

Document of
The World Bank

Report No: 24913-CO

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED PURCHASE OF EMISSIONS REDUCTIONS BY THE PROTOTYPE CARBON FUND
IN THE AMOUNT OF UP TO US\$3.2 MILLION
TO EMPRESAS PUBLICAS DE MEDELLIN (EPPM)
FOR THE
JEPURACHI CARBON OFF SET PROJECT

October 30, 2002

**Finance, Private Sector and Infrastructure Department
Colombia, Mexico and Venezuela Country Management Unit
Latin America and Caribbean Region**

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 23rd, 2002)

Currency Unit = Colombian Pesos (COP)

1 COP = US\$0.000427259

US\$1 = COP 2340.50

FISCAL YEAR

January 1st -- December 31st

ABBREVIATIONS AND ACRONYMS

AIJ	Activities Implemented Jointly	IBRD	International Bank for Reconstruction and Development
CARBOCOL	Carbones de Colombia (empresa minera de la Guajira Cerrejón)	IDB	Inter.-American Development Bank
CAS	Country Assistance Strategy	INCORA	Instituto Nacional de Reforma Agraria
CDM	Clean Development Mechanism	JCP	Jepirachi Carbon Offset Project
CERs	Certified Emission Reductions	JI	Joint Implementation
CND	National Dispatch Commission	MC	Marginal Costs
CO2	Carbon Dioxide	MMA	Ministry of Environment
CREG	Energy and Gas Regulatory Commission	MME	Ministry of Mines and Energy
CTO	Certified Tradable Offset	MtCO2e	Metric tons of carbon dioxide equivalent
EEPPM	Empresas Públicas de Medellín	MVP	Monitoring and Verification Plan
EIA	Environmental Impact Assessment	NSS	National Strategic Studies
EMP	Environmental Management Plan	OCC	Office of Climate Change of the Ministry of Environment
ER	Emission Reductions	OIT	Organización Internacional de Comercio
ERPA	Emission Reductions Purchase Agreement	ONIC	Organización Nacional Indígena
FIRR	Financial Internal Rate of Return	PCF	Prototype Carbon Fund
FY	Fiscal Year	PPA	Power Purchase Agreement
GHG	Greenhouse Gas	SENA	Servicio Nacional de Aprendizaje
GOC	Government of Colombia	SIN	National Interconnected System
GWh	Gigawatt hours	UNFCCC	United Nations Framework Convention on Climate Change
HCA	Host Country Agreement	UPME	Energy and Mines Planning Unit

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COLOMBIA
JEPIRACHI CARBON OFF SET PROJECT

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COLOMBIA
Jepirachi Carbon Off Set Project

Project Appraisal Document

Latin America and Caribbean Region
LCSEN

Date: November 14, 2002	Team Leader: Walter Vergara
Sector Director: DannyLeipzig	Sector(s): Renewable energy (100%)
Country Manager/Director: OlivierLafourcade	Theme(s): Climate change (P)
Project ID: P074426	

Project Financing Data			
<input type="checkbox"/> Loan	<input type="checkbox"/> Credit	<input type="checkbox"/> Grant	<input type="checkbox"/> Guarantee
<input checked="" type="checkbox"/> Other: Prototype Carbon Fund			
For Loans/Credits/Others:			
Amount (US\$m): 21.0			
Financing Plan (US\$m):	Source	Local	Foreign
BORROWER		10.60	10.40
PROTOTYPE CARBON FUND		0.00	0.00
Total:		10.60	10.40
		21.00	21.00

Borrower/Recipient: EMPRESAS PUBLICAS DE MEDELLIN
 (*) EMPRESAS PUBLICAS DE MEDELLIN (EEPPM) is the generator and seller of the emission reductions. Revenues from emission reduction credits, purchased by PCF, at US\$4/ton CO2 e, total US\$3.2 million. Up to US\$0.4 million of emission reduction revenues (representing up to US\$0.5/ton CO2 e) will be dedicated to co-finance a social program as part of the project. This resource does not appear in the financing of the project as it makes part of the revenues.

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 Ministry of Environment, Climate Change Group
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 Director Office of Climate Change Mitigation, Ministry of Environment
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Estimated Disbursements (Bank FY/US\$m):															
FY:	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Annual	0.10	0.10	0.04	0.24	0.23	0.35	0.12	0.12	0.26	0.17	0.18	0.35	0.27	0.27	0.27
Cumulative	0.10	0.20	0.24	0.48	0.71	1.06	1.18	1.30	1.56	1.73	1.91	2.26	2.53	2.80	3.07

Project implementation period: 2004-2019
Expected effectiveness date: 06/01/2003 **Expected closing date:** 12/31/2019

A. Project Development Objective

1. Project development objective: (see Annex 1)

The objective of the Jepirachi Carbon Offset Project (JCP or Jepirachi Project) is to contribute to the reduction of greenhouse gas (GHG) emissions from the power sector in Colombia through the promotion of a 19.5 MW wind-based electricity generation facility. The project is expected to displace an estimated 1.168 million metric tons of carbon dioxide equivalent (mtCO₂e) over a period of 21 years and will also support a social program that will contribute to improvements in the welfare of the local indigenous community.

The JCP, 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.

2. Key performance indicators: (see Annex 1)

- Emission Reductions (ERs) for the estimated amount of 1.168 (mtCO₂e) produced over a 21 year crediting period.
- Total purchase of ERs by PCF by 2019 of up to 800,000 tons of CO₂ e.
- Improvements in the welfare of the Wayúu Indian population in the area of influence of the project through improved access to potable water, education, health services and community strengthening.
- Gained experience and knowledge in the development, operation and maintenance of wind energy generation facilities and a better understanding of the medium-term prospects for this energy option in the energy mix of the nation.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)

Document number: 17017-CO **Date of latest CAS discussion:** November 18, 1999

The last full Country Assistance Strategy (CAS) was discussed by the Board on November 1997. Later, on November 1999 a progress report was considered at the Board to review the political, economic and financial developments, as well as to examine the progress achieved since the last CAS. The last CAS as well as the progress report identified two main strategic objectives for Colombia: *i*) poverty reduction and social development; and *ii*) sustainable growth. These objectives are to be achieved through intervention in six strategic areas:

- i. Promoting peace and development
- ii. Promoting rural development
- iii. Developing human capital
- iv. Attaining public sector responsiveness and efficiency
- v. Improving infrastructure services
- vi. Ensuring sustainable development

The JCP is consistent with these key priorities. First, at a wider level, the project contributes to global sustainability by reduction of GHG emissions from the power sector in Colombia. Locally, the project contributes to sustainable development by promoting diversity in the sources of energy for the power sector and increasing its reliance. The project also contributes to rural development and developing human capital through its social program.

1a. Global Operational strategy/Program objective addressed by the project:

The JCP supports the PCF global objectives as follows:

High-Quality Emission Reductions. The PCF supports funding of projects that produce high quality greenhouse gas ERs, which could be registered under the CDM as established under the Kyoto Protocol. The JCP will seek registration at the Executive Board for the CDM, and will generate ERs that are likely to be translated into Certified Emission Reductions (CERs), against the emission targets of industrialized countries under the Kyoto Protocol.

Knowledge. By transacting the GHG emissions, the PCF is developing a knowledge base of business processes relating to the carbon market. JCP will constitute the first PCF project in Colombia and will help to create institutional capacity on utilizing the CDM..

Technology Transfer. The PCF facilitates climate friendly investments in World Bank borrower countries. JCP will contribute to the transfer of wind technology to the country.

2. Background of the electricity sector

Background. 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.

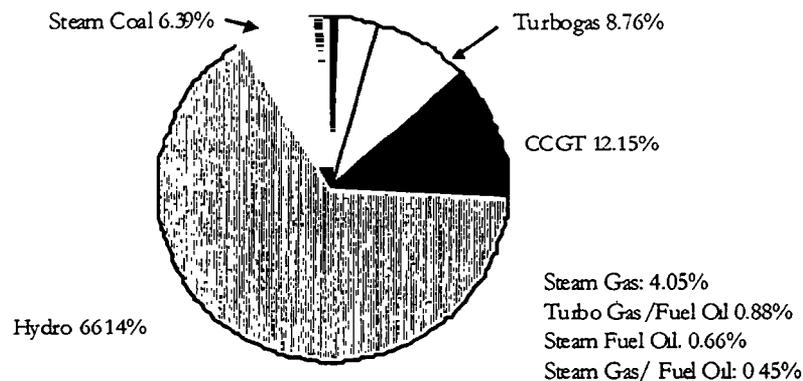
On the other hand, Colombia is extremely rich in wind resources, with a total potential estimated at about 5,000 MW. A recent study has also confirmed a high degree of complementarity between the hydro and the wind resources (see Annex 11), which if properly developed would improve the resilience and robustness of the power sector, making it less susceptible to impacts from drought or the effects of the Southern Oscillation ("El Niño"). While there are strong indications pointing to this complementarity, it still needs to be confirmed in the long-run through actual measurements and wind-powered generation. However, there are at the moment,

no wind based power generating plants installed in Colombia. Use of Carbon finance can contribute to realize the potential of wind power in the country.

Generation

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 1 summarizes the power mix by source and technology. The thermal generating capacity is 75% gas based, with the balance 25% corresponding to coal and fuel oil fired generation. Since 1980 the Colombian Electricity Supply System has maintained a hydroelectric share in the range 55-75%.

Figure 1 Technology Composition of the Installed Capacity in the Colombian Electricity Sector (2001)

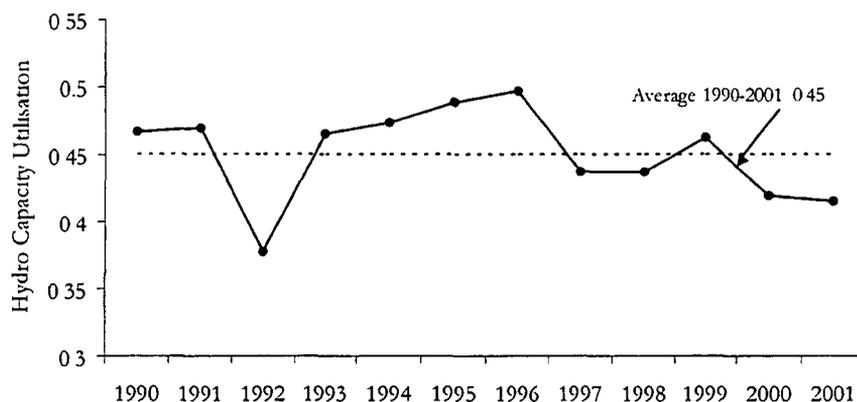


Source: Unidad de Planeación Minero Energética, Plan de Expansión de Referencia 2001, and www.upme.gov.co

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

In the period 1990-2001, five dry years (i.e. lower than average utilization capacity) 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 2 shows the utilization capacity of hydroelectric plants in the system during this period.¹

Figure 2 Utilization of Hydroelectric Generation Capacity in Colombia, Period 1990-2001



Source: Data from Unidad de Planeación Minero Energética (UPME), International Energy Data

Transmission and Distribution²

Transmission. The national transmission network consists of all the lines and sub-stations that operate at voltage levels of 220 kV or above. This is an integrated network in which all regional grids are connected. The network has an equivalent single-circuit length close to 10,000 km. All demand markets are interconnected.

The network also includes international interconnection with Ecuador and Venezuela. These international interconnection are just radial connections to supply relatively isolated areas. These do not allow for an integrated dispatch and frequency control, as is usually the case in real system interconnection. Uncertainty regarding electricity prices in Ecuador and Venezuela, and other important issues have prevented expansion plans regarding regional integration in transmission. So far, there are no firm plans for expansion of international lines. Interconexión Eléctrica S.A. (ISA), a public entity, is the largest transmission company, accounting for about 68% of total network ownership. There are 11 other transmission companies three of which are privately owned.

Distribution. There are also 34 distribution companies on the country. Out of these, 10 are small municipal companies, and the remaining 24 are regional companies or large municipal companies (there are two integrated utilities: Empresas Públicas de Medellín (EPPM), which serves Medellín, the second largest city of Colombia, and Empresas de Energía de Cali (ENERCALI), which serves Cali, the third largest city). Each regional operator is responsible for expansion of its own system.

Private Participation in the Colombian Electricity Sector

The ownership structure is described in Table 1. In terms of electricity generation, the sector is characterized by a 44% share of public ownership and a 56% share of private ownership.

Table 1 Market Size and Company Participation in the Colombian ESI (2001)

Name	Total MWs	Share %	Hydro	Gas	Coal/Oil
PUBLIC COMPANIES					
Empresas Publicas de Medellin (EEPPM)	2595.95	19.71	2125.95	470	
ISAGEN SA	1695	12.87	1410	285	
Public Companies contributing with less than 3%	1537	11.68	719.73	266	552
TOTAL PUBLIC	5828.68	44.27	4255.68	1021	552
PRIVATE COMPANIES					
EMGESA S.A. (ENDESA)	3036	23.06	2814		222
TEBSA (includes ABB, AES Corporation assets)	1520	11.54	1520		
Independent Power Producers (IPPs)	2596	19.72		2441	155
Co-generators	76.1	0.58	9	67.1	152.78
Private Co's contributing with less than 1%	110.8	0.84	81.8	29	
TOTAL PRIVATE	7338.9	55.73	4424.8	2508.1	558.78
TOTAL	13167.58	100	8680.48	3529.1	1023.8

Sources: Private Participation in Infrastructure Data Base (World Bank 2001), Colombian Energy Planning Unit (UMPE 2002), various companies annual reports.

In terms of transmission, about 10% of the National Transmission Network has been transferred to the private sector. At present, there are two private transmission companies: Empresa de Energía de Bogotá and Distasa. ISA, a government entity is the largest transmission company in the country. Also, large public generators such as EEPPM own transmission lines. According to a recent study on market power (Hagler-Bailly, 2002) the generation activity in Colombia constitutes a moderate oligopoly (i.e. about 70% of the market is served by large agents).

Evolution of Private and Public Company Investments³

Over the last six years, Independent Power Producers (IPPs) have added a total of 2580 MW of thermal power generation. Public utilities on the other hand have installed a total of 1310 MW since the liberalization in 1995 including a 405 MW hydroelectric plant in 2001.

Table 2 Private and Public Investment in the power Sector (MW) period 1995-2001

Type	IPPs	Public Utilities
Hydro	-	405
Coal	165	150
Gas	2415	755
TOTAL	2580	1310

IPPs however have reduced the rate of investments in Colombia mainly due to: a) an increase over the last two years (2000-2002) in the number of guerrilla attacks to transmission towers (these incidents however are localized and the area where the project is being developed has not been a subject of attacks), and b) a substantial increment in the price of natural gas after 1999. Regulatory uncertainty regarding the capacity charge has also reduced the interest in further investments.

Public utilities on the other hand have increased their rate of capacity additions after 1997, investing more in thermal generation than in hydroelectric power plants. In fact, public utilities (i.e ISAGEN, EEPPM) have expressed their intention of increasing the thermal share of their portfolio of power generating units within the next 5 to 10 years.

Legal and Regulatory Frameworks

a) Legal Framework

In 1990, the Colombian government introduced several new policies to spur economic development and promote private enterprise. In 1994, the Colombian government enacted laws that provide the current framework for the electricity sector. The key pieces of legislation include:

Law 142 established that the provision of electricity, telecommunications, water, sewage and bottled gas distribution are essential public services that may be provided by both public and private entities. **Law 143** sets out the following principles: efficiency, planning, continuity, adaptability, neutrality, solidarity and equity. These principles are to be implemented by the Energy and Gas Regulatory Commission (CREG) and other government bodies.

Other laws that apply to the JCP, include: **Law 56 of 1981** which establishes the relationship between the municipalities and the respective project sponsors, including provisions on payment of taxes. **Law 99 of 1993** which establishes the constitutional mandate for citizen participation on environmental matters, establishing forms and procedures for citizen participation such as prior consultation for indigenous and Black communities. Other applicable and relevant laws regarding the role and rights of indigenous populations are summarized in Annex 15.

b) Regulatory Framework

i) Electricity Market

The electricity market in Colombia is formed by regulated and non-regulated segments. The regulated market, which is directly contracted and supplied by distribution companies, is applied to industrial, commercial and residential users with annual demands below 0.5MW. In this market, the tariff structure is established by CREG resolutions. For EEPPM in particular the regulated market represents 73% of its service revenues. In the non-regulated market consumers with power demands above or equal to 0.5 MW can freely negotiate and contract their supply in the wholesale market (i.e. spot and contracts markets) directly or through either commercial entities, distributors or generators.

Laws 142 and 143 of 1994 also define the structure and rules associated to the wholesale electricity market in Colombia, which is essentially the information exchange platform for transactions between generators and commercial entities. The wholesale trading of electricity in Colombia may be carried out through supply agreements (i.e. long term contracts) or within the spot market (i.e. short term transactions). Market participants may choose between trading their electricity directly or acting in the market through a trader (i.e. brokers who can represent both suppliers and buyers). In the spot market, suppliers sell their electricity at the hourly prices issued in accordance with market conditions. The hourly-price of electricity at the "market node" (system's load center) is defined as the cost which would be incurred to supply an additional unit to the demand registered at the hour. In other words, this is the highest variable cost declared by the generators which would be in a position to increase their supply, considering both thermal and hydro generators. In the contracts market, parties freely agree on prices, contract duration, the share of transmission costs and other relevant issues.

ii) Operation of the Wholesale Market⁴

Bilateral Contracts. Energy purchases made by suppliers for regulated users through bilateral contracts are governed by regulations aimed at ensuring contractual competition in this type of transactions. Energy purchases made by suppliers for non-regulated users through bilateral contracts are not regulated and prices and contractual conditions are negotiated freely. Similar conditions apply for purchases between generating agents and between supplying agents. There is no term restriction to bilateral contracts (there is no minimum or maximum required period). Marketing and generation agents decide on the level of activity (presence) they want to have in the "spot" market. There is no restriction on the maximum capacity that a generation or supply agent can commit in bilateral contracts.

Transactions in the Pool. Transactions carried out directly in the Pool between generators and suppliers are governed by the following operating rules: (i) the settlement of payments to participants in the Pool is carried out according to the dispositions stipulated by the regulator (CREG); (ii) all the energy contracts that are drawn up between generators and the suppliers have to be registered, including clear procedures to determine, hour by hour, the quantities of energy required under the contract, and the respective price; and (iii) generators bid prices (\$/MWh) in the energy Pool (bidding rules are described in Resolution CREG-025 of 1995).

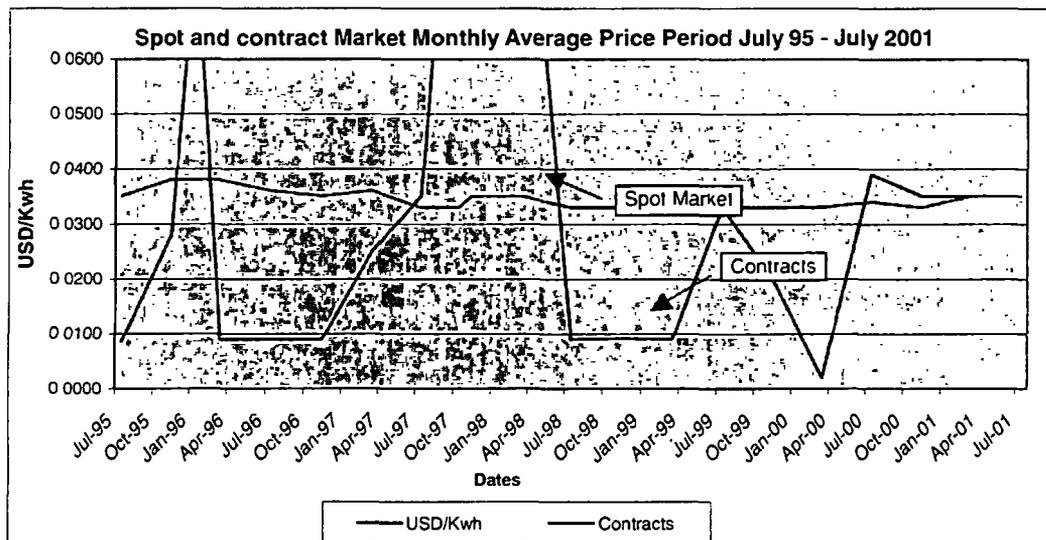
Electricity Tariffs. The Colombian electricity market has been acquiring experience year by year since 1994 and it is aiming at a complete and transparent market competition in the coming years. The performance of the market, in terms of electricity prices is provided in the Table 3 and Figure 5:

Table 3: Electricity Prices 1998-1999 (USD per Kilowatt-hour)

Type of consumer	1998	1999
Households	0.068	0.077
Industry	0.085	0.081

Source: Energy Information Administration, www.eia.doe.gov

Figure 3



Source: Unidad de Planeación Minero Energética (UPME), www.upme.gov.co, with annual exchange rates from the Economist Intelligence Unit (EIU).

Capacity Payment. The capacity payment is a financial mechanism aimed at reducing the risk of volatility and seasonal fluctuations of prices in the Pool. This represents a portion of the actual value of the expected rationing cost. The generation agents who contribute to the system with firm power, under estimated critical hydrology conditions during the dry season (summer time) receive a capacity payment. This is valued at the unit cost of one kW-installed capacity of the most efficient technology in terms of capital costs. At present, the reference is an open-cycle gas turbine, whose estimated cost is US\$ 5.25 per available kW-Month capacity.

The capacity payment guarantees a minimum flow of revenues to those generating agents that contribute with firm power to the system. Payments and settlement is done in the Pool, increasing

the Pool kWh price to buyers and transferring payment to generators according to kWh sold.

Conditions Applicable to the JCP. As of today the Colombian regulatory framework does not provide any specific incentive for the installation of wind power generation and does not deal directly with this type of facilities. Since renewable energy other than hydropower plays no role in Colombia's electricity supply industry, the construction and operation of a wind park in Guajira and its integration into the wholesale market would set an important precedent.

2. Main sector issues and Government strategy:

2.1 Main Sector Issues

Increased reliance on thermal-based generation capacity. After severe droughts, registered during the 1990s (i.e. 1992, 1997)⁵, 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 the share of firm 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 an 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).

Lack of incentives to sustain a solid reserve margin. As shown in Figure 2, in the period 1993-1996 hydrologic conditions (i.e. wet years) allowed the base-load dispatching of hydroelectric plants with utilization as high as 50% Under these circumstances, thermal power plants were not necessarily dispatched. During dry seasons thermal power plants are then called to fulfill the demand. In highly critical events however, thermal power generators cannot supply 100% of the demand since there are no economic incentives to sustain a solid reserve margin (i.e. as in the majority of liberalized power systems around the world).

High losses in the transmission and distribution system. Losses in the national transmission system represent approximately 1.8% of the total demand. Losses in the distribution systems are 18% on average and for the non-interconnected zones they approach 40%. However, in efforts to promote efficiency in distribution, the CREG does not recognize losses above 20%. This limit should decrease to 13% by 2003. Losses in the transmission system are exacerbated by the destruction of towers caused by guerrilla attacks.

Lack of definition for treatment of renewable generation capacity. Wind parks are not specifically referred to in the current regulations. Any generation unit with an installed capacity of 20 MW or more is obliged to participate in the spot market (ought to offer the energy in the market) on an equal footing with thermal and hydroelectric plants. If the capacity is less than 20 MW, however, the park qualifies as a "minor plant" (CREG Resolution No. 086 of 1996). A

“minor plant” with a generating capacity of at least 10 MW has the right to participate in the pool and benefit from pool services under a preferential dispatching option (e.g. spinning reserve). In essence, small 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.

If it wind park chooses to bypass the pool, two options might apply:

- If the output is sold to a generator, non-regulated user or a trader supplying non-regulated users, the contractual terms (e.g. price) are freely negotiable⁶
- If the park supplies a trader serving the regulated market, however, the output sells at hourly spot prices (except for the special case that the trader is subject to public regulations).

Precise rules for wind generation capacity when it exceeds the 20 MW limit are required to ensure that investments internalize the environmental and strategic benefits of renewable capacity in the country. The project, it is anticipated will avail itself of preferential dispatching.

Impacts of Climate Change on the endowment base for generation capacity. Colombia has recently, has completed its first communication to the United Nations Framework Convention to Climate Change (UNFCCC), including an assessment of the anticipated impacts of climate change and its vulnerabilities to these impacts. The communication concludes, in the context of expected changes with potential impact for the energy sector, that a significant fraction of the territory will be affected by variations in the hydrological system and rainfall patterns. In particular, there is a likelihood of an increase in the rate of decertification in high mountain ecosystems (source of many of the head waters of the largest rivers of the nation). The process will be caused by reductions in rainfall patterns, higher rates of evapo-transpiration and the consequent drying of these ecosystems. The impact over the overall hydro generation capacity has yet to be estimated but is likely to result in a reduction in the net flow of some rivers fed by headwaters located in the Andes, in particular over the Western range of the Andes. The character of the Paramo ecosystem (high mountain range, typically over 3500 meters altitude) is also likely to be affected and the communication forecasts a 75-85% in the reduction of the area of Paramo. This change is of grave significance because of the role the Paramo plays in water regulation and storage in the Andes.

2.2 Government Strategy

National Development Plan

The **National Development Plan of Colombia (PND)**, developed under the previous administration, proposes two strategies for the development of the national energy infrastructure: a) attract foreign direct investment and increase private participation, and b) strengthen the institutional structure for the planning, control and design of sectorial regulatory frameworks. In particular, the PND emphasizes the importance of promoting sustainable development and internalizing key environmental and social variables into the design and implementation of sector public policies. As part of the national environmental policy, the PND promotes two priority

programs: 1) “Clean Production” to promote the diffusion of new cleaner technologies and 2) “Green Markets” to enhance participation in markets that promote sustainable development (e.g. market based instruments, carbon market).

With respect to international treaties, the PND establishes that the Colombian environmental action is aimed at consolidating alliances with other nations to promote sustainable development through cost-effective actions at the municipal, sub-national and regional levels.

National Energy Plan

The **National Energy Plan (PEN)**, was drafted in 1994 and updated in 1997. For the particular case of the electricity sector, the national strategy as stated by the PEN has focused on the following actions:

- Strengthen the development of rural electrification
- Reconcile energy policies with national environmental priorities
- Strengthen scientific research and development activities in the energy field
- Apply incentives to attract private investment
- Diversify sources of energy production
- Consolidate and develop the 500 kV national transmission network
- Reduce transmission restrictions and losses
- Improve the mechanisms and actions of the wholesale electricity market
- Develop flexible contracting mechanisms with regards to coal and natural gas supply
- Develop “futures market” and design new financing instruments for wholesale market activities
- Restructure institutional and financial structure of distribution companies

National Electricity Sector Expansion Plan

The Colombian Energy and Mining Planning Unit (UPME) is in charge of designing the National Electricity Sector Expansion Plan which is a reference or indicative plan based on the criteria established in both the **PND** and the **PEN**. The national strategic elements related to the electricity sector are summarized below:

- Attend the electricity demand with a reliability higher than 95% in the long term
- Enhance the availability of firm capacity through the addition of thermal based capacity
- Improve system’s efficiency through the installation of clean efficient technology
- Diversify the sources of electricity generation in the system

Government’s Policy on Climate Change.

Colombia is a party to the Framework Convention on Climate Change and has also signed and ratified the Kyoto Protocol (Law 629 enacted November 30, 2001). Colombia has been a leading participant in the discussions on the provisions and regulations of the Clean Development Mechanism (CDM) in the context of the international negotiations under the auspices of the UNFCCC and has developed a detailed negotiations agenda on items leading to the definition of the rules for the CDM.

As part of these activities, the Government has made a **national assessment for the optimal use of the CDM** with Bank support (which was published in 2000). This assessment was undertaken by the Ministry of Environment in collaboration with other agencies in the energy, agriculture, industrial and forestry sectors. This study evaluated the country's potential for participation in CDM and the international carbon market, identified restrictions that could limit the development of CDM projects, and developed strategic lines to overcome these restrictions and maximize benefits for the country. Under the assessment, the Government has identified a portfolio of possible projects for submission to the CDM, which includes the proposed JCP.

The Government has likewise taken steps leading to the **further development of institutional capacity** through among other actions: a) the organization of an inter-institutional committee under the aegis of the Vice-president's office to ensure full coordination on climate change issues; and b) the set up of a climate change office.

Currently and on the basis of the studies sponsored as part of the National Strategic Studies (NSS), other inputs and the development of institutional capacity, the Government is in the process of defining the main trusts of a National Climate Change Plan⁸ that considers the following goals:

- Strengthen the capacity to adapt to the anticipated impacts from climate change;
- Promote of reduction of emissions and increase in the sequestration capacity for greenhouse gases;
- Minimize the adverse impacts on the nation's exports of fossil fuels;
- Promote scientific capacity and the availability of information on the impacts of climate change on the nation's economy and ecosystems;
- Support awareness and dissemination of information, and
- Promote financial mechanisms for the adoption and funding of response actions.

The plan, which is already drafted identifies and outlines the different benefits that could be gained through the CDM (Colombia as non-annex I party to the KP cannot participate in the other flexible mechanisms) and explicitly acknowledges the role that Carbon finance could play in promoting the goals of sustainable development in the country. The program proposed will be part of the goals, of the new administration, on climate change.

3. Sector issues to be addressed by the project and strategic choices:

The efficient use of the endowment for alternative renewable energy sources could complement the hydro potential and constitute an alternative option to the gradual increase of GHG emissions in the electricity sector The proposed project will provide necessary experience and would also test the regulatory and institutional system for the development of renewable energy sources, other than hydro in Colombia. The wind option has not been explored in the country and this project will constitute a first for the nation. The experience with Jepirachi could open the way to the further expansion of the wind energy option.

Promotion of wind energy also addresses the issue of increased vulnerability of the hydro-capacity as a result of anticipated impacts of climate change. The assessment of other renewable energy options will contribute to the identification of options to address the anticipated impacts of climate change on rainfall patterns. Furthermore, the contribution of wind energy offers complementarity to the hydrological regime⁹ (periods of strong winds occur during driest months), **strengthening the robustness of the power generation system.**

The experience with the JCP **will contribute to the definition of options to address gaps in the regulatory system for renewable energy sources.** The preparation of the project has already contributed to a review of the regulation and the identification of options to address these gaps.

The project will illustrate the potential of the country to participate in the Kyoto Protocol in terms of independent baseline determination, third party validation, verification and certification of the ERs. The JCP is expected to result in significant demonstration effects at the national and regional levels, not only in terms of technology but also in relation to carbon market transactions and the process of validating CDM projects. The example being set by the project will be used by the new Climate Change Office for purposes of dissemination of information and guidelines on how to prepare CDM projects.

C. Project Description Summary

1. Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

The project will support the development of a wind generation facility that is expected to generate about 68 GWh/year during the next 21 years, in the process displacing at least 1.168 mtCO₂e. The project includes a participatory program of institutional and community strengthening (social program). The social program is designed to benefit the indigenous population in the area of the project, effectively linking the global aspects with local development issues.

a) Development of Wind Energy Facility. The wind energy facility will have a nominal power capacity of 19.5 MW to be supplied by a series of aerogenerators to be linked to the national interconnected grid. The number and characteristics of the aerogenerators will depend on a bidding process to be finalized at the end of November 2002. The facility will deliver its energy under a preferential dispatching scheme according to what it is established by **CREG Resolution No.086** (dispatching options for power generation plants with installed capacities between 10 and 20 MW). A grid connection to the site with a length of 0.7 km will also be installed. The facility is expected to start operations at the end of September 2003. The PCF will purchase the emission reductions caused by the operation of the JCP.

b) Social Program. The social program will include activities defined in consultation with the local Wayúu community and will be put in place over the course of the first two years of construction and operation of the project. The program will not be restricted to the activities already outlined but will also establish the basis and provide the support for the development of

additional community development activities to be implemented during the duration of the project, on a sustainable basis, focusing in the areas of health, education, economic and institutional development (see table 4). The PCF will pay a premium on the value of the emission reductions based on the outputs of the social program.

Table 4: Social Program

Activity	Outputs	Impact
Water Desalination	Design and construction of a water desalinization unit The unit will be located in the neighborhood of the wind facility Facility will be powered by wind-energy	Substantial increase in local access to potable water
	Volume Treated: 2 to 4 cubic meters per hour	
	Water Quality: Potable	Direct impact on health of local population
Water Storage	Construction of two water storage facilities (Juagueys) and rehabilitation of two existing facilities	Substantial increase in access to water
School rehabilitation	Expanded school facilities. Provision of equipment and refurbishing of school dorms	Direct impact on access to education
Health Center rehabilitation	Provision of equipment and facilities to the health center. Equipment will include solar-powered refrigeration.	Direct impact on access to health services
Rehabilitation of graveyard	Fencing and up-keeping of graveyard	Religious and cultural priority
Community strengthening	To be defined as part of additional discussions with the Wayúu during the first two years of operation of the project and which will be implemented using emission reduction revenues.	Sustainability of social program.
Additional community development projects	To be defined as part of additional discussions with the Wayúu during the first two years of operation of the project and which will be implemented using emission reduction revenues.	Sustainability of social program and improvement of standards of living

Table 5: Implementation Schedule

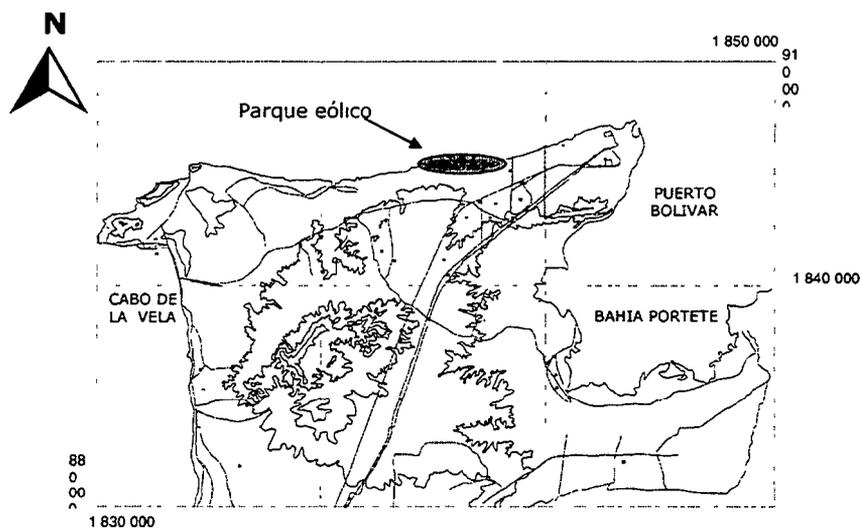
Activity	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
a Wind energy facility																					
Environmental permit																					
Feasibility studies																					
Access roads and camping																					
Equipment supply bidding process																					
Equipment manufacturing installation																					
Civil work																					
Starting of JCF operations																					
b Social Program																					

Location of the Project

The project will be located in Wayúu Indian Territory in the Northeastern region of the Atlantic Colombian coast, in the area between Cabo de la Vela and Puerto Bolivar, within the

municipality of Uribia in the Department of La Guajira (see figure 4 and Annex 16).

Figure 4: Project location



Project Costs and Funding Sources

Table 6: Project Costs and Funding Sources

Component	Indicative Costs (US\$M)	% of Total	Bank financing (US\$M)	% of Bank financing	PCF financing (US\$M)	% of PCF financing
Wind Facility	20.20	96.2	0.00	0.0	0.00	0.0
Social Program	0.80	3.8	0.00	0.0	0.00	0.0
Total Project Costs	21.00	100.0	0.00	0.0	0.00	0.0
Total Financing Required	21.00	100.0	0.00	0.0	0.00	0.0

Table 6: Project Costs and Funding Sources (revenues from ERs)

Component	Indicative Costs (US\$M)	%	Value of ERs (US\$M)
Wind Facility	20.20	96.2	2.80
Social Program	0.80	3.8	0.40
Total	21.00	100.0	3.20

2. Key policy and institutional reforms supported by the project:

The project is consistent with the Climate Change policies. It constitutes the first transaction of emission reduction credits out of the portfolio of investments identified under the National Strategic Study (NSS) for the optimal use of the CDM. The project will contribute to the development and strengthening of the market for ER transactions and to increased knowledge and understanding of the functioning of the Clean Development Mechanism both in Colombia and internationally. It is also expected to contribute significantly to the formation of the legal, regulatory and institutional frameworks of CDM-like projects and wind-based energy generation in the country.

3. Benefits and target population:

The project will contribute to sustainable development in various ways:

- It will demonstrate at a commercial level, the potential for wind based generation in the region, therefore facilitating future investments to capture the relatively large aeolic potential, which has been estimated at over 5 GW in the Guajira region (Empresas Públicas de Medellín, 2000). Future investment decisions on wind-based capacity additions would further reduce GHG emissions that would otherwise be released in a business as usual scenario for the power sector in Colombia.
- It will contribute to the reduction in the emissions of local criteria pollutants (such as NO_x, SO_x, particulates and volatile hydrocarbons) which would otherwise be released through thermal-based power generation. The exposure of populations to these pollutants has been linked to health effects and associated increases in mortality and reductions in productivity.
- It will add to the national private expertise in the installation and operation of on-grid wind-based power generation technology and strengthen institutional capacities with regards to national participation in international carbon markets.
- Through the effective promotion of the wind option, it will increase technology diversification in the power sector, enhancing the robustness of the power system and contributing to the security and reliance of supply.
- Also, as the wind regime is counter to the rainfall periods in the area, the use of wind complements the availability of hydropower further increasing the reliability of the system (the complementarity of hydro and wind as energy resources for Northern Colombia has been assessed in a preliminary manner by EEPPM. The analysis has found that the wind regime is the highest at the time when reservoirs are traditionally at their lowest in the Northern half of the country. The results are summarized in Annex 11; however, complementarity of these regimes will require further confirmation through the use of representative data series and actual operation of wind facilities).
- Additionally, the Social Program will benefit the population of the Rancherías Kasiwolin, Arutkajui and Media Luna addressing key local welfare issues. The total population is

estimated at about 400 individuals (Media Luna: 240, Arrutkajui: 40 and Kasiwolin: 120). See Annexes 14 and 15 for a description of the current situation of the Wayúu community.

The specific benefits of the agreed social program are:

- Substantial increase in access to potable water. This will have an important impact on health.
- Substantial increase in access to water for animal consumption.
- Improvement of social services in health and education.
- Job creation during construction of the power plant.¹³
- Community strengthening through training on indigenous rights and on preparation of cultural and productive projects to access legal transferences and PCF benefits.

4. Institutional and implementation arrangements:

Prototype Carbon Fund (PCF)

For purposes of the project, EEPPM will work in close coordination with the PCF, which was established for the purposes of (i) demonstrating how project-based transactions in greenhouse gas emission reductions can contribute to the sustainable development of developing countries and economies in transition; (ii) sharing the knowledge gained in the course of such transactions with all interested parties; and (iii) demonstrating how the World Bank can work in partnership with the public and private sectors to mobilize new resources for its member countries while addressing global environmental concerns.

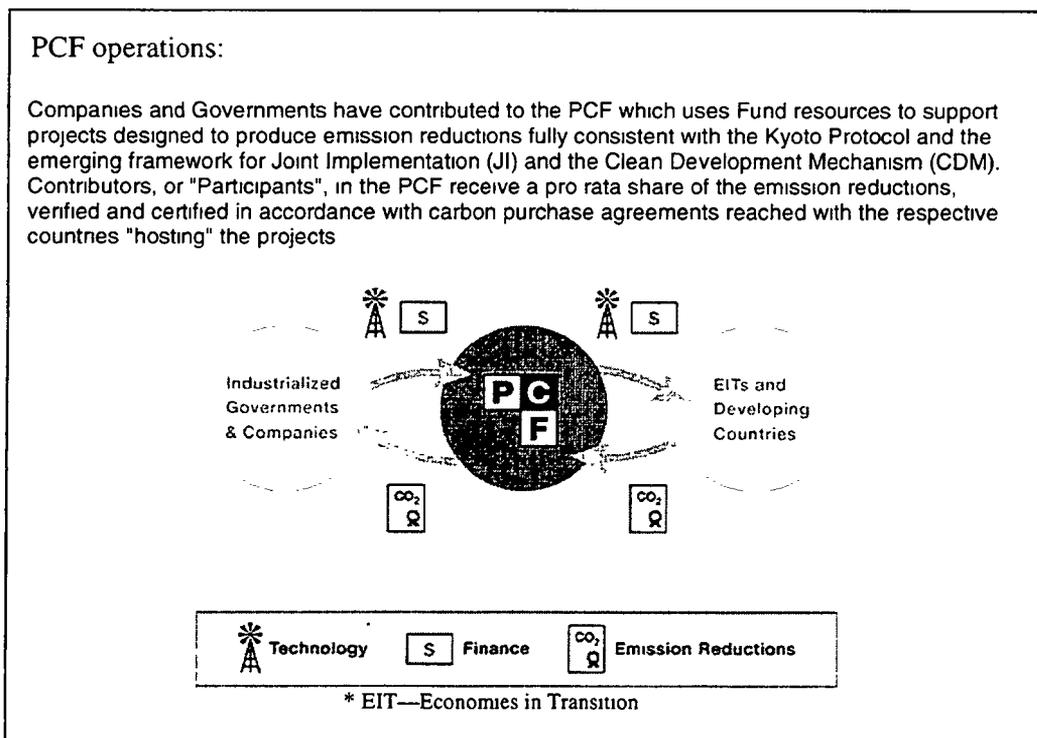
PCF enters into an Emissions Reduction Purchase Agreement (ERPA) and agrees on the accompanying Monitoring Plan (MP) with “project sponsors”, defining the quantity, price and other delivery conditions of ERs to be purchased by PCF, as well as accompanying institutional arrangements, including the monitoring and verification systems and methods. To increase the likelihood that the ERs will be recognized by the Parties to the UNFCCC, independent experts provide baseline validation and verification/certification procedures for ER that respond to UNFCCC rules as they develop. The ER estimates are based on the findings of a baseline study, validated by independent experts. The baseline study also certifies project’s “environmental additionality”, as the Kyoto Protocol requires that “*reductions in emissions are additional to any that would occur in the absence of the certified project activity*”. In other words, the project is additional if the scenario “with project” generates fewer greenhouse gas emission than the “baseline scenario”. Both the Baseline Study and the Monitoring and Verification Protocol have been finalized and are available in the project files.

The PCF will require that an independent third party contracted to perform the verification, issue a Verification and Certification Report that includes: (i) a statement of the amount of verified and certified ERs the sub-project has generated in the relevant period, (ii) such other matters as may be required by the UNFCCC or Kyoto Protocol; (iii) verification of compliance with Bank Safeguard Policies, and (iv) compliance with the planned social program.

The Jepirachi Project will be reviewed by the Bank during the construction phase of Project to: (i) address areas of implementation weaknesses, especially concerning the implementation of the

Environmental Management Plans and social mitigation measures; (ii) accommodate changes in priorities; and (iii) ensure compliance with relevant policies and procedures. PCF involvement will expire after emission credits for 800,000 mtCO₂e are validated. The Jepirachi Project will be carried out by Empresas Públicas de Medellín (EPPM). Apart from the PCF support, the project does not include any World Bank or IFC financing.

Figure 5: PCF Operational Structure



**Project Sponsor
MMA, UPME and CND.**

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 (EPPM), the project sponsor. EPPM is also the executing agency for the project and has responsibility for execution of both project components.

EPPM is a well managed and profitable company, run as a public utility under technical management. Its performance indicators make it one of the best run companies in Latin America. The long term strategic objectives of EPPM (increase the reliability of the power sector and reduce its vulnerability to impacts from climate variability, such as the El Niño effect) make it an

ideal sponsor to the project, much more so than a small private generator who would focus more on short term returns. As experience with the technology is gained, and the perception of risks is reduced the likelihood of private participation in the future wind market will increase. Finally, EEPPM brings a social development dimension that fits well with the ultimate objectives of the Clean Development Mechanism. It is EEPPM's corporate policy to stimulate local economies and strengthen local communities. This policy provided the basis for the development of the social program which is an integral and pioneering part of the project. This type of projects have a relatively low rate of reform which makes private sector involvement at this stage less likely.

EEPPM is the executing agency. It has 45 years of experience building and operating infrastructure as well as providing public services to the 2,500,000 inhabitants of the region including sanitary sewage, waste water transport and treatment, energy, gas distribution and telecommunications. EEPPM is an industrial and commercial State Enterprise with the specific objective of providing sustainable services and enhancing communities progress. The EEPPM power generating business has a total installed capacity of 2,023 MW which generates an average of 9125 GWh per year.

EEPPM has recently completed capacity additions to its portfolio of power generation projects including the construction and operation of thermal plants. Recent additions include Porce II (392 MW), and a second-phase expansion of La Sierra gas-based plant. The company is also planning the extension of the gas distribution network which will cover 89 km of primary pipelines, 24 stations and 5,600 km of secondary pipelines. In terms of the company's financial status, it is estimated that by the end of 2002 EEPPM investments will reach a total of 1.500 million USD with a balanced debt of 33% and equity above 3 billion USD.

EEPPM has a solid capital structure and shows a sustainable (and transparent financial balance) built on sales that has never needed external contributions or governmental fund transfers. Decision making regarding investments, expansion and the operation of the diversified portfolio of EEPPM's assets is exclusively conducted by internal administrative bodies, the Board of Directors and the general manager.

Government institutions are described below:

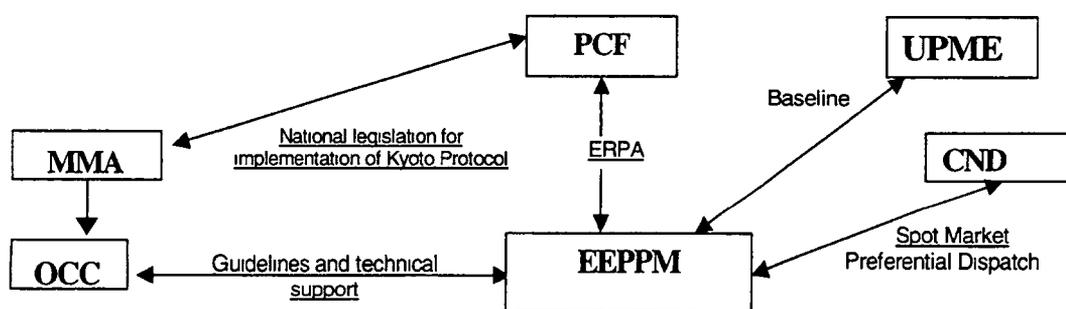
Ministerio de Medio Ambiente (MMA) and its Office of Climate Change. The Minister of Environment serves as the Designated National Authority for the CDM and therefore is the recipient of the sovereign credits created under the CDM. The MMA was the recipient of the NSS studies and has an interest in the development and promotion of a solid portfolio of projects for the Clean Development Mechanism. In particular, the MMA has created its Office of Climate Change (OCC) to deal with all aspects related to the Kyoto Protocol and its mechanisms and through it, provides general assistance to sponsors submitting projects for carbon finance. The Ministry of Environment is in charge of issuing environmental, right of way and land use licenses (global license) on the basis of EEPPM's Environmental Impact Assessment.

The Minister of Environment of Colombia has issued a Letter of Approval for the Project. With this Letter, Colombia approves the Project for the purposes of Article 12 of the Kyoto Protocol, confirms its voluntary participation in the Project and confirms further that the Project assists the Host Country in achieving sustainable development;

Energy and Mines Planning Unit (UPME). The UPME establishes 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 and has assisted in the modeling of the sector for purposes of establishing the baseline (or business as usual) GHG emissions.

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 conform 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 grants the preferential dispatch to the Jepirachi project.

Figure 6: Institutional Arrangements for the PCF Jepirachi Carbon Offset Project

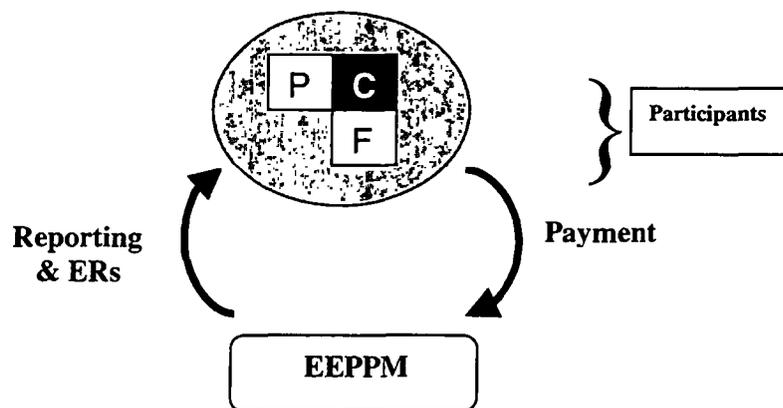


ERPA. The PCF will enter into an Emissions Reduction Purchase Agreement (ERPA) with the EEPPM. This ERPA will cover, *inter alia*, roles and responsibilities for the project implementation, monitoring and verification obligations. The criteria for ascertaining the quality of the ERs is provided by the PCF under the guidance of the UNFCCC. The JCP has shown that the ERs generated are additional, as defined under the Kyoto Protocol, and that the ERs are measurable and verifiable following a protocol acceptable to the rules of the Clean Development Mechanism. The ERPA defines the minimum amount of ERs in metric tons of carbon dioxide equivalent that the JCP will deliver to the PCF. Generation and delivery of the ERs shall be carried out in accordance the ERPA and be completed on or prior to a date agreed upon between the PCF and the JCP. The PCF's total purchase of ERs from the JCP will not exceed US\$ 3.2

million. This total will include project preparation expenses such as those related to baseline assessment, validation, monitoring, verification and certification. At the time of the signing the ERPA, an anticipated schedule of payments based on the delivery of ERs will be prepared. The project sponsor shall make requests for payment to the PCF pursuant to the ERPA. The first payment from the PCF to the JCP will be agreed to in the ERPA and will occur upon declaration by the PCF that relevant conditions have been met. Thereafter, the PCF will only pay the JCP upon delivery of ERs.

The terms of the ERPA have been agreed to between the PCF and the EEPPM and is included in the project files. Under the terms of the ERPA, the emission reductions will be purchased at a price of US\$3.50 per ton CO₂ e up to a volume of 800,000 tons against validation of the reductions. In addition, and against the delivery of the outputs of the social program, the emission reductions will be recognized a "premium" of US\$0.50 per ton CO₂ e. Delivery of ERs will be evidenced by a Verification Report and Certification Report issued by an Independent Third Party, selected for this purpose. In addition, an additional fifty Cents (US\$ 0.50) per each tCO₂e of Emission Reductions will be paid by the PCF, if the verification of the implementation status confirms the achievement of the full implementation of the Social Program. Otherwise, only an additional twenty five Cents (US\$ 0.25) per each tCO₂e of Emission Reductions will be paid if at least eighty percent (80%) of the social indicators as set forth by the Monitoring Plan are implemented. EEPPM will not receive any Premium payment, if the verification states an unsatisfactory implementation of the *Social Program*.

Figure 7: Direct Financial and Reporting Flow



Monitoring procedures. The EEPPM under a monitoring and verification protocol (MVP) with PCF to be undertaken by an independent third party will monitor the emission reductions and the

outputs of the social program. As additional or modified activities are included in the social program, these will also be monitored. In addition EEPPM, the community and the Municipality of Uribia, during the consultation process (see EIA) have reached an understanding that the Municipality will be responsible for operation and maintenance of the desalinization plant and that as part of their regular duties they will follow up on schooling and health indicators. The monitoring plan is discussed in the summary analysis, section 5 and Annexes 13,14 and 15.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

1. Basis for PCF project selection

The project was selected based on rules adopted by the UNFCCC parties for eligibility to the Kyoto Protocol's CDM, and it meets all of the eligibility criteria of the PCF, which were designed in consultation with PCF participants. In addition, the JCP supports the PCF portfolio strategy of achieving diversity across countries and regions with emphasis in renewable energy. An assessment made by EEPPM with partial financial support from GTZ and consultants evaluated the wind potential in the area and confirmed the high wind regime in the Guajira area.

Several alternatives were considered for the location of the plant, its rated capacity and technology. Alternative locations were rejected based on perceived environmental risks (closeness of nesting grounds or migratory paths) and social costs (closeness to religious sites and local settlements). The rated capacity was selected to take advantage of the maximum size for preferential dispatch. The technology selected (large diameter, slow rotating blades) was selected to minimize any risks to avifauna in the region. The Technical and Economic Feasibility Study conducted by EEPPM with the assistance of the GTZ, confirmed the viability of the project (Section E for a summary of technical aspects and Annex 4 for estimated project costs and financial analysis).

D.1.1 EEPPM has developed this project as part of their long term energy strategy, focusing on diversification and increased reliability of the electricity sector. While no alternative project sponsors were considered, as discussed in the project sponsor section, EEPPM is an ideal choice given its record of sound management, long term perspectives and social development objectives.

While the financial analysis (see section E-2) shows that the current rate of return is marginal and can only be improved somewhat with the emission reduction credits, these results have been obtained using relatively low electricity prices (by historical standards) prevalent today under the conditions of depressed demand and good hydrology. These factors however may change, increasing both the long run marginal costs and the spot electricity prices. Under some scenarios envisaged by UPME, the increase in the severity and frequency of the EL Niño effects may result in significantly higher electricity prices. The economy may also reinitiate its long term record of continuous growth, achieved in past decades, therefore stimulating electricity demand. However,

it would be important from a global perspective that increases in demand be met with low carbon emission options. Investing in wind energy today is a choice of strategic importance.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned). The following table shows related projects and associated ratings.

Table 7: Projects Financed by the World Bank

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
PCF/ Electric power and other energy	Chile - Chacabuquito Hydro Power Project.		
PCF/ Electric power and other energy	Costa Rica - Umbrella Project of Renewable Energies.	S	S
GEF/ Environment, other power and energy conversion	Mexico - Methane Gas Capture and Landfill Demonstration Project	S	S
GEF/ Electric power and other energy adjustment	Mexico - High Efficiency Lighting Pilot Trust Fund Project	HS	HS
GEF / Electric power and other energy	Brazil - Energy Efficiency Project	U	S
GEF/ Environment, electric power and other energy adjustment	Mexico - Renewable Energy for Agriculture Project	U	S
GEF/ Electric power and other energy	Argentina - Renewable Energy in the Rural Market Project	U	S
Other development agencies			

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in the project design:

The project has benefited from the emerging experience built in other PCF projects that are being conducted in different Latin American nations (e.g. Chacabuquito in Chile, Umbrella Project for Renewable Energy Sources in Costa Rica). In particular, on the basis of these experiences, the project emphasizes the local development linkages and seeks to ensure a strong partnership with the local population which have been found essential for long-term sustainability in similar operations.

4. Indications of borrower and recipient commitment and ownership:

The JCP was identified in the National Strategic Study for Colombia as a potential CDM project and has already been endorsed by the government with official communication issued by the Ministry of Environment (August 28th, 2001 letter from the Minister of Environment to the Prototype Carbon Fund requesting review and purchase of emission reductions from the project). EEPPM has been conducting multi-disciplinary studies since 1998 to determine the technical and economical feasibility of developing wind based power generation in the Guajira area. Given the potential of the region, EEPPM's intention in developing the JCP is to build company capacity on wind based generation projects. This will add to the demonstration of wind technology at the country and regional levels. The company strategy is aimed at portfolio diversification and participation in the international carbon market.

EEPPM Board of Directors has approved the project and requested its technical staff to undertake all due diligence tasks and complete its preparation. The company has sought the involvement of the PCF and requested and obtained GTZ technical assistance in the formulation of the project. The JCP will be fully financed with the resources of the EEPPM's balance sheet, which is considered sustainable and transparent. The following table provides information available on EEPPM's balance sheet.

5. Value added of Bank and Global support in this project:

The PCF is a new product of the World Bank to demonstrate how market-based emissions transactions can mitigate global climate change and pioneer emission reduction purchase transactions. The Bank's involvement helps to ensure quality of the first carbon projects, while providing necessary project due diligence and other fiduciary responsibilities.

The value-added of Bank support also includes the availability of in-house environmental economics and natural resources management expertise, ability to mobilize global experts with long experience in the field, technical support for project preparation, supervision capacity, and development of linkages with other sources of expertise and funding. Finally, the Bank brings to the proposed project the ability to serve as a catalyst for promoting environmental services throughout Latin America as well as knowledge of climate change mitigation programs both regionally and worldwide. Finally, Bank involvement links together the experience and lessons of its sector work (NSS), institutional development (support to the OCC) and the project. All this work comes together in the JCP as the result of the work done at the sector and institutional level.

E. Summary Project Analysis (Detailed assessments are in the project file, see Annex 8)

1. Economic (see Annex 4):

- Cost benefit NPV=US\$ million; ERR = % (see Annex 4)
- Cost effectiveness
- Incremental Cost
- Other (specify)

Additionality Analysis.

In accordance with rules adopted by the UNFCCC Parties to the CDM, the PCF requires that projects demonstrate additionality, ie., that the emission reductions are additional to what would occur in the absence of the project. There are various methods to demonstrate additionality, the most common of which is an economic analysis to determine the most likely course of action of an investor that tries to maximize profits. The analysis was used to determine that wind-energy plants are not the most likely option for capacity expansions, and that there will be no other investment in wind energy plants unless there is some other incentive. Revenues provided by the emerging carbon market could be the incentive needed to more widely implement renewable energy, while contributing to sustainable development. The analysis includes an assessment of a business as usual scenario and its associated GHG emissions.

Business As Usual in the Colombian Electricity Supply Industry. Generation pricing and merit order dispatch in the Colombian power sector are based on "energy price bidding" by generators. Generating units are 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. Dispatch bids reflect the energy-only related costs of production (the variable costs, comprising mainly fuel and operational costs), and no 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 low variable cost, will displace the most expensive alternative at the margin.

The following table lists capacity additions in a "business as usual" scenario as expected by UPME. 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.

Table 8: Expected Capacity Additions, Period 2002-2015

POWER PLANT	UNITS	FUEL	CAPACITY MW	ENTRANCE DATE
COLEGIO	3	Water	50	April 2nd 2002
CHIVOR	1	Water	125	May 1st 2002
	2		125	May 1st 2002
MIEL I	1	Water	125	June 12, 2002
	2		125	July 8, 2002
	3		125	August 8, 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

The units most likely to enter into operation in the short-term were compared with the JCP generation costs. The results are shown in Table 10. The generation costs (i.e. USD/MWh) of the Jepirachi Carbon Offset project are higher than the alternative options. The project is therefore considered additional. This is a conservative approach since not all investment and fixed costs are yet considered in the calculation of the alternatives (i.e. taxes are not included)

Table 9 Comparison of Jepirachi Project Generation Costs with Alternative Investment Options

Plant	Type	Investment USD/kw	Fuel Cost USD/MWh	Generation Cost USD/MWh
COSTA 150 MW	OCGT	453.76	11.61	36.50
COSTA 250 MW	OCGT	453.76	11.61	36.50
COSTA 150 MW	CCGT	792.30	7.69	32.82
COSTA 250 MW	CCGT	757.31	7.69	31.74
CARBON 150 MW	Steam Coal	1042.62	6.87	35.30
CA LLANOS 215 MW	OCGT	453.76	11.61	36.50
JEPIRACHI Wind 20 MW	Wind based	1056.34	-	38.35

The calculations consider a 10% rate of return over 25 years, with Average Capacity Factors of 0.70 for thermal power plants and 0.40 for the Jepirachi project over 20 years. Fixed costs include land lease and for the case of Jepirachi also the social plan. Taxes are included except for Jepirachi.

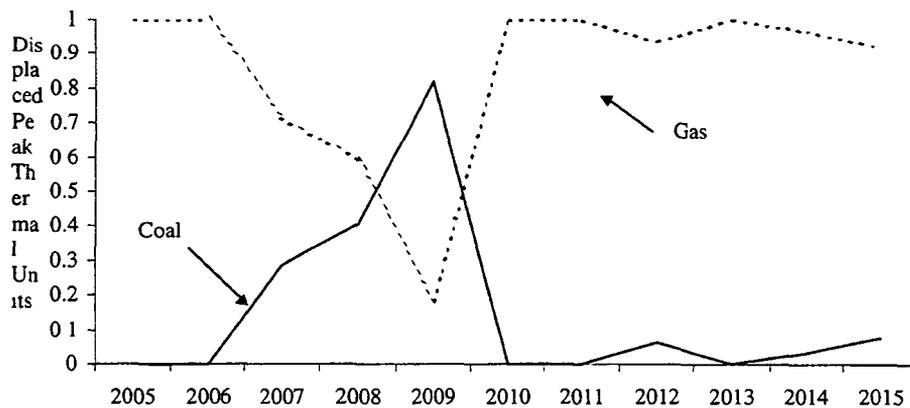
LRMC. As an extra additionality test, the generation costs of the project were compared with the LRMC(long-term marginal costs) for the power sector in the country. The LRMC has been estimated by UPME at between 2.3 to 3.0 cents USD per kWh for the period 2002-2010. The generation costs for the project have been estimated at between 3.8 to 5.4 cents USD per kWh, therefore the Jepirachi option would not be part of a least cost expansion plan of the sector, thus confirming the additionality of the project.

Baseline Emissions. An estimate of the current level of GHG emissions by the power sector has been made. The estimate was based on the simulation of the operation of the sector using the Super OLADE/BID model and a calculation of the associated GHG emissions with and without the Jepirachi unit. At first, the model did not select the Jepirachi unit, an expected result given the higher generation costs and the merit dispatch order used by the model. But, when forcefully included, the output was also used to calculate the associated emissions. The difference between the two calculations represents the anticipated net reductions of GHGs caused by Jepirachi. The summary of the results is presented in the baseline study. The model shows that the Jepirachi

Wind Power Project will displace a mix of coal and gas based power in the merit order (a combination of coal and gas based power plants in the period 2004–2009, and after 2010, mainly gas based power plants; see Figure 8 below. This is because the Jepirachi Wind Power Project will displace the most expensive units at the margin and after 2010 the marginal costs of coal based power plants become in average lower than the marginal costs of gas based power plants due to a change in the prices of both natural gas and coal).

The model considers the current and projected relative domestic market prices of gas and coal. There are substantial coal reserves in Colombia and it is projected that in real terms these prices will not significantly increase. Domestic gas prices however are projected to increase in real terms because of significant bottlenecks in the distribution system inside the country (limited pipeline capacity) and the reluctance of private investors in investing in long haul pipeline systems under the current unrest conditions in rural areas in some parts of the country. The model has taken these projections into account resulting in a phasing in of more gas as displaced capacity.

Figure 8: Percent Share Displaced by Jepirachi Gas vs Coal Based Peak Load Power Plants



Source: Baseline Assessment, results of

Estimate of Emission Reductions. The Jepirachi project will deliver approximately 68.3 GWh/year to the Colombian National Interconnected System (SIN) under a preferential dispatching scheme according to what it is established by **CREG Resolution No.086** (dispatching options for power generation plants with installed capacities between 10 and 20 MW). The estimated emissions of the sector with and without the JCP, resulted in a net difference of 1.168 mtCO₂e during the 21 year project cycle (Figure 9). These results were submitted as part of the baseline study to SGS (Switzerland), as independent validator for the project. The validator has endorsed the findings of the study.

Figure 9. Estimated Net Reductions in Emissions with and without the Jepirachi Project

Million Tonnes CO ₂			
Year	Baseline	With Project Scenario	Reduction
2002	2.47040872	2.47040872	0
2003	4.24335504	4.24335504	0
2004	4.09395269	4.07014935	0.02380334
2005	5.34825465	5.32445131	0.02380334
2006	5.84206302	5.83098722	0.01107579
2007	6.47186801	6.41128644	0.06058157
2008	7.18189348	7.12474861	0.05714487
2009	8.29974838	8.2112032	0.08854518
2010	9.57420637	9.5430116	0.03119477
2011	10.2292841	10.2000997	0.02918437
2012	12.6203795	12.5561212	0.06425834
2013	13.809703	13.767063	0.04264005
2014	15.4913519	15.4453247	0.04602723
2015	14.693894	14.6061	0.08779402
2016	15.092623	15.0257123	0.0669107
2017	15.092623	15.0257123	0.0669107
2018	15.092623	15.0257123	0.0669107
2019	15.092623	15.0257123	0.0669107
2020	15.092623	15.0257123	0.0669107
2021	15.092623	15.0257123	0.0669107
2022	15.092623	15.0257123	0.0669107
2023	15.092623	15.0257123	0.0669107
2024	15.092623	15.0257123	0.0669107
TOTAL	256.20397	255.035721	1.16824916

The model run simulated the period 2002-2015. For later years an average of the last 3 simulated annual estimated reductions was used as a proxy, for purposes of the estimate.

2. Financial (see Annex 4 and Annex 5):

NPV=US\$ million; FRR = % (see Annex 4)

EEPPM is a financially sound company. It has shown an impressive performance during years 1999 to 2001. Revenues grew 21% in year 2001, whereas operation costs increased only by 8%. Net income increased 24% in 2001 (see Table 6 in Annex 1). Financial ratios are healthy: liquidity, profitability and capitalization ratios are also very good for a public utility, and as a result it is believed that Jepirachi Project's impact on EEPPM performance is likely to be very small, since the project size will be less than 1% of its fixed assets, and just over 1% of its actual installed capacity.

Assumptions. The project financial analysis involves a base case and a sensitivity analysis with different scenarios. Jepirachi will provide energy to be sold to the grid at the spot market price. The base case reflects a worse case scenario (see Table 1 in Annex 1). It assumes that the project sells 68,328,000 kWh/h (40% Plant Factor). Spot price is assumed to be the average on 2001 (2.6 cents/kWh) which is a very conservative price since spot market prices have been consistently depressed for the last four years. This is a reflection of the mild recession experienced by the Colombian economy which in turn has flattened demand for electricity. The project has no additional revenue sources.

Costs have been provided by the sponsor and reviewed by the project team. Both costs and income are projected to increase at a 3% rate for the purposes of the analysis. Financials are provided in US dollars since spot market prices are quoted in US dollars in Colombia. Tax rate is 35%. Initial Working Capital requirements are US\$50,000. Lifetime of the project is 21 years, and the commission date of the plant is end of year 2003. Tables in Annex I will only show the 10 first years of project life even though the analysis reflects 21 years. Carbon financing is considered during the 21 years of project's life at a \$4 price and with the ER computations from Jepirachi Baseline study. The weighted average cost of capital (WACC) assumes a 10% expected return on equity and no loans.

The electricity prices have been estimated at US\$0.26/kWh, which is lower than the historical for contract prices during the period 1980-2000, as a conservative assumption. However, prices may indeed increase if the demand for electricity rebounds as part of the currently forecasted economic recovery of the country (projected GDP growth for FY 03 is 3.6%) and or if the reservoir levels fall as part of impacts from weather variability induced by the El Niño effect.

Investment and Capital Expenditures (Capex). Investment costs are \$20,598,852 as reported by project sponsor (see Table 8 Annex 1, and Table 12 below). There are no further Capex expected in the life of the project.

Operational Costs and Margins. Table 7 in Annex 1, offers a comparison on margins and prices for Jepirachi Project. In the base case Jepirachi has positive operating margins from the first year even though they are slim. 0.61 cents per unit of output is not much but expected price increases with economic recovery will certainly help the project improve its performance.

FIRR (financial internal rate of return) and sensitivity analysis. Table 1 in Annex 1, shows the Project (and Equity) NPV (Net Present Value) and IRR (Internal Rate of Return) analysis. For the base case, Jepirachi shows an IRR of 5.45% without carbon revenues. The rate goes up to 6.23% with carbon revenues. NPVs are positive up to this rate. NPV at WACC (10%) is therefore negative. IRR for equity holders equals project IRR since there is no external financial leverage in this project.

Table 3 in Annex 1 shows a sensitivity analysis considering with or without carbon revenues. Additional scenarios considered are a positive and negative deviation in original investment of 15%; an increase and decrease of electricity sales price of 20%; an increase to 46% Plant Factor and a decrease to 34%. IRRs in the different scenarios range from 3.40% to

7.61% without carbon sales and 4.29% to 8.46% considering carbon sales. Low return rates are mainly caused by low spot market prices despite the relatively high generation ratios and low investment costs of Jepirachi Project. In particular, an increase of prices up to 3.1 cents/kwh would yield a 7.99% IRR. A “normal” price is considered in the range of the 4 cents/kwh, which would be yielding a very comfortable 10.71% IRR with carbon credits. Those prices are expected to be reached soon due to an expected increase in demand and the current draught situation in Colombia. Investment deviations have also an important impact on the outcome. We have considered a customary 15% contingency approach. We have also been conservative in choosing a plant factor of 40% when wind measurement studies showed an expected 46% plant factor.

The aim of our financial analysis is to provide an extremely conservative approach hence the low rates of returns forecasted.

The following Tables provide with main financial indicators.

Table 10: JCP Operational Ratios

Operational Ratios	
Capacity	19.5 MW
Generation	68,328,000 kWh/y
Plant Factor	40%
Investment	\$20,598,852
Ratio Inv/Cap	1,056

Table 11: JCP Financial Analysis

Project NPV	No PCF	With PCF
5%	852,360	2,376,260
6%	(963,144)	411,548
7%	(2,559,982)	(1,315,784)
11%	(7,313,718)	(6,452,515)
WACC	(6,325,705)	(5,385,723)
IRR	5.45%	6.23%

Table 12: Financial Ratios

Ratios	
Debt to Equity	0.00
DSCR	N/A
ROE	2.04%

Project Financing. EEPPM will finance Jepirachi Project within its balance sheet. No special purpose entity will be constituted and no external financing is therefore sought.

Pending documents to be delivered for financial due diligence

- Open bids for contracts (November 2002)
- Contracts concessions (January 2003)
- Concessions, licenses and permits

A more detailed analysis (e.g. cash-flow projections) is included in Annex 1.

Fiscal Impact:

Since the World Bank is not a lender in this project, there are no fiscal impacts of Bank-lending activities. However, Emission Reductions' sales from the project sponsors to PCF are likely to be considered a taxable revenue in the host country that will have an impact in the project's profitability as it is shown in Tables of Annex 1. This fiscal impact generates an extra income for the host country.

3. Technical:

The nominal power capacity of about 19.5 MW is to be supplied by fifteen aerogenerators whose characteristics are provided in the Table below¹⁰.

Table 13: Technical Characteristics of Wind Turbines for Jepirachi

Rotor 1300 kW	
Type	3-bladed, horizontal axis, upwind
Rotor Diameter	60 m.
Swept Area	2.828 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/epoxic resine
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

The aerogenerators will be distributed within a space of 1 km length by 1.2 km width, North of *Ranchería* Kasiwolín and West of *Ranchería* Aratkajuy. These will be connected by a simple 13.8 kVA underground tension line that feeds the electrical substation for conversion to 110 kVA and subsequent electricity transmission through the regional network (i.e. owned by INTERCOR which is connected to the STN). The 700 meter grid connection from the site to the INTERCOR network will also be installed by EEPPM.

The only civil work that will be necessary for the project is related to the construction of the foundations for each aerogenerator. These foundations will be of 2 m depth with an area of 15m by 15 m. Temporary access roads, offices (i.e. four houses) and a storage house, will be built for construction and operation stages. The necessary measures will be taken during construction to contain the release of particles and other emissions or to avoid soil erosion. In particular, the technical feasibility study has established that, because of the geographic conditions (i.e. distances are short, topography is flat, etc) and soil characteristics (i.e. semi-desert, soils with low organic content, no abundant vegetation, etc) of the construction area, access infrastructure can be reduced to a minimum as well as the possible impacts derived from construction. There are no provisions for building new structures for the school or the health center.

4. Institutional:

4.1 Executing agencies:

EEPPM. EEPPM is the executing agency and has responsibility for implementation of all project components, including the social program.

Institutional Framework for the Implementation of the Kyoto Protocol. Environmental policies in Colombia emphasize the national commitment with sustainable development and in particular with GHG emissions reduction and the Kyoto Protocol. As stated before, Colombia acknowledged this national commitment with Law 629 enacted December 27th, 2000. The Office of Climate Change (OCC) of the Ministry of Environment (MMA) and the Colombian Academy of Sciences are actively involved in the promotion of measures to meet the obligations under the Convention and in actions to support the development of a market for carbon trade. IDEAM has been designated as the focal agency for the preparation of the communications under the convention.

4.2 Project management:

EEPPM has the administrative, financial and technical capacity to carry out and manage the proposed project. During the lifetime of the project, the PCF requires third party verification as per the ERPA and the rules adopted by the UNFCCC Parties. EEPPM will be assisted by a third party as established in the Monitoring and Verification Plan found in the project files

4.3 Procurement issues:

No financing of acquisition of assets or services with Bank funding is envisioned. EEPPM will use its own procurement practices to bid and contract the goods and services required for the project. The PCF will contract a verifier on a yearly/periodic basis until 2017 or such time that 800,000 tons of CO2 have been delivered.

4.4 Financial management issues:

There are no significant financial risks associated to the project. Country, sector and project related risks are described in Section F on Sustainability and Risks and in the risk matrix (annex 12).

5. Environmental: Environmental Category: B (Partial Assessment)

5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

EEPPM carried out an EIA including the physical, biological, socioeconomic and cultural components. Local communities were consulted throughout the EIA process. The EIA includes a detailed mitigation and contingency plans and an outstanding consultation process with local communities. In general terms, the EIA concluded that expected environmental impacts identified will be of low or very low magnitude. A description of the impacts and the mitigation measures is included in Annex 6. The negative impacts however will be carefully mitigated or minimized through the programs and strategies established in the environment management plan which includes the social management program designed by EEPPM and described in sections below.

5.2 What are the main features of the EMP and are they adequate?

Environmental Management Plan (EMP)

The EMP includes programs to avoid, control, mitigate or compensate the negative impacts as well as to enhance the positive impacts during both construction and operation phases. The structure of the EMP for the physical and biological management impacts is shown in the following table. The EMP adequately addresses all the impacts of the project.

Table 14: Jepirachi Carbon Offset Project: Environmental Management Plan (EMP)

Program	Impacts	Project
I PHYSICAL ENVIRONMENT		
Program for the Integration of Environmental Management into Construction and Operation Activities	Impacts on Soil and Groundwater	Management of activities related to camps, warehouses, and construction areas
		Solid and liquid waste management and disposal
		Management of activities and sites related to waste disposal
	Impacts on Air	Management of vehicular transit and materials & equipment transport
	Impacts on Soil and Water	Exploitation of native petro-materials for construction aggregates
		Water and wastewater management
Impacts on Soil	Management of inert material	
	Conservation and restoration of geologic stability	
General Impacts on Environment	Dismantling and abandonment of temporary infrastructure and construction camps	
Air Quality Management Program	Impacts on Air and Local Environment	Materials transport, loading and unloading
		Environmental rules for contractors in relation to air emissions
		Noise Management
Solid Waste Management Program	Impacts on Soil and Groundwater	Solid and liquid waste management
Landscape Management Program	Impacts on landscape	Management of impacts on landscape
II BIOLOGICAL ENVIRONMENT		
Program for the Protection of Vegetation & Land Cover	Impacts on Vegetation/Plant Cover	Protection of vegetation/land cover the site
Environmental Education Program	Impacts on Environment	Environmental Education
Management and Protection of Animal Life in Project Site	Impacts on Animal Life	Installation of preventive signals for bird protection and other measures

Source: EPPM, Energy Generation Planning Unit, 2002. Environmental Impact Assessment Jepirachi Project, Medellín, Colombia.

Social programs and projects are shown in section 6.1.

5.3 For Category A and B projects, timeline and status of EA:

Date of receipt of final draft: June, 2002

Environmental Permits and Licenses. On September 28th, 2000 the *Regional Autonomous Corporation of Guajira (CORPOGUAJIRA)* granted EPPM the permit to conduct the necessary surveys for technical and economic feasibility studies in the area under consideration which included 3,000 Km². On February 28th, 2002 EPPM submitted the EIA terms of reference for the JCP to CORPOGUAJIRA. The EIA was submitted on June 21, 2002. The issuance of the

license is expected by September, 2002.

The EIA prepared by EEPPM shows that the project has only limited to negligible environmental impacts (see annex 13). However, on the basis of its location in indigenous land and because of the extra care required to account for the indigenous dimension, the project has been given a B category.

5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

Consultation Process

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.

EEPPM 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. EEPPM 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. (See Annex 15). 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.

5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

Monitoring Plan. The Monitoring Plan establishes the procedures for the measurement, monitoring and follow up of all aspects included in the EMP and its programs. This plan is also aimed at analyzing and verifying the results derived from the implementation of the EMP's strategies and programs to ensure consistency and good practices and apply the corrective actions or adjustments as necessary.

The Monitoring Plan includes the following programs:

- Air Quality Monitoring Program;
- Wildlife Monitoring Program,
- Plant Life and Soil Conditions Monitoring Program
- Program for the Monitoring of Impacts on Landscape Amenities
- Program for monitoring of information and communication activities
- Program for the Follow-Up of employment generation

- Program for monitoring of environmental education activities
- Program for the Follow-Up on potential conflicts
- Program for the Follow-Up of compensatory measures
- Program for the Follow-Up of technology information

Under the Monitoring and Verification Protocol, the following aspects will be included:

Emission reductions monitoring program;
 Social plan monitoring program;
 Socioeconomic monitoring program.

Contingency Plan

The Contingency Plan includes the response procedures and measures to be applied in case of emergency due to the following possible events or risks:

- Hurricanes and tropical storms
- Eroded cliffs
- Sand storms
- Earthquakes
- Vandalism and terrorism
- Work related accidents
- Equipment Fires

The organizational structure for the contingency plan includes a central committee, brigades (e.g. fire fighting, evacuation, first aid, safety issues) and education and training programs for preventive and response measures.

6. Social:

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

In order to ensure that the project meets the needs and aspirations of the local (indigenous) population, EEPPM designed and carried out a Social Management Plan during project preparation (wind measurement, technical feasibility and EIA). 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 EEPPM, as well as to carry out the formal consultation as per Colombian law. This process was supervised by the Department of Indigenous Communities Affairs belonging to Ministry of Interior, entity responsible of the consultation process with indigenous peoples.

In relation to the social-economic and cultural issues, EEPPM carried out a participative diagnosis with the communities. Based on the diagnosis and taking into account the characteristics of the project, EEPPM identified and assessed potential social impacts. These impacts were consulted with the indigenous communities. As a result of the EIA and the characteristics and needs of the indigenous communities, EEPPM designed the Environmental Management Plan, which includes a Social Program. This Plan was consulted and agreed with indigenous communities.

Table 15. Social Management

Program	Impact	Project
Information and communication program	Alteration of cultural patterns. Fears and expectations of local community	Information, communication and dissemination of the wind project.
		Reception and resolution of claims
		Field visits to follow up the construction process
Employment opportunities program	Employment generation	Direct employment (recruitment and hiring)
		Indirect employment (acquisition of raw material, goods and services)
Environmental education program	Environmental sustainability	Dissemination of the EMP for employees and communities
		Training on design environmental projects
		Ethno-education projects
		Training on management and water conservation
		Training on solid waste disposal
		Training on adequate use of natural resources
Participation and community strengthening program	Impacts on cultural patterns	Training on indigenous rights according to Colombian law
		Training on formulation, implementation and assessment of self management projects to access legal transfers and additional PCF benefits
Information and training for employees program	Impacts on cultural patterns	Training on cultural life of Wayuu to employees and contractors
Compensation Program	Impacts on land and resources	Water desalinization plant
		Water storage
		School rehabilitation
		Health center rehabilitation
Technology dissemination Program	Impacts on new technology for the country	Rehabilitation of graveyard
		Field visits to wind power plant
		Dissemination material on new technology
Compensation of land uses program	Impacts on land	Seminars and workshops on wind generation
		Consultation and agreements on compensation for land uses
Archeological rescue and monitoring program	Impacts on cultural heritage	Archeological excavations on the coastal plain
		Recuperation of archeological materials in micro-watersheds

The selected project location does not affect any *Ranchería*, does not displace any house or settlement and is far from indigenous cemeteries. PCF will pay an additional premium on the value of the emission reductions, linked to the implementation of the series of activities that will be earmarked to benefit indigenous communities directly. The premium would represent a total estimated US\$400,000 during the participation of the PCF. This amount will be invested in the projects designed with the communities under the Participation and Community Strengthening Program. The plan will last over a period of 17 years. The projects will be community driven and designed in a sustainable manner in the following themes: social, cultural, economic and community organization.

Cultural Heritage aspects. As the project is located in an indigenous area, and in order to protect the local cultural patrimony, EEPPM has undertaken an archeological study. The objective of the study was to identify potential sites in the area, determine the expectations and interests of communities related to their cultural heritage and to design a program to recover and protect any findings of archeological relevance. On the basis of the study a program has been designed, to be implemented during construction. The program includes provisions for an exhaustive archeological survey, digs in areas of archeological relevance and monitoring of all construction activities to ensure proper care and provisions. The cost of this program has been estimated at about US\$40,000. This program will be carried out with authorization and participation of indigenous communities.

Detailed information on the social aspects of the project is included in Annexes 14 and 15.

6.2 Participatory Approach: How are key stakeholders participating in the project?

The exhaustive consultation process has taken place with the local Wayúu community. Twenty meetings have taken place, leading to a final consultation and agreement on the details of the social program. The consultations are documented in minutes (in the project files) and in a video that records the final consultation. The agreement with the community has been carefully crafted to take into account local and cultural practices of the Wayúu. During project preparation, a wide variety of consultations have also been carried out with government offices, national and international nongovernmental organizations, and local communities to discuss the impacts of JCP development and issues related to permit's requirements and the application of certain regulations in place to wind farms. These organizations, institutions and/or groups are listed below:

- Ministry of Environment; Ministry of Mines and Energy; Ministry of Interior, Department of Indigenous Communities Affairs; Authorities of *Rancherías* Kasiwolin, Arutkajui, Media Luna and Sector Escuela; Uribia Municipality; INCORA; INTERCOR; SENA; ONIC; Fundación CARBOCOL; Universities.

6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

EEPPM will maintain the consultation process during the construction and operation phases. The Information and Communication Program will allow to maintain a communication process with communities and entities during the entire project cycle. EEPPM will also maintain informed the

entities listed in the above section.

6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

EEPPM will implement the EMP directly. This company has the experience and responsibility to carry out it in a proper manner. Additionally, the implementation of the Social Management Programs will be supervised by the Department of Indigenous Communities Affairs of the Ministry of Interior, entity responsible for Indigenous Issues in Colombia as well as by CORPOGUAJIRA, the environmental entity responsible for providing the environmental license. CORPOGUAJIRA would conduct the monitoring of the implementation of all the programs of the Environmental Management Plan, including the Social Programs and Projects.

6.5 How will the project monitor performance in terms of social development outcomes?

A Monitoring and Verification Protocol has been drafted, under which an independent verification of the goals of the project, including those under the social program will be verified. Specific indicators for the social program have been included in the MVP.

7. Safeguard Policies:

7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Forestry (OP 4.36, GP 4.36)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Pest Management (OP 4.09)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Cultural Property (OPN 11.03)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Indigenous Peoples (OD 4.20)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Involuntary Resettlement (OP/BP 4.12)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Safety of Dams (OP 4.37, BP 4.37)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	<input type="radio"/> Yes <input checked="" type="radio"/> No

7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

Compliance with the provisions of the EIA and Mitigation Plan will be reviewed as part of the monitoring and validation protocol.

F. Sustainability and Risks

1. Sustainability:

The JCP has the technical, organizational and financial characteristics of a sustainable project. The financial strength and commitment of the sponsor provide assurances for the sustainability of the project. The social plan and the consultation process engages the local indigenous population and provides assurances of their support. The nature of the technology selected and its relatively low maintenance guarantee continuous operation for extended periods of time. The technical and economic feasibility studies, the environmental impact assessment, the financial analysis, and the baseline assessment have provided the necessary information to confirm the sustainability of the JCP.

As part of the social program, activities geared to community strengthening and management will assist the Wayúu to follow up and monitor both the commitments of the EEPPM and the Municipality contributing to the sustainability of the social activities and the project at large. The monitoring and verification will be undertaken by an independent party contracted by PCF. The MVP will expire when the last of the 800,000 mtCO_{2e} are verified. This is estimated to take place at year 17th of the project.

2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Political, economical or technical risks are not anticipated to be higher than the normal for this type of projects. For the JCP, the following elements of uncertainty can be mentioned.

Country Level

- *Economic Crises and Regulatory Risk:* Inflation and increases in import duties or other taxes are usual sources of uncertainty that can affect the JCP's financial sustainability. Risks associated to economic downturns or changes in regulatory frameworks would however be borne by EEPPM.
- *Terrorism Risk:* Alta Guajira has not traditionally been an area of active guerrilla terrorism. The location of the project within indigenous land further reduce the risks of guerrilla attacks. The indigenous population is expected to be an active and engaged stakeholder. The exhaustive consultation process and the strong and committed participation of the local population further reduces this risk.
- *Legal and Institutional Risks:* No risks are forecasted here since Colombia allows private electricity generation and EEPPM possess generator status.

Sector Level

- *Electricity Price:* Very low electricity spot prices can affect the expected project's financial sustainability. This risk however would only be borne by EEPPM whose projects portfolio is diversified and based on hydro and thermal power generating plants operating also under bilateral contracts. The JCP represents a small percentage of EEPPM's portfolio's installed capacity and for this reason its effect on company cash flows is almost negligible. In general, EEPPM would have the capacity to overcome any cash-flow problems with the JCP.

Project Level:

- *EEPPM risk of default:* this risk is very low, given the strong financial character of the company.
- *Execution risks:* There is a possibility of delays in the project implementation phase. However the construction phase is short (less than one year) and the process of design of the wind farm and selection of the contractor for its erection is well advanced.
- *Low rates of return:* The fact that Jepirachi Project is not economically attractive has prompted the World Bank team to demand extra reassurances from EEPPM management of its commitment to the project. EEPPM has provided documents from its executive board documenting and supporting its strategic decision of investing in Jepirachi Project. However, PCF exposure is always limited since there are no advanced payments and ER payments are due only once ERs are generated. If the project fails for any reason, no PCF payments would have been made. Hence, PCF exposure would be restricted to only the transaction costs incurred until then.
- *Technology and its Operation.* The technologies under consideration for the JCP are all state of the art and have been internationally demonstrated. There is however uncertainty regarding the efficiency in learning wind turbine's operation and regarding the replacement of parts since this is the first wind farm to be installed in Colombia.

Given the EEPPM's company experience as a public power generator, the overall PCF risk assessment is considered low to moderate.

Construction risk:	low
Operational risk:	low / medium
Technology risk:	low
Country risk:	low
Project entity / institutional risk:	low
Financial risk:	low/medium

Risk	Risk Rating	Risk Mitigation Measure
From Outputs to Objective		
From Components to Outputs		
Overall Risk Rating		

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)

3. Possible Controversial Aspects:

Any unresolved conflict with the Wayúu community could become a critical controversial aspect. However, extensive consultation and participation activities undertaken over a period of 18 months provide a substantial assurance for mitigating this risk. The Monitoring Plan designed by EEPPM already includes a program aimed at early identification and follow up of possible

conflicts to ameliorate this potential source of controversy. If any conflicts arise, the EEPPM has included a complaint process to address and resolve any grievances.

G. Main Conditions

1. Effectiveness Condition

Conditions for Purchase of ERs from JCP:

- Issuance of a Letter of Approval from the Designated National Authority to the CDM.
- Notification by the Government of Colombia to the Secretariat of the UNFCCC, in a manner satisfactory to the PCF, of the Emission Reductions Purchase Agreement of the JCP.
- Satisfactory Project Documentation, including a letter from the MMA providing:
 - i) A description of the Sponsor, the Project and the Financial Plan.
 - ii) Confirmation that the information provided to the PCF (PIN, PCN, financial model, financial statements, and other representations made by the Sponsor) are accurate.
- Permits and licenses required under national/local law to execute the Project (“Permits”).
- Signed ERPA between the JCP’s sponsors (i.e. EEPPM) and the PCF. This agreement will include: covenants on insurance, monitoring, verification, certification, compliance with safeguard polices, as well as payments for, and delivery of, ERs.

2. Other [classify according to covenant types used in the Legal Agreements.]

H. Readiness for Implementation

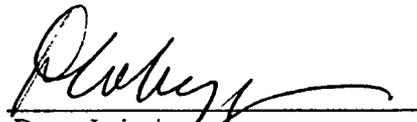
- 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
- 1. b) Not applicable.
- 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
- 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
- 4. The following items are lacking and are discussed under loan conditions (Section G):

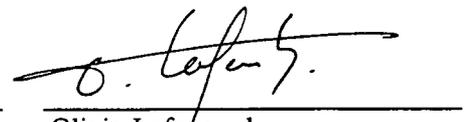
I. Compliance with Bank Policies

- 1. This project complies with all applicable Bank policies.
- 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

(The PCF is exempted from some WB policies, such as procurement and financial management and therefore many of the standard annexes in the PAD documentation are not applicable)


Walter Vergara
Team Leader


Danny Leipziger
Sector Director


Olivier Lafourcade
Country Manager/Director

Annex 1: Project Design Summary
COLOMBIA: Jepirachi Carbon Off Set Project

[This annex is not required for PCF projects.]

Annex 2: Detailed Project Description
COLOMBIA: Jepirachi Carbon Off Set Project

[This annex is not required for PCF projects.]

By Component:

Project Component 1 - US\$ million

Annex 3: Estimated Project Costs
COLOMBIA: Jepirachi Carbon Off Set Project

Project Cost By Component	Local US \$million	Foreign US \$million	Total US \$million
Wind Facility	9.80	10.40	20.20
Social Program	0.80	0.00	0.80
Total Baseline Cost	10.60	10.40	21.00
Physical Contingencies	0.00	0.00	0.00
Price Contingencies	0.00	0.00	0.00
Total Project Costs¹	10.60	10.40	21.00
Total Financing Required	10.60	10.40	21.00

¹ Identifiable taxes and duties are 0 (US\$m) and the total project cost, net of taxes, is 21 (US\$m). Therefore, the project cost sharing ratio is 0% of total project cost net of taxes.

Annex 4: Financial Analysis
COLOMBIA: Jepirachi Carbon Off Set Project

JEPIRACHI WIND PROJECT

Table 1: Assumptions

Investment	
Total	20,598,852
Debt	-
Equity	20,598,852
Land Value	-

Yearly costs	
Land's rent (to social plan)	20,000
O&M	81,000
Social Plan	-
Tax Rate	35%
Minimum Cash Balance	20,000
Initial Working Capital	50,000
WCR charged to Current Liabilities	

Income			
	Quantity	Price	Revenue
Electricity	68,328	0.026	1,776,528
Power	0	0.000	0
	Total		1,776,528
PCF Income	23,803	4.00	95,212

Ratios	
Debt to Equity	0.00
DSCR	N/A
ROE	2.04%

Profitability Test 2003	
Cost	Margin
0.0199	0.0061

Parameters	
Capacity	19.5 MW
Type	Wind
Plant Factor	40.00%
Generation	68,328,000 kWh/yr
Inv/Cap	1.056
Inv/Gen	0.301

Assumptions	
% Increase y. costs	3%
% Increase income	3%
Exchange rate	Project in USD
Commission date	2003
Lifetime	20 years

WACC	\$	%	r	WACC
Loan1	-	0.00%	8.00%	0.00%
Loan2	-	0.00%	0.00%	0.00%
Equity	20,598,852	100.00%	10.00%	10.00%
	20,598,852	100.00%		10.00%

Project NPV	no PCF	with PCF
5%	852,360	2,376,260
6%	(963,144)	411,548
7%	(2,559,982)	(1,315,784)
11%	(7,313,718)	(6,452,515)
WACC	(6,325,705)	(5,385,723)
IRR	5.45%	6.23%

Equity NPV	no PCF	with PCF
5%	852,360	2,376,260
6%	(963,144)	411,548
7%	(2,559,982)	(1,315,784)
11%	(7,313,718)	(6,452,515)
WACC	(6,325,705)	(5,385,723)
IRR	5.45%	6.23%

JEPIRACHI WIND PROJECT

Table 2: Cash Flow Analysis

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
NO PCF SALES											
INVESTMENT AND WCR	20,598,852	0	0	0	0	0	0	0	0	0	0
REVENUE	1,776,528	1,829,824	1,884,719	1,941,260	1,999,498	2,059,483	2,121,267	2,184,905	2,250,453	2,317,966	
OPERATIONAL COSTS	1,130,943	1,133,973	1,137,094	1,140,308	1,143,619	1,147,029	1,150,542	1,154,160	1,157,886	1,161,725	
DEPRECIATION	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943
INCOME TAX	225,955	243,548	261,669	280,333	299,558	319,359	339,754	360,761	382,398	404,684	
LAND											
NET CASH FLOW	-20,598,852	1,449,573	1,482,246	1,515,899	1,550,561	1,586,264	1,623,037	1,660,914	1,699,927	1,740,111	1,781,500
INTEREST-DEBT	0	0	0	0	0	0	0	0	0	0	0
EQUITY CASH FLOW	-20,598,852	1,449,573	1,482,246	1,515,899	1,550,561	1,586,264	1,623,037	1,660,914	1,699,927	1,740,111	1,781,500
WITH PCF SALES											
INVESTMENT AND WCR	20,598,852	0	0	0	0	0	0	0	0	0	0
REVENUE	1,776,528	1,925,036	1,979,931	1,985,560	2,241,822	2,288,059	2,475,447	2,309,681	2,367,189	2,574,998	
OPERATIONAL COSTS	1,130,943	1,133,973	1,137,094	1,140,308	1,143,619	1,147,029	1,150,542	1,154,160	1,157,886	1,161,725	
DEPRECIATION	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943
INCOME TAX	225,955	276,872	294,993	295,838	384,371	399,360	463,717	404,433	423,256	494,646	
LAND											
NET CASH FLOW	-20,598,852	1,449,573	1,544,134	1,577,787	1,579,356	1,743,775	1,771,612	1,891,131	1,781,032	1,815,989	1,948,570
INTEREST-DEBT	0	0	0	0	0	0	0	0	0	0	0
EQUITY CASH FLOW	-20,598,852	1,449,573	1,544,134	1,577,787	1,579,356	1,743,775	1,771,612	1,891,131	1,781,032	1,815,989	1,948,570

JEPIRACHI WIND PROJECT

Table 3: Sensitivity Analysis

	Base Case	Investment +15%	Investment -15%	Price Increase 20%	Price Decrease 20%	Plan Factor 46%	Plan Factor 34%
Investment	20,598,852	23,688,680	16,479,082	20,598,852	20,598,852	20,598,852	20,598,852
Electricity Price	0.026	0.026	0.026	0.031	0.021	0.026	0.026
Plant Factor	40.00%	40.00%	40.00%	40.00%	40.00%	46.00%	34.00%
NPV @ 5% no PCF	852,360	(1,627,857)	4,159,315	4,539,405	(2,834,685)	3,617,643	(1,912,924)
NPV @ 5% with PCF	2,376,260	(103,957)	5,683,215	6,063,305	(1,310,785)	5,141,544	(389,024)
NPV @ 6% no PCF	(963,144)	(3,486,446)	2,401,258	2,399,822	(4,326,110)	1,559,080	(3,485,369)
NPV @ 6% with PCF	411,548	(2,111,754)	3,775,950	3,774,514	(2,951,419)	2,933,772	(2,110,677)
NPV @ 7% no PCF	(2,559,982)	(5,121,893)	855,899	518,947	(5,638,912)	(250,785)	(4,869,179)
NPV @ 7% with PCF	(1,315,784)	(3,877,695)	2,100,098	1,763,146	(4,394,713)	993,413	(3,624,981)
NPV @ 11% no PCF	(7,313,718)	(9,995,368)	(3,738,186)	(5,073,571)	(9,553,865)	(5,633,608)	(8,593,828)
NPV @ 11% with PCF	(6,452,515)	(9,134,164)	(2,876,982)	(4,212,368)	(8,692,661)	(4,772,404)	(8,132,625)
NPV @ WACC no PCF	(6,325,705)	(8,981,791)	(2,784,256)	(3,912,182)	(8,739,227)	(4,515,563)	(8,135,846)
NPV @ WACC with PCF	(5,385,723)	(8,041,809)	(1,844,274)	(2,972,200)	(7,799,245)	(3,575,581)	(7,195,864)
IRR no PCF	5.45%	4.22%	7.61%	7.30%	3.40%	6.85%	3.94%
IRR with PCF	6.23%	4.95%	8.46%	7.99%	4.29%	7.57%	4.79%

JEPIRACHI WIND PROJECT

Table 4: Emission Reduction's Computations

	2,003	2,004	2,005	2,006	2,007	2,008	2,009	2,010	2,011	2,012	2,013	2,014	2,015	2,016	2,017
Total	0	23,803	23,803	11,075	60,581	57,144	88,545	31,194	29,184	64,258	42,640	46,027	87,794	66,910	66,910
Price (\$/mtCO2)	4.00	95,212	95,212	44,300	242,324	228,576	354,180	124,776	116,736	257,032	170,560	184,108	351,176	267,640	267,640
PCF Income	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

JEPIRACHI WIND PROJECT

Table 5. Jepirachi Project Income Statement Proforma

INCOME STATEMENT PROFORMA NO CARBON SALES

	2,003	2,004	2,005	2,006	2,007	2,008	2,009	2,010	2,011	2,012
Carbon Sales										
Electricity Sales	1,776,528	1,829,824	1,884,719	1,941,260	1,999,498	2,059,483	2,121,267	2,184,905	2,250,453	2,317,966
Total Revenue	1,776,528	1,829,824	1,884,719	1,941,260	1,999,498	2,059,483	2,121,267	2,184,905	2,250,453	2,317,966
O&M	81,000	83,430	85,933	88,511	91,166	93,901	96,718	99,620	102,608	105,687
Land's Rent (to finance social plan)	20,000	20,600	21,218	21,855	22,510	23,185	23,881	24,597	25,335	26,095
Social Plan	0	0	0	0	0	0	0	0	0	0
Depreciation and Amortization	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943
Total Operational Costs	1,130,943	1,133,973	1,137,094	1,140,308	1,143,619	1,147,029	1,150,542	1,154,160	1,157,886	1,161,725
Gross Income	645,585	695,851	747,625	800,952	855,879	912,454	970,725	1,030,745	1,092,566	1,156,241
Interest	0	0	0	0	0	0	0	0	0	0
Income Tax	225,955	243,548	261,669	280,333	299,558	319,359	339,754	360,761	382,398	404,684
Net Income	419,631	452,303	485,956	520,619	556,321	593,095	630,972	669,985	710,168	751,557

INCOME STATEMENT PROFORMA WITH CARBON SALES

	2,003	2,004	2,005	2,006	2,007	2,008	2,009	2,010	2,011	2,012
Carbon Sales	0	95,212	95,212	44,300	242,324	228,576	354,180	124,776	116,736	257,032
Electricity Sales	1,776,528	1,829,824	1,884,719	1,941,260	1,999,498	2,059,483	2,121,267	2,184,905	2,250,453	2,317,966
Total Revenue	1,776,528	1,925,036	1,979,931	1,985,560	2,241,822	2,288,059	2,475,447	2,309,681	2,367,189	2,574,998
O&M	81,000	83,430	85,933	88,511	91,166	93,901	96,718	99,620	102,608	105,687
Land's Rent (to finance social plan)	20,000	20,600	21,218	21,855	22,510	23,185	23,881	24,597	25,335	26,095
Social Plan	0	0	0	0	0	0	0	0	0	0
Depreciation and Amortization	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943	1,029,943
Total Operational Costs	1,130,943	1,133,973	1,137,094	1,140,308	1,143,619	1,147,029	1,150,542	1,154,160	1,157,886	1,161,725
Gross Income	645,585	791,063	842,837	845,252	1,098,203	1,141,030	1,324,905	1,155,521	1,209,302	1,413,273
Interest	0	0	0	0	0	0	0	0	0	0
Income Tax	225,955	276,872	294,993	295,838	384,371	399,360	463,717	404,433	423,256	494,646
Net Income	419,631	514,191	547,844	549,414	713,832	741,669	861,189	751,089	786,046	918,628

JEPIRACHI WIND PROJECT
Table 6: EPPM Financial Statements

EMPRESAS PUBLICAS DE MEDELLIN E.S.P
Income Statement
(Thousands Pesos)

	2001	2000	1999
Goods Sales	2 023	19,008	37,216
Services Sales	1,889,366	1,623,088	1,305,114
Other Income	469 693	305,174	303 379
Total Revenue	2 361,082	1 947,270	1 645 709
Cost of Sales	990,219	859,916	713,817
Cost of Operations	277,434	322,797	281,799
Financial Costs	123,240	111,864	95,525
Other Costs	314,663	276,119	315,551
Total Expense	1,705 556	1 570 696	1,407,692
Gross Income	655,526	376,574	238,017
Inflation Adjustments	0	(106,693)	(96,203)
Tax	77 753	17,586	0
Net Income	577,773	465,681	334,220

EMPRESAS PUBLICAS DE MEDELLIN E.S.P.
Balance Sheet
(Thousands Pesos)

	2001	2000	1999
Fixed Assets	9,447,673	9 787,542	8,473,140
Cash	344,920	230,326	202,869
Other Current Assets	738,765	638,468	741 374
Total Assets	10,531,358	10,656,336	9,417,383
Current Liabilities	577,858	487,418	648,758
Long Term Debt	2,236,289	3 511,226	2,426,603
Equity and Reserves	2,028,477	1,562,797	1,227,485
Gains in Value of Assets	2,879,538	3,866,746	3,917,849
Retained Earnings	2,809,196	1,228,149	1,196,688
Total Liabilities	10,531,358	10,656,336	9,417,383

EMPRESAS PUBLICAS DE MEDELLIN E.S.P
Cash Flow Statement
(Thousands Pesos)

	2001	2000	1999
Cash from Operations			
Net Income	577,771	465,681	334,220
Depreciation	262 991	226,429	201,135
Inflation Adjustments	-	(106,693)	(96 203)
Other	130 048	263,745	316,038
Cash Generated from Operations	970,810	849,162	755,190
Increase in AR	(41,277)	113,396	162,052
Increase in Inv	17,640	3,142	212
Decrease in AP	26,258	201,207	(47,135)
Other Acc increase	517,853	(19,178)	(85,726)
Cash Used in Operations	520,474	298,567	29,403
Net Cash Flow from Operations	450,336	550,595	725,787
Cash from Investments			
Increase in Land and Forests	23,784	(21,754)	(1,586)
Increase in assets under construction	935 409	(135,490)	(365,763)
Increase in permanent investments	(10,404)	(231,325)	(161,892)
Increase in planning and other	341,174	3,574	(126 128)
Increase in PP&A	(972,438)	(372,090)	(311,670)
Net Cash Flow from Investments	317,525	(757,085)	(967,039)
Cash from Financing Activities			
Increase in internal and external loans	(267,145)	395,777	433,726
Transfers to Municipality	(139,704)	(100,000)	(80,642)
Other Transfers	(165,930)		
Net Cash Flow from Financing Activities	(572,779)	295,777	353,084
Net Cash Increase	195,082	89,287	111,832

JEPIRACHI WIND PROJECT
Table 7: Margins Study

Profitability Test	2003	2004	2005	2006	2007	2008	2009	2010
Jepirachi								
Ave Price Sold	0.0260	0.0268	0.0276	0.0284	0.0293	0.0301	0.0310	0.0320
Total Cost + Int +Tax	0.0199	0.0206	0.0210	0.0210	0.0224	0.0226	0.0236	0.0228
Profit/(Loss)	0.0061	0.0061	0.0066	0.0074	0.0069	0.0075	0.0074	0.0092

JEPIRACHI WIND PROJECT

Table 8: Project Costs

ACTIVITY	DESCRIPTION	Total Price (US\$)	Percent of total cost
I	INFRAESTRUCTURA		
I - I	ADQUISICION PREDIOS CAMPAMENTOS Y TALLERES	7,612.5	0.04%
I - II	VIAS DE ACCESO A SITIOS DE OBRA Y CAMPAMENTOS	421,932.0	2.05%
I - III	PATIO TEMPORAL PARA ALMACENAMIENTO DE PALAS	56,523.6	.27%
I - IV	CAMPAMENTO, BODEGA Y TALLER	213,619.8	1.04%
I - V	IMPREVISTOS INFRAESTRUCTURA	69,968.8	
II	FUNDACIONES AEROGENERADORES *	1,056,049.5	5.13%
III	EQUIPOS (INCLUYE TRANSPORTE Y MONTAJE) *	12,457,069.6	60.47%
IV	CONEXION AL SISTEMA *	3,141,295.6	15.25%
V	COSTOS AMBIENTALES * (Y SOCIALES)	974,567.0	4.73%
VI	SUBTOTAL	18,398,638.4	89.32%
VII	INGENIERIA	2,200,213.7	10.68%
	TOTAL PROYECTO EOLICO DE LA ALTA GUAJIRA	20,598,852.0	100.00%

Annex 5: Financial Summary
COLOMBIA: Jepirachi Carbon Off Set Project

[This annex is not required for PCF projects.]

Annex 6: Procurement and Disbursement Arrangements

COLOMBIA: Jepirachi Carbon Off Set Project

[This annex is not required for PCF projects as they do not follow Bank procurement and disbursement guidelines.]

**Annex 7: Project Processing Schedule
COLOMBIA: Jepirachi Carbon Off Set Project**

Project Schedule	Planned	Actual
Time taken to prepare the project (months)		9
First Bank mission (identification)		02/01/2002
Appraisal mission departure		10/07/2002
Negotiations		10/14/2002
Signing of ERPA		10/15/2002
Planned Date of Effectiveness		06/01/2003

Prepared by:

Preparation assistance:

Bank staff who worked on the project included:

Name	Speciality
Walter Vergara	Engineer /Task Manager,
Eduardo Zolezzi	Engineer / Energy Specialist
George Ledec	Environmental Specialist
Elena Correa	Social Specialist
Gabriela Elizondo Azuela	Energy Specialist
Francisco Fernández-Asin	Financial Specialist
Fabio Arjona	Environmental Specialist
Alexandra Zenzes	Team Assistant
PCF Team:	

Ken Newcombe	Sr. Advisor
Charles J Cormier	Carbon Trade Specialist
Chandra Shekar Sinha	Carbon Trade Specialist

Annex 8: Documents in the Project File*
COLOMBIA: Jepirachi Carbon Off Set Project

A. Project Implementation Plan

Documents in Project File additional to PAD annexes:

1. PCF Project Idea Note (PIN)
2. PCF Project Concept Note (PCN)
3. PCF Project Design Document
4. Letter of Endorsement
5. Colombia: Country Assistance Strategy
6. Environmental Impact Assessment
7. Technical and Economic Feasibility Study
8. Baseline Assessment
9. Monitoring and Verification Protocol
10. Validation Report (final version pending)
11. Validation Protocol (final version pending)
12. Record of consultation process
14. Video record of final meeting with Wayuu leaders

B. Bank Staff Assessments

C. Other

*Including electronic files

Annex 9: Statement of Loans and Credits
COLOMBIA: Jepirachi Carbon Off Set Project
05-Sep-2002

Project ID	FY	Purpose	Original Amount in US\$ Millions					Difference between expected and actual disbursements	
			IBRD	IDA	GEF	Cancel	Undisb	Orig	Frm Rev'd
P069861	2003	CO- Social Sector Adjustment	150 00	0 00	0 00	0 00	155 00	0 00	0 00
P057369	2002	CO Judicial Resolution Improvement Prj	5 00	0 00	0 00	0 00	4 80	1 20	0 00
P057692	2002	2nd Magdalena Medio Project (LIL)	5 00	0 00	0 00	0 00	3 52	0 36	0 00
P065937	2002	CO WATER SECTOR REF ASSISTANCE PROJE	40 00	0 00	0 00	0 00	40 00	6 83	0 00
P041642	2002	CO PRODUCTIVE PARTNERSHIPS	32 00	0 00	0 00	0 00	29 69	-2 31	0 00
P073572	2002	CO Structural Fiscal Adjustment Loan	400 00	0 00	0 00	0 00	240 00	180 00	0 00
P063317	2001	GEF CO-HIGH ANDES	0 00	0 00	15 00	0 00	14 50	3 23	0 00
P040109	2001	CO PUBLIC FINANC MANAGEMENT PROJECT	35 47	0 00	0 00	0 00	33 74	-1 73	0 00
P069964	2001	CO- Human Capital Prot - Cash Transfers	150 00	0 00	0 00	0 00	127 54	-22 46	0 00
P044140	2000	CARTAGENA WATER SUPPLY & SEWERAGE ENV	85 00	0 00	0 00	0 00	68 75	44 17	0 00
P068762	2000	CO- COMMUNITY WORKS (MANOS A LA OBRA	100 00	0 00	0 00	0 00	82 40	45 40	0 00
P050578	2000	CO RURAL EDUCATION	20 00	0 00	0 00	0 00	18 05	9 19	0 00
P057326	2000	SIERRA NEVADA SUSTAINABLE DEVELOPMEN	5 00	0 00	0 00	0 00	3 69	-1 31	0 00
P050576	1999	CO- YOUTH DEVELOPMENT	5 00	0 00	0 00	0 00	2 17	2 17	0 00
P006861	1998	CO URBAN INFRASTRUCTURE	75 00	0 00	0 00	0 00	47 43	36 27	0 00
P053243	1998	PEASANT ENTERPRISE ZONES (LIL)	5 00	0 00	0 00	0 00	2 17	2 17	0 00
P046112	1998	CO PASTO EDUCATION	7 20	0 00	0 00	0 00	2 93	2 93	1 04
P006891	1998	CO ANTIOQUIA EDUCATION	40 00	0 00	0 00	0 00	16 26	14 08	4 02
P006884	1997	FINANCIAL MARKETS DEVELOPMENT	15 00	0 00	0 00	5 50	2 42	7 92	2 19
P040102	1997	REG REF TA	12 50	0 00	0 00	0 00	3 60	3 60	0 00
P039291	1996	URBAN ENVIRONMENT TA (TAL)	20 00	0 00	0 00	0 00	1 34	1 34	1 34
P006894	1996	SANTAFE I (Water/Supply)	145 00	0 00	0 00	0 00	34 96	34 96	0 00
P006880	1995	AGRICULTURE TECHNOLO	36 00	0 00	0 00	0 00	7 91	7 91	-7 19
Total:			1388 17	0 00	15 00	5 50	942 91	375 94	1 41

COLOMBIA
STATEMENT OF IFC's
Held and Disbursed Portfolio
Jun 30 - 2002
In Millions US Dollars

FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
2002	BCSC	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00
2002	Bavaria	70.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00
1969/85/88/93/95	CF del Valle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2001	CHMC	0.00	10.63	0.00	0.00	0.00	4.02	0.00	0.00
1974/01	Cementos Canbe	4.05	10.00	0.00	12.95	4.05	10.00	0.00	12.95
1963/90	Coltejer	6.02	0.00	0.00	0.00	6.02	0.00	0.00	0.00
1995/99	Corfinsura	25.00	1.49	23.51	0.00	0.00	1.49	23.51	0.00
2002	Inversura	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00
1987	PRODESAL	0.00	0.59	0.00	0.00	0.00	0.59	0.00	0.00
1977/89/92/94/96	Promigas	5.00	0.00	0.00	8.33	5.00	0.00	0.00	8.33
0/94/95	Promisan	0.00	0.20	0.00	0.00	0.00	0.20	0.00	0.00
2002	Proteccion	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
1996	Proyectos	0.00	5.00	0.00	0.00	0.00	5.00	0.00	0.00

2002	SIG	75.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	Surenting	0.00	5.10	0.00	0.00	0.00	2.50	0.00	0.00
2001	Tolcimento	3.33	0.00	0.00	10.67	0.00	0.00	0.00	0.00
	Total Portfolio:	188.40	65.01	53.51	31.95	15.07	23.80	23.51	21.28

FY Approval	Company	Approvals Pending Commitment			
		Loan	Equity	Quasi	Partic
2001	CCGF	0.00	0.00	19.00	0.00
2002	Bavaria	0.00	0.00	0.00	200.00
2002	Omumex Oil	30.00	5.00	0.00	0.00
2001	CHMC	0.00	10.00	19.38	0.00
	Total Pending Commitment:	30.00	15.00	38.38	200.00

Annex 10: Country at a Glance

COLOMBIA: Jepirachi Carbon Off Set Project

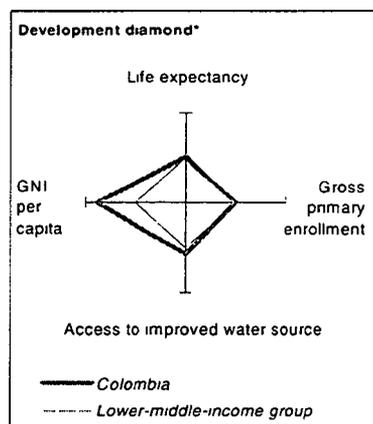
POVERTY and SOCIAL	Colombia	Latin America & Carib	Lower-middle-income
2000			
Population, mid-year (millions)	42.3	516	2,046
GNI per capita (Atlas method, US\$)	2,020	3,680	1,140
GNI (Atlas method, US\$ billions)	85.3	1,895	2,327

Average annual growth, 1994-00

Population (%)	1.9	1.6	1.0
Labor force (%)	2.7	2.3	1.3

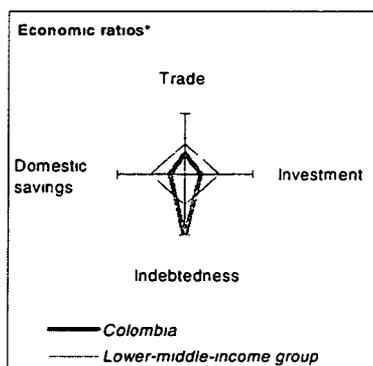
Most recent estimate (latest year available, 1994-00)

Poverty (% of population below national poverty line)	55		
Urban population (% of total population)	74	75	42
Life expectancy at birth (years)	70	70	69
Infant mortality (per 1,000 live births)	23	30	32
Child malnutrition (% of children under 5)	8	9	11
Access to an improved water source (% of population)	91	85	80
Illiteracy (% of population age 15+)	8	12	15
Gross primary enrollment (% of school-age population)	113	113	114
Male	113		116
Female	112		114



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

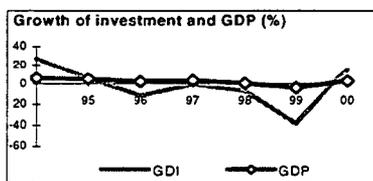
	1980	1990	1999	2000
GDP (US\$ billions)	33.4	40.3	84.8	81.3
Gross domestic investment/GDP	19.1	18.5	12.5	12.2
Exports of goods and services/GDP	16.2	20.6	18.6	21.9
Gross domestic savings/GDP	19.7	24.2	12.5	13.7
Gross national savings/GDP	19.6	21.6	10.5	11.9
Current account balance/GDP	0.3	1.3	-0.2	-0.2
Interest payments/GDP	0.9	3.9	2.8	2.5
Total debt/GDP	20.8	42.8	40.7	44.3
Total debt service/exports	15.1	40.9	43.5	47.9
Present value of debt/GDP			39.7	
Present value of debt/exports			221.8	



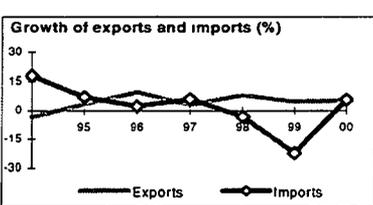
(average annual growth)	1980-90	1990-00	1999	2000	2000-04
GDP	3.6	3.0	-4.1	2.8	4.7
GDP per capita	1.5	1.1	-5.7	1.0	2.9
Exports of goods and services	7.5	5.3	4.7	5.3	4.4

STRUCTURE of the ECONOMY

(% of GDP)	1980	1990	1999	2000
Agriculture	19.9	16.7	13.8	13.8
Industry	32.5	37.9	28.1	30.5
Manufacturing	23.9	20.6	13.7	13.8
Services	47.6	45.4	58.1	55.7
Private consumption	70.2	66.4	64.4	68.1
General government consumption	10.1	9.4	23.1	18.2
Imports of goods and services	15.6	14.8	18.6	20.4



(average annual growth)	1980-90	1990-00	1999	2000
Agriculture	2.9	-2.2	0.2	5.2
Industry	5.0	1.7	-9.0	3.8
Manufacturing	3.5	-2.3	-10.2	9.3
Services	3.1	4.3	-1.1	1.9
Private consumption	2.6	2.6	-4.5	6.5
General government consumption	4.2	9.5	3.9	-14.5
Gross domestic investment	1.4	2.1	-38.3	15.2
Imports of goods and services	0.4	9.4	-22.3	5.8

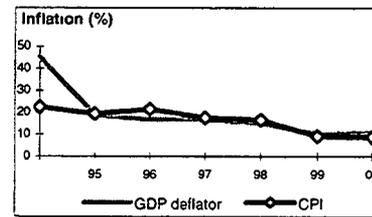


Note: 2000 data are preliminary estimates

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

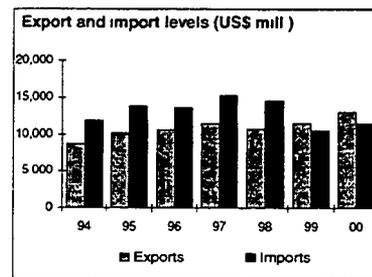
PRICES and GOVERNMENT FINANCE

	1980	1990	1999	2000
Domestic prices				
<i>(% change)</i>				
Consumer prices	26.4	32.4	9.2	8.8
Implicit GDP deflator	27.6	28.6	10.2	10.7
Government finance				
<i>(% of GDP, includes current grants)</i>				
Current revenue		15.8	12.7	12.1
Current budget balance		6.8	-4.9	-5.3
Overall surplus/deficit		3.9	-7.5	-6.1



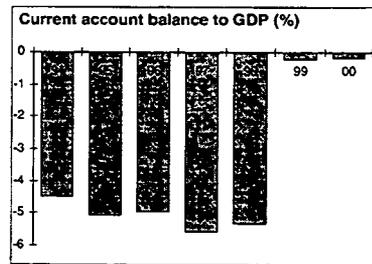
TRADE

	1980	1990	1999	2000
<i>(US\$ millions)</i>				
Total exports (fob)	4,255	7,139	11,569	13,115
Coffee	2,361	1,415	1,324	1,069
Petroleum	101	1,951	3,757	4,569
Manufactures	973	1,759	3,947	5,190
Total imports (cif)	4,663	5,589	10,659	11,538
Food	296	245	1,426	1,428
Fuel and energy	564	330	252	234
Capital goods	1,616	2,034	3,651	3,414
Export price index (1995=100)	7	61	194	243
Import price index (1995=100)	5	56	161	201
Terms of trade (1995=100)	126	110	121	121



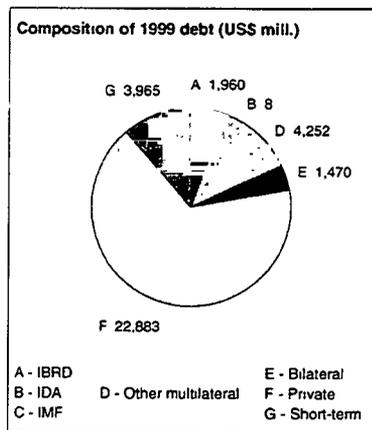
BALANCE of PAYMENTS

	1980	1990	1999	2000
<i>(US\$ millions)</i>				
Exports of goods and services	5,747	8,687	13,866	15,608
Imports of goods and services	5,597	7,089	13,408	14,301
Resource balance	150	1,597	457	1,307
Net income	-211	-2,080	-1,422	-2,429
Net current transfers	166	1,026	785	990
Current account balance	105	544	-180	-132
Financing items (net)	-430	53	502	-737
Changes in net reserves	325	-597	-322	869
Memo:				
Reserves including gold (US\$ millions)			8,103	9,006
Conversion rate (DEC, local/US\$)	47.3	502.3	1,756.6	2,087.6

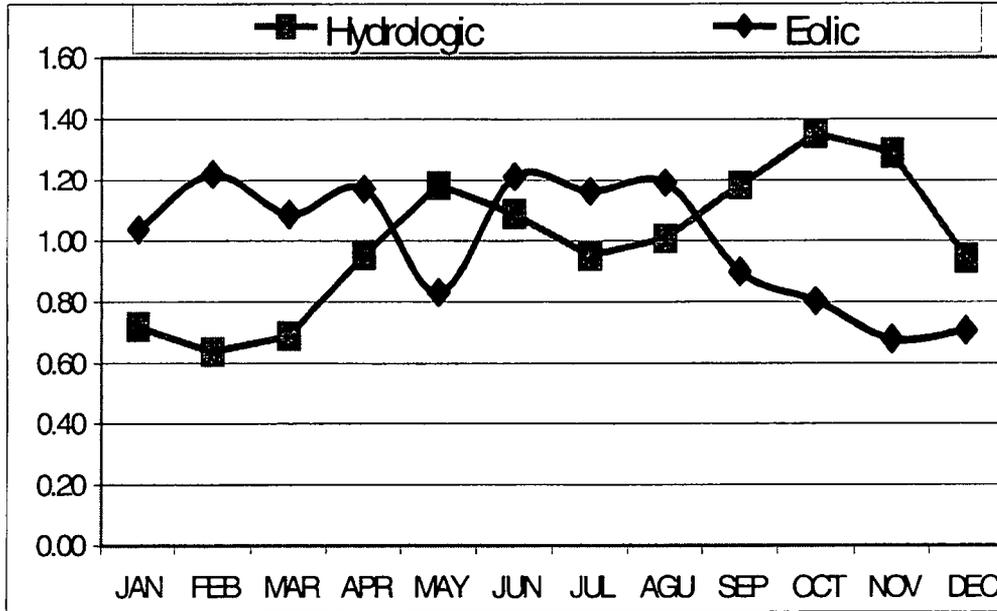


EXTERNAL DEBT and RESOURCE FLOWS

	1980	1990	1999	2000
<i>(US\$ millions)</i>				
Total debt outstanding and disbursed	6,940	17,222	34,538	35,968
IBRD	991	3,859	1,960	1,920
IDA	21	15	8	7
Total debt service	951	3,889	6,611	7,888
IBRD	144	751	390	370
IDA	0	1	1	1
Composition of net resource flows				
Official grants	8	35	103	
Official creditors	280	-40	970	275
Private creditors	531	-155	2,502	-415
Foreign direct investment	157	500	1,109	2,247
Portfolio equity	0	0	25	17
World Bank program				
Commitments	351	536	591	350
Disbursements	218	213	511	265
Principal repayments	66	435	271	244
Net flows	152	-221	241	21
Interest payments	79	318	121	127
Net transfers	73	-539	120	-105



**Additional Annex 11: Complementarity of Hydro and Wind Resources
COLOMBIA: Jepirachi Carbon Off Set Project**



Source: EEPPM

**Additional Annex 12: Risk Matrix
COLOMBIA: Jepirachi Carbon Off Set Project**

Risks/Factors	Impact on PCF	Risk Assessment	PCF Mitigation
Pre-Completion Phase			
Technology and Resource Risk			
Wind factors: average wind speed, frequency distribution (momentary, daily, seasonal fluctuations); height scaling factor (roughness index); directional distribution; congruity of wind pattern (daily, long-term), site topography; surrounding topography	Wind factors determine: Variability, Reliability of power generation Impact: delay in plan commissioning and delivery of ERs	Wind factor evaluation: Consultants have estimated probability distribution of wind based on (1) wind data collected by bidders (> one year); (2) long-term meteorological data, (3) congruity of wind pattern and load pattern at peak period ("time slice" analysis) (4) number of turbines	PCF will fund only up to 90% exceedence limits (industry standard)
Choice of turbine technology and site selection	Turbine technology determines: <ul style="list-style-type: none"> • Design, rated output, cut-in and cut-out wind speed and the power curve • Capacity factor (ratio between actual output and rated output) Site selection determines: <ul style="list-style-type: none"> • Capacity factor • Turbine design; rated power output (cut-in wind speed and rated power, maximum power at maximum wind speed) Impact: delay in plan commissioning and delivery of ERs	Turbine technology and engineering. <ul style="list-style-type: none"> • Known technology with good track record • Experienced contractors in all bidding consortia Acceptance testing: Consultants conduct on-site and computer-simulated performance testing of turbines (kWh obtained per unit time for various wind speeds)	First PCF (milestone) payment is subject to positive acceptance testing report by independent engineers
Transmission network: peak and off-peak characteristics of national grid system	Transmission network quality determines: Delivery of power to distribution grid Impact: delay in plan commissioning and delivery of ERs	Acceptance testing: <ul style="list-style-type: none"> • Consultants check comfortable level of "power supply fluctuation" within the overall network • Power delivery to distribution network 	First PCF payment is not depending on testing report by independent engineers
Social and Environmental Risk			
Acceptability by: <ul style="list-style-type: none"> • Residents of surrounding areas • Environmental and wildlife 	Level of certainty in power availability Impact: delay in plan	Site selection away from residential areas, aviation routes/flightpaths, migrating bird routes, electromagnetic	WBG environmental and social review during project preparation Alternative coverage by

<ul style="list-style-type: none"> protection groups Telecom & air navigation licensing authorities Jepirachi has raised questions from the indigenous population in whose land the project will be developed NGOs 	commissioning and delivery of ERs	communication systems (radio, television, radar and satellite reception sites)	pre-feasibility insurance; performance guarantees PCF is determined to go above and beyond the law to compensate the Wayúu people, ensuring that they will directly benefit from a set of activities identified in the social plan
Economics/Country Risk			
Inflation, FX:	Increase in costs, contingency drawn, lower debt service cover, lower equity return; however no reduction expected in output Impact: No financial sustainability of project	Economic and financial assessment of project Country Risk Assessment	These project risks are borne by project sponsors PCF pays in USD
Delay in Completion			
Sponsor's default; Sub-contractor's default (failure to complete transmission facilities); Political factors (delay in permits, consents, licenses); Natural force majeure	Impact: delay in plan commissioning and delivery of ERs	Project will be covered if contracts contain termination and compensation clauses for delaying events	PCF could seek to collect liquidated damages
Post-Completion Phase			
Offtake Risk			
PPA/ Grid/Transmission problems	No impact: Project sponsor is an integrated public utility		
Political Force Majeure/Country Risk			
Terrorism and war	Project may be unable to generate	Not in a terrorism area	
Expropriation of Assets	Project may be unable to meet its liabilities	Country risk rating	Insurance Mention of Government intervention in Host Country Agreement
Availability and free transfer of foreign currency	Project may be unable to meet its liabilities	Country risk rating	Insurance, Mention of Government intervention in Host Country Agreement
Change in law and regulations	Project may be unable to meet its liabilities	Country risk rating	Insurance
Natural Force Majeure Risk			
Natural events, lack of/insufficient /excess wind	Project may be unable to generate	Risk assumed entirely by sponsor	Risk assumed by catastrophic insurance PCF only pays on delivery
Operating Risk			
Operating costs	Lower than forecasted operating costs may turn	Baseline study and cost revision and verification in	Domestic costs are indexed

	STMC into baseline cost before the end of purchasing period	the MVP	
O&M risk	Poor maintenance by operator reduces generation	Yearly monitoring and validation	PPA should provide incentives and penalties
Grid operations	If transmission network fails, ERs will not be generated	Since the generator is the distributor, it is in its best interest to operate the grid properly	PCF only pays on delivery
Economic/Country Risk			
Long-term Marginal Cost higher than least-cost alternative	Risk that assets would be stranded if generation market is deregulated		Non-delivery of ERs is element of default
Taxes	Increased taxes rates may affect the project's ability to meet its liabilities		PPA should allow for pass through of cost due to tax increases
Inflation	Increased costs may affect the ability of the project to meet its liabilities		Local operation cost are indexed against local inflation index. Foreign operating cost are indexed against an international index
Interest rates	Increased interest costs may affect the ability of the project to meet its liabilities		Sponsors must hedge against interest rate variation
Foreign Exchange/ availability of foreign currency	Lack of foreign currency may affect the ability of the project to meet its liabilities		Ask for a Foreign Exchange Convertibility Letter and a Foreign Exchange Account Letter
Availability of cover	Lack of insurance cover in the market may leave the project exposed to the risk of natural force majeure events causing damage and interruption of revenues		There is no indication from the market that insurance will not be available
Cost of insurance cost	Increased insurance costs may affect the ability of the project to meet its liabilities		Sponsor should assume extra increase in risk premiums
Environmental/Social Risk			
Compliance with existing standards	Project unable to comply with environmental restrictions may lead to a revocation of PCF agreements	Environmental assessments are part of WBG normal due diligence. Its execution should be revised by validator/monitor	Sponsor has good track record of compliance
Imposition of more expensive environmental restrictions	Project unable to comply with environmental restrictions may lead to a revocation of PCF agreements		PPA should allow for pass through of cost due to tax increases
Host Country withdraws from the Kyoto Protocol			
Host Country does not sign and	ERs are not creditable		Event of Default

ratify the Kyoto Protocol once enters into force			
Baseline Risk			
Relevant changes in merit order dispatching structure due to unforeseen events (increase in natural gas and coal prices, lower than expected demand increases due to economic downturns, etc)	Project generates fewer ERs than expected	Baseline study to evaluate and periodical baseline adjustment for updated estimation of carbon emissions power purchase	Overcollateralization, payment on delivery
Uncertainty regarding installed capacity retrofitting and retiring rates	Project generates fewer ERs than expected	Design of clear policies that establish performance instruments and rules to increase information among stakeholders regarding this issue	Inclusion in HC of this policies

Additional Annex 13: Environmental Analysis
COLOMBIA: Jepirachi Carbon Off Set Project

Environmental Assessment Framework

This annex: (i) briefly summarizes the findings of the Environmental Impact Assessment and (ii) proposes screening criteria and procedures for ensuring compliance with Bank safeguard policies

Regulatory and Institutional Framework for Environmental Assessment

Existing legislation on Environmental Impact Assessment (EIA) is adequate, and the country has institutions and people with the technical capacity to carry out the necessary studies and assessments.

The Ministry of Environment and the Autonomous Regional Corporations are the competent authorities for issuance of environmental licenses. As per recently issued regulations for issuance of environmental licenses (decree 1728 of 2002), the Ministry issues the license for construction and operation of power generating facilities with a capacity of at least 100 Mw and the Regional Corporations for hydro or thermal power plants within the range of 10 Mw-100 Mw. Aeolic power facilities with a capacity under 100 Mw do not require of an environmental license. Instead, the Regional Corporation with oversight over the area of the project (CORPOGUAJIRA) will issue a permit for use of natural resources required for construction and operation and will follow up on the implementation of the environmental management plan included in the EIA.

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 systems
- 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 archeological 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.
- On the other hand the project will result in the displacement of greenhouse gases from thermal power plants.

Power Transmission Lines. No significant environmental issues related to power lines have

been identified. A dual 700 meter grid connection to be installed, will run from the electrical substation to the transmission “tower 20” owned by INTERCOR. 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 lines for the . Collisions will be minimized by strategically locating the anchors, the towers and providing a light color to the installations.

Road Construction or Improvement. The JCP 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 leveling 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 facilities. In particular the slow moving blades selected for this unit will reduce noise impacts. In addition, the site is 1.5 kms away from the nearest settlement, further masking the noise as part of the background noise prevalent in the area (wind gusts).

Impact on bird populations, native vegetation and scenic values is explored under the heading natural habitats, below.

Other Complementary Facilities. The EIA does indicate the specific locations and approximate surface areas for aerogenerators, underground electric transmission network (to transmit aerogenerators output to electrical substation), electrical substation and grid connection to INTERCOR and access roads. 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 (refurbishing of school facility, health center, small water storage pits, the set up of 2-4 m³/hour desalinization plant and refurbishing of the cementery) will be undertaken. Same procedures will be followed even though the impacts anticipated are negligible.

Compliance with Natural Habitats (OP 4.04). The EIA submitted by the EEPPM provides the necessary information regarding the physical “footprint” of the project including associated prevention, mitigation and compensatory measures (i.e. provided in the Environmental Management Plan). The EIA clarifies that the project will have minimal impact on the natural environment of the area. Thus, OP 4.04 is not triggered.

The Guajira Peninsula harbors several endemic desert birds found only there and along the

adjacent Venezuelan coastal plain (including Vermilion Cardinal, Toyuco Sparrow, and White-whiskered Spinetail), and doubtless other endemic fauna and flora. The EIA did not identify major environmental impacts regarding the physical “footprint” of the project. The JCP will not be located within existing or officially proposed protected areas. The key point is that the project takes into account the coastal as well as the desert ecosystems. 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). Although most of the project area is comprised of natural habitats, the expected impact on these habitats and their component species is expected to be less than significant (thus not triggering the special mitigation requirements of OP 4.04). The anticipated, relatively minor impacts on natural habitats and biodiversity are of three types:

a. **Land Clearing.** the land area to be cleared to install the wind turbines is 6.5km, 400 meter access road, borrow pits, and complementary facilities totals only 7 hectares, of which only 6 hectares would remain cleared permanently and the remainder would be rehabilitated with natural vegetation following construction. A fraction of the intervened area is already denuded. The land to be cleared is generally covered by semi-arid Guajira Xeric Scrub, with a relatively low diversity but high endemism of desert-adapted plants and animals, some of which occur only on the Colombia's Guajira Peninsula and adjacent coastal Venezuela. However, the area of this 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 Behavior.** To minimize any incidental harm to wildlife during project construction, the Environmental Management Plan in the EA Report 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 Wayúu (gotas); (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. Project drivers will also be required to avoid speeding and to take all prudent measures (consistent with human safety) to avoid running over reptiles, small mammals, and other wildlife. All these rules are included in the Management Plan.

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 siting and design features: (i) The siting of the windmills and transmission line does not overlap with the normal flight paths of flamingoes, ibises, cormorants, herons, pelicans, and other heavy flying birds as they move between their coastal feeding, resting, and breeding sites; (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 color clearly identified by flying birds. The white color is good for diurnal at night vision ; (iii) the distance between the transmission line conducting wires will be at least 2.5 meters apart to avoid electrocuting vultures, caracaras, owls, or other birds of prey as they take off from tower perches (Andean Condors, with larger wingspans, do not occur in the project area); and (iv) the

top (grounding) power line wire will be made more visible to flying birds with inexpensive plastic devices. The plastic device will have a diameter of 80cm spheres, and will be of phosphorescent orange or green colors. The device will be placed on the wire every 20 meters. The project's environmental and social Monitoring Program includes periodic censuses of bird populations in the general project area, as well as systematic record-keeping of any birds found dead or injured under the windmills or transmission lines. Of the project area's birdlife, the species of greatest conservation concern (which could collide with the turbines or power lines) is the Greater Flamingo (*Phoenicopterus ruber*), which has a regionally significant population along the Guajira coastline and is the flagship species of the nearby protected area, Parque de los Flamencos. Regarding **design**, the JCP will install blades that rotate slowly as well as devices of alert birds in order to minimize the risk of bird mortality. The aerogenerators will be at least 200 m. from the coast line.

Environmental Rules for Contractors. The programs proposed in the Environmental Management Plan (EMP) include the actions regarding proper disposal of solid and liquid waste and in general those regarding good practices. The Social Management Plan also includes the prevention and mitigation measures to avoid and/or minimize impact on community dynamics and conflict at all stages of the project lifecycle. The EIA repeatedly points to the need for educating project drivers to exercise great caution and reduce speeds so as to minimize any road kills of domestic animals (goats, dogs, etc.). These provisions are important, but should also be extended to wild animals (including reptiles and small mammals).

Cumulative effects. The project will not increase the environmental load in the area in any significant manner. The project is not linked to emissions during operation. Social impacts (addressed in Annexes 14 and 15) are not likely to adversely affect the area and measures are being implemented to address any potential social adverse effect on cultural patterns. The project is unlikely to attract people at the site as there are very few manual tasks.

Monitoring procedures. The EEPPM under a monitoring and verification protocol (MVP) with PCF to be undertaken by an independent third party will monitor the emission reductions and the outputs of the social program. As additional or modified activities are included, these will also be monitored. In addition EEPPM, the community and the Municipality of Uribia, during the consultation process (see EIA) have reached an understanding that the Municipality will be responsible for operation and maintenance of the desalinization plant and that as part of their regular duties they will follow up on schooling and health indicators. EEPPM will also monitor the measures considered under the management plan.

Screening Criteria and Procedures

Site location and sensitivity is a major factor determining the type and extent of the required environmental work. The following matrix provides with criteria for assessing the sensitivity of the project to elements considered in social and environmental safeguard policies.

MATRIX I: SENSITIVITY OF POTENTIAL PROJECT SITES

Indicators	Environmental Sensitivity Range		
	High/Critical	Medium	Low/None
I INVOLUNTARY RESETTLEMENT (OP 4.30)			
No persons economically disadvantaged / population density	Considering these indicators see Annex VII		
Land ownership communal, indigenous	Nonexistent	-	Clearly Defined/Established
Degree of Economic Dependency in Land Use or Water	High	Medium	Low
Economic development ¹³	Well established	Mixed Ownership	Illegal Ownership
II NATURAL HABITATS AND FORESTED AREAS (OP 4.04, OP 4.36)			
Presence of critical natural habitats including existing and proposed protected areas ¹⁴ and other land or water areas of high conservation value or forested areas ¹⁵		-	No
Existence of other natural habitats	Yes ¹⁶	-	-
Existence of sites that maintain conditions vital for the viability of areas mentioned above	Yes	-	No
III INDIGENOUS PEOPLE (O.P. 4.20)			
Existence of indigenous people	Indigenous territory	Dispersed/Mixed	None
Acculturation	High	-	Low
IV CULTURAL HERITAGE / PROPERTY (O.P. 4.11)			
Existence of sites	Known	Suspected ¹⁷	None
V WATER RESOURCES			
Availability/use freshwater	Scarce	-	Abundant
Quality freshwater	Pristine	-	Highly Contaminated
Use of saltwater	Coral Reefs, Mangroves, Valuable Marine Ecosystems	Sites Tourist Value	Other
Use of contaminated water (including POPs) ¹⁸	-	-	Yes
Quality receptor water body	Pristine	-	Highly Contaminated
VI IMPACTS ON REGIONAL DEVELOPMENT			
Regional, local consolidation	Poorly Consolidated	-	Well Consolidated
Road network development	Inexistent/Non-existent	-	Dense
Possibility of induced secondary development ¹⁹	Yes	-	No
Induced changes in demographic patterns	Yes	-	No
Disruption of cultural values	Yes	-	No
VIII DISPUTES AREAS (OP 7.60) AND INTERNATIONAL WATERWAYS (OP 7.50)			
Effects of projection international basins / water bodies	Yes	-	
Project located in disputed area	Yes	-	

Important Notes

- a) Degree of economic dependency sea dependency
- b) Availability of freshwater rain water storage in Jagueyes, tanker distribution
- c) Quality freshwater in Jagueyes bad
- d) Water quality distributed by tankers good
- e) Use of contaminated water (Jagueyes) young goat consumption and water for bathrooms

The following categorization has been proposed for wind power by the same guidelines.

TYPE OF PROJECT / COMPONENT	PROPOSED CATEGORIZATION	RECOMMENDED EAs AND OTHER STUDIEST
1.3 Renewable Generation (off-grid / on-grid)²⁰		
a) Wind power field	1 B 2 B 3 B 4 B	<ul style="list-style-type: none"> • EA (Environmental Analysis)²¹ 1 2, 3 4 • Environmental Supervision 1, 2, 3, 4 • Environmental Rules for Contractors 1 2, 3, 4
1 Construction, operation, maintenance		
2 Capacity Expansion		
3 Modernization/ Rehabilitation		
4 Retirement (closure and dismantling)		

The JCP has been categorized as a B project considering the magnitude of the environmental impacts identified as established by the Social and Environmental Safeguard Policies of the

World Bank. As such it has developed and EIA with associated Monitoring and Verification Plan and an Environmental Management Plan that includes actions and plans that ensure contractors will follow best practices.

Summary of EIA Submitted by EEPPM

Environmental Impact Assessment

Introduction

An Environmental Impact Assessment (EIA) is the instrument used to determine the environmental feasibility of the Jepirachi wind energy project, as well as the planning of environmental management during the later stages of the project. Herein is a summary of the main aspects of this study, carried out from 1998 to 2002 in full consultation with the local indigenous population and as per the guidelines of the local environmental agency, CORPOGUAJIRA; it considers the technical description of the project, the environmental characterization of the area covered by the study, the criteria for selecting the site, the identification, evaluation, and ranking of the impacts, a summary of the natural resources that will be used by the project, and summaries of the environmental management plan, the monitoring plan, and the contingency plan.

The construction and operation of the wind park is part of a program to facilitate the future development of wind energy on a large scale in Colombia, which, in addition to the wind park, considers, the installation of a regional network of wind measurement stations to determine the real wind energy potential of the Upper Guajira region, the preparation of proposals for a regulatory and legal framework for wind energy in Colombia, and the acquisition of the knowledge needed for its planning, construction, operation, maintenance, and commercial development.

The evaluation of the wind energy potential in Colombia is still preliminary, even though some studies have been undertaken such as the survey and publication of the wind map in Colombia, by IDEAM-INEA (Environmental Studies Institute) and the PESENCA program (the Special Atlantic Coast Energy Program), sponsored by GTZ, which in the 1980s evaluated the wind energy potential of some sites in the Atlantic Coast region. In addition, an evaluation was done of the evaluation of the potential for renewable energies in the department of Antioquia, by the ZREV and the Basque power agency for Empresas Públicas de Medellín. Based on that study, in 1999 the analysis and field reconnaissance were performed for a more specific feasibility study for the construction and operation of a wind park in the department of La Guajira. The results of the analysis shows a high and consistent wind regime, very appropriate for its utilization as a source of power in the area.

PROJECT DESCRIPTION

The Jepirachi wind park is located in the northeastern part of Colombia's Atlantic Coast region, between the localities of Cabo de la Vela and Puerto Bolívar, near Bahía Portete, municipality of Uribia, department of La Guajira. The park would be made up of a series of wind turbines that would have a total installed capacity of 19.5 MW of nominal power, which would correspond to approximately 15-23 wind turbines, depending on the results of the bidding process. These wind turbines are made up of a rotor approximately 60 meters in diameter and a generator on a tower 60 meters tall distributed in two to three rows with eight and seven wind turbines, respectively, in an area approximately 1 km long, parallel to the beach, and 1.2 km wide, to the north of the *ranchería*, or Wayúu community, of Kasiwolin, and to the west of the *ranchería* of Arutkjui. The total area required is approximately six hectares. The site is beyond the no-construction zone adjacent to the shore line.

The wind turbines would be connected by an underground network of 13.8 KVA, which conducts the power to a sub-station at the southern end of the park, with a transformer that increases the power to 110 KVA, and which will be the starting point of a line approximately 700 meters long that connects the park to the Regional Transmission System by a 110 KVA dual circuit line (Cuestecitas-Puerto Bolívar), owned by INTERCOR, which supplies power to the coal-export port.

The civic works for the park will consist of the foundations for the wind turbines, approximately 12 meters x 12 meters, and 2 meters deep, in reinforced steel, and the sub-station building, with its guard booth, the temporary housing-type offices (4), one container-type warehouse (3), one hangar-type facility with an area of approximately 600 m². In addition, there would be an area for storage of aggregate with an area of approximately 600 m². While these installations will only be used during construction, the same will be delivered to the community after start up, for eventual use. Eleven kilometers of roads would be built, with technical specifications for the transport and assembly of equipment that connects the sites for the wind turbines to the port where the equipment is to be off-loaded. In order to minimize the environmental impact and generate income for the local residents, the lodging services in Cabo de la Vela will be used for the camps.

LOCATION

The area in which the park will be located belongs to the geographic unit known as the "Upper Guajira," which is, physically, a hot and arid semi-desertic area, with a relatively flat topography. The area studied is alongside the sea in an area with tropical desert scrub, with a predominance of small-leaf species, many of them with a restricted distribution, likewise the animal wildlife, especially the birds have limited populations (exact topographic and location maps are available in the project files). Some of the flora in the zone have a restricted global distribution

In terms of socioeconomic conditions, the region is in the territory of the indigenous *resguardo* (reservation) of the Wayúu, who have pressing unmet basic needs (especially water supply and health care), and who are very protective of their traditions. Their social organization is based on

family clans, and they are highly dispersed in the territory, where they live mainly from animal husbandry (goats) and sea fishing.

CRITERIA FOR SELECTION OF THE SITE

In selecting the project site, the area between Cabo de la Vela and Bahía Portete was considered. The analysis involved considered technical, environmental, and socio-cultural factors such as: proximity to the port for the arrival of vessels with a large cargo capacity, for off-loading equipment, minimizing the distance of the overland transport thereof; proximity to the Cuestecitas-Puerto Bolívar high tension line, so as to facilitate connection to the network; geological, topographic, and bioclimatic conditions favorable to building access roads and construction infrastructure, assembly, and operation; and the small population in the area immediately adjacent to the project site.

In addition, an effort was made to avoid interfering with the religious conceptions of the indigenous communities, or their everyday activities, and to assure protection for the fauna and flora, establishing restrictions from 200 to 1,000 meters from sites such as water storage vessels (*jagueyes*), crops, cemeteries, coastline, and the *rancherías*.

ENVIRONMENTAL IMPACTS

During the construction of the project, the main concerns are related to air quality, the alteration and loss of soils and deterioration of the plant cover, changes in the landscape, possible bird collisions, soil contamination, increasing noise levels, deteriorating infrastructure due to excavations, building access roads and work areas, moving equipment, building foundations, installing the towers, and constructing the connection line and the sub-station.

Given that the area is inhabited by an indigenous community, it is considered that the main environmental impacts are related to the cultural and organizational aspects of the community, such as the impact on the *resguardo*, job creation, potential to aggravate conflicts and harm the archeological heritage, alteration of the local community dynamic, and the death of domestic animals.

In terms of benefits, in addition to the contribution to renewable energy supply and its implications for economic development in general, the project's status as a "demonstration project" will yield considerable benefits to the power and technology sector, given that it will make possible technological transfer related to the planning and operation of wind energy facilities; it will also make it possible to have more specific expectations regarding the harnessing of the region's wind energy potential. In the region, the wind energy potential identified could become an important development option, in view of the territory's limited potential for agro-forestry, livestock, and uses that require water. The social plan included in the project addresses this limitations and seeks to increase the supply of water to the locality.

ENVIRONMENTAL MANAGEMENT PLAN

The EMP includes the following aspects:

Program of management of environmental issues during construction; its objective is to prevent and mitigate impacts during construction of the project through good engineering environmental management practices. This includes:

- management of water-borne residues;
- management and disposal of solid debris and proper utilization of construction materials;
- recovery of intervened areas after construction.

Solid waste management program that consists of the adequate management of solid waste generated during construction and operation of the project. It will include collection, separation, recycling, and disposal of this waste, accompanied by an environmental education program.

Air quality management program that includes the necessary measures to prevent and control of emissions of airborne pollutants (mostly dust) during the construction phase.

Management of impact on the landscape that includes preventive actions such as selection of the site with the least landscape fragility, the use of turbines with the greatest capacity for generation, to reduce their number, etc. It also seeks to ensure that architectural designs are used in the construction of the infrastructure that are in synchrony with the natural and cultural conditions.

Program for the protection of soil and soil cover. This includes actions to prevent impacts on soil cover and restoration of intervened areas after construction.

Program for protection of animal wildlife in the area including actions that will prevent and mitigate any impacts.

A summary of these programs is shown in figure below (all social impact management programs are described in Annex 14):

Program	Impacts	Project
I PHYSICAL ENVIRONMENT		
Program for the Integration of Environmental Management into Construction and Operation Activities	Impacts on Soil and Groundwater	Management of activities related to camps, warehouses, and construction areas
		Solid and liquid waste management and disposal
		Management of activities and sites related to waste disposal
	Impacts on Air	Management of vehicular transit and materials & equipment transport
	Impacts on Soil and Water	Exploitation of native petro-materials for construction aggregates
		Water and wastewater management
Impacts on Soil	Management of inert material	
	Conservation and restoration of geologic stability	
General Impacts on Environment	Dismantling and abandonment of temporary infrastructure and construction camps	
Air Quality Management Program	Impacts on Air and Local Environment	Materials transport, loading and unloading
		Environmental rules for contractors in relation to air emissions
		Noise Management
Solid Waste Management Program	Impacts on Soil and Groundwater	Solid and liquid waste management
Landscape Management Program	Impacts on landscape	Management of impacts on landscape
II BIOLOGICAL ENVIRONMENT		
Program for the Protection of Vegetation & Land Cover	Impacts on Vegetation/Plant Cover	Protection of vegetation/land cover the site
Environmental Education Program	Impacts on Environment	Environmental Education
Management and Protection of Animal Life in Project Site	Impacts on Animal Life	Installation of preventive signals for bird protection and other measures

MONITORING PLAN

Monitoring air quality: determine the efficiency of the management plans adopted to minimize the negative impacts on the atmosphere, in terms of particulate matter and noise during the phase of construction and operation of the project. Monitoring terrestrial fauna: evaluate the modification and structure of the groups of terrestrial fauna in the area of influence of the project, mainly as related to bird species, especially the aerial routes of flamingos and other species. Monitoring the establishment of plant life: determine the activities and processes required to determine the effectiveness of the management measures proposed for the protection of plant life and the soil during the construction phase, and adjust such measures based on the evaluations performed. In addition, it includes follow-up in terms of taking to the soil, propagation, etc. Monitoring the impact on the landscape: exploring the perceptions of the community and of

visitors to the region as to the new landscape conditions that would be introduced by the wind park. In addition, monitor acceptance of the measures proposed in the environmental management plan. Finally, apply different methodologies for assessing the visual quality, fragility, and visibility of the project in the regional context of Alta Guajira.

CONTINGENCY PLAN

A contingency plan has been prepared that identifies and provides for mitigation and in some cases prevention actions for some natural threats such as hurricanes, tropical storms, erosion of cliffs, sand storms, and earthquakes, as well as man-made threats, such as vandalism and terrorism; and threats associated with technology, such as workplace accidents and equipment fires. From the plan, it is concluded that traffic accidents and workplace accidents in the course of construction are significant risks, equipment fires during the operations phase constitute a “tolerable” risk, and the all others are considered “acceptable” risks. The plan provides the measures for prevention and mitigation of impacts.

COSTS

The costs of environmental management of the project are estimated at USD 800,000 (COL \$ 1,606,000,000 of 2002) which correspond to 3.32% of the total project costs; of these, about USD600,000 correspond to the Environmental Management Plan, about 100,000 correspond to the Monitoring Plan, and about USD 100,000 to the Contingency Plan.

ENVIRONMENTAL CLEARANCE PROCEDURES UNDERTAKEN (as of September 2002)

Various steps have been taken with different environmental and indigenous institutions and authorities:

- Opinion from the Bureau of Indigenous Affairs of the Ministry of Interior as to the need to begin a process of prior consultation with the indigenous communities. December 30, 1999.
- Obtaining a permit to study natural resources: On September 28, 2000, a study permit was obtained from the Regional Autonomous Corporation of La Guajira (Corpoguajira), valid for two years, for an area of approximately 3,000 km², granting EMPRESAS PUBLICAS DE MEDELLIN priority over other concession applicants while the study permit is in force, as well as exclusivity for undertaking the studies. This permit imposes on EPM the requirement to provide information on the results of the study of winds and the study on social management (Resolution No. 562 of April 6, 2000, and Resolution No. 2001 of September 28, 2000).
- Obtaining environmental permits from Corpoguajira for siting three climatological stations in the area of influence of the Project (Resolution No. 562 of April 6, 2000, and Resolution No. 2271 of November 8, 2000).
- Opinion from the Ministry of Environment on the requirement to obtain an environmental license for the wind park (December 27, 2001). Clarification from the Ministry of Environment on the environmental agency with the authority to issue the environmental license (February 1, 2002).
- Consultation with the Ministry of Mines and Energy as to the applicability of Article 45 of Law

99, on transfers from the power sector to municipal governments and regional autonomous corporations (CARs) for generating power from wind energy projects (February 2002). Response from the Ministry of Mines and Energy on the non-applicability of the transfer regime for wind energy projects (March 2002).

- Submission of the proposed Terms of Reference for the Environmental Impact Assessment (EIA) of the Wind Energy Project to Corpoguajira (February 18, 2002). Application to Corpoguajira to begin the procedure to obtain the environmental license for the Wind Energy Project (February 18, 2002).
- Application to the Ministry of Interior for certification of the existence of indigenous and Black communities in the project area (May 31, 2002).
- Application to Corpoguajira to hold a meeting to formalize the prior consultation (June 2002).

On August 6, 2002, the Government issued Decree 1728 providing further regulations for environmental licenses, as a result of which, aeolic projects do not require of an environmental license but instead require of permits for use of the natural resources prior to start up. Accordingly, EEPPM, which had already completed a request for license, complemented this information with a request for the said permits.

**Additional Annex 14: Indigenous Plan and Cultural Property
COLOMBIA: Jepirachi Carbon Off Set Project**

Social Management during the studies phase

In order to ensure close linkage and harmonization of project activities with the indigenous peoples of the area as well as in order to ensure respect and integrity of their culture, EEPPM designed and implemented a Social Management Plan during the project preparation phase (wind measurement, technical feasibility and EIA). 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 EEPPM, as well as to carried out the formal consultation demanded by Colombian law. All these is detailed in the EIA and in the Social Management Plan. The Consultation processes is described in Annex 15.

Social Aspects of the Environmental Impact Assessment

As traditional in Colombian practice, EEPPM integrate the physical, biological, social, cultural and economic components into the environment assessment. The EIA was designed and carried out by an interdisciplinary team including an anthropologist. The archeological component was studied by archeologist of the University of Antioquia. The EIA included a sociocultural diagnosis, an impact identification and assessment, and a formulation of a Social Management Programs. This annex deals with the key highlights of the social aspects of the analysis.

Sociocultural diagnosis (social baseline).

General Social and Cultural Characteristics of the Wayúu Community

Location and Demography. Indigenous Wayúu inhabit in the Guajira Peninsula, in Colombian and Venezuelan lands. Colombian government has recognized to Wayúu their legal rights to the land they have traditionally inhabited. A *Resguardo* (land ownership to the community) was created in 1984 and it was extended in 1994. This *Resguardo* is located in the Department of *La Guajira* and has an extension of 10,675 km², which represent 51% of this Department of LA Guajira. According to the census of Wayúu peoples carried out in 1992, there are 128,727 indigenous people in the Colombia territory. This population lives in 3,344 *Rancherías* and inhabit in 23,217 houses. Half of the population lives in the Uribia Municipality, the general area where the project will be located.

Territoriality. Wayúu territoriality is defined on the basis of the following issues: “*Womainpá*” (means homeland or motherland. It is a territoriality that belongs to a matrilineal settlement “*apushi*”). There are more than one thousand *Womainpá* in the *Resguardo*. Each *Womainpá* has from 10 to 30 *Rancherías*); “*Shpiapá*” (means neighborhood or *ranchería*); “*Te’ Piapá*” (means house); “*Unap*” (means plot; is a settlement of a nuclear family); and “*Azure*” (means sources of water. These sources are under the control of the leaders of each *Ranchería*).

Economic activities. The traditional economical activities are shepherding, fishing and horticulture. An important source of economic resources is represented by the transfers from the National Royalties Fund, based on the exploitation of coal in the region. To obtain these resources, indigenous communities design projects, which are approved by local municipalities. These resources are allocated according to the number of habitants per *Ranchería*

Social organization and Language. Wayúu peoples are organized in an open society, without centralized authorities. Their organization is based on *matrilineajes* (*apushi*, or *matriarchal system*) linked to specific territories (*womainpa*) and based on kinship. Wayunaiki is the main language although an important number of people speak and comprehend Spanish.

Legal system. Wayúu peoples have a legal system called “ley del cobro” or “compensation system” based on the principle that injured parties are entitled to compensation. There are only two alternatives when someone commits a fault: compensation to the injured party or administration of inter-group justice.

Housing. The traditional Wayúu settlement consists in a group of houses, which create a *Ranchería* or *Pichiplala*. Each *Ranchería* has an indigenous name. Houses are built in local materials.

The socio-cultural analysis identified the following two key bottlenecks to improvements in the welfare of the Wayúu community:

A generalized lack of water: Due to the desertic characteristics of the area, the lack of water constitutes one of the most important needs of the communities. The water supply is seasonal and there are no desalinization units. Water has a brackish quality and potable water comes by truck.

Poor health and school facilities. The existing school and health center are not adequate to attend the current needs of the population. Although they are centrally located to facilitate access, the facilities are limited, incomplete or non-functional. The health and education services are a responsibility of the municipal government but these could be greatly improved if adequate facilities are made available.

Sociocultural impacts.

The analysis shows that the project has very limited and localized social impacts, which are summarized below, together with the associated project activities to address and mitigate those impacts.:

STAGE	IMPACT	ASSOCIATED PROYECT ACTIVITIES
CONSTRUCTION	Damage of the <i>resguardo</i>	<ul style="list-style-type: none"> ■ the occupancy of physical spaces for the construction of road works and the location of the required equipment for the parks operation.
	Employment generation	<ul style="list-style-type: none"> ■ the requirements of local labor for works not qualified during the construction and operation of the project, in activities such as: vigilance, cleanliness and temporary services. ■ Equally for the increase of demand of good and services of the project.
	Conflict potential	<ul style="list-style-type: none"> ■ the presence of foreign personnel (required in the stages of construction and visitors in operation), management of the impacts, particular interests, negotiation of employees, access to the resources, religious-magical beliefs and cultural differences.
	Damage to the archeological heritage	<ul style="list-style-type: none"> ■ activities of the project such as roads adjustment, excavations for the construction of towers, construction of substations and system connection towers .
	Alteration of the local community dynamic	<ul style="list-style-type: none"> ■ activities of construction and operation of the project.
	Contribution to the national technological knowledge	<ul style="list-style-type: none"> ■ the development of new technology of electric generation that opens the possibilities of implementation of future energy sources compatibles with the environment.
	Increase in municipal income of Uribia	<ul style="list-style-type: none"> ■ Tax payments that the project must do at the beginning of the commercial operations of the park.

Environmental Management Plan (Social Management Programs)

Based on the results of the EIA as well as on the identification of key bottlenecks, EEPPM has formulated a Social Management Programs and Projects summarized below (please see EIA for a full description):

- Information and communication program to guarantee harmonious relations between the project and the various social actors in the area of influence through integral social management geared to implementing the projects of the Environmental Management Plan, and promoting community participation through communication strategies in accordance with the cultural and religious beliefs of the Wayúu.
- Job creation: will define the mechanisms for hiring personnel required for the construction and operation of the project works, and for supplying the goods and services that the

community can provide to the project, so as to generate a benefit for the local population.

- Archeological recovery and monitoring to undertake the studies for reconnaissance, prospecting, and evaluation, and form a trained team to supervise the excavations involved in the construction, or to ensure archeological recovery if required.
- Environmental education: to carry out processes to sensitize the communities from the *rancherías* located in the project area to undertake, in a participatory manner, activities for conservation and improvement of environmental conditions in their immediate surroundings, and to make rational use of the natural resources.
- Community participation and strengthening: foster processes of training and community participation aimed at upgrading the skills of the Wayúu communities in the area of influence of the project, bolstering their possibilities for development and strengthening their cultural identity through training and technical assistance.
- Program to provide information to personnel: implement training activities for personnel of Empresas Públicas de Medellín E.S.P. and its contractors, providing information on the Wayúu culture, their legal system, customs, and valued sites, for the purpose of fostering an intercultural relationship that contributes to respect for cultural differences, sensitizing them to the indigenous question, ensuring adequate conduct on their part, preventing conflicts, ensuring respect for the territory and power relations among the various *rancherías*.
- Implementation and monitoring of compensatory measures: adequately implement the compensatory measures defined for the different communities, considering community participation as a fundamental element of the sustainability and appropriation of these projects.
- Technological dissemination program: make known the technological knowledge produced by the development of wind energy in Colombia during the phases of planning, construction, assembly, and operation of wind energy projects.
- Program to establish easements and payments for occupation of the territory, and compensation through payments: the objective is to ensure the availability of the areas required for the construction and operation of the project through coordination with the traditional authorities, to carry out the legal obligations and respecting the territorial rights of the communities.

Summary of Social Management Programs		
SOCIOCULTURAL AND ECONOMIC MANAGEMENT PROGRAMS		
Program	Objectives	Project
Information and communication program	Inform communities on the project, its characteristics and stages. Establish harmonic relationships between communities and EEPPM Encourage community participation	Information, communication and dissemination of the wind project.
		Reception and resolution of claims
		Field visits to follow up the construction process
Employment opportunities program	Improve communities income	Direct employment (recruitment and hiring)
		Indirect employment (acquisition of raw material, goods and services)
Environmental education program	Promote sustainable development	Dissemination of the EMP for employees and communities
		Training on design environmental projects
		Ethno education projects
		Training on management and reservoir of water
		Training on solid waste disposal
		Training on adequate use of natural resources
Participation and community strengthening program	Strength communities. Facilitate communities' access to financial resources	Training on indigenous rights according to Colombian law
		Training on formulation, implementation and assessment of self management projects to access legal transfers and additional PCF benefits
Information and training for employees program	Respect the cultural characteristics of communities	Training on cultural life of Wayuu people to employees and contractors
Compensation Program	Compensate the use of land and resources. Improve the standards of living	Water desalination plant
		Water storage
		School rehabilitation
		Health center rehabilitation
Technology dissemination Program	Inform and disseminate the advances of the new technology	Field visits to wind power plant
		Dissemination material on new technology

Cultural Heritage and Property

In the frame of the sociocultural diagnosis and in order to protect the local cultural patrimony, EEPPM has undertaken an archeological study during project preparation. The objective of the study was to identify potential sites in the area, determine the expectations and interests of communities related to their cultural heritage and to design a program to recover and protect any findings of archeological relevance.

A literature review and an archeological zone recognition undertaken as part of the study, identified the possibilities of impacts on the cultural property. There is little archeological research about the Colombian Guajira. Based on material evidence, three cultural periods have been discovered: (i) from the V century B.C to VIII century A.D; (ii) from IX century to XVI century A.D., and (iii) the period following the Spanish conquest. During the second cultural period, the populations lived around the costal zone, where fishing and mollusk collection were the principal activities. Later, with the arrival of the Spanish conquerors, sheep herding was the principal economic activity. Nevertheless, there are archeological surveys that help to understand the cultural adaptation of pre-colombian societies to European influence once the Spanish conquest began. These studies provide the ability to perform an archeological tracking of ethnic groups through various historical periods. In addition, a preliminary survey with the participation of indigenous authorities and elders took place during project preparation. Twenty eight sites of relevance were identified.

On the basis of the study a program has been designed, to be implemented during construction (mentioned in the above section). The program includes provisions for an exhaustive archeological survey, digs in areas of archeological relevance and monitoring of all construction activities to ensure proper care and provisions. As there is a generalized lack of archeological information in the area, this program constitutes a pioneering effort to rescue the cultural heritage of the local inhabitants. The cost of this program has been estimated at about US\$40,000. This program will be carried out with authorization and participation of indigenous communities. The results will be disseminated in the communities through publications and workshops, further encouraging the protection of their cultural identity.

Budget for Environmental Management Plan (Social Management Programs)

The first Table shows a program costs summary and the second one shows the costs per item

Program	Cost (USD \$)
Information and communication program	27,613.63
Employment opportunities program	9,147.72
Environmental education program	18,238.63
Participation and community strengthening program	22,897.72
Information and training for employees program	7727.27
Compensation Program	159,090.90
Technology dissemination Program	24,488.63
Compensation of land uses program	22,727.27
Archeological rescue and monitoring program	38,379.54
TOTAL	330,311.36

Costs Summary per Item	
ITEM	Cost (USD\$)
Personnel	51,761.36
Training and teaching material	58,352.27
Infrastructure works and equipment	181,818.18
Archeological Rescue and Monitoring Program	3,837.95
Others	34,541.6
Total	330,311.36

Institutional and Communitarian Strengthening Plan (Operational Stage)

In addition to the social management plans for the construction stage, EEPPM will design and implement a social plan for the operational stage called "Institutional and Community Strengthening Plan". The main objective of the plan is the improvement in the welfare of the Wayúu. This plan will be tailored based on the activities already concerted with the Wayúu, and developed as a result of the participation and community strengthening, and the compensation programs outlined above. These activities will justify the premium on the value of the emission reductions over the commitment period (17 years). The premium has been set at US\$0.50 per ton of CO₂ e. The cost of the additional programs has been estimated at US\$400,000 during the commitment period. The projects will be community driven and designed in a sustainable manner. The following activities are included:

Institutional and Communitarian Strengthening Plan (Operational Stage)	
Theme	Description
Social	Health, education, public services and recreation
Cultural	Activities for strengthening of cultural identity
Economic	Activities related to fisheries, eco-tourism, handicrafts and animal husbandry
Community organization	Training and management

The methodology to formulate and implement these projects is outlined in detail in the EIA and Social Program and includes the following steps: a) participatory diagnosis, including both the community and the relevant local authorities; b) identification, assessment and sizing of the activities, which will be done as per technical, cultural and social criteria concerted with the Wayúu; c) design of the activities, specifying the objectives, goals, timetables, resources and responsibilities of all stakeholders; d) implementation; and e) monitoring and evaluation. The monitoring will be made directly by EEPPM in agreement with the relevant local authorities and institutions. Given the fact that the PCF will fund this plan, the PCF will monitor, the implementation stage of the project, through independent evaluators.

Monitoring and sustainability

The monitoring of the Environmental Management Plan (Social Management Programs) will be carried out by EEPPM according to the Monitoring Plan included in the Environmental and Social Management Plan. Additionally, the environmental authority CORPOGUAJIRA is incharged of the monitoring of all the activities, according to Colombian law.

The monitoring of the Institutional and Communitarian Strengthening Plan (Operational Stage) will be covered under the Monitoring and Verification Protocol. The monitoring and verification will be undertaken by an independent party contracted by PCF. The MVP will expire when the last of the 800,000 mtCO₂e are verified. This is estimated to take place at year 17th of the project. Additional monitoring, specifically what relates to health, schooling and overall social indicators is part of the responsibilities of the Municipality of Uribia, and this was confirmed during the consultation process. Operation and maintenance of the water, health and school facilities is also under the purview of the Municipality. As part of the social program, activities geared to community strengthening and management will assist the Wayúu to follow up and monitor both the commitments of the EEPPM and the Municipality.

Institutional Arrangements

EEPPM will be the responsible agency for the implementation of the Social and Cultural Plan. The Plan will be implemented by a professional team composed of one of each of the following: a sociologist (coordinator), a anthropologist, a social communicator, a archeologist, a specialist in etno-education, a sanitary enginery, and a civil enginery. This team will be supported by a technologist and an archaeological assistant, and they will have permanent translators.

EEPPM is a solid company that has 50 years of experience in the country. This company had carried out successfully many energy generation projects and has a social team in charge of the development of social programs related to all the company activities. For example EEPPM has prepared an exhaustive Social development and Management Plan in the context of the Porce II hydroelectric project completed in 1998. The Plan included an assessment of social impacts, an archeological plan (a major result of this Plan consisted in the discovery of the oldest human remains in the region), a resettlement plan and other aspects. The initial experience with this plan was documented and published in 2000 (Plan de Gestión Social Proyecto Porce II, EEPPM). EEPPM has also participated in similar undertakings for other projects that together constitute a solid track record on social management issues. In 2001 EEPPM invested more than 15,000 million Colombian Pesos on activities related to community development. EEPPM corporate policy includes a commitment for the development of local communities where their activities are located.

**Additional Annex 15: Information and Consultation Process
COLOMBIA: Jepirachi Carbon Off Set Project**

**JEPIRACHI WIND ENERGY PROJECT
PROCESS OF INFORMATION AND CONSULTATION**

Consultation Process

Summary. An extensive and exhaustive consultation process has taken place with the local Wayúu community. Twenty meetings have taken place, leading to a final consultation and agreement on the details of the social and environmental program detailed earlier. The consultations are documented in minutes (in the project files) and in a video that records the final consultation (also in the project files). The agreement with the community has been carefully crafted to take into account local and cultural practices of the Wayúu.

During project preparation, a wide variety of consultations have also been carried out with government offices, national and international nongovernmental organizations, and local communities to discuss the impacts of JCP development and issues related to permit's requirements and the application of existing regulations. These organizations, institutions and/or groups, are listed below: Ministry of Environment; Ministry of Mines and Energy; Ministry of Interior, Department of Indigenous Communities Affairs; Authorities of *Rancherías* Kasiwolin, Arutkajui, Media Luna and Sector Escuela, Uribia Municipality; INCORA; INTERCOR; SENA; ONIC Fundación CARBOCOL, and Universities. All the process was supervised by the Department of Indigenous Communities Affairs of the Ministry of Interior and Wayunnaiki language translators assisted during negotiations.

The process of social management carried out during the project planning stage sought to bring the best possible image of the company to a region in which it never worked, with very special characteristics, as it is a *resguardo* (reservation) inhabited by indigenous communities who have a different culture, protected by national legislation, and with a history of negative experiences with development projects. **This meant that regaining trust in the *alijuna* (white man, or outsider) would pose a major challenge to the company, which would allow for no errors in the relationship with the communities.** The process followed has greatly enhanced the chances for a fruitful and long-term relationship with the Wayúu, in the process increasing the prospects for sustainability of the project.

Process. On December 30, 1999, the General Bureau of Indigenous Affairs, in the Ministry of Interior, gave its opinion regarding the need for prior consultation during the studies of the wind energy potential in the Upper Guajira to analyze the economic, environmental, social, and cultural impact on the Wayúu indigenous communities of a wind park in indigenous territory. That process was carried out over nearly three years by the EEPPM pursuant to the legislation in force and the company's environmental policies, which include commitments to comprehensive environmental management, continuous improvement of environmental management, and interaction with stakeholders.

The process of prior consultation has been developed with the Wayúu indigenous communities in

the area of influence of the project, such as Kasiwolin, Arutkjui, and *rancherías* (Wayúu communities) in the Media Luna sector known as Aturrutchon, Kamusuchiwo'u, and Kasushi, among others. An information, consultation, and coordination process has been developed with the indigenous communities through meetings, workshops, field visits on various themes, and at the same time they have participated in the environmental studies that have been performed. This process was developed based on the existing regulations for ethnic minorities, which define prior consultation as a mechanism of participation exclusively for indigenous and Black communities, based on a process of communication and inter-cultural coordination.

Legal framework. The process of prior consultation was based on domestic and international legislation on ethnic minorities and related sectorial and company policies, such as:

ILO Convention 169 of 1989, and Law 21 of 1991

ILO Convention 169 establishes: “Governments shall ... [consult the peoples concerned, through appropriate procedures and in particular through their representative institutions, whenever consideration is being given to legislative or administrative measures which may affect them directly.”

“The peoples concerned shall have the right to decide their own priorities for the process of development as it affects their lives, beliefs, institutions and spiritual well-being and the lands they occupy or otherwise use, and to exercise control, to the extent possible, over their own economic, social and cultural development. In addition, they shall participate in the formulation, implementation and evaluation of plans and programs for national and regional development which may affect them directly.”

The 1991 Constitution of Colombia:

Article 7: “The State recognizes and protects the ethnic and cultural diversity of the Colombian nation.”

Article 10: “Spanish is the official language of Colombia. The languages and dialects of the ethnic groups are also official in their territories.”

Article 13: “All persons are born free and equal before the law, shall receive the same protection and treatment from the authorities, and shall enjoy the same rights, freedoms, and opportunities with no discrimination on grounds of sex, race, national or family origin, language, religion, or political or philosophical opinion.”

Article 63: “Property for public use, natural parks, communal lands of ethnic groups, *resguardo* lands, the archeological heritage of the nation, and all other property as determined by law, are inalienable, imprescribable, and non-attachable.”

Article 72: “The cultural heritage of the nation is under the protection of the State. The

archeological heritage and other cultural property that constitute the national identity belong to the nation and are inalienable, non-attachable, and imprescribable. The law shall regulate the special rights that may attain for ethnic groups based on territories with archeological wealth.”

Article 286: “The departments, districts, municipalities, and indigenous territories are territorial entities.”

Article 287: “The territorial entities enjoy autonomy in the management of their interests, and within the limits of the Constitution and the law.”

Law 99 of 1993:

This law develops the constitutional mandate for citizen participation on environmental matters, establishing forms and procedures for citizen participation such as prior consultation for indigenous and Black communities.

It includes the following definition: “The exploitation of natural resources shall be done without detriment to the cultural, social, and economic integrity of the indigenous and traditional Black communities, in keeping with Law 70 of 1993 and Article 330 of the Constitution, and the decisions on this subject shall be made after consultation with the representatives of those communities.”

This law also establishes a payment of 6% on the value of the electricity sale from hydroplants and a 4% from thermoelectric plants, to the municipalities where the project is located and for the regional environmental authority. The Eolic generation is not subject to these payments. This has been confirmed both by the Ministry of Mines and Energy and the Ministry of Environment after being consulted by EEPPM.

Law 160 of 1994, Decree 2164/95:

This law partially regulates Chapter XIV of Law 160, of 1994, on the adjudication and titling of lands for indigenous communities for the establishment, restructuring, expansion, and regularizing of title to the indigenous *resguardos* in the national territory.

Article 23: Easements and construction of works. The indigenous *resguardos* shall be subject to easements established by the laws in force. When the construction of infrastructure works of national or regional interest is required in a *resguardo*, these may only be established after consultation and coordination with the authorities of the community and the issuance of the environmental license, when required, and a determination shall be made of the corresponding compensation, consideration, benefit, or participation.

In all cases provided for in this article, an inter-cultural regulation on use shall be drawn up in coordination with the community and with the participation of the Ministry of Interior.

Law 143 of 1994:

Article 53: It is established that during the phase of studying projects for generation and inter-connection, the companies that own the project should inform the communities affected, consulting with them as to the environmental impacts, the measures provided for in the environmental action plan, and the mechanisms for involving them in establishing the plan.

Decree 1320 of 1998:

This decree regulates the prior consultation with indigenous and Black communities.

The purpose of the prior consultation is to analyze the economic, environmental, social, and cultural impacts that might affect an indigenous or Black community due to the exploitation of natural resources in its territory. It also establishes that the person in charge of the project, work, or activity who must perform the prior consultation shall prepare the environmental studies with the participation of the representatives of the indigenous or Black communities.

Social Management Policy Guidelines of the Power Sector, 1990

These guidelines consider community participation to be the basis of social management. The essential conditions for this are: to inform, to consult, to coordinate, and to co-manage.

Even though the benefits of participation cannot be evaluated based on economic efficiency criteria, they do guarantee the harmonious insertion of the energy projects in the regional context. In so doing, they strengthen the communities' capacity for social management.

Environmental Policy of Empresas Públicas de Medellín adopted in the year 2000

This policy considers "social management as a strategy for inter-action with the communities that is based on the knowledge of the socioeconomic, cultural, and political characteristics of the communities influenced by the development of the projects, and on the need to have a harmonious relationship with them due to the impacts that might be caused by the study, construction, and operation of their projects."

Characteristics of the consultation process. The characteristics of the process of prior consultation developed with the Wayúu communities from the area of influence of the project were:

- **Information:** On EPM, characteristics of the project, actions and activities entailed in the studies, roles of the field personnel, stages of the project, forms of participation, decisions, among other aspects.
- **Consultation on impacts and management measures, and interests and expectations of the communities and institutions, by holding workshops, presenting videos, photographs, etc., that would enable the communities to take stock of the impacts of the wind energy project on**

the environment.

- Process of agreeing on management measures: 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 the 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.
- Characteristics of the climate seasons
- Aspects of the local legislation governing the Wayúu

Principles. In order to engage the social and institutional actors that would be affected by or involved in the project, it was necessary to devise strategies that would enable the EPM to become involved, in an appropriate manner, for the first time, in a power generation project outside of the department of Antioquia, with a new technology and in a territory governed by special management rules, as is the indigenous *resguardo*, which by its very nature is non-negotiable.

In addition, it was found that the feasibility of the project was largely based on the social component, which accorded greater responsibility to social management, given that not only was EPM going to have a presence in a hitherto unknown area, but also that we were interacting with historically marginalized indigenous communities, with negative precedents in terms of development projects in their territories, and with extremely precarious living conditions.

The foregoing, together with the fact that the indigenous communities had no knowledge of Empresas Públicas de Medellín – which called for social management, good conduct, transparency, accurate information, follow-through, etc. – were the guide for those responsible for the social management process.

Following is a description of the main guidelines or principles that guided the process of social management and prior consultations on the project:

LEGITIMACY: It was a clear, open, and transparent process in which the participation of the traditional authorities of the various *rancherías* and the community in general was taken into

account.

INTER-CULTURAL UNDERSTANDING: It was a process adapted to the particularities of the Wayúu culture, with translation into Wayunaiki in all meetings and assemblies.

PARTICIPATION: During the process, it was fundamental to foster the participation of the communities through meetings, workshops, field visits, talks, etc., which made it possible to build a sense of ownership of the project on the part of the community and the authorities.

CONTINUITY: The consultation was conducted continuously, over three years, without interruption, which helped bring about a process characterized by trust, appropriation, interest, and clarity around the project.

GRADUALITY: The consultation process unfolded gradually, mindful of the advances in the studies, dynamics, and times of the Wayúu communities, and the trust attained throughout the process.

RESPONSIBILITY: During the process the parties involved fully shared the responsibilities for the commitments taken on, such as: installation of stations, form of payment, agreements and consensuses around meetings, visits, scheduled studies, work programs, etc.

TRANSPARENCY: The process was characterized by transparency in the social management process and in the commitment of the staff to uphold the company's good name in a hitherto unknown area.

RESPECT: Respect for cultural differences was a permanent principle that guided the social management process, which was based on prior knowledge of the Wayúu culture, acknowledging their forms of social organization, leadership and representation, customs, valued sites, time-frames, which was enriched with the ongoing relationship with the communities and the dynamics of the process.

FLEXIBILITY: The different moments of the studies and prior consultation process had to adapt to the particular conditions of the communities, such as schedules, rites and customs, economic activities, methodologies of participation consistent with their relationships of authority and leadership, etc.

Methodology. The methodology developed in the consultation process was based on the principles of graduality, continuity, and respect, among others, noted above.

5.1 Interacting with the Community

The prior consultation process began with the communities from three *rancherías* and their traditional authorities, to reach agreement on installing the climatological stations required for carrying out the feasibility studies. These preliminary activities enjoyed the support of the environmental authority in the region, Corpogujaira, which issued the respective environmental

permits, and provided accompaniment in the field as necessary and provided support to the process of the Office of Indian Affairs at the Ministry of the Interior.

The process of information and consultation was developed through meetings, workshops, and field visits. The convocation for these events was issued through the authorities and leaders; and there was always a translator to provide translation into Wayunaiki.

5.1.1 Meetings

From September 1999 to June 2002, 25 meetings were held with the communities of Kasiwolin, and Arutkjui, and from the Media Luna sector and the municipality of Uribia. Some meetings included the participation of staff from the Ministry of Interior and Corpogujira. Meetings were undertaken both with the community and with institutions involved.

As the studies proceeded, the meetings covered different aspects and served different purposes, defined in the following terms:

- **Informational:** To present general information on the project and inform on the monitoring stations that would serve a basis for selection of specific sites for the aerogenerators.
- **Consultative:** To learn of the expectations of the communities and authorities on specific issues such as environmental impacts and management measures. To obtain from the communities a feedback and confirmation on the information obtained and on the socioeconomic diagnosis.
- **For consensus-building:** To reach agreement on different aspects of the project such as location of stations, works, and compensatory measures.
- **For formalizing agreements:** To formalize prior agreements entered into between Empresas Públicas de Medellín and the communities, with the presence of the Ministry of Interior, Corpogujira, Office of the Mayor of Uribia, and Office of the Governor of Guajira.

Meeting places

The meetings were held at:

- The school at Kamasuchiwo'u
- The hamlet of Kasiwolin
- The hamlet of Arutkjui
- Mayor's office of Uribia
- Municipal Council of Uribia
- National Indigenous Organization of Colombia (ONIC)

Minutes and records

Minutes were taken of each meeting, signed by all the 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 the communities, the Office of the Mayor of Uribia, Corpoguajira, and the Ministry of Interior. The actual minutes and copies of the agreements were copied to the office of the Governor of the Department of Guajira, at the section dealing with Indian affairs. In addition, a film and photographic record was kept of the meetings, which are part of the project documents and file.

Translation into the Wayúu language (Wayunaiki)

At each meeting, a translator was chosen, by mutual agreement with the community, who was trusted by the community.

The limitations imposed by language were such that the information concerning the project was adapted to the conditions of the communities, in a simple language, and using examples and comparisons easy for the community to understand.

Aids:

Some aids were used to make it easier to understand the projects, such as:

- Videos of wind parks in Spain
- Color photos of wind turbines, process of construction, etc.
- Scale models of wind turbines.

5.1.2 Workshops

1. Two (2) workshops were held with the communities to examine impacts, management measures, and compensation. Some of the potential impacts identified by the communities of Medialuna and Kasiwolin included:

- Attracting other communities, seeking to benefit, to the area
- Changing everyday life around streams, crops, and pastureland
- Death of animals and humans due to accidents
- Raising dust
- Affecting the plant life the animals feed on
- Job creation
- Improving quality of life in areas such as health

The communities' responses explained some of the fears in connection with the project. They had to do with the fact that in the translation into Wayunaiki, it was given to understand that the project would occupy the streams, having a detrimental impact on their crops and the animal husbandry near them. One other concern derived from translations difficulties related to the idea that the aerogenerators or the access roads could have been installed in areas traditionally used for crops. The meetings provided several opportunities to make the respective clarifications and to diminish expectations and fears. In this respect the meetings were fully successful.

The consultation on management measures and compensation made it possible to determine that the needs and expectations related to the project had to do with:

- Water supply (desalination plants, storage vessels (*jagueyes*), tanker truck)
- Improvement of the education and health services through the provision of facilities
- Employment and training
- Animal feed
- Electric power

2. A painting workshop was held with 50 children from the Kamusuchiwo'u School from the third, fourth, and fifth grades of primary school, to learn about their perceptions of the project, and to be used to illustrate a primer to explain the project in Wayunaiki.

The drawings illustrate a high level of knowledge and appropriation of the project by the children, and the integration of the project with the environment.

5.1.3 Field Visits

Once it was determined more precisely where the works of the project would be located, field visits were made with members of the community, especially traditional authorities, for the purpose of informing them of the different aspects of the project and learning from them their expectations, fears, and suggestions. The field visits had also the objective of identifying the potential sites for location of the aerogenerators and the potential locations for ancillary units (roads, offices, storage areas).

The following two important points stand out from these visits:

- The great significance of the crops for the community, especially the elderly women, who cultivate, and the fear that the works would interfere with them, due to their proximity, obstructing the wind and the sand that fertilizes the crops. This made it possible to re-define the preliminary location some works to make them acceptable to the community.
- The clarification with respect to the access route for getting the equipment to the project area, since it was not a new road, but rather involved improving the existing road between Puerto Bolívar and Cabo de la Vela, which they know as the "old road to Cabo de la Vela."

5.1.4 Environmental Studies

The direct participation of members of the different communities in the environmental studies was encouraged. These studies addressed issues such as:

- Study of the birds in the region
- Geotechnical assessment of soils and plant cover
- Topographical survey and cartographic restitution of the terrain

- Soil studies and sampling
- Construction and oversight of climatological stations
- Toponymy and location of special places
- Evaluation of building materials
- Socio-cultural description

The community was linked to these studies by the following means:

- Accompaniment as guides in field visits
- Knowledge of their territory and natural habitat through conversations with key informants
- Semi-structured interviews and conversations with the elderly to learn about the history of settlement, mobility of housing, mystical dreams, diseases, and death, among other issues
- Community thoughts about historical matters, everyday life, economic activities, social organization, and customs, among other aspects.

5.2 Inter-institutional Contacts

In developing the prior consultation, several inter-institutional contacts were made with competent local, regional, and national entities to ensure that the consultation process would maintain the investiture of a public process. These included the Ministry of Environment, the Ministry of Interior and the Ministry of Mines and Energy, Corpoguajira, the Office of the Governor of Guajira, and the municipal government of Uribia.

In addition, contacts were made with institutions experienced in carrying out community programs with the Wayúu, in order to learn about appropriate methodologies, successful and unsuccessful projects, and the lessons learned, to involve such knowledge social management process. These included SENA, Corpoguajira, and INCORA, among others.

The most noteworthy such initiatives were the following:

MINISTRY OF INTERIOR

- * Opinion on the need to undertake the prior consultation process to carry out the studies on wind energy potential in the Upper Guajira.
- * Certification of the presence of indigenous and/or Black communities in the region.
- * Follow-up on the process of prior consultation through participation in meetings with the communities.
- * Advisory services on methodological, legal, and territorial issues, among others.
- * Verification of community participation and respect for the rights of the ethnic minorities throughout the process.
- * Verification of the commitments related to management of the project impacts in the meeting for formalizing the agreements.

CORPOGUAJIRA

- * Permit to perform studies of the wind energy potential.
- * Environmental permit to install the climatological stations.
- * Monitoring from the beginning of the studies until the final meeting to formalize the agreements in field visits, presentation to and interaction with the community.
- * Advisory services and methodological workshops on environmental aspects, terms of reference for environmental impact study, experiences with the Wayúu, licensing procedures.
- * Monitoring of the process of prior consultation and of implementation of the commitments.
- * Provision upon review of the requests by EEPPM of the necessary permits for use of local resources for construction
- * Monitoring of the provision detailed under the environment management plan

MINISTRY OF MINES AND ENERGY AND MINISTRY OF ENVIRONMENT

- * Opinion on the application of Article 45 of Law 99 on transfers to the wind energy projects.
- * Opinion as to which agency has the authority to provide the environmental oversight.

OFFICE OF THE GOVERNOR OF GUAJIRA (Secretariat for Indigenous Affairs-Riohacha, Secretariat for Economic Development)

- * Supply of regional information required for the studies.
- * Advisory services on the issue of desalination plants.
- * Follow-up on the process and accompanying the meeting to formalize the agreements.

MUNICIPAL GOVERNMENT OF URIBIA

- * Accompaniment during the process of prior consultation with the communities, especially in the stage of agreements with and commitments to them.
- * Advisory services on territorial, legal, and cultural issues.
- * Participation in analyzing the compensatory measures.
- * Commitment by the municipal administration to the operation and maintenance of a desalination plant in the project area.
- * Participation in the *a priori* coordination meetings with the communities from the area of influence of the project, on the environmental management plan, especially on the compensatory measures.

SENA, INCORA, FUNDACIÓN INTERCOR

- * Participation in informational meetings on the project held in the context of the process of prior consultation.
- * Advisory services on experiences of projects with Wayúu communities, legal system, legal, territorial, and cultural issues.

SCHOOL staff in the Wayúu area.

- * Provision of space and logistics for meetings

6. Formalization of the Process

The process of prior consultation developed over almost three years (1999-2002) was formalized in the meeting held June 20, 2002, in the Kamusuchiwo'u School.

OBJECTIVE

To have the communities as well as the relevant authorities (environmental, indian affairs) verify the process, mindful of the contents of the study, their participation in its preparation, description of environmental impacts, management of said impacts, definition of agreements, and signature of the formal documents incorporating the agreements.

COMMUNITY MEMBERS PRESENT 103 persons signed

Communities from the Media Luna sector, Arutkjui, and Kasiwolin, and their traditional authorities

Corpogujaira

Ministry of Interior

Office of the Governor of Guajira

Office of the Mayor of Uribia

Empresas Públicas de Medellín

AGREEMENTS

Environmental Management Plan: Physical, biotic, and social component (document formalized June 20, 2002)

Agreement on the initial scope of the compensation measures: construction of the water desalination plant, refurbishing of two water storage pits and construction of two new water storage pits; provision of equipment and facilities at the health center and the school, fencing and upkeep of the cemetery.

Compensatory measures (document formalized June 20, 2002)

7. CONCERNS OF THE COMMUNITY

The main concerns of the communities expressed in the various meetings are 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 of 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

SUMMARY AND RECORD OF CONSULTATIONS HELD

- Meetings to provide information, or for consultation and coordination, with national, regional, and local institutions involved in community, environmental, and indigenous development and with the traditional and community authorities from the *rancherías*, or Wayúu communities, of Arutkjuí, Kasiwolin, and those in Media Luna, in the school sector, concerning the studies, their scope, time required, field activities, progress or results, environmental policy of Empresas Públicas de Medellín E.S.P., and decisions on the project, among other aspects (1999 to 2002). A compendium of the minutes of the meetings with the communities, a summary of the videotapes made, and a list of the meetings held is set forth in the annexes.
- Preparation of the basic studies with the participation of the communities, as observers of the climatological stations, as guides, inspectors or informants during the field visits for the studies of topography, birds, plant cover, soil use, and archeology (2001-2002). The socio-cultural description was presented to the communities for their verification along with the review of the topology as indicated in the maps (August and October 2001).
- Review of experiences with management measures applicable to the project zone: To this end, visits will be made to INCORA, INTERCOR, SENA, the Universidad Nacional, Corpogujira, ONIC, the General Bureau of Indigenous Affairs of the Ministry of Interior, the Mayor's Office of Uribia, and Fundación CARBOCOL (November 2001).
- Presentation of the characteristics of the wind energy project and consultation on impacts and management measures with the communities (November 2001, March and April 2002), and field visits with the community of Kasiwolin to verify sites of project works and areas of direct influence (April 2002). Finally, coordination of management measures with the communities, and meeting to formalize the consultation and conclusion of the process of consultation with the communities (May and June 2002).

**ENVIRONMENTAL IMPACT ASSESSMENT
METHODOLOGY AND RESULTS OF THE CONSULTATION PROCESS**

1. Summary of meetings with community

Meeting number	Dates d-m-y	Main objective of the meeting	Community	Place	Community members present (signatures)	Institutions represented
1	30-09-99	To inform the community of EPM's interest in installing a wind measurement station in its territory to study the wind energy potential, to coordinate with the community to determine where it should be located, and to select the tower observer.	Medialuna Kasushi	Kamusuchiwo'u School	Approx. 50	Representative of Corpoguajira
2	18-10-00	To inform the community of EPM's interest in installing a wind measurement station in its territory to study the wind energy potential; to coordinate with the community to determine where it should be located and to select the tower observer	Kasiwolin	Home of Felio Pushaina	25	Representative of Corpoguajira Representative of Ministry of Interior
3	11-08-00	To inform the community of EPM's interest in installing a wind measurement station in its territory to study the wind energy potential, to coordinate with the community to determine where it should be located, and to select the tower observer	Medialuna Arutkui	Arutkui	19	Representative of Corpoguajira
4	28-02-01	To inform the community of EPM's objectives in the area, and of any progress in the studies of wind energy potential. To address the concerns of the community.	Medialuna Kasushi, Arutkui	Kamusuchiwo'u School	50	Representative of Ministry of Interior
5	01-03-01	To inform the communities about the EPM, the results of the studies of wind energy potential, and to address the concerns of the community.	Kasiwolin	Home of Felio Pushaina	42	Representative of Ministry of Interior
6	18-04-01	To report on the characteristics of the wind energy project for the zone, status of the studies on wind energy potential, and future activities.	Medialuna Kasushi, Arutkui	Kamusuchiwo'u School	150	Representatives of Ministry of Interior Representative of the Office of Governor of Guajira
7	14-08-01	To report on and validate with the communities the results of the sociocultural description, and scope of the basic studies to be carried out in the zone.	Medialuna Kasushi	Kamusuchiwo'u School	10	
6	25-09-01	To report to the community on the possibility of building a wind energy project and explanations of the legal framework governing indigenous issues and the programming of a workshop on environmental impacts.	Kasiwolin	Home of Felio Pusahaina	25	
8	07-09-01	To report on works in the area, and to introduce the contractor for the cartography study and selection of personnel for the field study on plant cover, soil uses, and birds.	Kasiwolin	Home of Felio Pushaina	19	
9	20-11-01	To perform the consultation to identify impacts and for participatory analysis of the management measures.	Medialuna Kasushi, Arutkui	Kamusuchiwo'u School	62	
10	21-11-01	To perform the consultation to identify impacts and for participatory analysis of the management measures.	Kasiwolin	Home of Felio Pusahaina	46	

Meeting number	Dates d-m-y	Main objective of the meeting	Community	Place	Community members present (signatures)	Institutions represented
11	14-03-02	To inform the community of the status of the project studies, to consult as to the possible impacts and management measures, and to learn about the projects of interest to the community	Kasiwolin	Home of Felio Pusahaina	34	
12	18-04-02	To inform the community as to status of the project, to consult as to the possible impacts and doubts regarding environmental management, and to learn about the projects of interest to the community	Medialuna Kasushi Arutkjui	Kamusuchiwo'u School	17	Representatives Municipal Administration of Unbia
13	18-04-02	To clarify concerns about the previous meetings and minutes; and to validate the social description, with the authorities. Also, to discuss undertaking an archeological study, and possible agreements on compensation.	Kasiwolin	Home of Dons Unana	31	
14	15-05-02	To reach agreement with the community on measures to compensate for the environmental impacts	Medialuna Arutkjui	Arutkjui	19	Representatives, Municipal Administration of Unbia
15	16-05-02	To reach agreement with the community on measures to compensate for the environmental impacts	Kasiwolin	Home of Dons Unana	54	Representatives of the Municipal Administration of Unbia
16	28-05-02	To continue the meeting to reach agreement on measures to compensate for the environmental impacts	Arutkjui	Arutkjui	21	
17	28-05-02	To continue the meeting to reach agreement on measures to compensate for the environmental impacts.	Kasiwolin	Home of Doris Unana	57	Representatives of the Municipal Administration of Uribia
18	28-05-02	To reach agreement on measures to compensate for the environmental impacts.	Medialuna Kasushi	Kamusuchiwo'u School	24	Representatives of the Municipal Administration of Unbia
19	20-06-02	To formalize the agreements made during the process of prior consultation and to present information related to the project and the main environmental impacts.	Medialuna Kasushi, Arutkjui Kasiwolin	Kamusuchiwo'u School	93	Representatives of Corpoguajira Ministry of Interior, Municipal Administration of Uribia, Office of the Governor of Guajira, and of indigenous communities to Corpoguajira Legal representative of EPM Corregidor (local official)

2. Summary of institutional meetings

Meeting number	Dates d-m-y	Main objective of the meeting	Place	Community members present (signatures)	Institutions represented
1	16-08-01	To inform the municipal administration of Unbia, regional and municipal institutions, traditional authorities and community leaders about the characteristics of the wind energy project.	Meeting Room, Municipal Council of Unbia	Representatives of the communities of Medialuna (Kasushi), Arutkui, Kasiwolín	Ministry of Interior, Corpogujira INCORA, SENA, Office of the Governor of Guajira, Council of Unbia UMATA Unbia EPM
2	11-12-01	To inform the National Indigenous Organization of Colombia (ONIC) on progress in the studies of wind energy potential, characteristics of the project proposed, the process of consultation, and legislative initiatives regarding wind energy.	ONIC offices, Bogota		Directors of ONIC Representative Wayúu Public Services Enterprise
3	17-04-02	To inform the municipal administration of Unbia as to the status of the studies and the initiatives taken with Corpogujira, and progress in the consultation process.	Mayor's Office Unbia		Municipal offices: Secretariat for Government, Public Works, and Planning
4	14-05-02	To present the municipal administration of Unbia the compensatory measures proposed for the communities, and to secure its endorsement and commitment	Mayor's Office Unbia		Municipal offices Acting Mayor, Secretariat for Planning

In addition, meetings were held (no minutes were drawn up) with various institutions and agencies at:

- Secretariat for Economic Development of Guajira, Riohacha
- Secretariat for Indigenous Affairs, Riohacha
- SENA, Riohacha
- INCORA, Riohacha
- Fundación INTERCOR, Riohacha
- Corpogujira, Riohacha
- Ministry of Interior, Bogotá
- Ministry of Environment, Bogotá

Additional Annex 17: Footnotes
COLOMBIA: Jepirachi Carbon Off Set Project

1. Although to a lesser extent, hydroelectric utilization capacity might be affected also by transmission constraints.
2. The information for this section was, in part, extracted from the document. *Colombia Power Sector Market Profile*, E. Zoolezzi, 2001, The World Bank, yet to be published.
3. This section has been taken from the draft paper; *Effect of Regulatory Policies on the Dynamics of Liberalized Power Sectors: Cases of Latin America*, Elizondo, 2002, Imperial College of Science, Technology and Medicine, London, UK.
4. This Section is taken, in part, from the draft document Zolezzi, Eduardo.2001; *Colombia Power Sector Market Profile*, The World Bank.
5. On average, Colombia has 4 dry years every decade with one or two of those years being relatively intense droughts (i.e. Southern Oscillation, El Niño phenomena).
6. Moreover, a minor plant that does not participate in the pool and supplies non-regulated users is required to buy back-up services from a trader or generator.
7. Colombia: Primera Comunicacion Nacional ante la Convencion Marco de las Naciones Unidas sobre el Cambio Climático. IDEAM. Bogota, 2001
8. Lineamientos de Política de Cambio Climático, MMA, Bogota, June 2002.
9. JCP Feasibility Study, Technical Description, EEPPM, Electricity Generation Planning Unit, June 2002 .
10. This is the most probable alternative, a bidding process is being undertaken.
11. These paragraphs were written by George Ledec, Senior Environmental Specialist of the WB with the intention to guide the environmental screening process of wind based electricity generating facilities. This section is also based on the "Guidelines for Consistency Application of Social & Environmental Safeguard Policies" developed by Arjona and Elizondo for the QAT of the LAC Region, WB.
12. This matrix is taken from the document "Guidelines for Consistency Application of Social & Environmental Safeguards Polcies" developed by Arjona and Elizondo for the QAT of the LAC Region, WB.
13. For instance, established business.
14. Reserves that meet the criteria of the World Conservation Union (IUCN) classifications, as stated in O.P.4.04.
15. Forests comprised of native species also constitute natural habitats and are subject to both the forestry policy OP 4.36 and the natural habitats policy OP 4.04.
16. For non-critical natural habitats 1) avoid and minimize, 2) compensate.
17. For this particular case, the contractor must follow a Chance Finding Procedure.
18. POPs means Persistent Organic Pollutants.
19. Including increased demands on infrastructure.
20. On-grid refers to power generation connected and transmitted through transmission and distribution lines. Off-grid generation refers to stand-alone (on site) power generation such as the case of solar photovoltaic.

IMAGING

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