

Initial CDM Project Portfolio for the Republic of Panama

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FOREWORDS

The National Government's "Plan for Economic, Social and Financial Development with Investment in Human Capital" establishes that economic policy will be founded on the principles of social solidarity within a free market economy, while the State continues to assume its role in facilitating and promoting economic activity. It is within this context that the State continues to promote growth in the area of exports, assures greater efficiency and productivity in the use of natural resources, and encourages investments in - and the qualitative and quantitative growth of - human capital.

To this end, the Government of Panama, through the National Environmental Authority (ANAM), has participated actively in the international environmental negotiations, at both the United Nations Framework on Climate Change, and the Kyoto Protocol and its Clean Development Mechanism, thus proving its unrestricted political will to tackle the issue of global climate change. To date, Panama is one of the most advanced developing countries in the implementation of the Convention, the Kyoto Protocol and its Clean Development Mechanism, whose the ultimate objective is to assist developed countries in complying with part of their greenhouse gases (GHG) quantified limitation and reduction commitments, by means of purchasing Certified Emission Reduction (CERs), generated by project activities in developing countries in the fields of energy, industrial processes, agriculture, forestry and waste; an economic formula that translates into a new category of national environmental title for exportation, the reduction of GHG emissions.

Additionally, and following the prompt ratification of the Convention and its Protocol, and three years of national efforts towards the elaboration of the Initial National Communication, the Government of Panama has taken a step forward with the establishment of the National Program on Climate Change (PNCC) and the Panamanian Environmental Services Foundation (FUPASA), an effort which fully identifies with the ultimate objective of the United Nations Framework on Climate Change "To achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climatic system, in order to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner".

It is a great honor for me to present, on behalf of the Government of Panama, the "Initial CDM Project Portfolio for the Republic of Panama". This portfolio is the product of the collective commitment of government agencies, the private sector, international cooperation agencies and non-governmental organizations, and is geared towards the development of programs and measures that incorporate climate change into the process of planning for a sustainable national development.



Ricardo Anguizola
General Administrator
National Environmental Authority
Republic of Panama

INTRODUCTION

The Initial CDM Project Portfolio for the Republic of Panama has been developed within framework of the project “Institutional Strengthening of FUPASA”, funded by the USAID, through International Resources Group, Ltd. This project has as its main objective to present to international investors with the a Panamanian set of CDM project profiles according to the Kyoto Protocol of the United Nations Framework on Climate Change.

This Initial Portfolio consists of twenty-seven (27) project profiles, divided into two large sectors.

- Energy Sector
- Non-Energy Sector

There are twenty (20) profiles presented in the energy sector, and seven (7) profiles in the non-energy sector.

In the drafting of the Initial Portfolio of CDM projects, consideration was given to the national priorities for sustainable development which are set forth in the different plans and policies of the Government of Panama.

Care was taken during the development of the project profiles to assure that they cover a a series of aspects underlined by the Clean Development Mechanism, among which are:

- General description of the project
- Definition of the legal aspects of the CDM project
- Potential mitigation of GHG
- Costs
- Project feasibility
- The project's contribution to sustainable development and the transfer of technology; and
- Risks

Included as a component of the project profiles is the potential tonnage reductions of carbon dioxide equivalent per year (TCO₂ eq./year),

PANAMA: GENERAL INFORMATION

The Republic of Panama is located along the narrowest stretch of the Central American Isthmus, and serves to join North and South America. The country has a total area of 75,517 km². Panama lies within the 75th meridian to the west of Greenwich (local time is 5 hours behind Greenwich time). It borders on the west with the Republic of Costa Rica, on the east with the Republic of Colombia, on the north with the Atlantic Ocean and on the south with the Pacific Ocean.

The capital city and province of the Republic of Panama is Panama. Both modern and colonial, Panama City lies along the coast of the Gulf of Panama, which opens into the Pacific Ocean.

Approximately 90% of the population of Panama professes the Roman Catholic faith. In an atmosphere of religious tolerance, other faiths which are practiced are: Hinduism, Judaism, Protestantism, etc. The population of Panama is multicultural, including indigenous communities, Europeans, Chinese, Jews and Afrocaribbeans.

The year-round climate in the lowlands of Panama is tropical, with an average temperature of 27 degrees centigrade, and temperate tropical in the highlands, with an average temperature of 18 degrees centigrade. Relative humidity is approximately 78%. There are two seasons: the winter or rainy season, which extends from May to November, and the summer or dry season, which extends from December to April, approximately.

The average rainfall for the Atlantic Coast is 2,500 mm, and for the Pacific, 1,750 mm. In spite of increased precipitation during the rainy season, it is a rare day when the sun does not appear for at least a portion of the day.

The official language is Spanish. English is widely spoken and understood throughout the country. English is a mandatory course of study in high school and is spoken in all levels of society and within the business community.

General Information*

Official name:	Republic of Panama
Área:	75,517 km ²
Boundaries:	To the north, the Caribbean Sea; to the east, Colombia; to the south, the Pacific Ocean; to the west, Costa Rica.
Capital:	Panama City
Language:	Spanish (official)
Nationality:	Panamanian
Currency:	Balboa (circulates alongside the US\$)
National Holiday:	November 3, independence from Colombia
Official time:	GMT - 5 hours (normal)
National flower:	Holy Spirit Flower, a small orchid
Political division:	9 provinces and 4 indigenous territories

Demography

Population:	2,839,177(a) inhabitants (2000)
Rate of population growth:	2% annual (1990-2000)
Density:	37.6 inhabitants per Km ² (2000)
Birth rate:	21.4 per 1000 (2000)
Mortality rate:	5.1 per 1000 (2000)
Life expectancy:	74.4 años (2000)
Main cities (inhab.):	Panama City, Colon, David, San Miguelito, Santiago.

Education

Literacy:	92.3%
Religion:	Catholic

Economy

Principle products:	Bananas, sugar, coffee, shrimp, clothing, petroleum derivatives
GNP at 1982 prices:	US\$ 7,345.7 million (2000)
Estimated real BIP growth rate:	1.0%
Estimated BIP at current prices:	US\$ 10,245(E) million (2001)
Tasa de crec. PIB corriente:	2.3%(E) (2001)

* Drafted by the Bureau of Economic Analysis and Policies of the Ministry of Economy and Finance, based on information supplied by the Statistics and Census Bureau of the General Comptroller.

Annual per capita BIP:	US\$ 2,572 (2000)
Inflation rate:	0.3% (2001) third trimester.
Exports:	US\$ 5,748.8 million (2000)
Imports:	US\$ 7,039.7 million (2000)

Panamanian Economic Indicators

Indicator	III Trimester		Var. %
	2000	2001 (P)	2000/01
Agricultural Sector			
Agriculture			
Exportation of Bananas (in thousands of net kilos)	127,009	103,152	-18.8
Production of Sugar (in metric tons)	0	0	
Livestock			
Beef cattle sacrificed (heads)	73,456	68,265	-7.1
Hogs sacrificed (heads)	83,096	65,201	-21.5
Production of chicken meat (in thousands of kilos)	19,373	18,186	-6.1
Purchase of Raw Milk (in thousands of kilos)	40,896	41,604	1.7
Fishing			
Exportation of Shrimp (in thousands of net kilos)	2,257	2,448	8.5
Production of Fish Meal (in thousands of kilos)	9,206	...	
Industrial Sector			
Manufacturing Industry			
General Index of Physical Production (average)	105.7	...	
Industrial Energy Consumption (in thousands of KWH)	126,641	107,627	-15.0
Production of Tomato Derivatives (in thousands of kilos)	2,058	2,891	40.5
Production of Beer (in thousands of liters)	33,033	31,310	-5.2
Production of Alcoholic Beverages (in thousands of liters)	2,896	2,820	-2.6
Construction			
Construction Permits (in thousands of US\$)	123,909	127,543	2.9
District of Panama	93,523	101,651	8.7
Other Districts	30,386	25,892	-14.8

Production of Pre-mixed Cement (in m³)	162,711	115,148	-29.2
Electricity and Water			
Generation of Electricity (in thousands of KWH)	1,177,994	1,248,371	6.0
Hydraulic Electricity	913,594	642,205	-29.7
Thermic Electricity	264,400	606,166	129.3
Billing of Water (in millions of gallons)	15,545	15,867	2.1
Wholesale Commerce			
Personnel Employed (average)	17,584	...	
Salaries Paid (in thousands of US\$)	45,799	...	
Total Income (in thousands of US\$)	635,681	...	
Retail Commerce			
Personnel Employed (average)	24,259	...	
Salaries Paid (in thousands of US\$)	41,042	...	
Total Income (in thousands of US\$)	503,022	...	
Hotels and Restaurants			
Personnel Employed (average)	9,571		
Salaries Paid (in thousands of US\$)	13,125		
Total Income (in thousands of US\$)	61,372		
Daily Average of Room Occupancy (in units)	1,983	1,864	-6.0
Daily Average of Guests (persons)	3,214	2,869	-10.7
I.T.B.M.			
Sales (in thousands of US\$)	16,339	15,411	-5.7
Transportation, Storage and Communications			
National Port System			
Container Movement (in Teu's)	365,233	428,901	17.4
Cargo Movement (in metric tons)	5,661,038	5,637,163	-0.4
Panama Canal Authority			
Cargo Transported through the Canal (in thousands of t. I.)	47,774	46,762	-2.1
Ship Transit through the Canal (in units)	3,098	3,048	-1.6
Financial Establishments			
Internal Credit Balances (in millions of US\$)	11,935	12,258	2.7
External Credit Balances (in millions of US\$)	9,989	10,222	2.3
Interest Rate-Commercial Credit (percentage)	9.90	10.14	2.4
Interest Rate-Personal Consumption Credit (percentage)	13.20	13.07	-1.0
External Sector			
Exportation of Goods F.O.B. (in thousands of US\$)	201,348	197,916	-1.7

Petroleum Derivative Products	12,162	20,285	66.8
Bananas	39,054	29,169	-25.3
Shrimp	21,766	25,622	17.7
Coffee	636	782	23.0
Clothing	4,086	1,632	-60.1
Beef	1,815	3,439	89.5
Others	121,829	116,987	-4.0
Exportation of Services			
Tolls Charged, Canal Authority (in thousands of US\$)	136,324	134,955	-1.0
Entrance of Passengers (in thousands)	309	312	1.0
Tourist Expenditures (in thousands of US\$)	117,200	123,527	5.4
Consumption On Board (in thousands of US\$)	45,763	34,367	-24.9
Total Imports C.I.F. (in thousands of US\$)	840,576	748,109	-11.0
Capital Properties	174,937	119,129	-31.9
Crude Petroleum	129,475	123,447	-4.7
Food Products	80,143	82,158	2.5
Other Consumable Goods and Intermediates	456,021	423,375	-7.2
Colon Free Zone			
Weight of Imports (in thousands of metric tons)	201.4	226.8	12.6
Weight of Reexports (in thousands of metric tons)	164.9	184.2	11.7
Value of Imports (in millions of US\$)	1,208.0	1,245.7	3.1
Value of Reexports (in millions of US\$)	1,265.1	1,323.7	4.6
Net Export Value (in millions of US\$)	57.1	78.0	36.6

... Information not available.
(P) Preliminary Data.

Source:

Ministry of Economy and Finance, Bureau of Economic Analysis and Policy

<http://www.mef.gob.pa> e-mail: analeco@psi.net.pa

Department of Economic Information and Statistics of the Bureau of Economic Analysis and Policy, based on figures from the General Comptroller of the Republic and other Public Institutions of the Republic of Panama.

INITIAL CDM PROJECT PROFILES IN THE ENERGY SECTOR

Project	Province	River	Project Type	Power Installation MW	Promoter	Status
Algarrobos	Chiriqui	Casita de Piedra	Hydroelectric	11.2	Union FENOSA	Feasibility
Quebro	Veraguas	Quebro	Hydroelectric	8.59	Hidroelectrica del Sur, S.A.	Pre-feasibility
Paso Ancho	Chiriqui	Chiriqui Viejo	Hydroelectric	12.4	Paso Ancho Hidropower Corp.	Feasibility
Bajo de Mina	Chiriqui	Chiriqui Viejo	Hydroelectric	25	La Mina Hidropower Corp.	Feasibility
Pando	Chiriqui	Chiriqui Viejo	Hydroelectric	32.6	Electron Investments, S.A.	Feasibility
Monte Lirio	Chiriqui	Chiriqui Viejo	Hydroelectric	51.65	Electron Investments, S.A.	Feasibility
Esti	Chiriqui	-----	Hydroelectric	120	AES Panama, S.A.	Under Construction
Bayano (No. 3)	Panama	-----	Hydroelectric	85	AES Panama, S.A.	Under Construction
Dolega	Chiriqui	-----	Hydroelectric	3.2	Union FENOSA	In Operation
Macho de Monte	Chiriqui	-----	Hydroelectric	2.4	Unión FENOSA	In Operation

Project	Province	River	Project Type	Power Installation MW	Promoter	Status
Cerro Tute y La Miel	Veraguas y Los Santos	-----	Wind	12 – 20	ETESA	Feasibility
Rural Wind Project	Rural Areas	-----	Wind	2 – 5	ETESA	Project Idea
Valle de Anton	Cocle	Anton	Hydroelectric	1.8	Hidro Panamá, S.A.	In Operarion
Hornitos	Chiriqui	-----	Wind	30	Union FENOSA	Feasibility
Bonyic	Bocas del Toro	Bonyic	Hydroelectric	30	Hidroecológica del Teribe, S.A.	Feasibility
Fortuna	Chiriqui	-----	Hydroelectric	-----	EGE Fortuna, S.A.	Pre-feasibility
Transport System for Panama City "Tren Ligero"	Panama	-----	Transport	-----	MOP / BCEOM	Design Stage
Cerro Patacon Methane Recovery Project	Panama	-----	Waste Management	-----	Mayor of Panama City	Project Idea
N/A	UTP	N/A	Efficient Illumination on public buildings	N/A	Project Idea	N/A

INITIAL CDM PROJECT PROFILES IN THE NON- ENERGY SECTOR

Project Location	Promoter	Province	Project Type	Surface (ha)	Status	Area
Chucunaque River	Dobboyala Foundation	Darién	Reforestation of the Chucunaque River upper basin	6000	Project Idea	Chucunaque River
Cerro Patacon	Mayor of Panama City	Panamá	Reforestation of areas surrounding and within the Cerro Patacón sanitary landfill	15	Project Idea	N/A
Chiriqui	AES Panama	Chiriquí	Reforestation	1,250	Project Idea	N/A
El Copé National Park	San Felix Agroforestry	Coclé	Agroforestry and Nature Pasture Systems in the Buffer Area of El Copé National Park	N/A	Project Idea	N/A
Bayano	AES Panamá	Panamá	Reforestation	200	Project Idea	N/A
Santiago	Central Azucarera La Victoria	Veraguas	Treatment of Residual Water and Solid Waste	N/A	Project Idea	N/A
Asoré	Veraguas Reforester's Association (ASOREVE)	Veraguas	Carbon capture through the cultivation of hardwood trees	1000	Project Idea	N/A

CDM PROJECT PROFILES IN THE ENERGY SECTOR

Project:	Cerro Patacon Methane Recovery Project
Sector:	Energy
Current Status:	Project Idea
Estimated Emission Reduction (TCO₂eq/year):	N / D
Promoter:	Mayor of Panama City
Contact:	Lic. Jorge Sáenz Lic. Betzaida Valverde
Address:	Office of Municipal Sanitation, Carrasquilla
Phone numbers:	(507) 229-3445 229-3434 ext. 127
E-mail:	bethzaidavalverde@hotmail.com
Project Location:	Panama City, Province of Panama
Estimated Cost:	N / D

Project Objectives

Capture of methane produced by the decomposition of solid waste in Cerro Patacon sanitary landfill, for the generation of electricity.

Project Description

Methane is produced from solid waste by anaerobic decomposition. Solid waste decomposition represents approximately 20 percent of human-induced methane emissions. Emissions are expected to increase in the future, particularly in developing countries.

Methane emissions can be decreased in many ways, such as reducing solid waste generation (reduction of the source), deviating the loss away from disposal sites (in other words, through recycling or incineration), recovering garbage-generated methane, or insuring that garbage does not decompose in an anaerobic environment. In general terms, any technique or technology which reduces methane generation or converts methane to carbon dioxide through combustion, will reduce the net emissions of greenhouse gases.

The quantity of methane emitted into the atmosphere through solid waste disposal depends on the quantity of waste being disposed of, its composition, and the nature of the mechanism for disposal.

Since organic material can generate methane for as much as 10-30 years or more, appropriate programs for methane recovery must be directed particularly towards the reduction of greenhouse gases in regions where large quantities of organic waste have been or are currently being deposited in sanitary landfills. Depending on the site and the type of gas collection system to be installed, over 50% of the methane emitted can be recovered and used for generating electric energy.

The project consists of the generation of electricity through the use of methane produced by solid waste decomposition in the enclosed sector of Cerro Patacon sanitary landfill.

Project Justification

The project will utilize a non-traditional energy source, recovering the methane produced by decomposition of solid waste. The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution through the use of a greenhouse gas. The project is compatible with actions for mitigating the effects of climate change.

Project:	Improvement of efficiency in lighting of Public Buildings
Sector:	Energy
Current Status:	Project Idea
Estimated Emission Reduction (TCO₂eq/year):	N / D
Promoter:	Technological University of Panama
Contact:	Ing. Jaime Contreras
Address:	Technological University of Panama
Phone numbers:	(507) 236-4734
E-mail:	jaimecontreras@hotmail.com
Project Location:	Republic of Panama
Estimated Cost:	N / D

Project Objectives

To achieve better lighting in public offices through the application of strategies and measures which will produce effective savings in energy.

Project Description

Often, buildings in developed and developing countries are similar. Electricity is the dominant energy source, providing 70% of the energy demand in industrialized countries (EIA, 1994). However, the sources of this energy vary greatly from one country to the next. For example, carbon is the dominant energy source for Government advertising and structures.

The strategies to be applied in the buildings vary, depending on the size and type of construction and climate. Walls and roof insulation are important in many types of Government buildings. Modern commercial office buildings have overhead interior heat charges, produced by equipment and personnel, thereby diminishing the importance of insulation and increasing the importance of windows and glass building fronts. The strategies for equipment utilized in these buildings places emphasis on efficient air-conditioning, lighting and office equipment. Renewable technology strategies include photovoltaic systems, active and passive systems, and daylight. Often, the fact is overlooked that renewable strategies are highly efficient when integrated with the orientation of the building, form and design, and can be an important factor in restraining the growth of energy consumption in urban areas.

Project Justification

The application of measures and strategies for the improvement of lighting in public buildings will permit the reduction of GHG emissions that are associated with the type of lighting systems currently in use.

It has been calculated that the sector comprising residential, commercial and institutional buildings consumed a third of the global energy used in 1990, and produced approximately a third of the CO₂ emissions associated with this energy. Energy use ranges all the way from air-conditioning and lighting, to services such as food preparation and computer use. Emissions produced by the building sector include those which result from the direct use of fossil fuel, and fuel emissions associated with electricity and air-conditioning in the buildings. Over two-thirds of these emissions stem from residential buildings, the other third from commercial and institutional buildings.

Project:	Hydroelectric project, Valle de Antón
Sector:	Energy
Current Status:	Operating
Estimated Emission Reduction (TCO₂eq/year):	5,700
Promoter:	Hidro Panamá, S.A.
Contact:	Ing. José Luís Saíz
Address:	Continental Bank Tower, 20th floor, 50th Street and Aquilino de la Guardia
Phone numbers:	(507) 215-7788 / 215-7525
E-mail:	jose_luis.saiz@power.alstom.com
Project Location:	Valle de Antón, Coclé, Chiriquí
Estimated Cost:	US \$3,500,000.00

Project Objectives

To provide the province of Coclé with a clean and renewable energy source, through the generation of hydroelectricity in the area of Valle de Antón.

Project Description

The Valle de Antón Hydroelectric project uses the waters of the Antón river; the water enters into the suction building and is redirected to the generator structures located near the community of Valle de Antón, in the Province of Coclé.

It is a hydroelectric plant, with a small dam with a deviation channel. It takes water from the Antón river and redirects it by means of an open channel bed leading to the head chamber, which is connected to the turbines by a forced pipeline. After passing through the turbines, the water returns to the Anton river.

The Valle de Antón Hydroelectric project consist of three stages: The first stage has an installed total capacity of 1.8MW, and initiated operations in January of 2000. The other stages are foreseen to follow, the second towards mid-2002 and the third in 2003.

Project Justification

The project provides a clean and renewable energy source, and has, in addition, improved living standards and employment levels in the area where the project is located. The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Quebro Hydroelectric project
Sector:	Energy
Current Status:	Pre Feasibility
Estimated Emission Reduction (TCO₂eq/year):	10,847
Promoter:	Hidroeléctrica del Sur, S. A.
Contact:	Roberto S. Rodríguez M.
Address:	4th Street Curundú and Frangipani Ave.
Phone numbers:	(507) 225-3133 / 225-3119
E-mail:	hidrodelsur@mixmail.com
Project Location:	Río Quebro, Province of Veraguas
Estimated Cost:	US \$13,100,000.00

Project Objectives

To provide the region and the country with a clean and renewable energy source, through the construction of a hydroelectric plant on Quebro river, in the province of Veraguas.

Project Description

The Quebro Hydroelectric project utilizes the waters of Quebro river. It involves the construction of a conventional concrete dam 40 meters in height with a machine house at the foot of the dam, in order to create a lake covering approximately 520 hectares.

Project Justification

The project will provide a clean and renewable source of energy, as well as improving living standards and employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Paso Ancho Hydroelectric project
Sector:	Energy
Current Status:	Feasibility, in process of financial contracting
Estimated Emission Reduction (TCO₂eq/year):	25,947
Promoter:	Paso Ancho Hydro Power Corporation
Contact:	J.C. Lisac
Address:	Vía Argentina #52, Apt. 10B
Phone numbers:	(507) 269-4157 (507) 269-1815
E-mail:	intercarib@pananet.com
Project Location:	Volcán, Chiriquí
Estimated Cost:	US\$ 20,000,000.00

Project Objectives

To provide the region and the country with a clean and renewable energy source, through the construction of a hydroelectric plant on Chiriquí Viejo river, in the province of Chiriquí.

Project Description

The Paso Ancho Hydroelectric project consists of a 25-meter-high dam of earth, stone and concrete, on the Chiriquí Viejo river. The dam has been designed to serve as a spillway during high waters.

Formed by a lake that is 2 km long and 200 m wide, the water is directed through a 2-meter-wide concrete tunnel aligned to a machine house located 1,420 m downstream.

The machine house contains 2 units with a capacity of 4.5 MW each. In an average year, energy production will be 75 MWh.

Project construction is estimated to begin in October of 2002, with an estimated duration of 24 months.

Project Justification

The project will provide a clean and renewable source of energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Monte Lirio Hydroelectric project
Sector:	Energy
Current Status:	Feasibility
Estimated Emissions Reduction (TCO₂eq/year):	103,787
Promoter:	Electron Investments, S. A.
Contact:	Diego Eleta Q.
Address:	Floor 13, Aseguradora Mundial Bldg., Ave. Balboa and 41st Street
Phone numbers:	(507) 227-0444 / 227-0487
E-mail:	deleta@cableonda.net
Project Location:	Chiriquí Viejo River, Province of Chiriquí
Estimated Cost:	US \$101,842,000.00

Project Objectives

To provide the region and the country with a clean and renewable energy source, through the construction of a hydroelectric plant on Chiriquí Viejo river, in the province of Chiriquí.

Project Description

The Monte Lirio H. P. will be constructed on the Chiriquí Viejo river in the province of Chiriquí, and will consist of a generating plant with an installed capacity of 52 MW. The dam will be of the “water edge type with a smaller reservoir”. After passing through the turbines, the water will return to the Chiriquí Viejo river.

Project Justification

The project will provide a clean and renewable source of energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Pando Hydroelectric project
Sector:	Energy
Current Status:	Feasibility
Estimated Emissions	62,705
Reduction (TCO₂eq/year):	
Promoter:	Electron Investments, S. A.
Contact:	Diego Eleta Q.
Address:	Floor 13, Aseguradora Mundial Bldg., Ave. Balboa and 41st Street
Phone numbers:	(507) 227-0444 / 227- 0487
E-mail:	deleta@cableonda.net
Project Location:	Chiriquí Viejo River, Province of Chiriquí
Estimated Cost:	US\$. 62,672,000.00

Project Objectives

To provide the region and the country with a clean and renewable energy source, through the construction of a hydroelectric plant on Chiriquí Viejo river, in the province of Chiriquí.

Project Description

The Pando H. P. will be constructed on the Chiriquí Viejo river in the province of Chiriquí, and will consist of a generating plant with an installed capacity of 32 MW. The dam will be of the “water edge type with a smaller reservoir”. After passing through the turbines, the water will return to the Chiriquí Viejo river.

Project Justification

The project will provide a clean and renewable source of energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Macho de Monte Hydroelectric project
Sector:	Energy
Current Status:	Operating
Estimated Emissions Reduction (TCO₂eq/year):	12,500
Promoter:	Empresa Distribución Eléctrica Chiriquí, S.A.
Contact:	Jose Luis Esteban Viejo
Address:	Albrook, Bldg. 807, Diógenes De La Rosa Ave.
Phone numbers:	315-7870 315-7696
E-mail:	jleviejo@ufpanama.com
Project Location:	Bugaba, Chiriquí
Estimated Cost:	N/D

Project Objectives

To provide the area where the hydroelectric plant is located with a clean and renewable energy source, through the generation of electricity in the region of Cuesta de Piedra, Bugaba, province of Chiriquí.

Project Description

The Macho de Monte Hydroelectric project uses the waters of the Piedra river. Water enters the suction building and is redirected to the generating structures located near the town of Cuesta de Piedra, in the district of Bugaba, province of Chiriquí.

It is a hydroelectric plant without a dam, but with a deviation channel. It takes water from the Piedra river and redirects it through an open channel bed to the head chamber which connects to the turbines by means of a forced pipeline. After passing through the turbines, the water returns to the Piedra river.

The Macho de Monte Hydroelectric project consists of three Francis-type hydraulic turbines, with a total installed capacity of 2.800 kW.

The Macho de Monte Hydroelectric plant began operations in the year 1937, and starting on November 1 of 1998, has been operation by the Empresa de Distribución Eléctrica Chiriquí (EDECHI).

In January of 2000, EDECHI began rehabilitation of the plant, through the services of Soluziona Ingeniería, S.A. Said rehabilitation, which required 20 months to complete, involved the installation of two Francis-type turbines with their generators. Improvements were based on the latest technology available, providing greater energy efficiency to the central station.

The new, modernized plant began operations in November of 2001.

Project Justification

The project will provide a clean and renewable source of energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions

include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Algarrobos Hydroelectric project
Sector:	Energy
Current Status:	Feasibility, construction to begin
Estimated Emissions Reduction (TCO₂eq/year):	42,000
Promoter:	Empresa Distribución Eléctrica Chiriquí, S.A.
Contact:	Jose Luis Esteban Viejo
Address:	Albrook, Bldgf. 807, Diógenes De La Rosa Ave.
Phone numbers:	(507) 315-7870 315-7696
E-mail:	ileviejo@ufpanama.com
Project Location:	Caldera, Chiriquí
Estimated Cost:	US \$15,000,000.00

Project Objectives

To provide the area where the hydroelectric plant is located with a clean and renewable energy source, through the generation of electricity in the region of the community of Quebrada Seca, district of Boquete, province of Chiriquí.

Project Description

The Los Algarrobos Hydroelectric project uses the waters of the Algarrobos and Casita de Piedra streams. Water enters the suction building and is redirected to the generating structures located near the community of Quebrada Seca, in the district of Boquete, province of Chiriquí.

It is a hydroelectric plant without a dam, but with a deviation channel. It takes water from the Algarrobos and Casita de Piedra streams and redirects it through an open channel bed to the head chamber which connects to the turbines by means of a forced pipeline. After passing through the turbines, the water flows into the Chiriquí river.

The Los Algarrobos hydroelectric plant consists of two Pelton-type hydraulic turbines, with a total installed capacity of 9.950 kW.

Construction will begin in August of 2002, with the period for completion estimated at 20 months. The plant will begin operations in July of 2004.

Project Justification

The project will provide a clean and renewable source of energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Increase in Generating Capacity of the Central Hidroeléctrica Fortuna
Sector:	Energy
Current Status:	Planning stage
Estimated Emissions Reduction (TCO₂eq/year):	31,500
Promoter:	Empresa de Generación Eléctrica Fortuna, S.A.
Contact:	Ing. R. Matas / Ing. Gloria. Manfredo
Address:	Avenida Balboa, BBVA Bldg., floor 21
Phone numbers:	(507) 775-5048 / 5161 ; 227-3956 / 1090 / 2410
E-mail:	rafael.matas@ege-fortuna.com gloria.manfredo@ege-fortuna.com
Project Location:	Hornitos, district of Gualaca, province of Chiriquí
Estimated Cost:	US \$12,623,000.00

Project Objectives

To increase the generating capacity of the Central Hidroeléctrica Fortuna, through the deviation of five streams.

Project Description

The project seeks to use the water from five streams, with an average flow of 2.05m³/sec. These waters will be redirected to the lake, thereby increasing the lake's capacity and, in turn, the production of energy (MWh), without the need to increase the installed capacity of the plant or the construction of new infrastructure.

Project Justification

The project will increase the use of a clean and renewable source of energy. The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Bajo Mina Hydroelectric project
Sector:	Energy
Current Status:	Feasibility, in process of financial contracting
Estimated Emissions Reduction (TCO₂eq/year):	95,498
Promoter:	La Mina Hydro Power Corp.
Contact:	J.C.Lisac
Address:	Vía Argentina #52, Apt. 10B
Phone numbers:	269-4157 / 1815
E-mail:	intercarib@pananet.com
Project Location:	Caizán, Chiriquí
Estimated Cost:	US \$90,000,000.00

Project Objectives

To provide the region and the country with a clean and renewable energy source, through the construction of a hydroelectric plant on Chiriquí Viejo river, in the province of Chiriquí.

Project Description

The Bajo Mina Hydroelectric plant consists of a 30-meter-high dam of earth, stone and concrete, on the Chiriquí Viejo river. The dam has been designed to serve as a spillway during high waters.

Formed by a lake that is 2 km long and 200 m wide, the water is directed through a 5-meter-wide concrete tunnel aligned to a machine house located 3,600 m downstream.

The machine house contains 3 units with a capacity of 417 MW each. In an average year, energy production will be 260,000 MWh. This energy will be transmitted to the national network by a transmission line of 115 Kv, some 26 km in length.

Project construction is estimated to begin in April of 2002, with an estimated duration of 35 months.

Project Justification

The project will provide a clean and renewable source of energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Bayano Hydroelectric project
Sector:	Energy
Current Status:	Under construction
Estimated Emissions Reduction (TCO₂eq/year):	210,825
Promoter:	AES Panamá, S.A.
Contact:	David Sundstrom
Address:	Banco Continental Tower, Floor 25, Nicanor de Obarrio Street and Aquilino de la Guardia
Phone numbers:	(507) 206-2600 / 2603 / 2612 / 2613
E-mail:	Dave.Sundstrom@AES.com; LuisCarlos.Penaloz@AES.com; Domiluis.Domingez@AES.com;
Project Location:	Bayano, Province of Panamá
Estimated Cost:	US \$ 57,773,000.00

Project Objectives

The objective of the project is to increase the generating capacity of the Bayano H.P., through the installation of a third unit and the rehabilitation and updating of the units currently in use by the Plant.

Project Description

The Bayano hydroelectric project is a 150 MW development, constructed on the Bayano river in the province of Panama, approximately 80 km to the east of Panama City. The project represents 14% of the installed capacity of the SIN. The project consists of the main dam, a spillway and a machine house. Currently, the plant contains two 75 MW units with provision for two additional units. The objective of the project includes the installation of a third unit of 86 MW and the rehabilitation and updating of units 1 and 2, providing an additional capacity of 18 MW.

Project Justification

The project will increase the use of a clean and renewable source of energy. The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Bonyic Hydroelectric project
Sector:	Energy
Current Status:	Feasibility, in process of obtaining financing
Estimated Emissions Reduction (TCO₂eq/year):	49,731
Promoter:	Hydroecológica del Teribe, S.A.
Contact:	Sr. César Luis Romero, Ing. Domingo Perdomo
Address:	Vía España and Elvira Méndez Street, Banco de Boston Tower, Floor 3, Office 301
Phone numbers:	(507) 223-3048 / 223-3023
E-mail:	caing@cwpanama.net
Project Location:	Province of Bocas del Toro
Estimated Cost:	US \$. 57,000,000.00

Project Objectives

To provide the region and the country with a clean and renewable energy source, through the construction of a hydroelectric plant on Bonyic river, in the province of Bocas ded Toro.

Project Description

The project consists of the construction of a 30 MW hydroelectric generating station, including access routes, bridges and a 115 KV transmission line, between Bonyic and Changuinola. The project's interconnection will necessitate the construction of an electric substation in the Bonyic machine house, in order to transform energy from 31.8 KV, to 115 KV.

Project Justification

The project will provide a clean and renewable source of energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Dolega Hydroelectric Project
Sector:	Energy
Current Status:	Operating
Estimated Emissions Reduction (TCO₂eq/year):	17,000
Promoter:	Empresa Distribución Eléctrica Chiriquí, S.A.
Contact:	Jose Luis Esteban Viejo
Address:	Albrook, Bldg. 807, Diógenes De La Rosa Ave.
Phone numbers:	(507) 315-7870 315-7696
E-mail:	jleviejo@ufpanama.com
Project Location:	Dolega, Chiriquí
Estimated Cost:	US \$3,502,832.00

Project Objectives

To provide the area where the hydroelectric project is found, with a clean and renewable source of energy, through the generation of electricity in the district of Dolega in the province of Chiriquí.

Project Description

The Dolega project uses the waters of the Cochea river. Water enters the suction building and is redirected to the generating structures located near the community of Dolega, in the district of Dolega, province of Chiriquí.

It is a hydroelectric plant without a dam, but with a deviation channel. It takes water from the Cochea river and redirects it through an open channel bed to the head chamber which connects to the turbines by means of a forced pipeline. After passing through the turbines, the water flows into the David river. The Dolega hydroelectric plant consists of three Francis-type hydraulic turbines, with a total installed capacity of 3.230 kW.

The Dolega hydroelectric plant began operations in 1937, and beginning on November 1, 1998, is operated by Empresa del Distribución Eléctrica Chiriquí (EDECHI).

In January of 2000, EDECHI began rehabilitation of the plant, through the services of Soluziona Ingeniería, S.A. Said rehabilitation, which required 19 months to complete, involved the construction of a new machine house, where three Francis-type turbines were installed with their generators. Improvements were based on the latest technology available, providing greater energy efficiency to the central station.

The new, modernized plant began operations in August of 2001.

Project Justification

The project provides a clean and renewable source of energy, as well as improving employment levels in the area where it is located. The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for mitigating the effects of climate change.

Project:	Cerro Tute Wind Project
Sector:	Energy
Current Status:	Pre – Feasibility
Estimated Emissions Reduction (TCO₂eq/year):	56,922
Promoter:	Empresa de Transmisión Eléctrica, S. A.
Contact:	Ing. Ligia Lobo / Ing. Víctor Olmos
Address:	Dept.of Hydrometeorology, Level F, Hatillo Bldg., Ave. Cuba and 36th Street, Calidonia, Panamá
Phone numbers:	(507) 227-4856 227-7449
E-mail:	energet@sinfo.net
Project Location:	Santa Fé, Province of Veraguas
Estimated Cost:	N/D

Project Objectives

To provide the area of Santa Fe and the country with a clean and renewable source of energy, through the construction of a Wind park in the Cerro Tute area of the province of Veraguas.

General Objectives of the project

To eliminate the barriers which impede and obstruct the development of wind-generated energy production in Panama

To develop strategies which provide incentive to the development of Wind energy in Panama

To establish a data base which will allow the identification of potential sites for the generation of energy by wind

To identify three potential sites for the development of Wind farms

To elaborate a study of technical and economic feasibility for one of these potential sites

To identify local and international sources of financing in order to provide incentive for the private sector to invest in the generation of electricity through clean energies such as Wind energy

To build Panamanian institutional capacity in the techniques of identification, resource evaluation, design, construction, maintenance, financial aspects and investment, for the development of Wind farms in Panama

Project Description

The Cerro Tute Wind Park consists of a compound for the generation of electricity by means of a renewable resource (the wind), which will be located in proximity to the community of Santa Fé, in the province of Veraguas, and will have an installed capacity of 18 MW.

Construction of the compound will require the construction of roads, channels, foundations for generators, and buildings for control.

Project Justification

Worldwide, since the mid-80's, the generation of clean energy by means of the wind has ceased to be considered an experimental form of obtaining non-traditional energy. In the beginning of the 90's, it became a clean and commercially competitive form of generating electricity.

The need to preserve the environment and the imminent urgency to be less dependent on petroleum, forces us to search for clean energy sources which can be exploited as an alternative for electrical generation, to the extent that at least a portion of the country's energy needs can be met in this way.

According to previous studies on the Determination of Wind Potential in Panama (Master Plan for Renewable Resources - 1983 - University of Delaware), our country encompasses regions with excellent wind flow (Atlantic coast, Central mountain range) which could provide the country with from 50 to 300 MW of energy.

In order to turn this potential resource into reality, a series of aspects are being developed, such as: The detailed and punctual study of this resource, the true situation of this technology as a competitive source of electrical generation, the definition of its participation within the schemas which have already been predetermined for national generation, the determination of potential sites for the development of these projects, and the identification of obstacles which have impeded the development of this technology.

The project will provide a new source of clean and renewable energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution.

Project:	Design and Construction of the Blue Line of the Light Rail Train
Sector:	Transportation
Current Status:	Design
Estimated Emission Reduction (TCO₂eq/year):	N / D
Promoter:	Government of Panama - Ministry of Public Works (MOP) - BCEOM
Contact:	Ing. Alvaro Juliao Gelonch - Ing. Héctor Jiménez
Address:	Special projects MOP - Curundu
Phone numbers:	207-9446 207-9420
E-mail:	hjimenex@mop.gob.pa
Project Location:	Province of Panama
Estimated Cost	US \$ 200,000,000.00

Project Objectives

The urgent need to find transportation solutions stems from the alarming increase in recent years of vehicles in Panama City, which has resulted in the extreme congestion of its main avenues during the greater part of the day. Under these conditions, Panamanians are spending more and more of their day in cars or buses, resulting in more air pollution, noise, stress and physical wear, as well as causing general deterioration of the environment and a declining quality of life.

The MOP carried out a study which demonstrated the possibility of implanting a mass transit system with the objective of decongesting the city's streets and providing a faster and more efficient mode of transportation within the metropolitan area. The system recommended by the feasibility study is a Light Rail Train along two main avenues (Ave. España and Simón Bolívar). Based on the results of the "FEASIBILITY STUDY FOR A MASS TRANSIT SYSTEM IN THE METROPOLITAN AREA OF PANAMA CITY" (ESTPUM), the Panamanian government decided to initiate the design and construction phase of the Blue Line of the Light Rail Train, with the capacity to transport up to 134,500 passengers daily.

Project Description

The Light Rail Train project consists of the design and construction of the Blue Line of the Light Rail Train, with the capacity to transport up to 134,500 passengers daily.

Project Justification

The light rail train system will be exploited by a company which will be in charge of management and operations. Its market will be those passengers who currently circulate in the selected area, numbering around 134,500, according to data from the ESTPUM study. Upon implementation of the system, it is expected that a certain percentage of current users of private vehicles will instead use the light rail train system in order to get around. The project will permit reduction of air pollution, noise, stress and physical wear on individuals. The project is compatible with actions for the mitigation of the effects of climate change. The project will use electricity as its energy source, and will, in addition, improve employment levels in areas adjacent to the train's route.

Project:	Rural Wind Project for Battery Recharge	(2 to 5 Kw)
Sector:	Energy	
Current Status:	Project Idea	
Estimated Emission Reduction (TCO₂eq/year):	N / A	
Promoter:	Empresa de Transmisión Eléctrica, S. A.	
Contact:	Ing. Ligia Lobo / Ing. Víctor Olmos	
Address:	Dept. of Hydrometeorology, Level F, Hatillo Bldg. Ave. Cuba and 36 th Street, Calidonia, Panamá	
Phone numbers:	227-4856 227-7449	
E-mail:	energet@sinfo.net	
Project Location:	Republic of Panama	
Estimated Cost:	N / A	

Project Objectives

To Provide rural areas with a clean and renewable source of energy, through the installation of Wind generators and battery banks for the supply of electricity to said areas.

General Objectives of the project

To eliminate the barriers which impede and obstruct the development of wind-generated energy production in Panama

To develop strategies which provide incentive to the development of Wind energy in Panama

To elaborate a study of technical and economic feasibility for one of these potential sites

To identify local and international sources of financing in order to provide incentive for the private sector to invest in the generation of electricity through clean energies such as Wind energy

To build Panamanian institutional capacity in the techniques of identification, resource evaluation, design, construction, maintenance, financial aspects and investment, for the development of Wind farms in Panama

Project Description

The project entails the installation of small electric generators which will use a renewable resource (the wind) and battery banks, for the supply of electricity en rural areas.

Project Justification

Worldwide, since the mid-80's, the generation of clean energy by means of the wind has ceased to be considered an experimental form of obtaining non-traditional energy. In the beginning of the 90's, it became a clean and commercially competitive form of generating electricity.

The need to preserve the environment and the imminent urgency to be less dependent on petroleum, forces us to search for clean energy sources which can be exploited as an alternative for electrical generation, to the extent that at least a portion of the country's energy needs can be met in this way.

According to previous studies on the Determination of Wind Potential in Panama (Master Plan for Renewable Resources - 1983 - University of Delaware), our country encompasses

regions with excellent wind flow (Atlantic coast, Central mountain range) which could provide the country with from 50 to 300 MW of energy.

In order to turn this potential resource into reality, a series of aspects are being developed, such as: The detailed and punctual study of this resource, the true situation of this technology as a competitive source of electrical generation, the definition of its participation within the schemas which have already been predetermined for national generation, the determination of potential sites for the development of these projects, and the identification of obstacles which have impeded the development of this technology.

The project will provide a new source of clean and renewable energy, and will contribute to: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for the mitigation of the effects of climate change.

Project:	Hornitos Wind Park
Sector:	Energy
Current Status:	Basic Engineering Studies and Environmental Impact Studies
Estimated Emission Reduction (mt CO₂eq/year):	101,000
Promoter:	Empresa Distribución Eléctrica Metro-Oeste, S.A.
Contact:	Jose Luis Esteban Viejo
Address:	Albrook, Bldg. 807, Diógenes De La Rosa Ave.
Phone numbers:	315-7870 315-7696
e-mail:	jleviejo@ufpanama.com
Project Location:	Hornitos, Chiriquí
Estimated Cost:	US \$26,100,670.00

Project Objectives

To provide the region and the country with a clean and renewable source of energy, through the construction of an Wind park in the Hornitos region of the province of Chiriquí.

Project Description

The Hornitos Wind Park consists of a compound for the generation of electricity by means of a renewable resource (the wind). It will be located in proximity to the town of Calabazal, on top of the hills known as La Gianera, Barrial and Guabal, in the province of Chiriquí, district of Gualaca, and will have in installed capacity of 30,35 MW.

Construction of the compound will require the construction of roads, channels, foundations for generators, and buildings for control.

The Hornitos Wind Park will have 46 wind generators with a unit capacity of 660 kW, based on the latest technology in order to achieve the highest grade of efficiency in using the wind resource. The area of land to be used directly by the project will not exceed 25 hectares; adjacent lands may put to other uses.

The estimated construction period for the project is 18 months, and operations are estimated to begin in June of 2004.

Project Justification

The project will provide a new source of clean and renewable energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for the mitigation of the effects of climate change.

Project:	La Miel Wind Project
Sector:	Energy
Current Status:	Pre – Feasibility
Estimated Emission Reduction (mt CO₂eq/year):	63,247
Promoter:	Empresa de Transmisión Eléctrica, S. A..
Contact:	Ing. Ligia Lobo Ing. Víctor Olmos
Address:	Dept. of Hydrometeorology, Level F, Hatillo Bldg. Ave. Cuba and 36th Street, Calidonia, Panamá
Phone numbers:	(507) 227-4856 227-7449
e-mail:	energet@sinfo.net
Project Location:	Province of Los Santos
Estimated Cost:	N / A

Project Objectives

To provide the province of Los Santos and the country with a clean and renewable source of energy, through the construction of an Wind park in the La Miel region of the province of Los Santos

General Objectives of the project

To eliminate the barriers which impede and obstruct the development of wind-generated energy production in Panama

To develop strategies which provide incentive to the development of Wind energy in Panama

To establish a data base which will permit the identification of potential sites for the generation of energy by wind

To identify three potential sites for the development of Wind farms

To elaborate a study of technical and economic feasibility for one of these potential sites

To identify local and international sources of financing in order to provide incentive for the private sector to invest in the generation of electricity through clean energies such as Wind energy

To build Panamanian institutional capacity in the techniques of identification, resource evaluation, design, construction, maintenance, financial aspects and investment, for the development of Wind farms in Panama

Project Description

The La Miel Wind Park consists of a compound for the generation of electricity which will use a renewable resource (the wind), to be located in proximity to the community of La Miel, in the province of Los Santos, with an installed capacity of 20MW.

Construction of the compound will require the construction of roads, channels, foundations for the generators and buildings for controll.

Project Justification

Worldwide, since the mid-80's, the generation of clean energy by means of the wind has ceased to be considered an experimental form of obtaining non-traditional energy. In the beginning of the 90's, it became a clean and commercially competitive form of generating electricity.

The need to preserve the environment and the imminent urgency to be less dependent on petroleum, forces us to search for clean energy sources which can be exploited as an alternative for electrical generation, to the extent that at least a portion of the country's energy needs can be met in this way.

According to previous studies on the Determination of Wind Potential in Panama (Master Plan for Renewable Resources - 1983 - University of Delaware), our country encompasses regions with excellent wind flow (Atlantic coast, Central mountain range) which could provide the country with from 50 to 300 MW of energy.

In order to turn this potential resource into reality, a series of aspects are being developed, such as: The detailed and punctual study of this resource, the true situation of this technology as a competitive source of electrical generation, the definition of its participation within the schemas which have already been predetermined for national generation, the determination of potential sites for the development of these projects, and the identification of obstacles which have impeded the development of this technology.

The project will provide a new source of clean and renewable energy, as well as improving employment levels in the area where it is to be developed, in addition to permanent infrastructure (roads, electric service, communications, etc.) The project's contributions include: Conservation of the area's natural resources and biodiversity, sustainable use of the area's soil, and reduction of air pollution. The project is compatible with actions for the mitigation of the effects of climate change.

CDM PROJECT PROFILE IN THE NON-ENERGY SECTOR

Project:	Reforestation of the Chucunaque River upper basin
Sector:	Forest
Current Status:	Project Idea
Estimated Emission Reduction (mt CO₂eq/year):	N / A
Promoter:	Dobboyala Foundation
Contact:	Eligio Alvarado Paredes
Address:	Urb. Herbrugher, House 13 B
Phone numbers:	(507) 261-7229 261-6347 261-7229
e-mail:	dobbo@dobboyala.org
Project Location:	Chucunaque River, Province of Darién
Estimated Cost:	N / A

Project Objectives

Conservation of the biodiversity of the Chucunaque River upper basin.

Project Description

The Project entails reforestation of 6,000 ha in the upper basin of the Chucunaque River, with trees native to the area.

Project Justification

Development of the project will serve to avoid deterioration of the region's biodiversity, to make better sustainable use of the soil, and to protect the river's upper basin. Also, employment will be generated both directly and indirectly in the region, permitting a reduction in poverty in the area where the project is to be carried out.

Project:	Reforestation of areas surrounding and within Cerro Patacón sanitary landfill
Sector:	Forest
Current Status:	Project Idea
Estimated Emission Reduction (mt CO₂eq/year):	N / A
Promoter:	Mayor of Panama City
Contact:	Lic. Jorge Sáenz Lic. Betzaida Valverde
Address:	Office of Municipal Sanitation, Carrasquilla
Phone numbers:	229-3445 229-3434 ext. 127
E-mail:	bethzaidavalverde@hotmail.com
Project Location:	Panama City, Province of Panama
Estimated Cost:	N / A

Project Objectives

Reforestation of Cerro Patacon sanitary landfill area.

Project Description

The project entails reforestation of the areas surrounding and within Cerro Patacon sanitary landfill.

Project Justification

Development of the project will serve to avoid deterioration of the region's biodiversity, to make better sustainable use of the soil, to reduce air pollution and to protect the area adjacent to Cerro Patacon sanitary landfill. The project is compatible with actions for the mitigation of the effects of climate change.

Project:	Reforestation of 1,250 ha in Estí Hydroelectric Project area
Sector:	Forest
Current Status:	Project Idea
Estimated Emission Reduction (mt CO₂eq/year):	N / A
Promoter:	AES Panamá
Contact:	David Sundstrom
Address:	Banco Continental Tower, 25 th floor, Nicanor de Obarrio and Aquilino de la Guardia Streets
Phone numbers:	(507) 206-2600 / 206-2603 (507) 206-2612 / 206- 2613
E-mail:	Dave.Sundstrom@AES.com ; LuisCarlos.Penaloza@AES.com ; Domiluis.Domingez@AES.com ;
Project Location:	Gualaca, province of Chiriquí
Estimated Cost:	N / A

Project Objectives

Conservation of biodiversity in the region where the Estí Hydroelectric Project is being constructed.

Project Description

The project entails reforestation of 1,250 ha in the area where the Estí Hydroelectric Project is being constructed, with trees native to the area.

Project Justification

Development of the project will serve to avoid deterioration of the region's biodiversity, to make better sustainable use of the soil, and to protect the region adjacent to the Estí Hydroelectric Project. Also, employment will be generated both directly and indirectly in the region, permitting a reduction in poverty in the area where the project is to be carried out. The project contributes to the conservation of the region's natural resources and reduces air pollution. The project is compatible with activities for the mitigation of the effects of climate change.

Project:	Agroforestry and Natural Pasture Systems in the Buffer Area of El Copé National Park
Sector:	Forest
Current Status:	Project Idea
Estimated Emission Reduction (mt CO₂eq/year):	N / A
Promoter:	San Felix Agroforestry
Contact:	Félix Graell Edwin Graell
Address:	Las Barretas, La Pintada, Province of Coclé
Phone numbers:	(507) 239-4386 220-3653
E-mail:	rgraellr@avaya.com
Project Location:	Province of Coclé
Estimated Cost:	N / A

Project Objectives

To conserve the biodiversity of the area, and to avoid deforestation of the buffer area of El Copé National Park.

Project Description

The Project entails reforestation of the buffer area of El Copé National Park, with trees native to the area.

Project Justification

Development of the project will serve to avoid deterioration of the region's biodiversity, to make better sustainable use of the soil, and to protect the natural forests of El Copé National Park. Also, employment will be generated both directly and indirectly in the region, permitting a reduction in poverty in the area where the project is to be carried out. The project contributes to the conservation of the region's natural resources and reduces air pollution. The project is compatible with activities for the mitigation of the effects of climate change.

Project:	Reforestation of 200 ha in the Bayano Hydroelectric Project basin
Sector:	Forest
Current Status:	Project Idea
Estimated Emission Reduction (mt CO₂eq/year):	N / A
Promoter:	AES Panamá
Contact:	David Sundstrom
Address:	Banco Continental Tower, 25 th Floor, Nicanor de Obarrio and Aquilino de la Guardia Streets
Phone numbers:	(507) 206-2600 / 206-2603 (507) 206-2612 / 206- 2613
E-mail:	Dave.Sundstrom@AES.com ; LuisCarlos.Penaloza@AES.com ; Domiluis.Domingez@AES.com ;
Project Location:	Bayano, Province of Panamá
Estimated Cost:	N / A

Project Objectives

Conservation of biodiversity in the Bayano Hydroelectric Project basin.

Project Description

The project entails reforestation of 200 ha in the Bayano Hydroelectric Project basin, with trees native to the area.

Project Justification

Development of the project will serve to avoid deterioration of the region's biodiversity, to make better sustainable use of the soil, and to protect the Bayano Hydroelectric Project basin. Also, employment will be generated both directly and indirectly in the region, permitting a reduction in poverty in the area where the project is to be carried out. The project contributes to the conservation of the region's natural resources and reduces air pollution. The project is compatible with activities for the mitigation of the effects of climate change.

Project:	Treatment of Residual Water and Solid Waste from the Central Azucarera La Victoria
Sector:	Waste
Current Status:	Project Idea
Estimated Emission Reduction (mt CO₂eq/year):	N / A
Promoter:	Central Azucarera La Victoria, S. A.
Contact:	Buenaventura Juárez
Address:	La Raya de Santa María, Santiago, Province of Veraguas
Phone numbers:	(507) 959-0444 959-0422 959-0404
E-mail:	calvisa@cwpanama.net
Project Location:	La Raya de Santa María, Santiago, Province of Veraguas
Estimated Cost:	N / A

Project Objectives

To avoid contamination of the soil in the area in which the Central Azucarero La Victoria is located.

Project Description

The project involves treatment of residual waters and solid waste proceeding from the Central Azucarera, in order to avoid contamination of the soil and the sources of surface water in the area adjacent to the Central.

Project Justification

By treating residual waters and solid waste proceeding from the Central Azucarera, the project will serve to avoid deterioration of the region's biodiversity, to make better sustainable use of the soil, and to protect the area's surface water sources. Also, employment will be generated both directly and indirectly in the region, permitting a reduction in poverty in the area where the project is to be carried out.

Project:	Carbon capture through the cultivation of hardwood trees
Sector:	Forest
Current Status:	Project Idea
Estimated Emission Reduction (mt CO₂eq/year):	N / A
Promoter:	Veraguas Reforester's Association (ASOREVE)
Contact:	Yolanny Jiménez de Pinzón Sebastián A. Tejedor
Address:	El Espino Santa Rosa, Santiago, Province of Veraguas
Phone numbers:	959-0370
E-mail:	N / A
Project Location:	Province of Veraguas
Estimated Cost:	N / A

Project Objectives

To conserve biodiversity in the province of Veraguas, and to reduce the stress on natural forests.

Project Description

The Project involves reforestation of 800 ha in the province of Veraguas (998% Teak and 2% African Mahogany and Pine)

Project Justification

Development of the project will serve to avoid deterioration of the region's biodiversity, to make better sustainable use of the soil, and to protect the province. Also, employment will be generated both directly and indirectly in the region, permitting a reduction in poverty in the area where the project is to be carried out. The project contributes to the conservation of the region's natural resources and reduces air pollution. The project is compatible with activities for the mitigation of the effects of climate change.