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Un Mundo Verde en sus Manos

ENVIRONMENTAL ASSESSMENT

"PROYECTO EOLOELÉCTRICO HONDURAS 2000"

Tegucigalpa, M.D.C. Honduras, C.A.

August 2005

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I. General Information.

The rise in energy consumption is one of the greatest problems facing modern society, due to the increase in population and to the growing energy demands by industrial society. Moreover, society attempts to meet this demand through fossil fuels, which accelerates the more or less near depletion of these limited resources and results in serious consequences for the environment, such as acid rain, the greenhouse effect and climate change.

In general governments have begun to worry about the issue, encouraging the development of renewable energy, although these efforts are insufficient to bring about an acceptable solution in the short term.

The wind is a source of energy known to man since very ancient times. The use of wind today could replace fossil fuels, avoid the earth's overheating, and prevent the emission of millions of tons of carbon dioxide.

Over the next 40 years, if we do not manage to drastically reduce emissions of gases that affect the atmosphere, then the most advanced beings on the planet will have achieved turning back the climate of Earth to what it was like a few hundred thousand years ago. The main source of carbon dioxide gas emissions is the burning of fossil fuels. Carbon dioxide is a gas that greatly contributes to the "greenhouse effect". As this gas accumulates in the atmosphere, the energy from solar radiation is converted into heat and is retained, just as what happens in greenhouses for flowers or vegetables, as not all of the radiation can fully escape out into space, thus causing the temperature of the planet to progressively increase.

<u>Wind energy</u>:

Wind energy is known as man's use of the energy from the wind. In the past, wind energy was used to propel marine vessels and move grain mills. Today, it is mainly used to generate power in a clean and safe manner.

Wind energy turbine

<u>Clean energy</u>:

Electricity generation from wind does not produce toxic gases, nor contributes to the greenhouse effect or acid rain. It does not cause dangerous side-products or waste pollutants.

Each kWh of electricity generated by wind energy instead of coal prevents the emission of one kilogram of carbon dioxide – CO_2 – into the atmosphere. Every tree is capable of absorbing 20 kg of CO_2; generating 20 kilowatts of clean energy has the same effect, in terms of air pollution, as planting a tree.

Technology that uses wind to generate electricity has reached a stage of maturity and has proven to be economically competitive with conventional energy sources. Its use has spread throughout the world, particularly in countries like the United States and many others in Europe. These countries operate significant generation capacities based on wind, and their plants are running well and getting all of the benefits that this technology offers. Throughout the world, about 18,500 MW of wind energy have been installed. This represents about $20 billion U.S. dollars that have helped create approximately 50,000 jobs.

In the Central American region, there are many places suitable for installing wind projects. Likewise, Honduras presents an opportunity to develop wind projects. The excellent wind resources existing in the country are ideal verification for the installation of these types of projects, with an overall capacity of more than 200 MW according to studies of the Ministry of Natural Resources and the Environment, under the project SWERA.

The project proposed by Energía Eólica de Honduras, S.A., is located in the area of Cerro de Hula and Izopo, 24 Km south of Tegucigalpa, Department of Francisco Morazán, in the municipalities of Santa Ana and San Buenaventura. The Department of Francisco Morazán has a land area of 8619 km^2. The projected population of this Department for the year 2005 is 954,256 people. This department has 28 municipalities and 3,240 settlements. The turbines will be located at different sites in about six rows for a total of 42 turbines, each generating 1.5 MW for a total nominal capacity of 60 MW. This project will be the largest that has been built in Latin America at the time of its completion. The project will have a substation for the collection of the energy generated by the different turbines, which will be sent via a transmission line to the 138 KV Toncontín substation.

The project area of influence falls within the following municipalities:

San Buenaventura:

Municipality of the Department of Francisco Morazán, contains 4 villages, 45 settlements. The geographical position is Latitude North 15º50', Longitude West 87º08'. It has a territorial extension of 59.9 km^2. The population of this municipality for the year 2004 was 2,079 inhabitants **(see Annex No. 1)**.

Santa Ana:

Municipality of the Department of Francisco Morazán, contains 6 villages, 57 settlements. The geographical position is Latitude North 13º55', Longitude West 87º16'. It has an elevation of approximately 1,430 meters, and an area of approximately 60.8 km^2. The population of the municipality for the year 2005 was 9,461 inhabitants **(see Annex No. 2)**.

1. Project Name.

"Proyecto Eoloeléctrico Honduras 2000"

1.1. Economic Activity.

The economic activity of the project is the generation of electric power using the wind (Aeolian) and sale of energy to the national electric utility (ENEE) for its addition to the National Interconnected System (SIN).

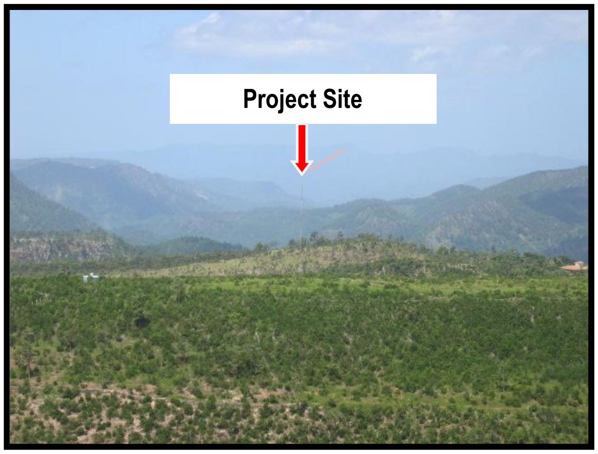
2. Location.

The site studied for the location of the wind energy power station is located 24 kilometers south of Tegucigalpa in the areas of Cerro de Hula and Izopo, in the municipalities of San Buenaventura and Santa Ana in the Department of Francisco Morazán, described above.

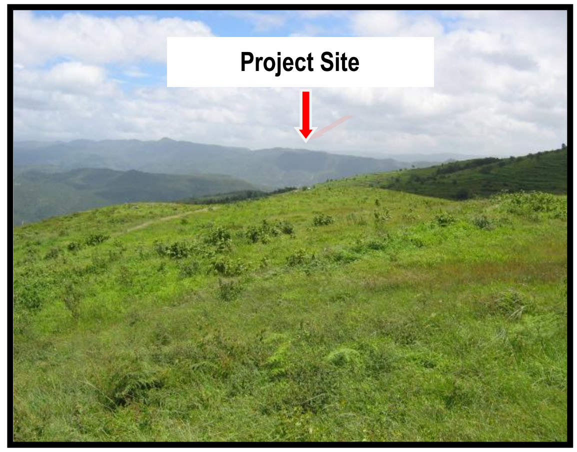
The coordinates of the sites where the turbines will be installed are the following:

Installation	UTM Coordinates of the Area	Elevation m.a.s.l.	Description
Row 1	472594E 1541190N 472925E 1540925N 473541E 1540807N 473521E 1540667N 472904E 1540759N 472493E 1541087N	1,650	Cerro de Hula, to the north of Zarzacagua Row of up to 7 turbines
Row 2	474794E 1539428N 475686E 1538958N 476028E 1538658N 475912E 1538543N 474740E 1539330N	1,480	El Cruce, highway to San Buenaventura Row of up to 9 turbines
Row 3	473865E 1539107N 473958E 1539195N 474301E 1538905N 477197E 1538818N	1,420	San Simón Row of 3 turbines
Row 4	473413E 1538996N 473555E 1538953N 473530E 1538517N 473977E 1537918N 473862E 1537831N 473336E 1538450N	1,350	Nueva Arcadia Row of up to 7 turbines
Row 5	482670E 1539416N 483416E 1538454N 483515E 1538544N 482779E 1539492N	1,680	Izopo / Los Pozos Row of up to 6 turbines
Row 6	481357E 1538908N 481442E 1539047N 482809E 1538306N 482706E 1538135N	1,620	Montaña de Izopo / Las Casitas Row of up to 10 turbines
Substation	473000E 1541000N 476000E 1539000N	1,520	La Bodega, El Cruce Electric interconnection depends on the agreement with ENEE.
Operations and Control Building	473000E 1543000N 478000E 1539000N	1,540	El Cruce, entrance to San Buenaventura

The coordinates given for the rows of turbines are the vertices of the areas of interest for each row. The base of each steel tower measures 4.6 meters in diameter and takes up an area of approximately 20m^2, not including the foundations and access roads (**see Annex No 3**). The tower foundations can extend beneath the surface at approximately three times the radius of the tower, depending on the final design, which will depend on the geotechnical study.

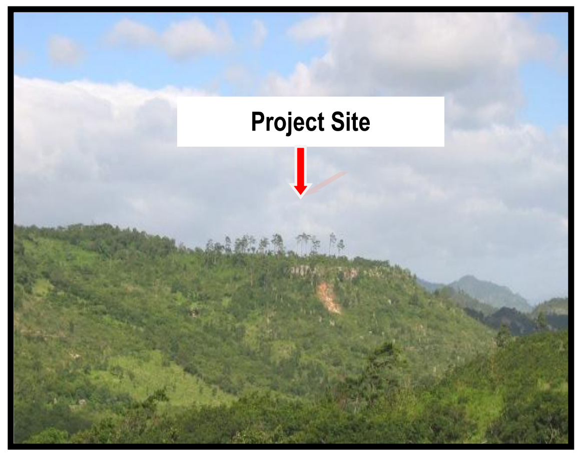


Nueva Arcadia, Santa Ana

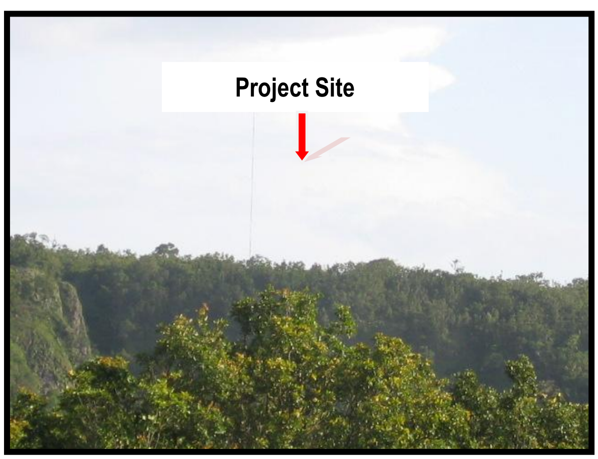


Cerro de Hula, Santa Ana

Agua Fría, Santa Ana



El Cruce, San Buenaventura



Izopo, San Buenaventura

The boundaries are:

Given the numerous plots of land in the area and the legal status of each, the boundaries of the pieces of land where the turbines, building and substation would be installed are being defined at this time jointly with the municipalities of the area, in order to know the landowners with full title of ownership, the tenants with rights of usage, and land occupants. Once this process is finalized and the owners identified, the boundaries of each plot of land can be specified.

3. Total Investment.

Description	***US$***		***Lempiras***
Development	1,754,100	1.7%	33,152,490
Engineering	900,000	0.9%	17,010,000
Generation Equipment	66,854,020	66.1%	1,263,540,978
Transportation	5,500,000	5.4%	103,950,000
Infrastructure and Construction (BOP)	15,193,000	15.0%	287,147,700
Others	4,672,806	4.6%	88,316,033
Interest during construction	6,295,686	6.2%	118,988,460
TOTAL	**$101,169,612**	**100.0%**	**L 1,912,105,662**
			T.C. 18.90

4. Attorney in Fact.

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II. Biophysical Description of the Project Area.

The Honduras 2000 project is located in the Department of Francisco Morazán, which has an area of 8619 km^2 and is located between latitudes 13 degrees 14 minutes and 15 degrees 02 minutes North and longitudes 86 degrees 38 minutes and 87 degrees 28 minutes West. This Department is divided into 27 municipalities and the Central District of Tegucigalpa. Most of the country's population is concentrated in this Department, thus constituting one of the major poles of development in the country.

Owing to the nature of the project, the parameters of greatest importance to its development are described below, such as geographic conditions, wind and overall weather.

2.1. Geographical Conditions.

The general geographical conditions of the Department of Francisco Morazán can be classified by the relief as hilly areas with a slope gradient between 15-30%, and as undulating areas with a slope gradient between 7-15%. Soil types that can be found in the area are: Entisols, Andisols, Inceptisols and Alfisols. According to the National Cadastral Program, the soils in these areas vary from slightly deep to deep, with the majority the latter. These soils are usually well-drained, although they may still present imperfect or moderate drainage. The soils have formed mainly in Quaternary alluvial deposits that have been transported by materials of various origins or by acidic extrusive rocks, or as deposits over tertiary ignimbrite or derived from tertiary acidic extrusive materials.

Pictures showing the topography of the site, which is naturally rocky and fragmented, in detail

Topography.

In general terms, the Department of Francisco Morazán can be classified by the relief as Undulating Zones, with a slope gradient between 7 and 15%, which corresponds to a total of 6.6% of the surface area of the country (including also to parts of the Departments of Olancho, La Paz, Intibucá, Lempira, Cortés and Colón). The zone where the project is located is composed of complex topography, with hills, plateaus and alternating valleys. The projected location of the turbines is at an elevation of between 1340 and 1720 m.a.s.l. The formations of greatest height in the zone are Cerro de Hula (1722 m.a.s.l.), Montaña de Izopo (1920 m.a.s.l.) and Cerro La Mole (2021 m.a.s.l.).

Orography.

The overall relief of the Department is mixed, composed of mountains, valleys and plateaus. Among the main mountains are La Flor (2,407 m.a.s.l.), Agua Blanca (1,500), El Chile (2,225, declared as a biological reserve by means of Decree No. 87-87); and the Southern and Central mountains of Hierbabuena (2,243), biological reserve San Juan (2,270), Lepaterique (2,243), Canta Gallo (1,380) and Urape (1,700). The valleys of this Department are of tectonic origin, the most commonly known being the valleys of Talanga, Siria, Guayabuque, Guaimaca, Amarateca, El Zamorano. The well-known plateaus are Zamorano, Lepaterique, and La Bodega or Cerro de Hula. The terrain is complex, with both hills and valleys, scarce vegetation cover throughout the majority of the area, and a dispersed population concentrated in nearby settlements.

2.2. Surface and Groundwater Hydrography.

Surface Water Hydrography. The principal surface water source of the Department of Francisco Morazán is the Choluteca River, formed in the mountains of Lepaterique. It is part of the Choluteca and Sampile watershed basins, with an area of 7,907 km^2, a length of 349 km, and an average flow of 90 m^3/sec. The basins have a population density of 133 hab/km^2, with an average annual rainfall of 1,100 mm, and an average annual surface runoff of 3,479 Hm^3.

Other water sources near the project site, near the city of Tegucigalpa, are three rivers including: the Jacaleapa or Sabacuante, originating from the mountains of Azacualpa; the Grande or San José, originating from Cerro de Hula; and the Guacerique, originating from the mountains of Yerba Buena. Other rivers that cross through the Department are: Cacao River, Gauyape River, Siria River, Humuya River, Ojojona River, Adurasta River, Talanga River, Agalteca River, and Siguapa River, among others.

Groundwater Hydrography.

In the central and southern zones of the country, the water table can descend many meters between November and April, being higher as one advances south, and considerably diminishing the productivity of the wells during that period. Springs are dispersed throughout the mountainous and undulating regions, which occasionally dry up. Continuous and accurate information on groundwater availability and exploitation flows is not available.

2.3. Climatological Conditions.

The climate of the Department of Francisco Morazán is variable due to the uneven topography, few valleys and numerous mountainous foothills. The precipitation is distributed in accordance with the orography, as well as the wind exposure. The winds are predominantly from the Northeast. The phenomena that determine precipitation are: the effect of the intertropical convergence zone from May to October, and then the anticyclone period from October to February.

The climate of the country's central zone pertaining to Francisco Morazán and Comayagua is characterized according to Köppen[1] as tropical savannah, with an average annual rainfall of 1,680 mm throughout 102 days of rain, a relative humidity of 66%, and an average annual temperature of 29.1ºC, with a maximum temperature of 34.5ºC and a minimum temperature of 23.4ºC. Due to the rainfall characteristic of the area, the area under study can be regarded as sub-humid to dry, meaning that the average annual rainfall is between 500 - 2000mm.

[1] Wladimir Köppen, German climatologist and botanist

Specifically, the climatic conditions of the project site are stable, with temperatures ranging from a minimum of approximately 9°C during the months of December and January, up to about 28°C in the months of April and May. The average temperature is 18°C. The atmospheric pressure is 1.01kPa.

Wind Velocity.

Honduras is influenced by the Atlantic trade winds with a predominantly Northeastern direction. These winds enter the country from the North through the Departments of Atlantida and Colón. Portions of these winds are broken by the Nombre de Dios mountain range. However, when the wind direction is NEE, there is a current that enters behind this mountain range, carrying strong winds to the center of the country.

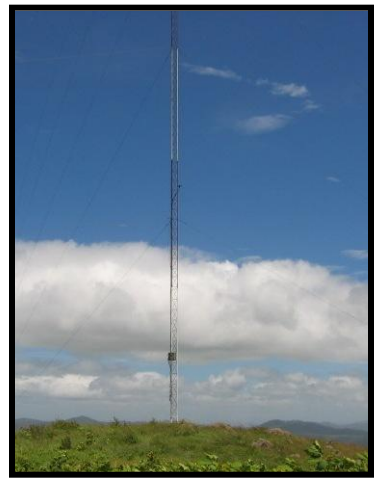
The most important component of this project is the wind resource, upon which the feasibility of the project depends. A study was conducted by the company Zond of Honduras, S.A. to collect wind resource information, ranging between the years 1995 and 2001. The company initially installed 16 anemometer towers with sensors at 10, 20 and 30 meters, to measure wind speed and direction. The company subsequently came to install up to 21 towers, some of which were decommissioned as measurements allowed for better and greater precision in locating wind corridors, until finally there remained 7 30-meter towers and 2 50-meter towers. The remaining towers have sensors at 10, 30 and 50 meters to measure normal parameters and constant winds that more accurately characterize the behavior of the wind and better determine its potential.

After preliminary measurements, and considering the characteristics of the area, the following anemometers were selected for conducting the study:

Name	Description	Height (m)			
		10	20	30	50
HCH-1	HCH-1 is the only anemometer that has operated consistently during the entire 6 ½ year period. It serves as the long term reference anemometer, since there is no other like it in these mountains with such quantity and quality of data.		x	x	
HCH-3	It is situated at a high point in a pasture, about 800 m southeast of HCH-1, elevation 1660 m.a.s.l. The top of the hill at this site is facing north to south.		x	x	
HCH-5	It is situated on Zarzacagua, a hill covered with grass, facing west-northwest to east-southeast. Its elevation is 1660 m.a.s.l. Southwest of the site; the terrain descends to the Pacific Ocean.	x		x	
HCH-6	It is situated in Agua Zarca and at 1360 m.a.s.l., it is the station at the lowest altitude of the group. This site is a secondary wind hill below the main hill. The local exposure is on top of a hill surrounded by pine trees, which represent minimal interference to the measurements.	x		x	
HCH-7	It is situated in El Cruce, a flat area at the southern edge of the main hill, elevation 1480 m.a.s.l. There are only low shrubs that can affect the winds in this area.	x		x	
CH-1	It is a 50-m tower located 1400 m.a.s.l. on a secondary hill in Nueva Arcadia. There are 1-meter high shrubs, scattered trees, and no buildings.	x		x	x
CH-2	It is a 50-m tower located at the same edge as HCH-7, but about 300 m east-southeast. Its exposure and elevation are similar to HCH-7.	x		x	x
Isopo-2	It is situated on the westward side of a hill, beyond where the terrain slopes southward towards the ocean. Its elevation is 1630 m.a.s.l. There are scattered trees between 10-15 m high in the area.	x		x	
Isopo-3	It is situated atop a hill that makes up part of the main formation, at an elevation of 1720 m.a.s.l. There are some trees on the northwest side of this hill; the southwestern side is completely open.	x		x	

Table 3. Description of the anemometers used in the study

Anemometer in Nueva Arcadia



Anemometer in El Cerro de Hula

Anemometer in San Simón
Nueva Arcadia

Anemometer in Montaña de Izopo

From the wind resource study conducted by the consultant Richard Simon[2], based on measurements taken at the site, the following results were obtained:

The average annual on-site wind velocity is 8.87 m/s, and the turbulence intensity factor at 15 m/s is 0.12. For this reason, the site is classified as Class Ib[3] according to the IEC 61400-1 standard, applicable to wind turbines.

[2] According to data collected by the company Zond de Honduras from 1996 to 2001, with 18 anemometers located in the area.
[3] Class I is characterized by an average long-term (Vave) wind speed of up to 10 m/s, and a maximum turbulence intensity of 0.16 at 15 m/s


Pictures that show the intensity of the winds and their effect on the morphology of the trees at the project site.

2.4. Flora and Fauna.

Flora

According to the descriptions obtained from "Life Zones in the Departments of Atlantidas, Comayagua, Cortez, Francisco Morazán and Yoro" (Tegucigalpa, D.C., 1980), it is apparent that the formerly characteristic vegetation of the area has been severely altered to the degree that it is unobservable in its primary state. The vegetation is characterized as secondary, with species belonging to various states of recovery or degradation. The vegetation cover is made up of conifers and hardwoods. The first group, dominant with regard to the second, generally occupies the most rugged lands composed of less fertile soil and forming pure or almost pure forests of "Ocote Pine", (*Pinus ocarpa*), with mostly thin, very spaced out trees of relatively low height, between 10 to 12 meters on average. In mixed forests, the mixture is primarily formed of "Ocote Pine" as the prevailing species and of "Encino", called (*Quercus oleoides*), "Oak" (*Quercus peduncularis*), "Honduras Oak" (*Quercus hondurensis*), "Nance" (*Byrsonima crassifolia*), "Quebracho" (*Lysiloma seemannii*), "Hopbush" (*Bodonaca viscosa*), "Yellow Trumpetbush" (*Tecoma atans*), "Suyate Palm" (*Paurotis cookii*), "Capulin" (*Muntingia calabura*), "White Poplar" (*Clethra macrophylla*), "Arrayán" (*Leucothoe mexicana*), and "Guava" (*Peidium sp*).

In the inspection of the different turbine installation points at the project site, the following species of vegetation were observed:

- In the Nueva Arcadia community: "Ocote Pine" (*Pinus ocarpa*), "Encino" (*Quercus oleoides*), "Quebracho" (*Lysiloma seemannii*), Huesillo, "Guavas" (*Peidium sp*), and "Nances" (*Byrsonima crassifolia*).

- In the San Simón community: "Encino" (*Quercus oleoides*), "Oak" (*Quercus peduncularis*), "Arrayán" (*Leucothoe mexicana*), Huesillo, as well as other species such as "Eucalyptus" (*Eucalyptus camaldulensis*), "Cypress" (*Cupressus lusitanica*), "Mango" (*Mangifera indica L.*), "Avocado" (*Percea americana MILL*).

- In Cerro de Hula, no type of tree was observed, only the presence of Graminia and "maize" cultivation (*Zea mays L.*).

- In the Agua Fría community: Quebrachos (*Lysiloma seemannii*), "Encinos" (*Quercus oleoides*), and Bramble.

- In the El Cruce community: “Guavas” (*Peidium sp*), “Oaks” (*Quercus peduncularis*) and “Encinos” (*Quercus oleoides*).

- In Montaña Izopo, the predominant vegetation are “Oaks” (*Quercus peduncularis*), and “Encinos” (*Quercus oleoides*).

Fauna

Due to the aforementioned destruction of primary vegetation, the wild fauna is scarce, limited to the species that adapted to being near human populations and farms. Among the species of mammals found in the area are rodents, such as the "common mouse" (*Mus Musculus*), the "field mouse" (*Peromyscus maniculatus*), the "hispid cotton rat" (*Sigmodon hispidus*), and the "squirrel" (*Sciurus variegatoides*); species of marsupials, such as the "common opossum" (*Didelphis marsupiales*); herbivorous species, such as the "rabbit" (*Sylvilagus floridanus*); and carnivorous species, such as the "raccoon" (*Procyon lotor*), the "gray fox" (*Urocyon cinereoargenteus*), and the "skunk" (*Mephitis sp*). The bird species that can be found in the area belong to the families Fringillidae, Icteridae, Cathartidae, Columbidae, Falconidae and Trochilidae.

During the field visit, the local population was questioned regarding the animal species that they have observed either frequently or occasionally in the area. Of note is that the site is located in a subtropical dry forest with low tree density, since the zone has been anthropogenically altered by the rural population. According to the information collected, the fauna are scarce and of little variation, and include the following species: "black vultures" (*Coragyps atratus*), "rooks", "woodpeckers" (*Melanerpes formicivorus, hoffmannii*), certain types of "parrots" (*Amazon spp*), "doves", "rabbits" (*Sylvilagus brasilensis*), and "squirrels" (*Sciurus deppei*), as well as various types of non-specifically identifiable snakes, smaller reptiles and lizards. None of the aforementioned species are found in danger of extinction or under special protection by national or international environmental agreements. Likewise, once the project is installed, the impact to these species will be minimal.

2.5. Environmentally Important Areas.

The Department of Francisco Morazán, where the wind energy generation project will be located, has some environmentally important areas, such as the "Corralitos" Wildlife Refuge, the "La Tigra" National Park, part of the “Montaña de Yoro” National Park and the “La Yerbabuena” Biological Reserve. The sites where the 42 turbines will be installed for generation, which include communities in the municipalities of Santa Ana and San Buenaventura, such as Cerro de Hula, Aguazarca, San Simón, Nueva Arcadia, El Cruce and Izopo, are all outside of the aforementioned designated protected areas of importance to biodiversity. Neither of these municipalities contains national areas declared as environmentally important that could be affected by the project's implementation.

III. Socioeconomic Situation.

3.1. Means of Communication in the Area.

Access Roads

The main access road is the Southern Highway, connecting the site with the city of Tegucigalpa towards the north, and with the port of Henecán towards the south. This highway is paved and is apt for transporting the generation equipment, according to the conclusions of the transportation logistics study.[4]

The secondary roads that connect the crossroads to the rows of turbines according to site plans have paved sections at the following sites: El Cruce - Santa Ana and El Cruce - San Buenaventura. There are also stretches of dirt roads that are in good condition and other sections that need to be repaired.

3.2. Nearest Towns.

The most important towns in the vicinity of the project are described below. The distance indicated is measured from the location of the turbine closest to the town:

- Tegucigalpa has a population of 1,294,849 inhabitants, at a distance of 24 km.
- Santa Ana has a population of 9,461 inhabitants, located at a distance of approximately 2 km, and communities in this municipality that may be impacted by the Project are:
    - Agua Fría has a population of 101 inhabitants, located at a distance less than 1 km.
    - El Cruce has a population of 454 inhabitants, located at a distance less than 1 km.
    - Nueva Arcadia has a population of 360 inhabitants, located at a distance less than 1 km.
    - Zarzacagua has a population of 243 inhabitants, located at a distance less than 1 km.
    - Caserío San Simón has a population of 128 inhabitants, located at a distance less than 1 km.
    - Caserío La Puerta Vieja has a population of 306 inhabitants, located at a distance less than 1 km.
    - Caserío Agua Zarca has a population of 42 inhabitants, located at a distance less than 1 km.
    - Caserío Las Casitas has a population of 1,363 inhabitants, located at a distance less than 1 km.
- San Buenaventura has a population of 2,079 inhabitants, at a distance of 5 km, and communities in this municipality that may be impacted by the Project are:
    - Los Pozos has a population of 6 inhabitants, located at a distance less than 1 km.
    - Apamar has a population of 56 inhabitants, located at a distance less than 1 km.
- Ojojona has a population of around 10,000 inhabitants, at an average distance of 5 km from the turbines located in Santa Ana, in Cerro de Hula.

[4] Study conducted for Mesoamerica Energy by DACOTRANS, 2005.

3.3. Economic Activities in the Area.

The main economic activities in the municipalities of San Buenaventura and Santa Ana are:

- Agriculture.
- Small-scale cattle ranching.
- Poultry farming.

None of the aforementioned activities will be affected by the installation of the wind project, rather the same activities can continue as normal in the future since they are compatible with each other.

National Socioeconomic Indicators

The following table shows a summary of the key national socioeconomic indicators, according to the XXIX Household Survey of May 2004.

National Socioeconomic Indicators

Indicator	Rural	Urban	National
Households	707,017	663,417	1,370,434
	51.6%	48.4%	
Population	3,816,824	3,183,187	7,000,011
	55%	45%	
Without access to water	27%	8%	17%
Without basic sanitation	28%	42%	21%
Without energy	62%	5%	
Unemployment	3.8%	8.0%	
Per capita income (in Lps.)	801 ($45)[5]	2,091 ($116)	
Extreme poverty	61.4%	29.1%	
Unsatisfied Basic Needs (UBN)	38%	27%	

Access to basic services (water, electricity, basic sanitation), are of paramount importance to the development of towns, based on their close relationship to the living conditions of people and especially to children's health. In Honduras, of the 7 million inhabitants of the country in May 2002, the majority live in rural areas (55%), and as such the majority of households are located in these areas as well (51.6%), which raises other social indicators, such as the extreme poverty exceeding 60%. However, the greatest access to basic services, permanent employment and a higher income per capita is always more prevalent in urban areas.

While it is true that 73% of the rural population have access to water, what is worrying is the fact that 20% of those use water from rivers, streams, ponds or other natural sources.

Access to electricity in Honduras is an urban feature, not a rural one. While 95% of urban households have access to electricity via the public electricity system, only 38% of households in rural areas have this access, meaning they must meet their needs through other means, as shown in the table below.

[5] At the rate of $18 per Lempira

Access to Electricity by Source

Source	Rural	Urban	National
Public Service	30.0%	70.0%	66.0%
Private Service	36.1%	63.9%	0.4%
Own electric generator	100.0%	0.0%	0.2%
Solar Energy	100.0%	0.0%	0.5%
Candle	83.1%	16.9%	5.7%
Oil or kerosene gas lamp	96.4%	3.6%	20.1%
Pine	96.0%	4.0%	6.9%
Other	87.4%	12.6%	0.2%
TOTAL	51.6%	48.4%	100.0%

About 50% of the households in rural areas of Honduras mainly use oil lamps, gas lamps and pine for lighting.

Socioeconomic Indicators of the Zone

Following are some socioeconomic indicators for the Department of Francisco Morazán, showing specific indicators for the area directly affected by the project.

Basic Indicators of the Department of Francisco Morazán

Indicator	Departmental	Central District	San Buenaventura	Santa Ana
DEVELOPMENT INDICATORS				
Population	954,256	850,227	2,079	9,461
Human Development Index (HDI)	**0.748**	0.782	0.708	0.673
Human Poverty Index (HPI)	**18.9**	n.a.	n.a.	n.a.
Life expectancy index	**68.8**			
Literacy rate	**89.4**	94.0	80.7	85.9
Estimated real GDP per capita (US$)	**2,971.2**	3,235.3	2,167.8	2,191.5
BASIC INDICATORS AND COVERAGE				
Population undernourished	**23.1**	19.2	28.9	31.6
Access to electricity	**80%**			
Access to potable water	**80%**			
Access to health services	**65%**			

Source: UNDP, Human Development Report of Honduras, 2003.

3.4. Community Structures.

According to the UNDP National Report on Human Development, access to health care services at the Departmental level is about 65% (including the hospitals in Tegucigalpa). Upon studying the situation on a micro-scale, neither of the two municipalities in the area of influence have a hospital, but they do have four (4) health centers for a total population of 11,000 people. Likewise, these municipalities have 21 schools for a surrounding population of 4,000 children (less than 14 years old).

Education, health and economic indicators of the two municipalities in the area of influence

Municipality	Demographics		Education		Health			Economics
	Population	Less than 14 years old	Primary Schools	Secondary Schools	CESAMO	CESAR	Private	EAP[6]
San Buenaventura	2.079	35.8%	7	1	1	2	0	43.3%
Santa Ana	9.461	37.0%	14	1	3	0	4	41.8%

Source: Compiled by Mesoamerica Energy based on data from the 2001 Census, the 2003 UNDP Human Development Report for Honduras, and interviews with municipal authorities

3.5. Water Supply Source of Nearby Populations.

The sources of water that supply the different communities in the Municipalities of Santa Ana and San Buenaventura stem from groundwater sources (springs), which are managed through Community Water Boards. It is estimated that in these two municipalities, more than 80% of the population has access to water.

[6] EAP: Economically Active Population

IV. Project Description.

The Honduras 2000 Project, proposed by Energía Eólica de Honduras, S.A., is located in a zone comprised of the areas of Cerro de Hula and Montaña de Izopo, within the Sabacuante River and the Concepción River Basins. The area is characterized by strong winds that hit the area almost constantly throughout the year. The winds suffer a compression, which causes an acceleration to sweep over the tops of the hills, making the site a favorable area for the location of the Project.

The primary objective of the project is to generate electricity using the energy produced by wind, known as Wind Energy, which is known as a "non-conventional and clean" type of energy, in contrast to the thermal power generation plants based on fossil fuels (oil and its derivatives) that emit air pollutants. In Honduras, about 75% of the generation in 2004 was based on thermal plants.

Wind power, meanwhile, uses a renewable resource, which is not depleted, is locally available, and is a non-contaminating clean energy. It has emerged as an environmentally acceptable alternative source of energy to support the growing electrical demand of the country, where the demand for electricity is increasing at a very high rate (growing an average of 5% annually). The initial term of the project is scheduled to be 30 years. The project includes the installation of 42 GE 1.5_{SLE} turbines for a nominal installed capacity of 60 MW, which according to the wind conditions and the generation capacity of each turbine, is expected to generate a total of 227,000 MWh a year, at a plant factor of approximately 43%.

Activities to be undertaken in the transportation, installation and assembly stages.

Personnel required for the installation and assembly of the wind turbines, as well as the assembly time, depends on the characteristics of the location of the park. The greater the ability to move and maneuver at the site and the milder the site terrain, the lesser the time needed for construction and assembly, reducing the impact on the area.

4.1. Transport.

Installation of the GE 1.5_{SLE} turbine requires transport of the following items from the shipping port in Honduras:

- 1 truck for each section of the tower. The 62m, 65m and 80m towers consist of 3 sections, meaning that 3 trucks are needed per tower.
- 1 truck for transport of the nacelle, control panel and hub.
- 1 truck for transport of the blades, 3 blades per truck.
- 1 truck for transport of the transformer and the medium voltage pads.

The standard requirements for the access road to the park and its internal roads take into account the assembly of a 500 TN Demag AC500 hydraulic crane. The steps of building the road will meet the following minimum requirements:

- Minimum load that the road soil should bear: 12 TN per each axle of a truck.
- Excavation: approximate depth of 30cm.
- Lower layer of coarse gravel (20/40): thickness of 20 cm.
- Upper layer of fine gravel (0/20): thickness of 10 cm.
- Leveled.
- Minimum width of the road: 4.5m in a straight line and a width increase at curves.
- Maximum slope of the road between 8º and 10º. At the moment of determining the maximum slope, the most critical transport is that of the nacelle (50TN), taking into account its weight.

- Curvature radius should be established depending on the terrain, as both the radius and the slope of the curves must be analyzed.
- At the moment of determining the curvature radius, the most critical elements are the transport of the blades, due to their length of 34 meters, and of the first section of the tower with a maximum diameter of 4.30 meters.

Installed Capacity

The total installed capacity of electricity generation for Honduras in 2004 was 1,376 MW. Of this total, 63.4% came from thermal plants, 34.5% (475 MW) from hydropower plants and 2.1% (29 MW) from private biomass plants. Currently, the electricity demand in Honduras is growing rapidly every year, at an average of 5%, and as such ENEE is forced to plan and contract more power and energy to meet said demand. According to information from ENEE on the evolution of the installed capacity in the country from 1979 until 2003, since 1995 the growth of the installed power has been based on fossil fuels.

Electricity Generation

In the year 2004, the country's total generation amounted to 5,221 GWh – 72% of this total came from thermal generation and energy imports and 28% (1,443 GWh) was accounted for by renewable generation (hydropower and biomass).

a. Foundations.

The main characteristics of the foundation necessary for the GE 1.5_{SLE} are specified in the following table:

Characteristics	GE 1.5_{SLE}, 65m
Excavation	12 m diameter octagon
Depth	2.90 m
Mass of Steel	12.2 Tn
Volume of Concrete	215 m^3

These foundations are suitable for terrain that complies with the following characteristics:

Bearing Capacity	65m Tower
Soil bearing capacity at the edge of the foundation	135 kN/M^2
Soil bearing capacity at the center of the foundation	185 kN/M^2

Minimum Friction Angle between soil and foundation: 10º.

Minimum dynamic load modules of the terrain:

Bearing Capacities	Transverse Elongation Coefficient	65m Turbine Lateral Load (MN/m^2)
Soft Terrain	0.35	123
Semi-Hard Terrain	0.40	157
	0.41	168
	0.42	183
	0.43	202
	0.44	227
	0.45	263
	0.46	
	0.47	

These foundations are suitable for terrain that complies with the following characteristics:

Minimum Friction Angle between soil and foundation: 27.5º.

Minimum dynamic load modules of the terrain:

Bearing Capacities	Land Elasticity Coefficients Es dyn (MN/m2)	Land Elasticity Coefficients Es Stat (MN/m2)
Soft Terrain	110	35
Semi-Rough to Rough Terrain	>140	40

Space and Cranes needed for Assembly

The space needed for the construction and assembly of the wind turbines is determined primarily by the area occupied by the cranes and the space required to perform all of the maneuvers and works during assembly.

Taking into account only the area occupied by the cranes, the minimum space required for assembly of the GE 1.5SLE turbine is 29 x 14mts + 4.5mts of road. The transport has to be positioned next to the crane on the main road and ready for lifting.

The cranes that will be used for assembling equipment are:

- 500 TN Crane with folding jib of 35mts.
- Alternative: 300 TN Demag CC 1800 Crane with tracks.
- 80 or 100 TN Auxiliary Crane.

The turbine rotor is usually assembled on the ground prior to being lifted by crane. This means that an additional space is needed as mentioned in the previous paragraph in order to assemble the blades on the ground. In the event that the space at the site is very tight and does not allow the assembly of the rotor on the ground, there is the possibility of mounting two blades on one side of the hub and then lifting this in order to assemble the third blade in the air.

b. Total Area.

The total project area is comprised of an area of approximately 40,000 m^2, composed as follows:

1. 159 m^2 per each turbine (excluding access roads), representing a total of 6,300 m^2 for the 42 turbines.
2. 30,000 m^2 for the administrative building and the operation yard (plant, warehouse and spare parts yard).
3. 1,650 m^2 for the substation.

c. Construction Area.

The area required for the construction of the turbine rows is a 60 m wide strip. The length depends on the quantity of turbines and the characteristics of the terrain, and has been included in the coordinates indicated in the table. The foundation for each tower measures 14 meters in diameter, and occupies an area of approximately 200 m^2, not including the access roads.

The base of each steel tower measures 4.6 meters in diameter, and occupies an area of approximately 20 m^2, without counting the foundations and access roads. The tower foundations can extend beneath the surface at approximately three times the radius of the tower, depending on the final design, which will depend on the geotechnical study. During construction, an area of 40 meters in radius (approx. 5,000m^2) should be cleared for the assembly of each turbine.

d. Land Use.

Land use in the project area of influence will not change from its current use:

- Agriculture
- Small-scale cattle ranching
- Poultry farming.

4.2. Operation.

a. Project Scope:

The economic activity of the project is the generation and sale of electric power generated by means of the wind (Aeolian), with a nominal installed capacity of 60 MW, composed of 42 turbines of 1.5 MW nominal capacity each.

b. Materials and Supplies.

During the operation of the wind power station, the main input will be the local availability of the wind, which is higher in the summer (November to March) and lower in the other months of the year.

The plant will include the necessary supplies to provide adequate maintenance to operations in order not to alter the expected generation as contracted with ENEE (this includes spare parts such as blades, rotors, local cranes, among others). During the months of September-October, annual preventive maintenance will be carried out on the turbines.

c. Technology.

Technical description of a wind turbine and its main components.

The GE Energy 1.5_{SLE} 60Hz is a three bladed, upwind, horizontal-axis wind turbine with a rotor diameter of 77 m. The turbine rotor and nacelle are mounted on top of a tubular tower, giving a rotor hub height of 64.7 m, 80 m or 85 m respectively. The wind turbine employs an active yaw control system (designed to orient the machine with respect to the direction of the wind), an active blade pitch control system (designed to regulate turbine rotor speed), and a generator/power electronic converter system coupled to the variable speed drive train system (designed to produce nominal 60 Hertz (Hz), 575-volt (V) electric power).

(See Annex No. 4)

The GE Energy 1.5_{SLE} 60Hz wind turbine has been designed with a distributed drive train system, wherein the main drive train components, including main shaft bearings, gearbox, generator, yaw drives, and control panel, are attached to a bedplate (see Fig. 1).

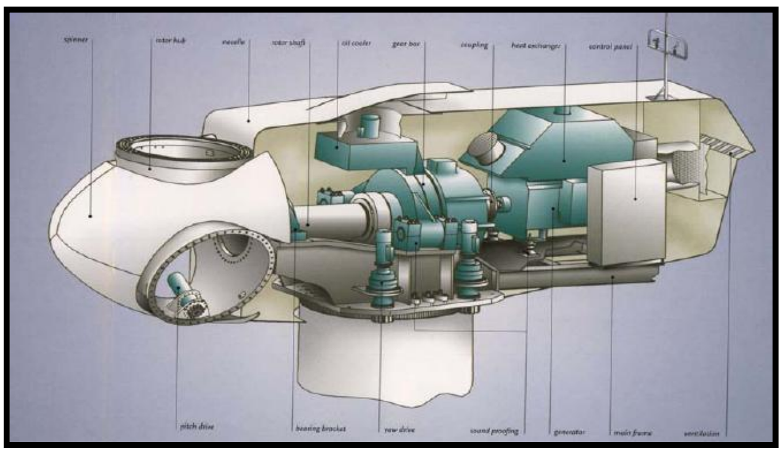


Fig. 1: GE Energy 1.5_{SLE} 60Hz wind turbine nacelle design

The turbines to be installed in the wind power park will be turbines manufactured by the company GE, model GE 1.5_{SLE} 60 Hz, comprised of the following main components:

Rotor

The rotor on the GE Energy 1.5_{SLE} 60Hz wind turbine is designed to operate in an upwind configuration (the blades positioned upwind of the turbine tower) and is comprised of three blades mounted to a cast ductile iron hub.

The rotor diameter is 77 m, resulting in a swept area of 4,657 m^2, and is designed to operate between 10 and 20 revolutions per minute (rpm). Rotor speed is regulated by a combination of blade pitch angle adjustment and generator/converter torque control. The rotor spins in a clock-wise direction when viewed from an upwind location.

Full blade pitch angle range is approximately 90 degrees, with the zero degree position being with the airfoil chord line flat to the prevailing wind. The blades being pitched to a full feather pitch angle of approximately 90 degrees accomplishes aerodynamic braking of the rotor; whereby the blades “spill” the wind thus limiting the rotor speed.

To give greater clearance between the rotor and the tower, the rotor is tilted upward and away from the tower by approximately 4 degrees and the blades have an effective coning angle of 1.5°.

Blades

There are three rotor blades used on each GE Energy 1.5_{SLE} 60Hz wind turbine. The blades are manufactured from fiberglass epoxy resin and with a smooth layer of gel coat on the outer surface that is designed to provide UV protection and blade color.

The rotor blades use a custom, proprietary family of airfoils that were designed specifically for use on wind turbines. The airfoils are designed to reduce sensitivity to blade-surface roughness caused by insect and dirt build-up seen during normal operation.

The airfoils transition along the blade span with the thicker airfoils being located in-board towards the blade root (hub) and gradually tapering to thinner cross sections out towards the blade tip.

Blade Pitch Control System

The GE Energy 1.5_{SLE} 60Hz rotor utilizes three (one for each blade) independent electric pitch motors and controllers to provide adjustment of the blade pitch angle during normal operation. Blade pitch angle is adjusted by an electric drive that is mounted inside the rotor hub and is coupled to a ring gear mounted to the inner race of the blade pitch bearing (see Fig. 1).

GE’s active-pitch controller enables the wind turbine rotor to regulate speed, when above rated wind speed, by allowing the blade to “spill” excess aerodynamic lift. Energy from wind gusts below rated wind speed is captured by allowing the rotor to speed up, transforming this gust energy into kinetic which may then be extracted from the rotor. Three independent back-up battery packs are provided to power each individual blade pitch system to feather the blades and shut down the machine in the event of a grid line outage or other fault. By having all three blades outfitted with independent pitch systems, redundancy of individual blade aerodynamic braking capability is provided.

Hub

The hub is manufactured from cast ductile iron and is used to connect the three rotor blades to the turbine main shaft. The hub also houses the three electric blade pitch system sand is mounted directly to the main shaft. Access to the inside of the hub is provided through a hatch for inspection and service of the electric pitch system and blade mounting hardware.

Gearbox

The gearbox in the GE 1.5_{SLE} 60Hz wind turbine is designed to function as a speed increaser and transmit power between the low-rpm turbine rotor and high-rpm electric generator. The gearbox for the 60 Hz version of the GE 1.5_{SLE} 60Hz is a three-stage planetary/helical gear design with a ratio of gear 1:72. The gearbox is mounted to the machine bedplate with elastomeric elements that are designed to provide vibration damping and noise reduction between the gearbox and bedplate. The gearbox housing is cast from ductile iron and is designed to house the drive train gearing. The gearing is designed to transfer torsional power from the wind turbine rotor to the electric generator. A parking brake is mounted on the high-speed shaft of the gearbox.

Bearings

The blade pitch bearing is a dual, four-point ball bearing designed to allow the blade to pitch about a span-wise pitch axis. The inner race of the blade pitch bearing is outfitted with a blade drive gear that enables the blade to be driven in pitch by an electric gear-driven motor/controller.

The main shaft bearing on the GE 1.5_{SLE} 60Hz is a double-row spherical roller bearing mounted in a pillow - block housing arrangement.

The bearings used inside the gearbox are of the cylindrical, spherical and tapered roller type. These bearings are designed to provide bearing and alignment of the internal gearing shafts and accommodate radial and axial loads.

Gearbox Lubrication System

The gearbox has a forced-lubrication system (driven by an electric pump). The fluid capacity of the gearbox is approximately 300 liters (L).

The bearings are force-lubricated by cross flow from individual spray nozzles. Before the oil is pumped through the oil lines, it passes through a filter, a heat exchanger and a pressure reduction valve designed to provide clean oil at the correct pressure to the bearings.

Brake System

The electrically actuated individual blade pitch systems act as the main braking system for the wind turbine. Braking under normal operating conditions is accomplished by feathering the blades out of the wind. Any single feathered rotor blade is designed to slow the rotor, and each rotor blade has its own back-up battery bank to provide power to the electric drive in the event of a grid line loss.

The turbine is also equipped with a mechanical brake located at the output (high-speed) shaft of the gearbox. This brake is only applied immediately on certain emergency-stops (E-stops). This brake also prevents rotation of the machinery as required by certain service activities.

Generator

The generator is a doubly fed induction-generator with wound rotor and slip rings. The generator synchronous speed is 1200 rpm, and a variable frequency power converter tied to the generator rotor allows the generator to operate at speeds ranging from 870 rpm to 1600 rpm. Nominal speed at 1.5 MW power output is 1440 rpm.

The generator meets protection class requirements of the International Standard IP 54 (totally enclosed) and is air-cooled. The generator housing is grounded and an air-to-air thermal exchanger cools the windings under normal operating conditions. The generator is mounted to the bedplate on elastomeric foundations to reduce vibration and associated noise.

Temperature sensors are built into the generator windings to provide a temperature reading to the wind turbine controller. In the event the generator temperature is outside of the normal operating range, an automatic shutdown of the turbine is initiated if the generator is on-line. Additionally the machine will be unable to start if the windings are below their acceptable operating temperature limit.

Flexible Coupling

Designed to protect the drive train from excessive torque loads, a flexible coupling is provided between the generator and gearbox output shaft. This is equipped with a torque-limiting device sized to keep the max. allowable torque below the 3 times limit of the drive train.

Yaw System

A roller bearing attached between the nacelle and tower facilitates yaw motion. Four planetary yaw drives (with brakes that engage when the drive is disabled) mesh with the outside gear of the yaw bearing and steer the machine to track the wind in yaw. The automatic yaw brakes engage in order to prevent the yaw drives from seeing peak loads from any turbulent wind.

A wind vane sensor mounted on top of the nacelle sends a signal to the turbine controller to evaluate the position of the nacelle with respect to wind direction. Within a specified time interval, the controller activates the yaw drives to align the nacelle to the average wind direction. The yaw drives require electric power to operate.

On the underside of the yaw deck, a cable twist sensor is mounted to provide a record of nacelle yaw position and cable twisting. After the sensor detects 900-degree rotation in one direction (net), the controller automatically brings the rotor to a complete stop, untwists the cable by counter yawing of the nacelle, and restarts the wind turbine.

Tower

The GE Energy 1.5_{SLE} 60Hz wind turbine is mounted on top of a tubular tower, putting the wind rotor hub height at 64.7 m, 80 m and 85 m depending on the configuration. The tubular tower is tapered and manufactured in three or four sections from steel plate. Access to the turbine is through a lockable steel door at the base of the tower. Service platforms are provided. Access to the nacelle is provided by a ladder and a fall arresting safety system is included. Interior lights are installed at critical points from the base of the tower to the tower top.

Nacelle

The nacelle of the GE 1.5_{SLE} 60Hz is constructed of fiberglass and lined with sound-insulating foam (see Fig. 1). This sound insulating foam helps reduce acoustic emissions from the wind turbine. Access from the tower into the nacelle is through a manhole in the bedplate, which is located beneath the wind rotor main shaft.

The nacelle is ventilated and illuminated with electric lights and a skylight hatch. A hatch at the front end of the nacelle provides access to the blades and hub. When the rotor is stopped and secured in position with a hydraulic rotor lock, the interior of the hub can be accessed through one of three hatches located in the rotor spinner.

Anemometer, Wind Vane, and Lightning Rod

An anemometer, wind vane, and lightning rod are mounted on top of the nacelle housing. Access to these sensors is accomplished through a hatch in the nacelle roof.

Lightning Protection

The rotor blades are equipped with a strike sensor mounted in the blade tip. Additionally a solid copper conductor from the blade tip to root provides a grounding path that leads to the grounding system at the base of the tower foundation (see Fig. 2). The turbine is grounded and shielded to protect against lightning, however, lightning is an unpredictable force of nature, and it is possible that a lightning strike could damage various components notwithstanding the lightning protection deployed in the machine.

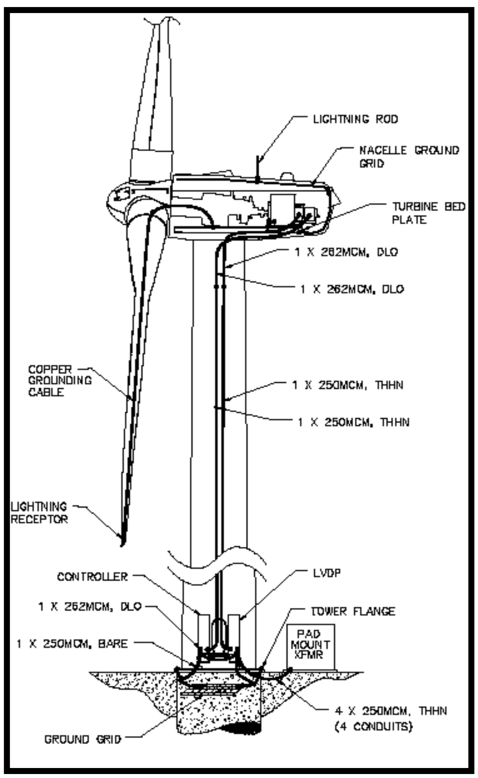


Fig. 2: Diagram of the Lightning Protection and Grounding System

Wind Turbine Control System

The GE 1.5_{SLE} 60Hz wind turbine machine can be controlled automatically or manually from either the control panel located inside the nacelle or from a personal computer (PC) located in a control box at the bottom of the tower. Control signals can also be sent from a remote computer via a Supervisory Control and Data Acquisition System (SCADA), with local lockout capability provided at the turbine controller.

Using the tower top control panel, the machine can be stopped, started, and turned out of the wind. Service switches at the tower top prevent service personnel at the bottom of the tower from operating certain systems of the turbine while service personnel are in the nacelle. To override any machine operation, Emergency-stop buttons located in the tower base and in the nacelle can be activated to stop the turbine in the event of an emergency.

Under partial load, the blade pitch angle is held constant and the rotor speed is controlled by the generator/converter control system. Once the rated wind speed is reached, the rotor blades operate in a servo mode whereby turbine power output and rotor speed are controlled by varying the blade pitch angle in combination with the generator/converter torque/speed control system.

Power Converter

The GE 1.5_{SLE} 60Hz wind turbine uses a power converter system that consists of a converter on the rotor side, a DC intermediate circuit, and a power inverter on the grid side. Altogether this complete system functions as a pulse-width-modulated converter in 4-quadrant operation.

The converter system consists of an insulated gate bipolar transistor (IGBT) power module and the associated electrical equipment. Variable output frequency of the converter allows a rotational speed-module operation of the generator within the range of 870 rpm to 1600 rpm.

V. Human Resources.

5.1. Number of Employees.

The total number of employees is approximately 211 people, divided into direct and indirect employment. It is expected that most of these people are from villages near the project. The number of people contracted can be lower or higher than the predicted number, depending on the needs of the project during its construction and operation

5.2. Distribution by Area.

	Direct	Indirect
Construction (temporary)	**130**	**43**
Welders	20	10
Engineers	5	
Electricians	15	5
Foremen	5	10
Bricklayers and builders	50	
Guards	5	
Administrators	5	
Warehouse	5	
Food Supplies		13
Other	20	5
Operation (permanent)	**30**	**8**
Administrative	5	
Electricians	5	
General Maintenance	10	
Guards	3	
Warehouse	2	
Food Supplies		3
Other	5	5

5.3. Work Schedule.

The work schedule for employees will be divided into shifts starting from 7:30 a.m. onwards. Rotating shifts will comply with the Law of the Labor Code of Honduras.

5.4. Benefits Offered.

Employees will have the benefits granted by the Law of the Labor Code of Honduras.

VI. Basic Services.

6.1. Water Supply and Consumption.

The potable water supply in the municipalities of San Buenaventura and Santa Ana, of the Department of Francisco Morazán, can be broken down in the following manner, based on 2001 statistics:

San Buenaventura

	Houses	Percentage
Public or private system piping	135	34.62%
Well with winch	49	12.56%
Well with pump	28	7.20%
Spring, river or stream	165	42.30%
Lake or lagoon	4	1.02%
Street or delivery vendor	0	0.00%
Other	9	2.30%

Santa Ana

	Houses	Percentage
Public or private system piping	1,141	71.26%
Well with winch	102	6.37%
Well with pump	44	2.74%
Spring, river or stream	205	12.80%
Lake or lagoon	10	0.62%
Street or delivery vendor	8	0.49%
Other	91	5.68%

During the construction and operation phases of the project, purified water will be provided for project personnel consumption.

6.2. Garbage Collection.

In the Municipality of San Buenaventura, there is no garbage collection system, while the Municipality of Santa Ana does have a garbage collection system. Nevertheless, the Santa Ana collection system does not cover all of the occupied dwellings in the municipality. For each municipality, the waste is disposed by means of:

San Buenaventura

	Houses	Percentage
▪ Thrown in the street, river or ravine	42	10.76%
▪ Collected by garbage truck	0	0.00%
▪ Taken to the dump or Dumpster bin	0	0.00%
▪ Burned or buried	218	55.89%
▪ Private service	1	0.25%
▪ Other	129	33.07%

Santa Ana

	Houses	Percentage
▪ Thrown in the street, river or ravine	55	3.45%
▪ Collected by garbage truck	11	0.68%
▪ Taken to the dump or Dumpster bin	6	0.37%

▪ Burned or buried	1,506	94.06%
▪ Private service	7	0.43%
▪ Other	16	0.99%

During both the construction and operation phases of the project, the waste that is generated will be collected, stored, transported, and ultimately disposed of in a place designated by the corresponding Municipal Authority.

6.3. Telephone Access.

The Municipality of San Buenaventura has 90 telephone lines in service, reaching 43.29 per thousand inhabitants, with a percentage of lines by municipality of 0.07%.

The Municipality of Santa Ana has 6 telephone lines in service, servicing only 0.63 per thousand inhabitants.

Some of the project sites do not have telephone service. During the construction phase at each site, the company will have a radio communication system. During the operation phase, the control room will not only have radio communication, but will also have a cordless telephone system in order to make communication possible around the clock.

6.4. Sanitation System.

In the Municipality of San Buenaventura, 0.76% of the population is connected to the sanitary sewage system, while 40.76% are not connected to the sewage system service, 30.00% use a simple latrine for the elimination of human waste, and 28.46% are connected to a septic tank.

In the Municipality of Santa Ana, 1.56% of the population is connected to the sanitary sewage system, while 23.04% are not connected to the sewage system service, 38.72% use a simple latrine for the elimination of human waste, 36.47% are connected to a septic tank, and 0.18% use a toilet that discharges to a river or ravine.

During the construction phase of the project, portable latrines will be set up at a ratio of 10:1. During the operation phase, the control rooms will include sanitation services.

6.5. Roadway System.

The turbine installation sites are accessible by dirt roads that currently lack maintenance. The Eoloeléctrico Honduras 2000 project has considered the expansion and maintenance of these roads in order to facilitate the transport of equipment during the construction phase of the project, and to ease implementation during operation of the power station.

6.6. Energy Type.

Energy to the municipalities is supplied by different sources, varying among the inhabited dwellings, and distributed by type in the following manner:

San Buenaventura

Energy Type	**Houses (%)**
Own electric generator	0.51
Electricity from a private system	1.02
Electricity from the public system	30.76
Oil or kerosene gas lamp	36.66
Candle	14.10
Pine	13.84
Solar panel	1.79
Other	1.28
Total	**100.00%**

Santa Ana

Energy Type	**Houses (%)**
Own electric generator	0.062
Electricity from a private system	1.62
Electricity from the public system	66.52
Oil or kerosene gas lamp	15.55
Candle	8.36
Pine	5.43
Solar panel	0
Other	2.43
Total	**100.00%**

During the construction of the plant, all of the respective procedures will be carried out before ENEE in order to include the necessary infrastructure for energy access at the sites. Portable electric generation could also be used.

VII. Contingencies.

7.1. Contingency Plan and Risk Management.

All health and safety programs have one single purpose: the performance of activities without accident, injury or occupational illness. In addition to eliminating deaths and human suffering, the programs eliminate the high costs, the squandering and the poor quality that result from accidents.

That is why every project seeks to have a health and safety manual, so as to reduce the possibility of accidents and lower the high costs that accidents generate. All accidents are against work efficiency and effectiveness, because they are a product of the lack of control over the workers, materials, processes and environment. In order for a project to be efficient and effective, it must counteract the threat of accidents through the implementation of a health and safety manual.

All projects seek to have safety. Safety is the set of formulated laws, criteria and norms, which aim to control the risk of accidents, occupational illnesses and injuries, both to individuals and to the equipment and materials involved in the development of any activity.

7.1.1 Because wind power generation is different from other kinds of generation, as this kind of generation does not use flammable fuels as raw material that should be stored and processed, for this reason it does not generate toxic contaminants. Nonetheless, like other generation projects, wind plants have medium and high voltage electrical infrastructure, which requires appropriate care in accordance with the accepted practices and standards in force.

7.1.2 The focal points in the contingency plan are based on if the turbines meet the design safety standards of the International Electrotechnical Commission (IEC). The standard applicable to design safety is the IEC 61400, as the components of the turbine will be tested to verify that they are within the design limits and do not pose any danger to safety when in operation.

7.1.3 Further studies will be conducted on the suitability of the site ("Turbine suitability"), which simulate the maximum forces to which the equipment will be submitted under the site conditions, based on the extreme values determined by the study of wind and on the turbulence values resulting from the simulation considering the characteristics of the terrain and the location of the turbines.

7.2. Contingency Plan against Pasture or Brush Fires.

7.2.1 Within operation and maintenance procedures, the immediate area around the wind turbines will be kept clear.

7.2.2 Firefighting equipment shall be kept in operation and maintenance facilities.

7.2.3 Crews should receive training on proper procedures, and the community shall be involved by forming preventive committees with the support of the company.

7.2.4 Firefighting equipment will be kept near welding or other activities that imply greater risk.

7.2.5 Flammable materials will be stored and used in strict adherence to its MSDS label.

7.2.6 Warning signs will be posted and employees will be reminded of the proper basic procedures in case of an emergency.

7.2.7 An inspection by the Fire Department will be requested for the proper evaluation of the facilities.

7.3. Preventive Maintenance Plan to avoid Tower Blade or Mechanical Equipment Throws.

Because a turbine blade could detach due to design flaws, poor manufacturing, incorrect installation, wind gusts that exceed design capabilities, impact with cranes or towers, or lightning strikes, the following measures are used:

Design flaws	Design certification, simulation efforts, and laboratory tests on equipment components. Regular inspections will be conducted in accordance with the preventive maintenance program recommended by the manufacturer.
Deficient production	Manufacturing quality control systems, independent certifications, equipment testing before shipment, equipment acceptance testing on site. Regular inspections will be conducted in accordance with the preventive maintenance program recommended by the manufacturer.
Incorrect installation	Use of installation manuals prepared by the manufacturer, the use of contractors approved by the manufacturer and supervision of said contractors over the installation. Independent verification, acceptance testing. Regular inspections will be conducted in accordance with the preventive maintenance program recommended by the manufacturer.
Winds that exceed design capacity	Wind conditions of the site will be monitored, alarms and automatic braking systems, periodic inspections of and preventive maintenance on components subject to continuous loading. Turbines have an automatic system that puts them out of operation when limits are exceeded, securing the blades in the position of least resistance to the wind.
Impact with the cranes or towers	Safety procedures recommended by the manufacturer for the installation and maintenance of equipment will be followed in order to minimize risk. During crane operations, precautionary measures will be taken in accordance with the established safety procedures (distance, manual brakes and monitoring of weather conditions).
Lightning	Turbines have a system of lightning arrestor conductors incorporated in the blades, which carry the discharge to the ground through conductors and ground networks installed for this purpose. The turbine monitoring and control system has vibration sensors and alarms that indicate if there was damage after a strike, and if so that triggers the emergency shutdown procedures of the machine or the required corrective maintenance.

7.4. Contingency Plan against Hurricane Force Winds.

7.4.1 The wind turbines are designed to withstand winds of up to 55 m/s, a value which is higher than the upper limit of a class II hurricane according to the Saffir/Simpson scale (50m/s).

7.4.2 Since the plant has its own anemometry equipment and constant weather condition monitoring, any weather event of this nature will be detected early and plant staff will be trained to perform the necessary actions.

7.4.3 In the case of extreme weather events, appropriate measures will be coordinated with the relevant authorities. The turbine control mechanism will shut off operation automatically when winds are blowing above the acceptable range. Also, the variable pitch mechanism allows brakes to be applied to the rotor using the blades -- even a single functioning blade is sufficient to execute an emergency stop. The design of the turbines will be done in accordance with IEC 61400 standards in terms of safety, and is certified by independent bodies such as Germanischer Lloyd (GL).

7.5. Restricted Access Warning Signs in Proximity to Wind Turbine Towers.

7.5.1 All facilities will be properly marked with warning signs.

7.5.2 The towers themselves do not represent a danger to the immediate surroundings, as they have no exposed electrical components. Where appropriate, use of adequate signs and physical barriers to protect people's lives will be implemented, such as in the case of the electric substation, where a mesh perimeter fence and security indications are used in accordance with the NESC and NEC standards. In terms of safety procedures, industry specific best practices will be followed when performing equipment operations or maintenance.

7.6. Airplane or Bird Collisions.

The towers are tall structures that are easily seen from land, though not as easily seen from the air, especially in bad weather conditions.

7.6.1 The company has already established communication with the Civil Aviation Directorate General of the Ministry of Public Works and Transport on the possible restrictions to the implementation of the project. In similar projects in Costa Rica, it has been required that the towers are painted with equal bands of red and white color, or that the necessary prevention mechanisms are incorporated in the electrical installations similar to those used by banana plantations for the service of fumigation pilots.

7.6.2 In regard to the layout of the project in the municipalities of San Buenaventura and Santa Ana, the area is not a route for migratory birds, and thus the possible collision of birds is considered not to affect the development of the project.

7.7. Electromagnetic Interference Contingency Plan.

7.7.1 The turbine blades could produce interference with radio waves in the towns located near the towers, most of all because of the "shadow" effect that the blades would produce over the airwaves. Considering the way in which these waves propagate in different bands throughout the country, one can infer that if there is interference then it would be in a very restricted area around the towers.

7.7.2 The control and security equipment is linked to the turbines through fiber optics, which minimizes the impact of electromagnetic interference on the control system. The turbines have automatic and manual safety mechanisms that can be activated in case of communication failures. The harmonic current emissions are within the limit permitted by the IEEE 566 standard, and the electromagnetic fields are within the existing parameters.

Two high voltage 230kV transmission lines belonging to ENEE pass through the project site already. The voltages present in the plant will all be lower than those already present in the existing lines.

7.8. Occupational Safety.

Public health and safety risks associated with conventional electricity generating plants are typically connected with the emission of gases into the atmosphere and with the solid and liquid waste that is spewed into the ground or water. Any of this waste causes adverse impacts on public health, or poses risks to workers.

Wind farms differ substantially from other electrical facilities given that they have no combustion processes and do not produce emissions. Moreover, the only potentially toxic or hazardous materials associated with the majority of wind farms are the relatively small quantities of lubricating oils, hydraulic fluids and insulation used in the turbines. Nonetheless, even small leaks of these materials can contaminate the groundwater or produce impacts on the local habitat if the leak is not controlled over a long period of time.

Among the accidents that can pose a security issue is the incidence of a turbine blade, or parts of it, separating from the rotor and flying off with the wind. Also, blades can detach without breaking. Such events are rare and usually occur under unexpected and unprecedented wind conditions.

Although the majority of wind projects are located in rural areas, many are visible from public roads and are relatively accessible to the public. Since the technology and equipment associated with wind generation of electricity are still new and unusual, they can be an attraction for those people who pass by the farms and want to see and touch an operating or idle wind turbine. Members of the public who will visit these facilities are susceptible to harm from the movement of the blades, the breakage and flying off of parts, the electrical equipment and the collapse or fall of the turbines.

Arid locations where wind farms can be installed with high wind speeds, a low level of vegetation and no trees, and with variable topography, can also pose a potential fire hazard during the dry months of the year for various reasons, most of which are related to non-compliance of maintenance programs.

7.8.1 Noise.

Modern wind turbines are fairly quiet and will be made even quieter in the future. When planning a wind farm, special care must be given to any sound which can be heard from outside of neighboring houses. Inside of the houses, the level of sound will be much lower, even with the windows open. The potential effect of noise is usually evaluated by estimating the noise level that will be reached when the wind blows from the turbines towards the houses, which is considered a conservative assumption. The sound of wind turbines slightly increases with wind speed.

Ten years ago, wind turbines were much noisier than the ones in use today. Much work has been put into creating this generation of turbines as silent machines, as much through the design of the blades as of the mechanical parts of the machine.

Safety Mechanisms.

Staff who work during the construction phase of the project and in subsequent maintenance work should have safety devices that include personal and crew safety equipment. The construction company and the company responsible for the maintenance work thereafter must also have first aid kits available.

The company that runs the construction works shall be responsible for providing staff with the following safety features:

Personal Safety Equipment:

1. Hard-hat, which is also used to identify employees as follows: White (Engineers), Green / Blue (Managers of groups or crews), Yellow (Workers), Red (Safety Inspectors).
2. Protective goggles (where applicable).
3. Dust masks (where applicable).
4. Back support harness.
5. Safety belts.
6. Boots with steel protection.
7. Welding coats and aprons.
8. Gloves.
9. Ear plugs (in areas where applicable).

Crew Safety Equipment:

1. First aid kit (supplies and medicines).
2. Staff trained in first aid.
3. Vehicle available for mobilization of accident victims.
4. Radio communication equipment.

Construction Company Safety Equipment:

1. Stretchers to transport injured victims.
2. Stretcher harness for the evacuation of injured victims.
3. Vehicles available for transport in case of emergencies.
4. Radio communication equipment.
5. Guaranteed access to an ambulance system.
6. Medical and accident insurance.

Cleanliness and Order.

In order to reduce the risk of accidents, it is essential to maintain order and cleanliness in all work areas.

For this reason, the project site will include a series of rules to follow to maintain order and cleanliness at all times.

Here are the rules and parameters to follow:

- Throw away garbage in the right place.
- Store tools and materials in pre-designated and well protected places.
- At the end of the day, collect garbage in your work area and put it in the trash can.
- At the end of the day, leave your work area neat and tidy.

VIII. Environmental Indicators.

All projects have an economic, social and ecological impact. Some of these effects are negative, but in well-designed projects, most are positive. In the case of negative impacts, these may be permanent or temporary, and depending on their magnitude, can be significant or insignificant. Currently there are methods, included in this environmental assessment, for analyzing the possible impacts of a project and for providing solutions to significant impacts through mitigation measures. Most important is to balance the increasing demands of our society, which in this case refers to providing a continuous supply of energy, and likewise, to balance out natural resources depletion and environmental pollution.

8.1. General Description.

The project will be built in the area of Cerro de Hula and Izopo, 24 km south of the capital, Tegucigalpa, M.D.C., Department of Francisco Morazán, in the municipalities of Santa Ana and San Buenaventura. The turbines will be located in six rows, four of which are located in the vicinity of the place known as el Cruce. The remaining two rows are located in Montaña Izopo, road to Cerro La Mole. The terrain is complex, with both hills and valleys, scarce vegetation cover throughout the majority of the area, and a dispersed population concentrated in nearby settlements.

8.2. Environmental Aspects.

Wind energy has many positive environmental aspects. It is clean, renewable and a means of sustainable generation.

Some environmental impacts of wind energy are visual and landscape factors, noise and electromagnetic interference. While none of these effects last longer than the operational lifespan of the plant, they are generally just as significant as the ecological impacts in terms of shaping public opinion and determining whether or not a proposed wind plant installation will get development permission. Ecological effects in this context cover all of the material effects on flora and fauna.

8.3. Environmental and Economic Benefits.

Global warming as a result of anthropogenic emissions of greenhouse gases is a generally accepted fact. Each unit (kWh) of electricity produced from wind turbines can displace one unit of electricity generated by a hydrocarbon-burning power plant. It is possible to calculate the quantity of contaminating gases that this replacement signifies in generic form, although this value varies according to the efficiency of the power station, the use of emission-reduction equipment, and the type of fuel.

Electricity generation through wind power offers one of the most economic energy options among the new sources of renewable energy in reducing the emission of CO_2 and other greenhouse gases. In the case of Honduras, a 1.5MW wind turbine can generate up to 6,088 MWh, and can displace up to 4,262 tons of CO_2. Thus for this 60 MW plant, with a projected generation of 243,000 MWh annually, it is estimated that it could displace between 170,000 and 175,000 tons of CO_2, depending on wind patterns and the capacity factor throughout its 20-year lifespan.

Wind energy does not generate acid rain, an environmental problem that has zonal or regional impacts and is associated with the generation of NOx and SO_2.

Wind power generates no dangerous residues, such as those produced by nuclear power plants, both during a plant's operation as much as in its dismantling at the end of its lifespan, nor does wind power present any risk of a grand-scale accident like those that occurred in the cases of Chernobyl or Three Mile Island, where there were accidents that left long-term repercussions due to the leak of waste into the environment.

Moreover, the use of wind power generates savings in terms of using fossil fuel reserves, contributes to the rational use of energy, and for Honduras in particular, where current power generation is based on a system of oil and its derivatives, it can result in hard currency savings, contributing to the security and diversity of the energy supply.

Wind power helps economies, particularly local economies, in various important aspects. Jobs, greater incomes, and a contribution to regional development are created in the areas and communities where wind plants are located. A study conducted in the State of New York found that the production of 10 million kWh of electricity from wind power generates 27% more jobs in the State than the production of the same quantity of energy by the latest generation of coal plants, and generates 66% more jobs than combined cycle natural gas plants. One of the reasons for this is that part of the cost of generation is the acquisition of the fuel, a commodity that contributes to much fewer jobs than other industries, especially when the fuel comes from other regions of the country or is internationally imported.

Below is a table comparing the impacts of various technologies used to generate electricity:

COMPARISON OF THE ENVIRONMENTAL IMPACT OF THE DIFFERENT FORMS OF PRODUCING ELECTRICITY (in Tons per GWh produced):

SOURCE OF ENERGY	CO_2	NO_2	SO_2	Particulates	CO	Hydrocarbons	Nuclear Waste	TOTAL
Coal	1,058.2	2.986	2.971	1.626	0.267	0.102	-	1,066.1
Natural Gas (combined cycle)	824	0.251	0.336	1.176	TR	TR	-	825.8
Nuclear	8.6	0.034	0.029	0.003	0.018	0.001	3.641	12.3
Photovoltaic	5.9	0.008	0.023	0.017	0.003	0.002	-	5.9
Biomass	0	0.614	0.154	0.512	11.361	0.768	-	13.4
Geothermal	56.8	TR	TR	TR	TR	TR	-	56.8
Wind	**7.4**	**TR**	**TR**	**TR**	**TR**	**TR**	**-**	**7.4**
Solar Thermal	3.6	TR	TR	TR	TR	TR	-	3.6
Hydro	6.6	TR	TR	TR	TR	TR	-	6.6

Source: US Department of Energy, Council for Renewable Energy Education and AEDENAT.
TR = traces.
NOTE: The emissions values also consider those emitted by equipment used during the construction period.

8.4. Positive Impacts.

Among the main impacts of a wind plant installation are:

- There will be no major impact on access routes, though these routes could be improved where necessary in order to secure the transport of project equipment.
- Production of clean energy through wind, which boosts social and economic development of the area.
- Improvements to the quality of life of the population served by the plant, through the generation of jobs.

- Increased local and international tourism to the first wind plant in the country and the largest in Central America.
- Introduction of clean technology to area residents and to the country.
- Does not change current land use and is compatible with other currently productive activities.
- There is no impact on soil erosion
- The project does not cause any impact that could change cultural values in the area.
- The wind energy plant will produce a favorable added value to the landscape with the addition of turbines.
- The area's original landscape has been previously directly altered by various human activities that are currently being developed (antennas and others).
- Throughout the different stages of the project, local workforce native to the area will be employed.

8.5. Environmental Effects.

An analysis was carried out on the environmental effects that the massive use of wind energy for electricity generation, such as the so-called wind farm or plant, could produce. For discussion of local environmental effects of wind energy, the aspects that affect human perception and behavior have been separated from those that affect the ecology. Among the effects of the former are:

- Land use.
- Visual impact.
- Noise.
- Electromagnetic interference.
- Health and safety.
- Archaeological and paleontological resources.
- Socioeconomic impacts.

Among the ecological aspects are:

- Effects on flora.
- Effects on fauna.
- Soil erosion.
- Alteration of water quality.
- Alteration of air quality.
- Solid and hazardous waste.
- Consumption of materials and energy.

8.6. Aspects that affect Human Perception or Behavior.

8.6.1 Land Use.

While wind farms require large areas for their installation, they effectively only use a small portion of land (less than 10%); for example, a 50MW plant can occupy an area of 6.07 km^2, but the area needed to install the equipment will be 0.7 to 0.75 km^2, leaving the rest of the area available and compatible with other productive activities used by humans. Moreover, wind farms are generally located in previously undeveloped rural or remote areas. These factors have unique environmental implications for land use, visual impact, noise, biology and socio-cultural considerations in general, all different from conventional power plants.

8.6.2 Visual Effect.

Wind farms must be in open areas in order to be commercially viable, and they are therefore visible. The reaction to the sight of a wind farm is highly subjective. Many people see them as a welcome symbol of a clean source of energy, while others see them as an unwelcome addition to the landscape.

The wind industry has put considerable effort into the careful integration of wind farms with the landscape. Computer-created photomontages, animations and even panoramic views, along with zonal maps of the visual influence, all provide objective predictions of the appearance of a wind farm. A 1.5MW wind turbine looks slightly different from a 500kW machine, so the tendency to have more powerful machines, paradoxically, reduces the subjective visual effect at a given installed capacity.

Most turbines are currently installed on slender tubular steel towers, which for most people are more aesthetically pleasing than the classic high-voltage line railing towers (known as lattice towers). Professional designers are employed by many companies to improve the appearance of their machines and in many cases landscape architects are involved in the visual assessment of projects.

8.6.3 Sound Effect.

The impact due to noise generated by wind turbines has been studied in many countries, especially in detail in the United States, and it has been concluded that the real noise produced is not significantly higher than the sound of the wind itself passing through a moving object. There is only significant mechanical noise, therefore the primary source of sound is aerodynamic in nature as the wind passes over the blades of the wind turbine. Considering the project is not located near densely populated areas, there will be no significant adverse impact on the human environment at all.

The resulting measured sound level for a single turbine on a reflective terrestrial surface at the standard distance is 57.9 dBA for a Model 1.5_{SLE} wind turbine.

For purposes of comparison, 57 dBA is far below other sounds that are common to the surrounding area. These noises include vehicular traffic (60-75 dBA). The turbine sound level would be more comparable to the sounds of children playing (50-60 dBA) or to the sounds of typical household appliances.

Note however that sound levels are measured at a distance of only 100 meters. Therefore it is anticipated that the sound will not be distinguishable from a nearby residence or meeting place.

These sonic effects, because of their magnitude, have no impact on wildlife and thus are not considered important.

8.7. Negative Impacts

8.7.1 During the construction phase, negative impacts are related to biophysical aspects in the immediate project area.

8.7.2 The quality of the environment will be altered by activities related to the use of machinery, transport, loading and unloading materials, and storage of construction materials.

8.7.3 Other negative impacts include contamination from dust emissions, increased noise levels from machinery, and poor management of solid waste produced by employees or other persons. While these impacts are considered low impact and temporary, they are negative for the quality of the environment. Once in the operation phase, the use of machinery will decrease considerably, as well as the amount of solid waste as a result of reducing the number of project staff.

IX. Environmental Control Activities.

9.1. Suggested Mitigation Measures.

1. Recruitment of local manpower for the activities to be carried out during the construction phase. (This will require training).

2. Provide personnel with the required protective equipment, both for assembly activities in the construction phase as for maintenance activities during the operation phase.

3. During the expansion and maintenance of access roads, it is recommended to frequently irrigate the area with water in order to minimize air pollution from fugitive dust.

4. In all work areas, receptacles shall be provided for the temporary disposal of solid waste, classified and separated into domestic and packing materials.

5. During assembly activities in the construction phase, the areas where the project will be executed should have portable bathroom facilities. During the operation phase, the control room shall be equipped with fixed bathroom facilities with their respective septic tanks.

6. Work areas should have water available for human consumption, preferably bottled.

7. During the construction phase, it is recommended to put up a perimeter fence that restricts access to people not related to the project.

8. The remains of construction materials used for the foundations must be disposed of at the place designated by the Municipal Authority.

X. Environmental Consultants Information

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10.4 REGISTRY OF THE COMPANY WITH THE SERNA

RE-0004-2002 AMBITEC

XI. Sworn Statement of the Consultant.

SWORN STATEMENT

We, AMBITEC, S.A. de C.V., represented by Eng. **MIGUEL ÁNGEL ENAMORADO VALLECILLO**, General Manager, Agronomist, Administrator, married, of local residence, with identity card # 1622-1964-00190, make the following Sworn Statement, that I have no pending court case and that I am in full possession and exercise of my civil powers, therefore I attest to all of the information presented on the project "*EOLOELÉCTRICO HONDURAS 2000*", before the Secretary of Natural Resources and Environment, in which AMBITEC is registered under # ***RE-0004-2002*** and for which I sign the present document this 30th day of the month of August of the year two thousand and five.

ENG. MIGUEL ÁNGEL ENAMORADO VALLECILLO
General Manager
AMBITEC, S.A. de C.V.

XII. Letter from the Developer, which certifies the acceptance of the study presented by the consultants.

ENERGÍA EÓLICA DE HONDURAS, S. A.

EDIFICIO TRIBU, 4KM AL NORTE DE FORUM PO BOX 878-1260, SAN JOSÉ, COSTA RICA TEL. [506] 209-7950 FAX. [506] 209-7957 TEL EN HONDURAS: 370-4936

CERTIFICATION OF ACCEPTANCE

I, the undersigned, **Jay Gallegos**, of full legal age, Engineer, of American citizenship, with American passport #710202707, acting in representation of the company named **Energía Eólica de Honduras**, a fixed capital public corporation, registered as No80, under Volume 588 in the Registry of Company Properties at this address, acting as General Manager, formally accept the Environmental Assessment conducted for the project *EOLOELÉCTRICO HONDURAS 2000*, which is located in the Department of Francisco Morazán, 24 kms south of Tegucigalpa, in Cerro de Hula and Izopo, located in the municipalities of Santa Ana and San Buenaventura, and attest that it is to my agreement and can be presented before the Secretary of Natural Resources and Environment (SERNA) by AMBITEC, a company that is registered under registration # *RE-0004-2002* and for which I sign the present document this twelfth day of the month of August of the year two thousand and five.

Jay Gallegos
General Manager
Energía Eólica de Honduras, S. A.

XIII. Sworn Statement of the Developer.

ENERGÍA EÓLICA DE HONDURAS, S. A.

EDIFICIO TRIBU, 4KM AL NORTE DE FORUM PO BOX 878-1260, SAN JOSÉ, COSTA RICA TEL. [506] 209-7950 FAX. [506] 209-7957 TEL EN HONDURAS: 370-4936

SWORN STATEMENT

I, the undersigned, **Jay Gallegos**, of full legal age, Engineer, of American citizenship, con with American Passport #710202707, acting in representation of the company named **Energía Eólica de Honduras**, a fixed capital public corporation, registered as No80, under Volume 588 in the Registry of Company Properties at this address, acting as General Manager, make the following Sworn Statement: that I have no pending court case and that I am in full possession and exercise of my civil powers, therefore I vouch for all information provided in the **Environmental Assessment** of the Project *EOLOELÉCTRICO HONDURAS 2000*, which is located in the Department of Francisco Morazán, 24 kms south of Tegucigalpa, in Cerro de Hula and Izopo, located in the municipalities of Santa Ana and San Buenaventura, can be presented before the Secretary of Natural Resources and Environment (SERNA) by AMBITEC, a company that is registered under registration # *RE-0004-2002* and for which I sign the present document this twelfth day of the month of August of the year two thousand and five.

Jay Gallegos
General Manager
Energía Eólica de Honduras, S. A.

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XV. Annexes.