *y*
$\mathbf{W_{OM}}$ is the operating margin weight
$\mathbf{W_{BM}}$ is the build margin weight

The weights W_{OM} and W_{BM} in equation (E.4.2) have been given their default value (0.5) for the purpose of the calculations presented in section E of this PDD. As indicated in section B.2, step 3, the project suggests the following values: $\mathbf{W_{OM} = 1.0; W_{BM} = 0.0}$

The Operating margin emission factor in the baseline $EF_{OM,Dispatch,, baseline,y}$ is calculated using the following procedure,

First, the dispatch Data OM emission factor ($EF_{OM,\ Dispatch\ Data,\ y}$) in the baseline is calculated using equation (B.2.1) as follows,

$$EF_{OM,DispatchData,baseline,y} = \frac{E_{OM,y}}{EG_y} \qquad \text{(E.4.3)}$$

Second step is to calculate the emissions (tCO2) associated with the operating margin in the baseline,

$$E_{OM,baseline,y} = \sum_h EG_h * EF_{DD,h} \qquad \text{(E.4.4)}$$

Third step is to calculate the hourly generation-weighted average emissions per electricity unit (tCO2/MWh) of the set of power plants (*n*) in the top 10% of grid system dispatch order during hour *h* in the baseline,

$$EF_{DD,baseline,h} = \frac{\sum_n EF_{n,y} * GEN_{n,h}}{\sum_n GEN_{n,y}} \qquad \text{(E.4.5)}$$

After having calculated the Operating Margin Emissions Factor, next step is to calculate the Build margin emissions factor in the baseline, using the following equation,

$$EF_{BM,baseline,y} = \frac{\sum_m EF_m * GEN_{m,y}}{\sum_m GEN_{m,y}} \qquad \text{(E.4.6)}$$

All the terms in equations E.4.3 to E.4.6 have been described in section B2. By using the approach presented above and the data shown in Annex 3, the baseline emissions will be 17,714 tCO2 for 2004 , 252,303 tCO2 for a 14-year period and 378,614 for a 21-year period, this last one corresponding to three crediting periods. These estimations have been summarized in the following table,

Year	Estimation of baseline emissions (t CO2e)
2004 (Jan-Dec)	17,723
2005 (Jan-Dec)	18,044
2006 (Jan-Dec)	18,044
2007 (Jan-Dec)	18,044
2008 (Jan-Dec)	18,044
2009 (Jan-Dec)	18,044
2010 (Jan-Dec)	18,044
2011 (Jan-Dec)	18,044
2012 (Jan-Dec)	18,044
2013 (Jan-Dec)	18,044
2014 (Jan-Dec)	18,044
2015 (Jan-Dec)	18,044
2016 (Jan-Dec)	18,044
2017 (Jan-Dec)	18,044
2018 (Jan-Dec)	18,044
2019 (Jan-Dec)	18,044
2020 (Jan-Dec)	18,044
2021 (Jan-Dec)	18,044
2022 (Jan-Dec)	18,044
2023 (Jan-Dec)	18,044
2024 (Jan-Dec)	18,044
Total CERs	378,603

Note: Due to operational and adjustment related issues characteristic of aeolic technology, power plants do not function to full capacity during their first six months of operation This is the reason for the lower emissions estimation for 2004 compared to the rest of the years. The 2005 estimation was used for the following years

E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity:

Given that E.3 is equal to zero, the emission reductions of project activity are equal to E.4.

E.6. Table providing values obtained when applying formulae above:

Variables	2004	Total Crediting Period (14 years)	Total Crediting Period (21 years)
Operating Margin Emissions Factor (tCO2/MWh)	0.3619	----------	----------
Build Margin Emissions Factor (tCO2/MWh)	0.3199	----------	----------
Baseline Emissions Factor EF (tCO2/MWh)	0.3409	----------	----------
Electricity generated by project (GE) (MWh)	51,991.45	740,107.32	1,110,631.25
Baseline emissions (BE) tCO2	17,723	252,295	378,603
Project emissions (PE) tCO2	0.0	0.0	0.0
Emissions reduction from electricity generation (tCO2/year)	17,723	252,295	378,603

Year	Estimation of project activity emissions (t CO2e)	Estimation of baseline emissions (t CO2e)	Estimation of leakage (t CO2e)	Annual estimate of emission reduction (t CO2e)
2004 (Jan-Dec)	0	17,723	0	17,723
2005 (Jan-Dec)	0	18,044	0	18,044
2006 (Jan-Dec)	0	18,044	0	18,044
2007 (Jan-Dec)	0	18,044	0	18,044
2008 (Jan-Dec)	0	18,044	0	18,044
2009 (Jan-Dec)	0	18,044	0	18,044
2010 (Jan-Dec)	0	18,044	0	18,044
2011 (Jan-Dec)	0	18,044	0	18,044
2012 (Jan-Dec)	0	18,044	0	18,044
2013 (Jan-Dec)	0	18,044	0	18,044
2014 (Jan-Dec)	0	18,044	0	18,044
2015 (Jan-Dec)	0	18,044	0	18,044
2016 (Jan-Dec)	0	18,044	0	18,044
2017 (Jan-Dec)	0	18,044	0	18,044
2018 (Jan-Dec)	0	18,044	0	18,044
2019 (Jan-Dec)	0	18,044	0	18,044
2020 (Jan-Dec)	0	18,044	0	18,044
2021 (Jan-Dec)	0	18,044	0	18,044
2022 (Jan-Dec)	0	18,044	0	18,044
2023 (Jan-Dec)	0	18,044	0	18,044
2024 (Jan-Dec)	0	18,044	0	18,044
Total CERs	0	378,603	0	378,603

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

Empresas Públicas de Medellín carried out an environmental impact assessment (EIA) including physical, biological, socioeconomic and cultural components. Local communities were consulted throughout the EIA process. The EIA includes detailed mitigation and contingency plans and an outstanding consultation process with local communities. A summary of the findings follows (excerpted from the World Bank Project Appraisal Document). Please see Annex 9 for additional information.

Summary of Findings of Environmental Impact Assessment
Excerpt from Annex 13 of Project Appraisal Document

This document briefly summarizes the findings of the Environmental Impact Assessment for the Jepirachi Wind Power Project.

Main Potential Environmental Impacts Associated with Wind Power Plants

Environmental (physical and ecological) issues related to wind power projects that could be of concern include:

- The resulting impacts from the construction of power transmission lines;
- The opening of new access roads, which can lead to indirect impacts around the project area;
- Increase in noise pollution, depending on the number and model of the turbines and the distance between them, as well as the location of the power plant in relation to existing housing;
- The rotating arms can kill birds, and the negative impact can be especially serious if the windmills are located in the path of migratory birds;
- Impacts on native vegetation and archaeological sites as a result of construction activities for windmill towers, transformers, and access roads; and
- Impacts on the scenic value of the area since wind-power plants are usually located at the top of hills or in open land, both of which make them visible from far away.

Power Transmission Lines

No significant environmental issues related to power lines have been identified. Both the wind farm and the grid connection will be located at least 200 m apart from the coast so as to minimize impacts on birds and their routes. Some collisions of non-marine birds may occur with the wind turbines, but these will be minimized by strategically locating the anchors, the towers and providing a light colour to the installations.

Road Construction and Improvement

The Jepirachi Wind Power Project will not include new road construction or major road improvements through natural forests, wetlands, protected areas, or other ecologically sensitive areas. The project site has been chosen so as to minimize the demand for infrastructure access during construction, installation and operation of the project. Impacts during construction works for temporal and no-temporal access roads will not be significant given the topography and other physical characteristics of the project site (e.g. semi desert ecosystem with almost no vegetative cover and no organic content, rain volume is minimal, etc.). From the geo-technical point of view, only a superficial preparation will be needed for cleaning and access levelling works. The EIA indicates that aggregate material would be extracted from the edges of the Apure and Paat Arroyos, and clarify that no material will be extracted from wet stream-beds.

Noise

New wind technology is significantly less noisy than older technologies. In particular the slow moving blades selected for this unit will reduce noise impacts. In addition, the site is 1.5 km away from the nearest settlement, further masking the noise as part of the background noise prevalent in the area (wind gusts).

Other Complementary Facilities: The EIA has identified the impacts that might be derived from construction activities and has included a program for the prevention and mitigation of these impacts within the Environmental Management Plan. In particular, this program will ensure that contractors follow good construction and environmental practices. As part of the social program, small facilities and civil works will be undertaken, namely refurbishing of school facility, health center, small water storage pits, the set up of 2-4 m3/hour desalinization plant and refurbishing of the cemetery. Same procedures will be followed even though the impacts anticipated are negligible.

Compliance with Natural Habitats (OP4.04): The EIA clarifies that the project will have minimum impact on the natural environment of the area. The project will not be located within existing or officially proposed protected areas. The project's impact on local biodiversity will mostly be negligible because relatively so little land will be cleared (and, in the case of bird collisions, project design seeks to minimize any adverse impacts). The anticipated, relatively minor impacts on natural habitats and biodiversity are of three types:

(a) Land clearing: the land to be cleared to install the wind turbines is6.5 km2400 m access road, borrow pits, and complementary facilities that totals only 7 ha, of which only 6 ha would remain cleared permanently. The area of the vegetation to be affected by the project is a very tiny fraction of the remaining total of this ecosystem type on the Guajira Peninsula, so the loss is not at all significant.

(b) Construction worker behaviour: To minimize any incidental harm to wildlife during project construction, the Environmental Management Plan specifies that all contractors and construction workers will be prohibited from (i) any hunting, killing or capture of wild animals or herds used by the Wayuu (ii) any cutting, burning or collection of natural vegetation (including cacti) that is not strictly required for project implementation and approved by the supervising engineer in the field and (iii) contamination of waterways with solid or liquid wastes.

(c) Potential bird mortality: From a natural habitats degradation and biodiversity conservation standpoint, the project's potentially most serious adverse impact could be bird mortality from wind turbine collisions, or transmission line collisions or electrocutions. These impacts are expected not to be significant due to the following project sitting and design features: (i) the sitting of the windmills will not overlap with normal flight paths of birds found in the area (ii) the wind turbines have a bird-friendly design, with large slow-moving blades, tubular towers (with no attractive bird perches near the blades) that include a plastic device at the top of each one and with a visible colour clearly identified by flying birds (iii) the distance between the transmission line conducting wires will be at least 2.5 m apart to avoid electrocuting any birds of prey (iv) the top power line will be made more visible to flying birds with inexpensive plastic devices.

Cumulative Effects: The project will not increase the environmental load in the area in any significant manner.

Social Aspects: In order to ensure close linkage and harmonization of project activities with the indigenous peoples of the area as well as to ensure respect and integrity of their culture, Empresas Públicas de Medellín designed and implemented a Social Management Plan during the project preparation phase. The main objective of this Plan was to inform, consult and agree with indigenous communities, and local and environmental authorities on the activities developed by Empresas Públicas de Medellín, as well as to carry out the formal consultation required under Colombian law.
A summary of the Social Management Plan follows in the next page.

Summary of Social Management Program		
Program	**Objectives**	**Project**
Information and communication program	1. To inform communities on the project, its characteristics and stages 2. To establish harmonic relationships between communities and the project sponsor. 3. To encourage community participation.	a) Information, communication and dissemination of the wind project. b) Reception and resolution of claims c) Field visits to follow up the construction process
Employment opportunities program	Improve community income	a) Direct employment (recruitment and hiring) b) Indirect employment (acquisition of raw materials, goods and services)
Environmental education program	To promote sustainable development	a) Dissemination of the EMP for employees and communities b) Training on design of environmental projects c) Ethno education projects d) Training on management of reservoir of water e) Training on solid waste disposal f) Training on adequate use of natural resources
Participation and community strengthening program	1. To strengthen communities 2. To facilitate communities' access to financial resources	a) Training on indigenous rights according to Colombian law b) Training on formulation, implementation and assessment of self management projects to access legal transfers and additional PCF benefits
Information and Training for employees program	To respect the cultural characteristics of communities	a) Training on cultural life of Wayuu people to employees and contractors
Compensation Program	1. To compensate for the use of land and resources 2. To improve the standard of living	a) Water desalinization plant b) Water storage c) School rehabilitation d) Health Center rehabilitation e) Rehabilitation of graveyard
Technology Dissemination Program	To inform and disseminate the advances of the new technology	a) Field visits to the wind power plant b) Dissemination of material on new technology

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

The environmental impacts of the project are not considered significant. The EIA was completed in accordance with Colombian law. The government endorsed the project with official communication issued by the Ministry of Environment.

SECTION G. Stakeholders' comments

G.1. Brief description how comments by local stakeholders have been invited and compiled:

The EIA was conducted under the requirements established in the *Decree 1320 of 1998* relative to ethnic minorities and *Agreement 169 of 1989* of the International Labor Organization (ILO) that calls for mandatory consultation processes and the participation of indigenous communities during the development of environmental assessments.

Empresas Públicas de Medellín developed an extensive consultation process during the period 1999-2002. This consultation process included national, regional and local governmental institutions concerned with indigenous peoples, and traditional authorities and communities of Rancherías Kasiwolin, Arutkajui and Media Luna. The first consultation regarded the installation of the wind monitoring devices in 1999. The consultation process continued during all the phases of the EIA. The methodology and scope of the EIA was consulted as well as the identification of the impacts and the measures to manage them. Empresas Públicas de Medellín carried out a total of 20 formal consultation meetings with communities and several meetings with governmental institutions. All the consultation meetings with the communities were carried out with translators. The consultation process finalized in June 2002 with an agreement on the Environmental Management Plan, which includes the physical, biological, socioeconomic, and cultural programs described above. The Ministry of Interior, Department of Indigenous Communities Affairs, supervised the consultation process.

No concerns were raised by any other stakeholders when the project was posted on the PCF website.

G.2. Summary of the comments received:

The main concerns of local groups, authorities and communities, expressed through comments received during the various meetings, were related to the fear of being deceived once again and of losing their lands; these concerns were reiterated throughout the process. In addition, other concerns were raised such as:

- Fear of fencing off the land due to the project, with the loss of their everyday activities
- Fear of the lightning attracted by the climatological stations
- Size of the project
- Negotiation of easements
- Benefit for the municipal government
- Hiring of local Labor
- End-use of the power generated by the project
- Company management of operations and benefits
- Fear that it will not be possible to continue cultivating crops
- Death of animals such as goats
- Negative impact on plant life, which is food for the goats
- Negative impact on human health

- Fear that individuals from another region may take advantage of or claim the benefits of the project
- Generation of royalties for the municipal government of Uribia
- Request for money as payment or consideration
- Benefits for the communities during the stage of project operation

G.3. Report on how due account was taken of any comments received:

All comments received from stakeholders were taken into account through a participation process with communities of the region. There was a consultation process carried out by EEPPM that was developed through meetings, workshops, and field visits. The first step in this process was the "prior consultation". This process began with the communities from the *rancherias* and their traditional authorities and enjoyed the support of the environmental authority in the region, CORPOGUAJIRA, which issued the respective environmental licenses, and provided accompaniment in the field as necessary. The main characteristics of this process developed with the Wayúu communities from the area of influence of the project were:

- Consultation on impacts and management measures, interests and expectations of the communities and institutions, by holding workshops, presenting videos, photographs, that would enable the communities to take stock of the impacts of the wind energy project on the environment.
- A process of agreeing on management measures was carried out. Meetings and workshops were held with the communities in which the proposals of the community were considered, especially for managing the impacts related to the transit of vehicles and the possible impact on persons, animals and burial grounds, job creation for the local population, contracting of goods and services, and the definition of compensatory measures aimed at improving the quality of life, particularly as pertains to water, health and education.
- Participation of communities in the environmental studies: The communities participated actively as guides and informants in the basic studies such as: studies of birds, plant life, and soils uses, topography, and aerophotogrammetric restitution, geotechnical studies, archeological studies and social description.
- Follow-up on agreements and activities derived from the studies and from the process, such as the operation of the stations, the impact on the milieu, expectations mutual implementation of commitments, which made it possible to get feedback on the process, and to improve the interaction with the community.

EEPPM possesses records not only of all comments received by stakeholders but also of the complete process of consultation. Based on comments received, EEPPM fully carried out an "Execution Plan" where all the comments were introduced. Moreover minutes were taken of each meeting, signed by all persons in attendance, setting forth the information provided about the project, its characteristics, the studies required, doubts, expectations, and fears of the communities; the impacts, needs, and commitments made by the parties. A copy of each of the minutes was provided to communities, the Office of the Major of Uribia, Corpoguajira and the Ministry of Interior, If additional information is needed please contact Ana Maria Sandoval at EEPPM, +57 -54 380 04230.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Represented by:	
Title:	Director
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Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

N/A

Annex 3

BASELINE INFORMATION

General Data Summary

The National Dispatch Center (CND) facilitated all the necessary information via official digital data to calculate the Operating and Build Margin Emission factors. The generation of every plant for every hour was downloaded with the help of a system called "neon" at CND web page[3]. This information is summarized as follows,

Energy generation national grid 2004: 48,619,956 MWh
Jepirachi Wind Project Generation 2004: 51,991.45 MWh
Imports to Colombian interconnected system 2004: 48,431 MWh
Imports Venezuela: 13,458 MWh
Imports Ecuador: 34,973 MWh
Imports/National Generation: 0.099 %

Data for calculating the Operating Margin emission factor

Following, relevant data used to calculate the EF_{OM} is presented. The tables presented below contain the Emissions factor of all power plants connected to the Colombian national grid. Table 1 presents all power plants operating with natural gas and table 2 presents all power plants operating with coal. Based on this, the calculated Operating Margin emissions factor is, EF_{OM} = 0.3619 tCO2/MWh

Plant Name	Emission Factor (tCO2/MWh)
Barranca 1	0.7208
Barranca 2	0.7185
Barranca 3	0.7349
Barranca 4	0.6831
Barranca 5	0.7703
Barranquilla 3	0.5710
Barranquilla 4	0.6496
Cartagena 1	0.5986
Cartagena 2	0.6603
Cartagena 3	0.5851
Flores 1	0.4254
Flores 2	0.6030
Flores 3	0.5648
Guajira 1	0.5773
Guajira 2	0.5715
Merielectrica 1	0.5675
Palenque 3	0.8426

[3] Neon is a database, which contains close to 35 different variables that are measured and stored by CND. All this information can be found at www.mem.com.co

Proelectrica 1	0.4810
Proelectrica 2	0.4810
Tebsa Total	0.4320
Termocandelaria 1	0.5623
Termocandelaria 2	0.5701
Termocentro 1	0.4136
Termodorada 1	0.5369
Termocali 1	0.3993
Termopiedras	0.5518
Termosierrab	0.3731
Termovalle 1	0.3983
Termoyopal 2	0.7482

Table.1 Emissions Factor (tCO2/MWh) for power plants operating with natural gas.

Plant Name	Emission Factor (tCO2/MWh)
Paipa 1	1.501
Paipa 2	1.295
Paipa 3	1.314
Paipa 4	1.020
Tasajero 1	0.854
Zipaemg 2	1.055
Zipaemg 3	0.964
Zipaemg 4	1.023
Zipaemg 5	0.890

Table.2 Emissions Factor (tCO2/MWh) for power plants operating with coal.

All the data presented in the above tables have been delivered by UPME and is considered official information.

Data for calculating the BM emission factor

Total Generation 2004: 48,619,956 MWh
20% of total generation: 9,723,991 MWh
EF_{BM} = 0.3199 tCO2/MWh

The Build Margin Emission factor was calculated ex ante based on the most recent information available on plants already built for sample group "*m*"(Option 1 of ACM0002) at the time of PDD submission.
The sample group "m" consists of the power plants capacity additions in the electricity system that compromise 20% of the system generation (in MWh) and have been most recently.

Plant Name	Year commissioned	Generation 2004 (MWh)	Accumulated Generation (MWh)
Termoyopal 2	2004	59,536	59,536
Miel 1	2002	1,021,864	1,081,401
Porce 2	2001	1,662,346	2,743,747
Termosierra	2001	439,913	3,183,660
Termocandelaria 1	2000	10,259	3,193,919
Termocandelaria 2	2000	52,523	3,246,442
Termocentro	2000	200,690	3,447,133
Urra	2000	1,045,222	4,492,356
Paipa 4	1999	661,912	5,154,268
Termocali	1999	31,803	5,186,072
Flores	1998	460,722	5,646,794
Merielectrica	1998	43,734	5,690,528
Tebsa	1998	3,542,373	9,232,901
Termovalle	1998	3,037	9,235,939
Termodorada	1997	2,299	9,238,238
Flores 2	1996	460,722	9,698,961
La Tasajera	1994	25,036	9,723,991

Table 3. List of plants "m" for year 2004

Note: La Tasajera generation (last row) has been modified to meet the 20% of total national generation. Its annual generation was 1,492,964 MWh and was then adjusted to 25,036 MWh to set the energy addition to 9,723,991 MWh, which corresponds to the 20% of total national generation.

Data for calculating the Combined Emission Factor (EF_{2004})

EF_{OM} = 0.3619 tCO2/MWh
EF_{BM} = 0.3199 tCO2/MWh
W_{OM} = 0.5
W_{BM} = 0.5

EF_{2004} = 0.3409 tCO2/MWh

The default relative weights for OM and BM emission factors are used for presentation purposes. Once EB emits concept on the proposed relatives weights the corresponding adjustment will be made.

Annex 4

MONITORING PLAN

The structure of the next monitoring plan has been developed, taking as a model the monitoring plan presented with the Emissions Reduction Purchase Agreement (ERPA) by EEPPM to the World Bank on December 10, 2002. Sections 1 to 4 from the above mentioned document are presented below.

1. The Monitoring Protocol

1.1 Purpose of the MP

In the context of the Clean Development Mechanism (CDM) of the Kyoto Protocol, monitoring describes the systematic surveillance of a project's performance by measuring and recording performance-related indicators relevant to the project or activity. The Monitoring Protocol also includes verification, which is the periodic auditing of monitoring results, the assessment of achieved emission reductions (ER) and the project's continued conformance with all relevant project criteria.

This Monitoring Protocol (MP) defines a standard against which the Colombia: Jepirachi Carbon Offset Project performance in terms of its greenhouse gas (GHG) reductions and conformance with all relevant Clean Development Mechanism (sustainable development) criteria will be monitored and verified. As such the MP, after its validation, will be an integral part of the contractual agreement between the Prototype Carbon Fund (PCF) and Empresas Públicas de Medellin (EEPPM).

The MP is a part of the project design documents. The MP builds on the baseline scenario identified in the Jepirachi's project Baseline Study and is fully consistent with the Baseline Study.

1.2 Use of the MP by the Project Operator

The MP is a working document that identifies the key project performance indicators and sets out the procedures for tracking, monitoring, calculating and verifying the impacts of the project, in particular with respect to the project's ERs.

This MP must be used by the project operator when planning and implementing the project and during the projects operation. Adherence to the instructions in the MP is necessary for the project operators to successfully measure and tracks the project impacts and prepare for the periodic audit and verification process that will have to be undertaken to confirm the achieved ERs. The MP is thus the basis for the production and delivery of ERs to the PCF or other buyers and for any related revenue stream that the operator expects to receive.

The MP assists the operator in establishing a credible, transparent, and adequate data measurement, collection, recording and management system to successfully develop and maintain the proper information required for an audit of the collected information and for the verification and certification of the achieved ERs and other project outcomes. Specifically, the MP provides the requirements and instructions for:

- establishing and maintaining the appropriate monitoring system including spreadsheets for the calculation of ERs
- checking whether the project meets key sustainable development indicators;

- implementing the necessary measurement and management operations;
- preparing for the requirements of independent, third party verification and audits.

The MP ensures environmental integrity and accuracy of crediting ERs by only allowing actual ER to be accounted for after they have been achieved. The MP must therefore be used throughout the life of the project. It must be

- adopted as key input into the detailed planning of the project, and
- included into the operational manuals of the project.

The MP can be updated and adjusted to meet operational requirements, provided such modifications are approved by the Verifier during the process of initial or periodic verification. In particular, any shifts in the applicable baseline that are identified by following this MP may lead to such amendments, which may be mandated by the Verifier.

1.3 Structure of the MP

The MP document contains the following parts:

- *Section 2* explains concepts and principle assumptions applied in monitoring the GHG performance of the project and in calculating ERs. The section also discusses data sources and assumption and lays out why the MP is expected to compute ERs in a conservative manner.
- *Section 3* contains instructions regarding operational and monitoring obligations the operator is expected to assume.
- *Section 4* presents the functioning of the MP electronic workbook. The workbook is implemented as Excel spreadsheets and is an integral part of the MP.

2. Concepts and principal assumptions

The MP builds on the baseline study. The methodology in the MP is guided by the need and limitation of measuring project performance indicators and calculating ERs in an efficient and transparent way.

2.1 Emission Reductions from the Jepirachi Wind Power Project

The Jepirachi Wind Power Project consists of a wind power plant with 19.5 MW located in the Guajira desert (an area of consistent and high winds) The project is located in Wayuu Indian Territory in the Northeastern region of the Atlantic Colombian coast, in the area between Cabo de la Vela and Puerto Bolivar, within the region of Uribia in the Department of Guajira. In terms of geodesic coordinates the site is located 12˚ 15' 4 North latitude, 72˚ 4' 1" to the East, 5 Km west from Puerto Bolivar, an area of sparse population.
In the absence of the Jepirachi Wind Power Project, the same level of demand for electricity would be met by the combined production of plants in the SIN, thus emitting GHG. Generation pricing and merit order dispatch in the Colombian power sector are based on "energy price bidding" by generators for a day ahead based on estimated hourly demand. "Minor plants" (10-20 MW) have the right to participate in the pool and benefit from pool services under a preferential dispatching option (e.g. spinning reserve). In essence, such plants can access the electricity market by selling all their available output at the wholesale market price ("precio de bolsa"), which includes a "capacity payment" component (as a floor price for the bids), and are exempt from penalties on non-delivery of electricity. Since the Jepirachi Wind Power

Project qualifies as a minor plant, it will preferentially dispatch its energy in the merit order, and will displace those generating units that are programmed for dispatching according to their bids. The total estimated emission reductions to be achieved by the project are 284,458.96 tons of CO_2 over 16 years (by year 2019).

2.2 Geographic and System Boundaries for the MP

As referred in ACM0002 the project boundary has to be assessed in terms of the emission sources and spatial extent.

- *Emission sources*: Jepirachi Project presents zero emissions, since it is a Wind farm Project. For the baseline determination only CO2 emissions from electricity displaced due to the project are accounted for.
- *Spatial extent*: The spatial extent of Jepirachi Project boundary includes the project site and all power plants connected physically to the electricity system Jepirachi is connected to. The Colombian grid is a national grid, connected to Jepirachi through a 0.7 km long line. Therefore, all power plants providing electricity to the Colombian grid system are included in the project boundary.

2.3 Time Boundary and Baseline Review Protocol

The Baseline Study has opted for a 7-year renewable baseline (for a maximum total crediting period of 21 years) for which the project is likely to generate ERs in compliance with the CDM.

2.4 Calculating Emission Reductions

The emission reduction from the project results from the electricity from the Jepirachi wind power plant displacing power generated by coal (or simple cycle or combined cycle gas) in the Interconnected System. The outline of the method to calculate the emission reduction follows ACM0002-"Consolidated baseline methodology for grid-connected electricity generation from renewable sources". The steps needed to perform the emissions reduction calculation are summarized as follows,

Determine the net Project electricity output for the period chosen from NEON (the official database maintained by CDN) that can be accessed through www5.ISA.com.co /neonweb [4] by accumulating the hourly results from the measurements made available by CND in MWh or KWh.

⇩

Determine all Grid-connected-plants hourly net electricity output "Generacion Real" for the period chosen from www2.ISA.com.co/neonweb in MWh or KWh.

⇩

Determine all plants hourly bidding prices "Precio de Oferta" for the period chosen from www2.ISA.com.c/neonweb. in $/MWh

⇩

[4] Once in this page, access to the Database is granted after supplying valid user ID and password.

Determine the Dispatch order[5] *in the following way; for every hour, order all the plants taking as a reference the higher bidding price so that the plant with the higher bidding price stay at the top (marginal price)*

⇩

Once the dispatch order is built, relate every plant's hourly bid price to its correspondent hourly net electricity generation (Generacion Real)

⇩

Gather all power plants official emission factors in tCO2/MWh. This information is directly supplied by UPME at www.UPME.gov.co

⇩

Determine Operating Margin Emissions Factor following general procedure presented in ACM0002- "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", using method "c". See section B.2

⇩

Obtain from UPME at www.UPME.gov.co the most recent information available on plants already built. This information is used to estimate a) the five power plants that have been built most recently and b) the power plants capacity additions in the electricity system that compromise 20% of the system generation (in MWh) and that have been most recently.

⇩

Determine Build Margin Emissions Factor following general procedure presented in ACM0002- "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", using *Option 1*. See section B.2

⇩

Calculate the Baseline emission factor (EF_y) according to procedure presented in ACM0002- "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

⇩

Determine Net annual CO2 emissions in the Baseline by multiplying the baseline grid Emissions Factor calculated in the predecessor step by the Project annual generation,

$$BE_y = EG_Y * EF_y$$

⇩

Total CERs generated by the project for the period is calculated as

$$ER = BE-PE-L = BE$$

[5] For more information on how the Colombian Dispatch system works, please see next numeral.

Where PE are the project emissions and L refers to leakage as defined in the methodology ACM0002- "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" *Both are equal to cero (0).*

The CND programs the dispatch of the power units by strict economic merit, considering the river flows, the opportunity cost of the water, the operational cost of the thermal units and the filling of the hourly load curve of the demand. The outcome is the hourly generation program for each power unit and the hourly marginal cost of the whole system (that cost represents the highest operational cost of the power units generating in each hour). The CND must coordinate in real time the dispatch at minimum cost of the power units according to the weekly and daily programs.

The CND publishes daily and monthly reports of the actual operation of the SIC, including in that report the hourly generation for each power unit and the marginal cost for each hour. The information required for fulfilling this MP are thus provided by CND and is also available with UPME.

3. OPERATIONAL AND MONITORING OBLIGATIONS

The operator of the Jepirachi wind power project will have certain operational and data collection obligations to fulfil, in order to maximize the greenhouse gas emissions reductions and to ensure that sufficient information is available to calculate ERs in a transparent manner and to allow for a successful verification of these ERs.

3.1 Operational Obligations

The operational obligations of EEPPM are to ensure that all reasonable steps to maximize the generation from the Jepirachi facility are taken and thereby maximize the GHG emissions reduction.

3.2 Data Requirements and Project Database

The data required for the MP is in line with the kind of information collected by an electricity utility. The data used in this MP will be collected by EEPPM and comes from the following sources:

- **National Dispatch Centre (CND)** Web-page, www.mem.com.co . Access to CND database is available only upon agreement with the CND. The operational data collected includes: National Energy Demand, Hourly/Daily National Generation by plants, Hourly/Daily Plants Energy Bid prices, Energy generated to cover constraints, National Hydraulic Generation, Dams water levels among others.
- **Energy and Mines Planning Unit (UPME)** publishes most of its data in its website (www.upme.gov.co) and includes: Reference Energy and Mines Expansion Plans, Energy and Mines Statistics Bulletins, International Analysis of Electricity Prices, Colombian Electricity Market Magazine, among others. UPME is in charge of the presenting the Indicative Expansion Plan for the energy sector, as well as support the requirement for information from the ministry and from the stakeholders. UPME high technical capacity has been used to estimate expected carbon emission reduction through advance simulation methods, and calculates individual plants emission factors based on detailed technical information and chemical analysis of all fuels used within the country.

4. The Jepirachi Wind Power Project Workbook

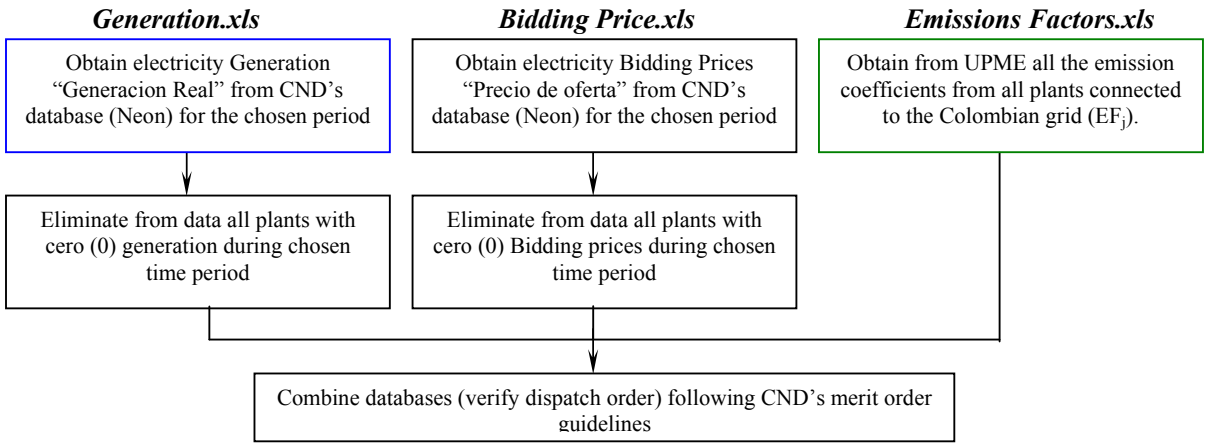
4.1 General Description

This section explains and illustrates the steps required by the operator to enable the GHG emissions reductions to be calculated on a monthly basis using the proposed Jepirachi project workbook. The electronic work is an Annex to the MP and an integral part thereof.

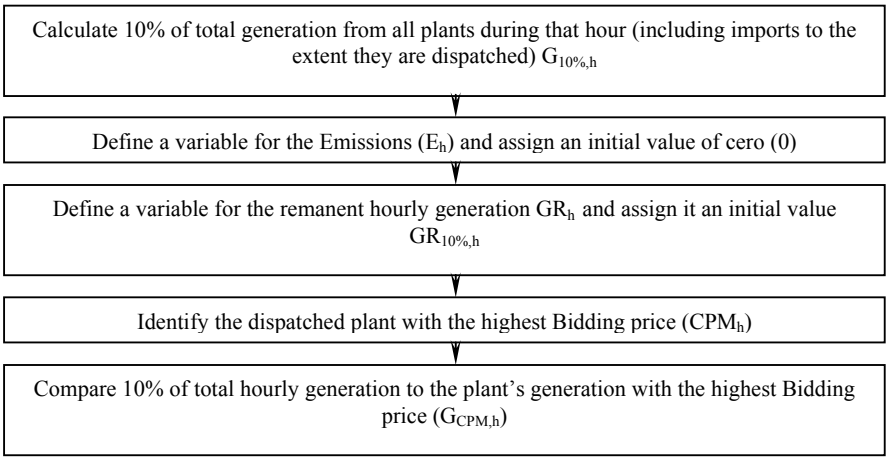
Initially for the Operating Margin Emission Factor, three excel sheets (***Generation.xls, Bidding Price.xls, Emissions Factors.xls***) are needed to download the information extracted from UPME and NEON, which is CND database. In the following pages diagrams of the steps followed to calculate both, the Operating and Build Margin Emissions Factors are presented.

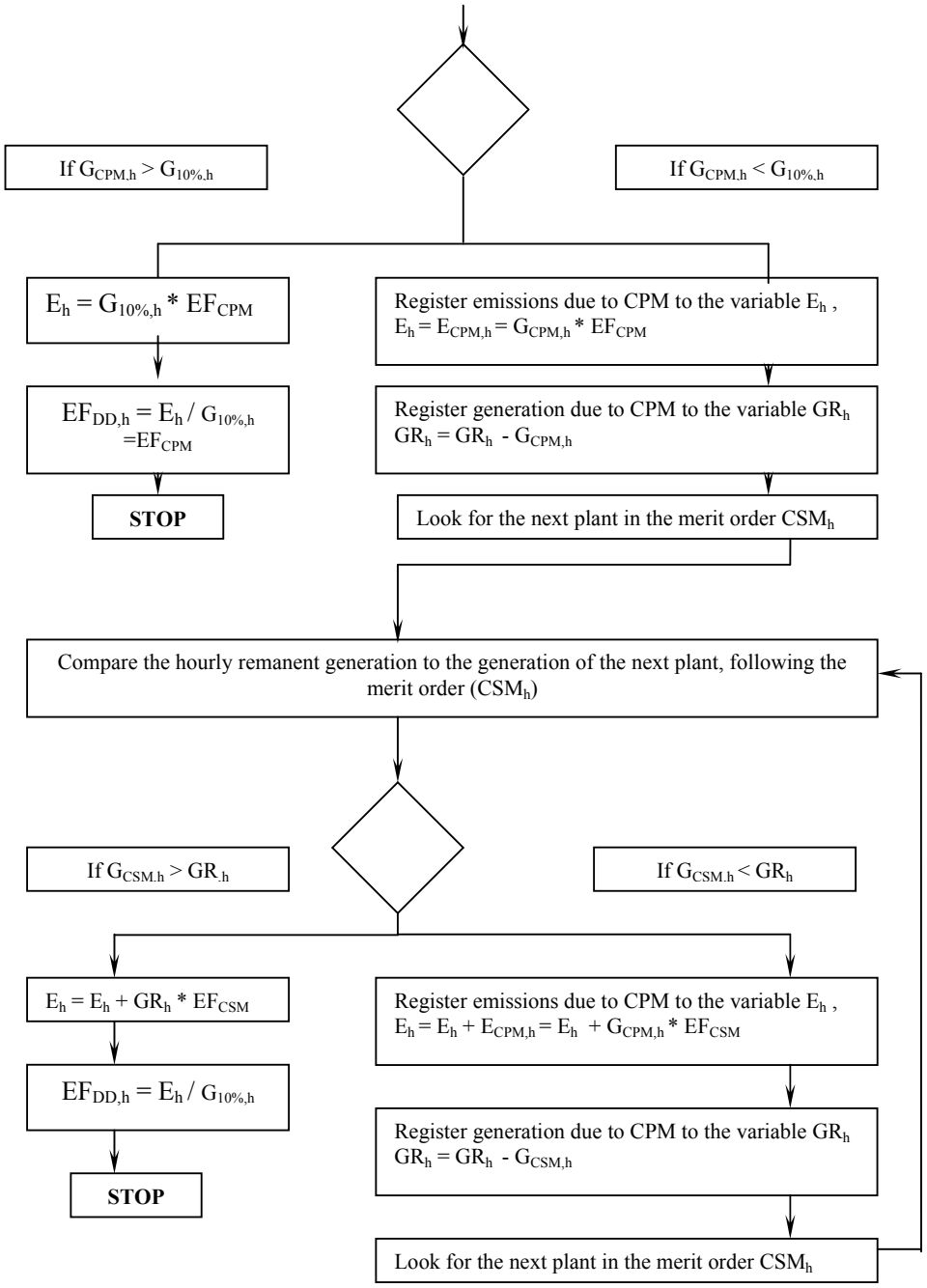
4.1 General algorithm to calculate the Operating Margin for year *y*

The use of a sub-routine allows the interaction among databases and the calculation of the hourly emission factor following the steps in the flow chart below. The results form these calculations are generated automatically and stored in new data sheets for verification purposes.



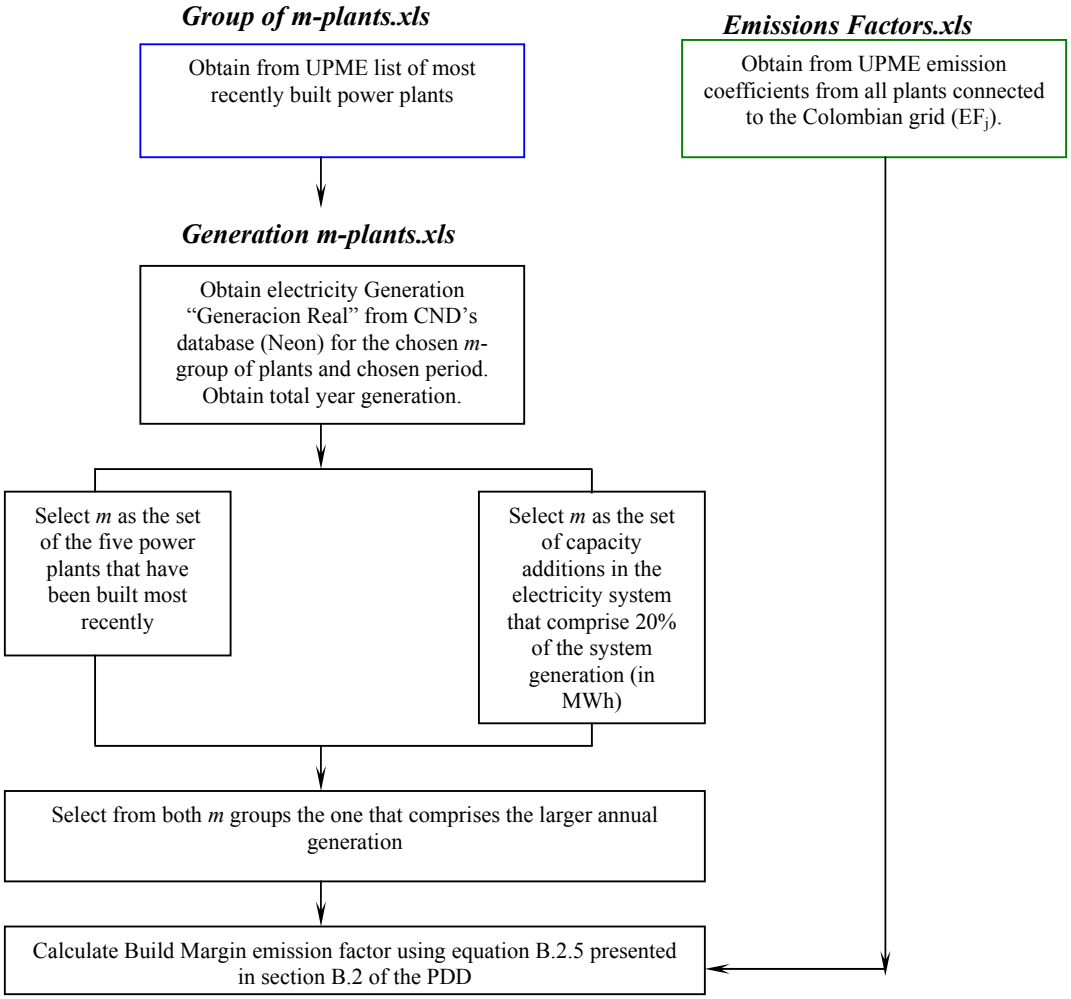
For every hour of the chosen period, simultaneously and independently





Once the $EF_{DD,h}$ is estimated, the dispatch data OM emission factor $EF_{Dispatch\ data,\ y}$ is calculated as specified in PDD's section B.2, STEP1. The steps presented above to calculate the hourly emission factor $EF_{DD,h}$ have to be repeated every year to update the Operating margin Emissions Factor.

4.3 General algorithm to calculate the Build Margin



The steps described above represent a one-time-procedure for the calculation of the Build Margin for year *y*. This Build Margin Emission Factor (BM_{EF}) will be kept constant for the first and second crediting periods following *Option 1* for the BM_{EF} estimation, presented in ACM0002.

Annex 5

National and Sectoral circumstances

National and sectoral circumstances: The total net installed capacity of the Colombian National Interconnected System (SIN) in 2001 was 13.2 GW. Most of this installed capacity is hydro-based (about 66%) making the country highly reliant on hydropower. Figure A.5.1 summarizes the power mix by source and technology.

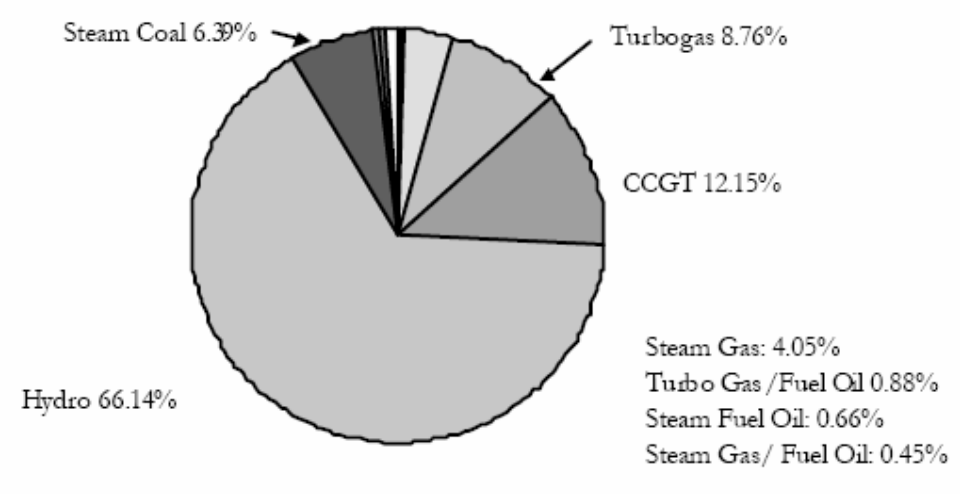
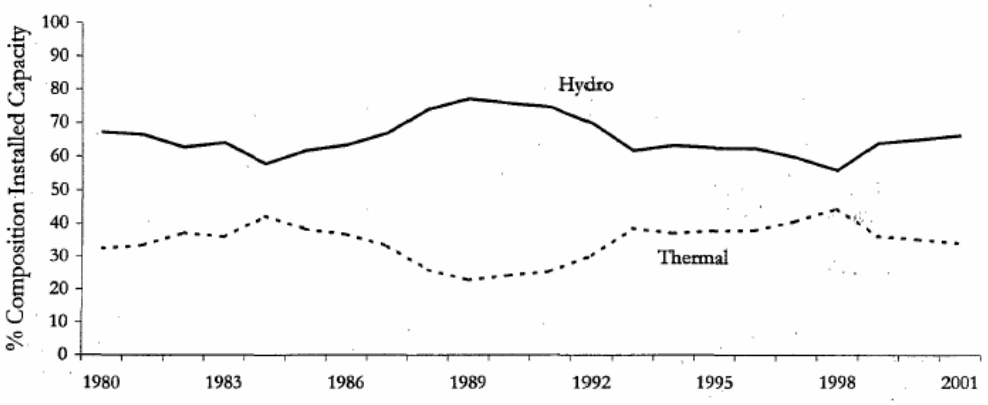


Figure A.5.1 Technology Composition of the Installed Capacity in the Colombian Electricity Sector (2001); source "Unidad de Planeación Minero Energética, Plan de Expansión de Referencia 2001"

Since 1980 the Colombian Electricity Supply System (ESI) has maintained a hydroelectric share in the range 55-75% and a thermal composition in the range 25 to 45%. This is appreciated in figure A.5.2.



0-200

After severe droughts, registered during the 1990s (i.e. 1992, 1997), that caused power shortages with associated forced rationing, the system has encouraged the development of more thermal generation capacity, specifically with the intention of increasing capacity and enhancing the system's reliability of supply. The increase in thermal share of the SIN has also been the indirect result of the withdrawal of the

public sector in large investments and the reluctance of private generators to enter the hydro electric generation and associated environmental and social requirements. Therefore, future additions to the power mix to attend the projected growth in demand are anticipated to be thermal-based. While this responds to the need for flexibility and robustness of the system, the increase in thermal share contributes to the gradual increase of GHG emissions by the sector and the release of local criteria pollutants (such as NOx and, SOx particulates and volatile hydrocarbons, which have been linked to health of exposed populations).

Hydro Availability and its Effects in the Supply/Demand Ratio in the power sector

In the period 1990-2001, five dry years affected the supply of electricity, including the drought of 1992 due to El Niño phenomenon. This has been a cause of concern and has led efforts to diversify the sources of power, focusing on an expansion of thermal generation capacity. Figure A.5.3 shows the utilization capacity of hydroelectric plants in the system during this period. Hydro utilization capacity could be defined as the percentage of the actual Hydro capacity in use over the maximum available Hydro capacity.

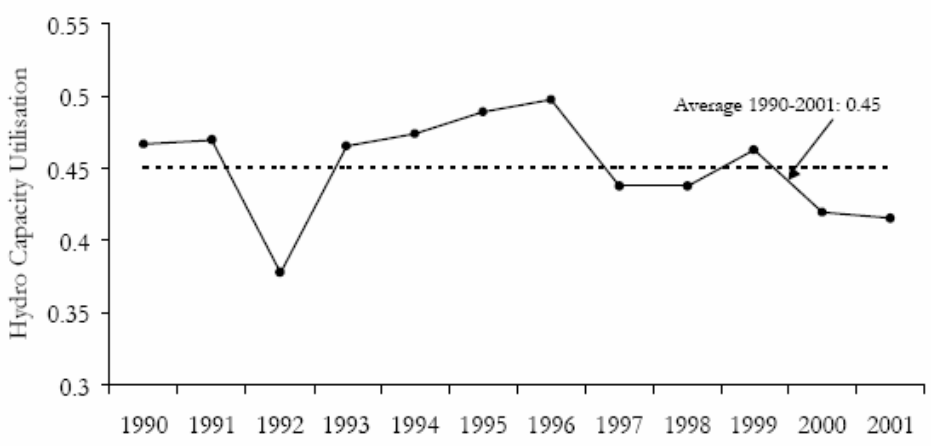


Figure A.5.3 Utilization of Hydroelectric Generation Capacity in Colombia, Period 1990-2001; source, Data from Unidad de Planeación Minero Energética (UPME), International Energy Data

Presently, market forces in Colombia strongly favor thermal power over renewable energy, resulting in a trend of increased carbon emissions per generated kWh. A greater number of thermal power projects are likely to be developed in the short term as they are faster to implement and more competitive in terms of capital costs than renewable energy projects. On average, these capital costs are US$450-US$700 per installed kW for natural gas or fuel oil systems, versus $1,000/kW for wind power systems.

Taken together, these factors presented above have resulted in a greater share of thermal energy in the SIN, and this trend is expected to continue according to the indicative expansion plan. Given its small size (19.5 MW) relative to the net installed capacity of the SIN (13.2 GW), the Jepirachi Wind Power Project has no effect on the planned expansion of the SIN.

The main sources of information in Colombia, for the interconnected grid, are: (i) the operational database updated, operated and managed by the National Dispatch Centre, CND, in ISA; and, (ii) UPME,

the planning unit for the energy sector created by the minister of mines and energy, to serve as technical secretariat for energy planning in the country. All this data goes through a very strict verification and validation process performed by the official entities that make it public. In this way it can be assured that the data is replicable and reliable.
Information from all stakeholders in the interconnected system is subjected to regulation by the CERG, the national regulatory commission for energy. A well-developed, high quality, internationally accepted measuring standards have been enacted. Audits are commonplace to ensure the quality of the data, plus multiple interest groups have access to the data, as the transactions only can use official data. QC/QA methods are regularly enforced. Colombia offers very good, accurate and reliable data from its interconnected electric grid.

Reductions of emissions: The project employs a non-GHG emitting technology (wind power). In the absence of the Jepirachi Wind Power Project, the same level of demand for electricity would be met by the combined production of plants in the SIN, thus emitting GHG. Generation pricing and merit order dispatch in the Colombian power sector are based on "energy price bidding" by generators for a day ahead based on estimated hourly demand. "Minor plants" (10-20 MW) have the right to participate in the pool and benefit from pool services under a preferential dispatching option (e.g. spinning reserve). In essence, such plants can access the electricity market by selling all their available output at the wholesale market price ("precio de bolsa"), which includes a "capacity payment" component (as a floor price for the bids), and are exempt from penalties on non-delivery of electricity. Since the Jepirachi Wind Power Project qualifies as a minor plant, it will preferentially dispatch its energy in the merit order, and will displace those generating units that are programmed for dispatching according to their bids. The total estimated emission reductions to be achieved by the project are 252,295 tons of CO_2 over 14 years (by year 2017).

Baseline scenario: The baseline scenario was constructed following the approved consolidated methodology, ACM 0002. According to this approach the future scenario can be described as a combined analysis of the existing grid, its operation and recent additions. To complement the suggested analysis this section presents the information required to estimate the building margin. It also introduces the expansion plans that were defined by the government of Colombia through UPME.

The government of Colombia envisioned the electric power expansion path based on three main considerations: (i) those projects already approved and under construction; (ii) project inscribed at UPME for implementation in the near future; and, (iii) analysis of the demand growth and least costs expansion of the interconnected grid base upon already inscribed power plants. The results are summarized in Table A.1.1.

Projects inscribed in UPME and Table A.1.1 plausible expansion scenarios as defined by UPME. Notice that 67% of the potential additions to the interconnected grid are hydropower plants, while 32.6% are thermal units for short term scenarios. However, hydropower generation has become a less likely investment option in Colombia for various reasons related to site availability and its effect on costs, environmental and social impacts associated to reservoirs and flooding, and also due to high up-front capital investment. Nevertheless, UPME has developed indicative scenarios for the expansion of the electricity supply industry considering specific assumptions on demand (i.e. medium growth rate), fuel prices (i.e. low price scenarios) and lower than average hydrologic conditions, as well as perceived trends and registered intentions by private and public generators.

For the **short-term scenarios** UPME concluded that **Scenario** 2 would be the most probable given assumptions considered, especially with regards to retirements, and the fact that scenarios 1 and 4 exhibited lower levels of reliability regarding security of supply than Scenarios 2 and 4.

UPME concludes that given the assumptions on demand and fuel prices the system will probably only add gas-based generation in the period 2006-2010 (shown as **Scenario 1 for Long Term Expansion).** It is important to note that lower than average hydrologic conditions were assumed for the four scenarios described above. Under scenarios of average hydrologic conditions, the installation of new hydroelectric plants would not occur. Also, the government has not issued any new licenses for hydroelectric generation given the local social and environmental impacts associated to these projects.

Short Term Scenarios (2001-2005)												
Year	**Scenario 1 (MW)**			**Scenario 2 (MW)**			**Scenario 3 (MW)**			**Scenario 4 (MW)**		
	Gas	Coal	Hydro	Gas	Coal	Hydro	Gas	Coal	Hydro	Gas	Coal	Hydro
2001	500		404.2	500		404.2	500		404.2	500		404.2
2002			625			625			625			625
2003												
2004				150			150			150		
2005							250				120	
Sub-total	1529.2			1679.2			1929.2			1799.2		
Long Term Scenarios (2006-2010)												
Year	Gas	Coal	Hydro	Gas	Coal	Hydro	Gas	Coal	Hydro	Gas	Coal	Hydro
2006	250									250		
2007	250			250			250					
2008	250					400	250			250		
2009	250			250	150		250		200		100	200
2010	215			215			215		200	215		
Total	1215			1265			1365			1215		

Table A.1.1. Expected Capacity Additions, Period 2001-2010 (Source UPME,"Evolución del Comportamiento de la Demanda de Energía Eléctrica 2001")

Additionality: To demonstrate that the project activity is additional and therefore not the baseline scenario, *the tool for the demonstration and assessment of additionality* is used (please see section B.3); the proposed project faces important barriers that in fact further prevent it from being part of the capacity expansion plan. First, there is a significant technological barrier as there is no experience in the country with the implementation of wind-turbine technology to generate electricity on a commercial basis. Secondly, there are significant investment barriers, as local developers have no access to equity and debt in the local and international markets, largely due to the high risk of investments in Colombia. Thirdly, the expansion planning in Colombia calls for an increase in the thermal generation, given the high reliance on hydroelectric capacity, in order to provide a more secure supply of energy. Wind energy is not an appropriate choice to meet this objective, as it is unreliable and uncertain. This is confirmed by the fact that all capacity expansion since the liberalization of the energy sector in 1995 has been in thermal energy.

Hence, the project is additional because it generates emission reductions that would not occur otherwise, since the project does not present an economically attractive investment opportunity. Given the

significant technological and investment barriers associated with wind energy in the country, the project sponsor is unlikely to invest in the project in the absence of carbon finance.

Institutional arrangements for the PCF Jepirachi Carbon Offset Project

The principal institutions involved in the project include: (i) Ministry of Environment (MMA) and its Office of Climate Change (OCC); (ii) Energy and Mines Planning Unit (UPME), (iii) National Dispatch Commission (CND) (iv) Department of Indigenous Communities Affairs from the Ministry of Interior, and (v) Empresas Públicas de Medellín (EEPPM), the project sponsor. EEPPM is also the executing agency for the project and has responsibility for execution of both project components. This can be represented in the following schematic.

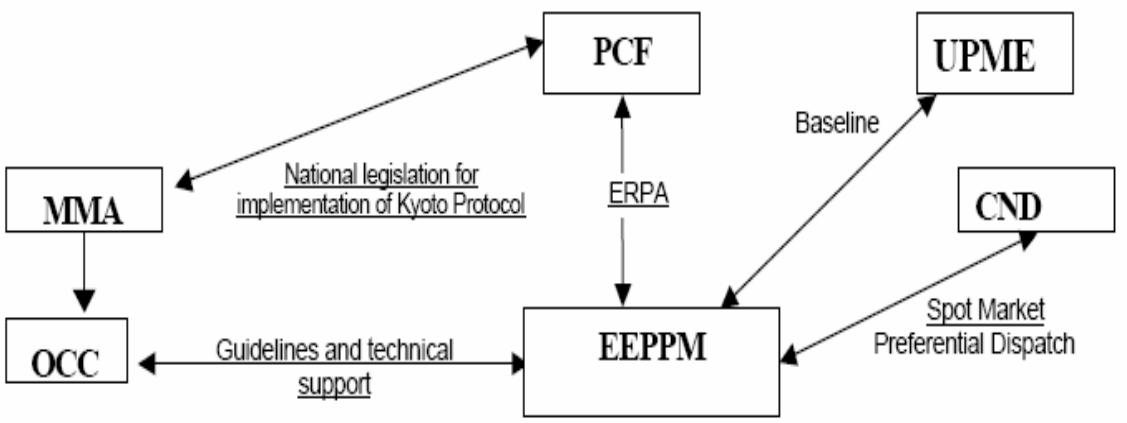


Table A.5.4 Institutional arrangements for the PCF Jepirachi Offset Project

Annex 6

Letter from Mr. Luis Carlos Rubiano (EEPPM Project Manager) announcing Jepirachi's commercial operations starting date

EEPP DE MEDELLIN

Octubre 8 de 2003

01102770
Empresas Públicas de Medellín E.S.P.

Doctor
WALTER VERGARA
Latin America Environment Department
The World Bank
1818 H Street, N.W.
Washington, DC 20433 U.S.A.

Asunto: Información entrada Operación Comercial JEPIRACHI

En atención a los compromisos establecidos en el Acuerdo de Adquisición de reducción de emisiones, suscrito entre el Banco Internacional de Reconstrucción y Fomento, como Fideicomisario del Fondo Prototipo del C0.arbono, Sección 3.01 Verificación inicial del proyecto , literal (i), relacionado con el asunto:

"Antes del comienzo de la operación comercial del Parque del Viento Jepirachi, pero no más tarde de noviembre 1 de 2003, el Proyecto quedará sujeto a Verificación inicial por parte de un tercero independiente, con el objeto de evaluar si el proyecto, según lo constituyó la Entidad del proyecto, cumple con las especificaciones del Documento de Diseño del proyecto y las disposiciones del Plan de Monitoreo ("Verificación Inicial"). Con este propósito: (i) la Entidad del Proyecto notificará al Fideicomisario por lo menos (60) sesenta dias antes del comienzo de la Operación Comercial ....".

En virtud de lo anterior, les informamos que el montaje de los 10 primeros aerogeneradores estará en diciembre del 2003; los 5 restantes, las pruebas, los sistemas de comunicaciones, etc están previstos para entrar en operación comercial en la última semana de febrero del año 2004, aproximadamente.

En caso de presentarse algún cambio o avance con relación a estas fechas, les estaremos informando oportunamente.

Con ello damos cumplimiento a la citada cláusula del contrato mencionado.

Cordialmente,

LUIS CARLOS RUBIANO ORTEGÓN
Subgerente Planeación Generación Energía

Carrera 58 No. 42-125 Apartado Aéreo 940. Conmutador: (054) 3808080 Fax: (054) 3806790
www.eeppm.com Medellín Colombia

P-313

Annex 7

Letter 1. Letter from EEPPM to Colombian Environment Ministry (MMA) to ask for the inclusion of Jepirachi in Colombia's CDM portfolio

EEPP DE MEDELLIN
01047436
Empresas Públicas de Medellín E.S.P.

Diciembre 5 de 2002

Doctora
CECILIA RODRÍGUEZ GONZALEZ- RUBIO
Ministra (E)
Ministerio del Medio Ambiente
Calle 37 8-40
Bogotá D.C.

Asunto: Solicitud aprobación proyecto reducción de emisiones - Parque Eólico Jepirachi

Respetada doctora Rodríguez:

Como es de su conocimiento, Empresas Públicas de Medellín ha venido trabajando en la formulación del Proyecto Parque Eólico Jepirachi elegible al Mecanismo de Desarrollo Limpio – MDL - del Protocolo de Kyoto en la Alta Guajira. Este proyecto se encuentra en etapas finales de formulación y negociación de venta de los certificados de reducción de emisiones de gases de efecto invernadero con el Fondo Prototipo de Carbono del Banco Mundial.

Con el fin dar continuidad a las actividades requeridas en el ciclo de proyectos del MDL a nivel internacional, de la manera mas cordial, adjunto a la presente copia del Documento de Diseño del Proyecto Jepirachi con el propósito de solicitarle la aprobación nacional del proyecto, de acuerdo con lo establecido en la Séptima Conferencia de las Partes de la Convención Marco de las Naciones Unidas sobre Cambio Climático.

Reciba un cordial saludo,

LUIS CARLOS RUBIANO ORTEGÓN
Subgerente de Planeación Generación Energía

Copia: Doctor Juan Pablo Bonilla - – Viceministro, Ministerio del Medio Ambiente
Doctora Martha Patricia Castillo – Coordinadora Oficina Colombiana para la Mitigación del Cambio Climático, Ministerio del Medio Ambiente.

Carrera 58 No. 42-125 Apartado Aéreo 940. Conmutador: (054) 380 8080 Fax: (054) 3806790
www.eeppm.com Medellín Colombia

P-313

Letter 2. Letter with date 09/08/2001 sent by the Colombian Environment Ministry (MMA) on behalf of EEPPM to the Prototype Carbon Fund, showing the interest of EEPPM in registering Jepirachi Wind Project as a CDM project activity before the project started

MINISTERIO DEL MEDIO AMBIENTE

Ministry of the Environment

Mr. KEN NEWCOMBE
Director Prototype Carbon Fund
World Bank
1818 H Street, NW
Washington, DC 20433

1001-2-3142

MINISTERIO DEL MEDIO AMBIENTE
Fecha: 09/08/2001 09:53 a.m. No. Radicación :1001-2-314
Trámite: CORRESPONDENCIA INFORMATIVA
Actividad: PRESENTACION, Folios: 1, Anexos: 1
Destino: BANCO MUNDIAL

Dear Mr. Newcombe

The Ministry of the Environment of Colombia has received a copy of the Jepirachi Carbon Off-set project, a wind farm electricity project of Empresas Públicas de Medellín located in the province of la Guajira, Colombia.

We are aware that the objective of the Prototype Carbon Fund is to provide resources for projects that will generate greenhouse gas emission reductions. We hereby endorse the Jepirachi Carbon Off-set project, and are pleased to submit it to the Prototype Carbon Fund, for review and financing. We hope that this project can be registered in the future, when the modalities and procedures of Clean Development Mechanism of the Kyoto Protocol are developed.

Empresas Públicas de Medellín will be pleased to answer any question regarding the details of the project during the technical review. However, please feel free to contact us if you have any questions related to our Ministry.

Yours Sincerely,

CLAUDIA MARTINEZ ZULETA
Minister of the Environment (A)
Colombia

CC: Mr. Krishna Challa - Sector Manager for Energy in Colombia, World Bank
Mr. Walter Vergara - Project Manager, World Bank
Ms Ana Maria Calle – Subgerente de Planeación - EEPPM

CAMBIO PARA CONSTRUIR LA PAZ

Letter 3. National Approval from MMA of the Jepirachi project as an eligible activity for the Clean Development Mechanism of the Kyoto Protocol.

Libertad y Orden

Ministerio del Medio Ambiente
República de Colombia

Bogotá D.C., 10 DIC. 2002

0001-2-1332

Doctor
Iván Correa Calderón
General Manager
Empresas Públicas de Medellín E.S.P.
Carrera 58 No. 42-125
Medellín

Mr. Correa:

In response to your request according to communication with location number 0001-1-1332, in which you call for the national approval of the Project "Parque Eólico Jepirachi" as an eligible activity for the Clean Development Mechanism of the Kyoto Protocol, I would like to indicate the following considerations:

- Colombia ratified the United Nations Convention on Climate Change through Law 164 of 1994; which was attainable by the Constitutional Court through Verdict C-073 of February 23, 1995.

- Likewise, Colombia ratified the Kyoto Protocol through Law 629 of December 27 of 2000, which was also attainable by the Constitutional Court through Verdict C-860 of April 15, 2001.

Taking into account herein before, the country is an active member of the Convention on Climate Change as well as of the Kyoto Protocol. Regarding the national approval of projects, the Decision 17th of the Seventh Conference of the Parties, held in Morocco on 2001, states that:

- Paragraphs from 28 through 30 correspond to the participation requirements, in literal F it states:

  "(...)
  28. Participation in a CDM project activity is voluntary.
  29. Parties participating in the CDM shall designate a national authority for the CDM.
  30. A Party not included in Annex I may participate in a CDM project activity if it is a Party to the Kyoto Protocol.

  Likewise, paragraph 40 of literal G, which asserts about Validation and Registration states that:

  " 40. (...)
  (a) Prior to the submission of the validation report to the executive board, have received from the project participants written approval of voluntary participation from the designated national authority of each Party involved, including confirmation by the host Party that the project activity assists it in achieving sustainable development;

Calle 37 No. 8 – 40 Bogotá D. C. PBX. 332 3400 - 332 3434 www.minambiente.gov.co

Libertad y Orden

Ministerio del Medio Ambiente
República de Colombia

Taking into account herein before, the Ministry of Environment requested the Ministry of Foreign Relations, its nomination as Designated National Authority for the Clean Development Mechanism. This fact was consolidated through consular note of May 22nd of 2002, with location number DM/VAM/CAA No. 19335, which was addressed to the UNFCCC Secretariat and, as it was previously mentioned, the State is a member to the Convention since June 20th of 1995, date in which the Convention on Climate Change was put into force.

Finally, once we have reviewed the information you sent I might state that the project presents the following characteristics:

- **Endorsement of the Project to the Carbon Prototype Found.** The Project initiated the formulation of eligible activities in the framework of the National Strategic Study for the Implementation of the Clean Development Mechanism in Colombia 1999-2000. In august 28th, 2001, the Ministry of Environment endorsed the project to the Prototype Carbon Found of the World Bank.

- **Use of Renewable Energy Sources.** The performance of the Jepirachi Project constitutes a pioneer activity in Colombia on the use of renewable sources of energy, such as the use of winds. Although wind energy generation has been widely used in several parts of the world, it would be the first project in the country with such characteristics.

- **Pollutants Reductions.** It is estimated that the project will reduce 840.000 Tons of greenhouse gas emissions during the period 2003-2015, besides the reduction of local pollutants, such as NOx and SOx in comparison with the alternatives of carbon and natural gas generation.

- **Benefits to the local communities.** According to the Law 56 of 1981, and Law 99 of 1993, the project will generate compensations to the local community. In addition the project has implemented all previous consultations procedures with the representatives of the regional indigenous communities.

- **Fulfillment of Environmental Regulations:** Taking into account that the Regional Autonomous Corporation of the Guajira –CORPOGUAJIRA- is the environmental authority competent, provided that the project is performed in its jurisdiction. The General Director of CORPOGUAJIRA sent communication No. 00406, with location number 1001-4-272 in which it is stated that "according to the environmental evaluation carried out by CORPOGUAJIRA the project Parque Eólico Jepirachi is considered under the criteria of environmental sustainability and it is in agreement with the current environmental regulations".

Considering the stated above and based on the documentation sent by Empresas Públicas de Medellín (EEPPM), the Ministry of Environment in its capacity of Designated National Authority, considers that the project "Parque Eolico Jepirachi" from Empresas Públicas de Medellín (EEPPM) contributes to the country's sustainable development and in addition, confirms that the Republic of Colombia voluntarily participates in the Clean Development Mechanism, defined in article 12 of the Kyoto Protocol.

Ministerio del Medio Ambiente
República de Colombia

For your information and pertinent purposes, copy of this letter will be sent to the Clean Development Mechanism Executive Board.

This communication has been issued originally in English and Spanish. In case of disagreement the Spanish version will prevail.

Cordially,

CECILIA RODRÍGUEZ GONZALEZ-RUBIO
Minister

GAEF/jblanco/mpcastillo

Annex 8

Determination of the Dispatch Order in the Columbian Power Sector

Generation pricing and merit order dispatch in the Colombian power sector are based on energy price bidding" by generators for a day ahead estimated hourly demand.

Generating units are then programmed for dispatch according to their bids, from the cheapest to the most expensive (the merit order), to supply the demand. The price (bid offer) of the last unit to be dispatched (the one at the margin) defines the "marginal price" of generation. In a strictly "spot price" dispatch, usually (but not always) the bids reflects the energy-only related costs of production (the variable costs; comprising mainly fuel and operational costs), and not investment-related costs. Operation decisions for existing plants (whose investment costs are already sunk) are based exclusively on its short-term variable costs. Hence, the dispatch merit order is determined by the variable costs of the various alternatives. In this case, the Jepirachi Carbon Offset Project, with its insignificant variable cost, will displace the most expensive alternative at the margin.

Under normal circumstances (when supply is sufficient to cover demand), clearly spot/marginal price in not sufficient to recoup investments for the plant at the margin. For the plants not at the margin, the, marginal price they receive for their generation is greater than their own variable production costs, therefore they can recover part of their investment cost.

In some power pricing systems, a "capacity payment" has been established to deal with the problem of recovering investments, and therefore having a better price signal for investing in new plants (One other method favored by economists is to freely allow for much higher prices during periods of tight supply - periods of very limited reserve or when shortages are expected - so that generators could make sufficient revenues during these periods to compensate for investments. This method increases the price volatility of the spot market). In Colombia, a proxy for capacity payment has been implemented, in a limited and ad-hoc way, through the establishment of a "floor price" in the wholesale power market (no generator could bid below this price). The regulator (CREG) establishes this floor price.

Annex 9

Letter from the Director of the Regional Autonomous Corporation of the Guajira (CORPOGUAJIRA) acting as legal environmental authority, confirming Project compliance with Colombian Environmental regulations

FROM : CORPOGUAJIRA PHONE NO. : 095 7273904 Dec. 09 2002 03:51PM P1

Corporación Autónoma Regional de La Guajira

0100 00106

Riohacha, 9 de diciembre de 2002

MMA Rad. D 1001-4-272

Doctor
JUAN PABLO BONILLA ARBOLEDA
Viceministro
Ministerio del Medio Ambiente
Calle 37 No. 8-40, Piso 4
Telefax: 2889540
Bogotá D.C.

Estimado doctor Bonilla:

En respuesta a su solicitud, le informo que el proyecto de construcción y operación del Parque Eólico Jepirachi, localizado en la región nor-oriente de la Costa Atlántica Colombiana, entre las localidades de El Cabo de la Vela y Puerto Bolívar, en inmediaciones de la Bahía de Portete en jurisdicción del Municipio de Uribia, Departamento de la Guajira, estaría conformado por una serie de aerogeneradores que sumarían una capacidad instalada total de 19.5 MW.

Empresas Públicas de Medellín propietaria del proyecto solicitó a CORPOGUAJIRA, licencia ambiental, para lo cual presentó el respetivo estudio de impacto ambiental dentro de los parámetros establecidos por el Decreto 1753 de 1994. Posteriormente, al expedir el Ministerio del Medio Ambiente el Decreto 1728 del 6 de agosto de 2002 y establecerse que el proyecto en mención no requiere de licencia ambiental, Empresas Públicas de Medellín se acogió a la cesación del trámite de licencia y solicitó el otorgamiento de los permisos necesarios para la ejecución del proyecto.

De acuerdo con la evaluación ambiental realizada por CORPOGUAJIRA al proyecto parque eólico Jepirachi considera que este se enmarca dentro de los criterios de sostenibilidad ambiental y acorde con las normas ambientales vigentes.

Cordial saludo,

PEDRO NEL MOSCOTE MOSCOTE
Director General

Cra. 7a. No. 3-08 Edificio El Ejecutivo 2do Piso Tels.: (095) 7273905 - 7273652 - 7272581 - 7283472 - 7276806
Telefax. 7273904 e-mail:corpogua@col3.telecom.com.co
Laboratorio: 7285052 - Fonseca 7756123

Context:

Before commissioning the Jepirachi Project, EEPPM performed a complete Environmental Impact Assessment (EIA) complying with all guidelines given by Colombia environmental regulation 1753 at that time. Once this EIA was completed, the environmental licensing process was initiated by EEPPM through the local environmental authority, the Regional Autonomous Corporation of the Guajira

(CORPOGUAJIRA)[6], following general procedures under the same environmental regulation aforementioned. In 2002, a new environmental decree (1728) was issued, replacing the old 1994 environmental guides. Under this new regulation, no environmental licensing was required for this specific type of projects due to their insignificant impacts to the environment and natural resources. Thus there is not an official letter of approval of the EIA. Please see above letter from the Director of the Regional Autonomous Corporation of the Guajira (CORPOGUAJIRA), confirming Project compliance with Colombian Environmental regulations. If required, a digital copy of the new 2002 Colombian environmental regulation is available.

[6] CORPOGUAJIRA is the competent environmental authority for Guajira region, where Jepirachi project operates.