CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
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SECTION A. General description of project activity

A.1 Title of the project activity:

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Bii Nee Stipa

A.2. Description of the project activity:

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The purpose of this project activity is to generate renewable energy coming from wind resources, in order to sell it to Mexican partners willing to consume this sort of energy. With this aim, the project activity will reduce greenhouse gas (GHG) emission by avoiding electricity generation otherwise produced at fossil-fuel fired power plants, and thus CO_2 emissions associated to it. Total power to be installed will be 200 MW in different phases:

Starting operations calendar:

Name	**Power Plant Operating**
Bii Nee Stipa I	20 MW the 31st December 2005
Bii Nee Stipa II	80 MW the 31st December 2006
Bii Nee Stipa III	100 MW the 31st December 2007
Cumulative power installed	**200 MW**

Table 1. Commissioning calendar

The wind resources available at the location of the project activity are optimal for the implementation of this kind of renewable project, due to the excellent wind resources existing (both speed and quality) in this area, as well as the possibilities of energy evacuation through existing High Voltage lines. Wind data is available at *Instituto de Investigaciones Eléctricas* (IIEE), CFE and yet confirmed by two 40m high measurement towers installed in December 2001 at the future Wind Farm location. A third 65m tower has been recently installed in order to evaluate with more accuracy the wind resources in the whole area.

At present stage, the wind farm is under final stage of development. Both construction and operation of the wind farm will be performed by GAMESA using in house technology and procedures.

Gamesa Energía signed a strategic alliance with CISA (Cableados Industriales SA) to co-develop wind farms in Mexico since February 2001. CISA is a 100% Mexican company specialized in the design, construction, operation and maintenance of electrical systems.

Wind power plants are one of the solutions to GHG emissions in the energy sector. The energy sector is considered one of the main responsible of GHG emissions. It is also one of the key sectors in the economic and social development of countries like Mexico. Low cost-pollutant plants are the basis for the forecast of energy demand for countries with high growth rate, so wind energy appears to be an optimal solution to this problem. Installing the first wind farm in Mexico will contribute to the growth in the development of renewable energy technologies, as well as to establish a clear and favourable framework for its expansion. It is very important to develop the renewable energy sector in Mexico to serve as an example to other countries in Latin America, which is crucial for stabilizing worldwide emissions.

The contribution to the environment of this kind of technology has been already proven in other countries, with a very positive result. It is remarkable to mention that Mexico has one of the best wind resource areas in Latin America, appropriate for wind energy development.

The project activity has obtained an environmental permit for 200 MW from SEMARNAT (responsible government agency). It has also obtained the permit for connecting to the National Grid issued by CFE

Boundaries

For the baseline determination, it will be only taken into account CO_2 emissions from electricity generation in fossil fuel fired power displaced by the project activity.

The spatial extent of the boundary includes the site where the power plant will be erected and all power plants physically connected to the Mexican National Grid, where the project activity will also be connected. It will be considered only power plants with no energy transportation constraints related to transmission lines. Electricity imports and exports from the Mexican National grid will be also taken into account.

A.3. Project participants:

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Gamesa Energia has signed a joint venture agreement with CISA (Cableados Industriales SA) for the co-development of wind farms in Mexico. Gamesa Energía and CISA will create a single purpose company for each of the wind farms under development. The shareholder structure of each company will be 90% Gamesa Energía and 10% CISA. CISA has been granted with the technical feasibility approval from CFE (Comisión Federal de Electricidad) and the environmental permit from SEMARNAT for the 200 MW. The JV is seeking construction and term loan financing commitments from one or more lenders for the 3 phases of the project and a commitment to fund equity from an Investor.

Gamesa Energía has obtained the letter of voluntary participation by the designated authority in Spain, as a country included in Annex 1 of the Kyoto protocol.

The Project will be property of a *Sociedad Autoabastecedora* (self-consumption entity), in which the company to consume the energy generated by the wind farm has to be a shareholder, apart from the investment partners of the project. Gamesa Energía is the main shareholder of the development, with a 70% ownership in the first 20 MW and 90% for the next 180 MW. The rest of the shareholders are CISA, with a 30% for first 20MW and 10% for next 180 MW, and a self-consumption partner (symbolic participation), being the party receiving the energy to be generated by the wind farm. This configuration comes motivated from the renewable regulation in place.

The self-consumption company will conclude all contracts for construction, Start-up, operation and maintenance with the GAMESA Group companies (Gamesa Eólica and Gamesa Servicios). The contract structure will be as follows:

Construction and Start-up contracts

First contract with Gamesa Eólica for the supply, installation and Start-up of wind turbines, including the transportation to the site and insurance wages. Second contract will be with Gamesa Energía Servicios, for the civil Works and electric Works and infrastructures.

Operation and Maintenance contracts

First contract is to be signed with Gamesa Eólica for the maintenance of wind turbines for a period of five years since the start-up of the wind farm, assuring an average availability of the 95%. A second contract will be signed with Gamesa Energía Servicios for the maintenance of the electric infrastructure.

A.4. Technical description of the project activity:

The Project is a 200 MW wind power project, expected to produce 730 GWh per year, with a capacity factor of 42%. The minimum expected operational lifetime is 20 years.

Total Power	200 MW
Turbine	A61-G52
Rated Power per turbine	1320 kW-850 kW
Rated output Voltage	690V
No. of turbines	150-234
Equivalent annual operating hours	3650
Annual Production	730 GWh
Capacity factor	42%
Transmission line length	6 km
Transmission line Voltage	115 kV
Wind Farm output transformer	20kV/115kV

Table 2. Power plant characteristics

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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Mexico

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

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Oaxaca. Pacífico coast, Tehuantepec Istmo

A.4.1.3. City/Town/Community etc:

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Juchitán de Zaragoza council, area La Ventosa.

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

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The Project is located in La Ventosa windy region in the Isthmus of Tehuantepec, state of Oaxaca, Mexico. The site is near the municipality of Juchitán de Zaragoza. The Project will be built on land leased from private landowners extending for at least thirty (30) years.

The coordinates for the last wind mast installed are, 94º 55’ W and 16º 34’ N. The wind farm extension will be approximately 2,000ha around this wind mast.

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

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Grid connected Power Generation. Sectorial Scope 1. Energy Industries

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

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After wind measurements and analysis, the optimal wind turbine (maximum energy output assuring its reliability throughout the lifecycle of the wind farm) has been selected to be either A61 from MADE manufacturer or G52 (or G-52RCC) from Gamesa. Eólica. Both MADE and Gamesa Eólica are companies from Gamesa Group.

The wind turbine size is 1,320 kW for the A61 turbine and 850 kW for the G-52 turbine (also G-52RCC, rated 800kW, which is the same wind turbine but under US standards). Both are three-bladed rotor machine, asynchronous four pole generators. Rated voltage of generator is 690V in both turbines, with 690V/20kV transformers each. These two turbines provide proven technology (over 2,000 wind turbines installed worldwide of each model), assuring optimal performance, maximum output from existing wind resource, robustness and reliability. The average availability of these wind turbines is proven to be over 95%

The line to connect to the grid will be a 115 kV and 6 km long line, from the wind farm control house to the national grid.

Total energy output and power installed for both turbines will be the same, the selection of one of them will depend on the wind turbulence being measured at present stage. This generation is based on the long-term forecast of net equivalent annual hours (hours per year with full power yield). This net equivalent hours are estimated to be 3650 hours per year, which implies a capacity factor of 42%.

The impact of the wind farm to the national grid has been studied by CFE with no objections to connect the wind farm to the National Grid. They have issued a connection agreement in which the wind farm has the right to connect to the grid.

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

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The Project will reduce anthropogenic GHG emissions by supplying zero GHG emission power, which will displace fossil-fuel-fired electricity generation. The Project is expected to be responsible for reducing 2,968,728 tCO_2e during the crediting period, as described further in the document. By not finalising the wind farm construction, the energy yield to the grid injected by the wind farm to the national grid would have to be supplied from another power generator. From the energy mix installed in Mexico and the forecast of new capacity additions (data available at CFE), this energy would come mainly from fossil-fuel sources.

The forecast of power installation in México in the future comes as follows:

Power (MW)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	% as of 2013
Hydro	9,608	10,232	10,544	10,544	11,293	11,293	11,293	11,293	12,193	12,793	12,793	19.6%
CC	10,603	11,257	12,378	14,654	15,700	16,618	17,955	20,063	21,360	21,910	23,360	35.7%
Gas	2,890	3,328	3,328	3,300	3,276	3,276	3,212	3,467	34,67	3,722	3,722	5.7%
Diesel	14,283	14,283	14,243	13,930	13,710	13,312	12,712	12,370	11,830	11,346	10,464	16.0%
Wind	3	3	3	104	104	104	104	205	307	307	408	0.6%
Free								38	1,819	3,546	6,446	9.9%
Fuel	140	189	189	189	218	218	210	210	213	213	213	0%
Geo.	960	960	960	960	960	960	960	960	960	960	960	1.4%
Coal	2,600	2,600	2,600	2,600	2,600	2,600	3,300	3,300	3,300	3,300	3,550	5.4%
Dual	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	3.2%
Nuclear	1,365	1,365	1,365	1,365	1,365	1,365	1,365	1,365	1,365	1,365	1,365	2.1%
Total	**44,552**	**46,317**	**47,710**	**49,746**	**51,326**	**51,846**	**53,211**	**55,371**	**58,914**	**61,562**	**65,381**	

Table 3. Source: Sener. "*Prospectiva del sector eléctrico* 2004-2013"

Future planning for wind power installation is expected to be 0.6% of total power installed within the Mexican energy system in 2013 (apart from power installed from this project activity). This means that the power to be installed from this project activity will not impact in the baseline calculations. The energy system will mainly be based in Combined Cycle and Thermal power plants, being the percentage of hydro power less than 20% in 2013.

This forecast is based on future energy demand expected, as well as planned infrastructure investment. New power plants generation with zero-emission will therefore displace any non-zero emission

generation within the project boundaries. In the absence of the project, the energy would be produced by non-zero emission power plants.

Further details are discussed in Section B.1.1.

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

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The chosen crediting period will be the fixed crediting period formula, starting 2006. The wind power plant will generate a total reduction of 2,968,728 tCO_2.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Emission rate (tCO_2/GWh)	520.7	511.5	502.2	493.0	483.7	474.5	465.2	456.0	446.7	437.5
Emission Reductions (tCO_2)	38,014	186,693	366,634	359,882	353,130	346,379	339,627	332,875	326,123	319,371
Total Emission Reductions (tCO_2)	2,968,728									

Table 4. Emission reductions

In each crediting year, the amount of emission reductions generated by the project will vary in relation to the product of total generation measured and the emission rate. Due to the importance of estimation of energy production during the period of PPA signed (in order to determine the cash flows generated by the wind farm and thus, the financing possibilities), a long-term forecast of net equivalent production hours is estimated by our technical office (net hours at full power operation). This estimations are conservative, and uses historical data series from meteorological measurements and data from wind measurement masts.

Total equivalent hours estimated for this wind farm are 3,650 annual hours, which would yield 730 GWh every year (Once the 200MW are installed). With an emission rate of 548.5 tCO_2/GWh (detailed information in section B) total emission reductions:

	Production	CO_2 emission reduction
Yearly	730 GWh	296,872 tCO_2 (average)
Total (2006-2015)	7,300 GWh	2,968,728 tCO_2

Table 5. Wind farm production

The baseline emission rate will be calculated annually (it will slightly decrease due to the forecast of installation of power capacity from combined cycle plants, whose emissions of 396 tCO_2/GWh are below the emission rate calculated with latest data available) over the whole crediting period. This will be described in the methodology proposed in section B.

A.4.5. Public funding of the project activity:

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N/A

SECTION B. Application of a baseline methodology

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

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For the project activity, the approved baseline methodology used is ACM0002, *Consolidated baseline methodology for grid-connected electricity generation from renewable sources*

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

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The proposed methodology is appropriate for this project since renewable projects like this fits into the spec of sources for electricity capacity additions (wind sources)

The methodology is designed to be applicable to grid-connected wind power projects, provided that does not involve switching from fossil fuels to renewable energy at the site of the project activity.

Also the geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available at *Prospectiva del sector eléctrico*, prepared by *Secretaría de energía.* Theses boundaries include all the geographic area and infrastructures within the whole territory of Mexico, as well as the energy exports and imports outside the Mexican energy system The characteristics of the Mexican energy system as well as the energy exports and imports are public and can be found at CFE web page: http://www.cfe.gob.mx/

The project is in an electric sector that is not dominated by generating sources with zero- or low-operating costs such as hydro, geothermal, wind, solar, nuclear, and low-cost biomass, and this fuel mix is expected to persist for the duration of the crediting period. For the chosen methodology (low-cost/must run resources: hydro, geothermal, wind, low-cost biomass, nuclear and solar generation) the percentages of production are shown for year 2003 and the forecast for 2013.

	2003	**2013**
Thermal	40.0%	18.7%
Combined cycle	27.0%	45.1%
Hydro	10.1%	7.2%
Coal	8.2%	5.6%
Dual	6.8%	6.0%
Nuclear	5.2%	2.9%
Geo+wind	2.7%	3.7%
Total	203,555 GWh	346,387 GWh

Total % under methodology	
2003	2013
18%	13.8%

Table 6. Source: Sener,"*Prospectiva del sector eléctrico* 2004-2013. Gráfica 21"

The forecast of power installed in México in 2006 (year when the first stage will start operations) is 49,746MW, so the impact of 200 MW would not reach the 0.4% of the generation mix of the electric system.

Moreover, the production factor of wind farms is usually low (the project activity brings a 42% of production), so the impact in the production yield mix will be even lower. Wind power installed works as an additional energy to the grid, since the wind resource is not regular. All these arguments point that any wind energy project would not deliver reliable electricity that could be counted as firm energy in the Mexican electric system.

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

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Part 1: Analysis of the additionality of the project

Wind energy in Mexico is the perfect complement for CDM projects due to its additionality. The most relevant fact that demonstrates this situation is that there are no wind farms in México. By finalising the project activity, Bii Nee Stipa wind farm will be the first wind farm in México.

For demonstrating its additionality, the *Tool for demonstration and assessment of additionallity* approved has been used, following all steps defined. These steps will demonstrate that the project activity is not the baseline scenario.

Step 0. Preliminary screening based on the starting date of the project activity

The crediting period of the project activity will start after the registration of the project activity, so step 0 does not apply to the project activity.

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

Definition of alternative scenarios to the project activity that otherwise could be implemented in case that the project activity does not reach its operative status.

Sub-step 1a. Define alternatives to the project activity

The output of the project activity is zero-emission electricity generation for exporting to the Mexican electrical grid. The alternatives to be considered will be power generation plants with zero or low emission capacity. The alternative scenarios include:

1. The proposed project activity not undertaken as a CDM project activity, this is a 200 MW wind power plant with 3,650 net equivalent production hours that does not obtain CERs from CDM registration.
2. Power generation plants from renewable sources with equivalent electricity output within the Mexican electrical system, like biomass or minihydro power plants. Due to the size of the project activity, minihydro power plants would not generate the same amount of electricity than the project activity; they would be considered as conventional hydro and would have a large impact on the baseline scenario.
3. Continuation of current situation in Mexico, as if no wind energy power plant was installed.

Sub-step 1b. Enforcement of applicable laws and regulations

For building a power plant, the developer has to participate in public tenders called by CFE (*Comisión Federal de la Energía*). Thus, any kind of project from renewable sources would have to compete against conventional energies in price, which would always be unfeasible. In order to promote the private investor to develop power plants from renewable sources, CRE (*Comisión Reguladora de Energía*) has created different formulas instead of participating in public tenders:

- Self-consumption (*autoabastecimiento*): For self-consumption purposes, it is possible to create a company co-owned by the power generator and the consumer following some specific rules. The energy not used by the consumer can be stored in a "virtual storage" managed by CFE, so real-time generation does not have to exactly match with real-time consumption. Total energy generated not used by the consumer has to be sold to CFE at a fixed price.
- Cogeneration (*cogeneración*): For power generation combined with steam or other thermal energy production or both. It is obligatory that the efficiency of the total of generation and electricity and heat consumption is higher that each part independently.
- Independent production (*producción independiente*): It is needed to mandatory sell the energy to CFE at a fixed price, and to be included in CFE expansion plans.
- Small energy producers (*pequeña producción*): for power plants smaller than 30MW of installed power.

The only possibility to make the Project activity or other renewable alternatives feasible is to create a Self-consumption company, so the consumer participates in the Project by purchasing at least one share of the project's company. Both alternatives 1 and 2 would have to use this formula.

Step 2. Investment analysis

This step will demonstrate that the proposed project activity is economically or financially less attractive than the other alternatives in case that the project activity does not get the revenue from the sales of certified emission reductions.

Sub-step 2a. Determine appropriate analysis method

The project activity generates incomes other than CDM related income, so simple analysis cost cannot be applied. Instead, the investment comparison analysis will be used.

Sub-step 2b. Option II Application of the investment comparison analysis

For the investment comparison analysis, the IRR is the main indicator for comparing all the scenarios under this analysis. The equity IRR will be used, since it reflects the return on equity investors and includes all amounts and costs of debt financing, which is a key issue for this project activity. We consider the equity IRR more suitable for the analysis

Sub-step 2c. Calculation and comparison of financial indicators

For any client to participate in the self-consumption company instead of buying the energy directly to CFE (also alternative 3), the PPA agreement to be signed need the price of energy to be indexed to the general tariff fixed by CFE minus some defined discount:

	Tariff ($Mex/MWh)
Year 1 to year 5	CFE tariff – 5%
Year 6 to year 10	CFE Tariff – 10%
Year 11 to year 15	CFE Tariff – 15%
Yer 16 to year 20	CFE Tariff – 20%

Table 7. Energy price in PPA

For calculating the CFE Tariff, the "*Tarifa HM Noreste de CFE*" is used (the tariff that would correspond to some potential clients). The weighted average price (following consumer's load curve) for such a consumer would be 70.9 c$Mex/kWh. It is expected the electrical tariff to keep growing in the future. In the last 5 years this tariff has grown more than 10%, except year 2001, on average above inflation (CPI) growth:

	Weighted average (c$MEX/kWh)	Annual increment	CPI
2004	70.9	22%	9%
2003	57.9	11%	7%
2002	52.2	23%	9%
2001	42.5	-5%	1%
2000	44.9	11%	6%
1999	40.5	12%	12%

Table 8. Increase on tariff. Source: CFE annual tariff

The equivalent baseload price for 2005 that clients are expecting is around 57 US$/MWh (a 9% discount on CFE tariff). On a 20-year project basis, this price would yield an IRR of the project that it will make it unfeasible. An extra income from CERs sales of between 5 to 20 US$/MWh will bring the project's IRR to the correct level, and would make the project to become feasible. At the current level of price of each tCO_2, the increase on the equity IRR of the project is 1.7%, enough for reaching the Required Rate of Return (RRR) for financing the project.

The level of investment for wind energy projects (1.2 million $/MW installed aprox.) is higher than the level of investment of other kind of renewable power generation plants like biomass. Thus, the project activity is financially less attractive than other renewable energy power plant project of similar characteristics that could be implemented otherwise.

Sub-step 2d. Sensitivity analysis

The main driver for performing a sensitivity analysis would be the price of the tCO_2 in organized markets.

The increment of the IRR for different price of tCO_2 scenarios:

	Price of tCO_2 (US$/$tCO_2$)				
	5	7	10	15	20
Project's IRR increment	+0.6%	+0.8%	+1,2%	+1,7%	+2,3%

Table 9: Increase on IRR with different scenarios

<u>*Step 3. Barrier analysis*</u>

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

The project is on the final stage of development. Last step to take is to sign a PPA (Power Purchase Agreement) contract to sell the energy under the "Sociedad Autoabastecida" formula described in the Mexican regulation. Since there is no premium for energy from renewable sources of any kind (like in other countries: Germany, Spain, Italy,) it is very difficult to negotiate a PPA price to assure the correct IRR of the project and obtaining financing for the project.

Moreover, for obtaining financing for the project activity a minimum equity IRR is required by investment banks. At this level, this financing would be very difficult to obtain because of this point.

The only way to make this project feasible is by means of these emission rights, which would yield an extra income for each MWh produced, and which give a more solid position with financing institutions

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

For other kind of renewable energy power generation projects, since the investment cost is much lower (like for biomass), both the sales of energy and the financing of the project are easier to obtain because of higher IRRs.

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity

There are no other activities similar to the project activity in Mexico. As said before, Bii Nee Stipa would be the first wind farm in Mexico. This kind of renewable energy source is not similar to any other technology due to its technical characteristics. Although this technology is widely used and proven, its high investment costs impeded its development in Mexico.

Sub-step 4b. Discuss any similar options that are occurring

No other activities are widely observed

Step 5. Impact of CDM registration

As explained in steps 2 and 3, the approval and registration of the project activity as a CDM activity will alleviate both economic and financial hurdles related to the project activity. The benefits associated to the registration:

- Anthropogenic greenhouse gas emission reductions
- Financial benefit of the revenue of sales of CERs
- More robust positioning for project financing

Part 2: calculation of the baseline emission rate

The baseline scenario consists on the electricity that would have otherwise been generated by the operation of the grid-connected power plants and by the addition of new generation sources.

For the calculation of the emission factor, which will yield the total equivalent CO_2 emission reduction for the whole crediting period, it is used a Combinated Margin (CM), following the approved methodology ACM0002. This Combinated Margin is divided in two parts, the Operating Margin (OM) and the Build Margin (BM). The weight of each term by default is 50% each. We think that this weight is appropriate, following the trend and forecast of future combined cycle installation in Mexico as we explain in step 3.

For the calculation of these two terms (CM and OM), the information used can be found at *Prospectiva del sector eléctrico*, prepared by *Secretaría de energia.* The latest data available is the document presented with data from 2003 and the forecast 2004-2013. This document can be found at http://www.energia.gob.mx/

Step1. Calculate the Operating Margin emission factor (EF_{OM})

The Operating Margin refers to actual generation mix by sources installed in México. The total fuel consumption for generation is divided into the different types of power plants, in order to determine what is the weighted average of actual CO_2 emissions in México.

For its calculation, the simple OM method has been selected from the four options proposed in the approved methodology ACM0002. The reason for selecting this method among the other four (simple adjusted OM, Dispatch Data Analysis OM or Average OM) is that the low-cost/must run resources in México are well below 50% of total grid generation in both the average of the five most recent years and in the long-term normals for hydroelectricity production:

	1998	1999	2000	2001	2002	2003
Hydro	27,51%	26,97%	26,21%	24,97%	23,33%	21,56%
Geo+wind	2,13%	2,10%	2,33%	2,18%	2,05%	2,15%
Nuclear	3,71%	3,84%	3,72%	3,54%	3,31%	3,06%
Coal	7,37%	7,29%	7,09%	6,75%	6,31%	5,84%
Steam	40,51%	40,05%	38,92%	37,08%	34,69%	32,06%
Combined Cycle	6,99%	6,91%	9,26%	13,47%	17,83%	23,80%
Turbogas	5,47%	6,63%	6,43%	6,18%	7,02%	6,49%
Diesel	0,34%	0,33%	0,32%	0,37%	0,35%	0,32%
Dual	5,96%	5,89%	5,72%	5,45%	5,10%	4,71%
Low-cost/must run %	33,36%	32,91%	32,27%	30,70%	28,70%	26,79%

Table 10. Source: Sener.“*Prospectiva del sector eléctrico* 2004-2013. Data from Cuadro 10”

Since data for calculating the emission factor using the simple OM method are very robust and reliable and following the definitions from the approved methodology this method can be applied to this project activity, the simple OM method has been finally chosen.

The average low-cost/must run generation in the last six years is 30.79%, below 50%. Coal is not included under the low-cost/must run category, but even adding coal generation to it, it would be always lower than 50%

Long term for hydroelectricity production is forecasted to be 10% of total generation in 2013.

For the purpose of determining the Build Margin (BM) emission factor, the spatial extent is limited to the project electricity system.

For determining the Operating Margin (OM) emission factor, it is necessary to determine the net electricity imports. There are no imports from other systems inside Mexico. The Mexican electricity imports and exports with other electric systems in other countries (imports from USA and exports to Belize) are:

	2002	2003	% of total generation
Imports (GWh)	531	71	0.05%
Exports (GWh)	344	953	0.8%
Net Exchange (GWh)	-187	882	

Table 11. Electricity imports and exports. Source: Sener. "*Prospectiva del sector eléctrico* 2004-2013"

For imports from connected electricity system located in another country, the emission factor is 0 tCO_2/MWh. Electricity exports will not be subtracted from electricity generation data used for calculating and monitoring the baseline emission rate.

The plans of transmission line construction for next years to increase the electricity export capacity are very low; there are no plans to build any transmission line to Belize. The interconnection with the US represents net imports calculated at 0 tCO_2/MWh. Future modifications of import and export capacity of electricity outside the Mexican electric system will not have any impact on the scenario for the project activity

For calculating the Simple OM, the generation-weights average emission per electricity unit (tCO_2/MWh) of all generating sources serving the system excluding the low-cost/must run generation units is used:

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j,y}}{\sum_{j} GEN_{j,y}}$$

Where:

$F_{i,j,y}$ is the consumption of fuel i (in TJ) by fuel sources j in year y
j, generating sources serving the system excluding the low-cost/must run generation units is used
$COEF_{i,j,y}$ is the CO_2 emission coefficient of fuel i in tCO_2/TJ
$GEN_{j,y}$ is the electricity in MWh delivered to the grid by the j source

This $COEF_{i,j}$ can be found in the IPCC Inventory Workbook, 1996. Data for F_{ij} can be found in TJ/day in *Prospectiva* so total annual consumption per fuel source can be calculated multiplying times 365.

Using the approved methodology AMC0002, we take data of specific energy consumption by fuel type directly calculated by CFE at *Prospectiva del sector eléctrico 2004-2013*. The emission coefficient factor by fuel type is determined in tCO_2/TJ instead of tCO_2/mass or volume.

The Operating Margin emission factor calculation for 2003 is 701.0 tCO_2/GWh (see details is Annex 3)

Step 2. Calculate the Build Margin emission factor ($EF_{BM,}$)

The building Margin emission factor is calculated as the generation-weighted average emission factor (tCO_2/MWh) of a sample of power plants, calculated is the same way as the Operating Margin. This sample of power plants can be chosen from two options proposed by the methodology. The option chosen is based on the most recent information available on plants already built at the time of submitting this PDD. For this option, the sample has to be either:

- The five power plants that have been built most recently.
- The power plants capacity additions in the electricity system that comprises 20% of the system generation (in MWh) and that have been built most recently

Most recent data available shows that in 2003, 85% of new power installed was combined cycle (natural gas) and 19% where Natural Gas turbines, which makes 99% of natural gas-fired power plants. For being conservative, it can be considered that the five last power plants installed in Mexico are Natural Gas Combined Cycle plants. Moreover, in *Prospectiva del sector eléctrico*, prepared by Sener the forecast of new power installed is based in Combined Cycle plants with a production of 54% of total generation in 2013.

Power Plant	Power installed (MW)	Technology	Location
Altamira III y IV (PIE)	1036	Combined Cycle	Tamaulipas
Tuxpan III y IV (PIE)	983	Combined Cycle	Veracruz
Mexicali (PIE)	489	Combined Cycle	Baja California
Transalta Chihuahua III (PIE)	259	Combined Cycle	Chihuahua
Naco Nogales (PIE)	258	Combined Cycle	Sonora
Transalta Campeche (PIE)	252	Combined Cycle	Campeche
Calera (bloque) (Arrendamiento)	170	Internal combustion	Zacatecas
El Verde (Arrendamiento)	103	Gas Turbine	Jalisco
Las Cruces (Arrendamiento)	100	Gas Turbina	Guerrero
Dos Bocas (bloque) (Arrendamiento)	100	Gas Turbina	Veracruz
Los Azufres	79.8	Geothermal	Michoacán
Los Azufres	26.8	Geothermal	Michoacán
Total	3856.6		

Table 12. New power plants installed. Source: Sener. *“Prospectiva del sector eléctrico 2004-2013”*

The technical characteristics of combined cycle power plants:

	Power	Efficiency	Life cycle
Combined Cycle	1 × 283	51.01	30 years
	1 × 568	51.23	30 years
	1 × 374	51.79	30 years
	1 × 750	51.82	30 years

Table 13. Technical data and characteristics of typical projects. Source: Sener. *“Prospectiva del sector eléctrico 2004-2013”*

For being conservative, we will take the least efficient factor for all new combined cycle power plants installed, this is 51.01%. This yields an emission factor of 396 tCO_2/GW. (See details in Annex 3)

Step 3. Calculate the baseline emission factor EF

The baseline emission factor is calculated as the weighted average of the Operating Margin emission factor and the Building Margin emission factor. For weighting these two factors, we consider that the default 50% each is appropriate for describing the real situation in Mexico. New wind farms will delay

the installation of new Combined Cycle while substituting both the existing mix of energies and the new Combined Cycle power plants. From the Sener forecast of energy consumption, it is remarkable to mention that 57% of generation in 2012 will come from Combined Cycle plants.

Thus, the baseline emission factor will be (701.0 + 396)/2 = 548.5 tCO_2/GWh

This baseline emission factor is the basis for calculating the emission factors for all the years in the crediting period.

Emission Reductions

The emission reduction by the project activity is the difference between the baseline emissions, project emissions and emissions due to leakage. Since there are no project emission and no emission due to leakage, the emission reductions will be the baseline emission. This baseline emission is the baseline emission factor multiplied by the energy generation.

Baseline emission factor (as of 2003): 548.5 tCO_2/GWh

Annual generation (once the 200MW are operating): 730,000 MWh

Annual baseline emission (as of 2003 baseline emission factor for 200MW): 400,405 tCO_2

Total emission reduction during the crediting period: 2.968.728 tCO_2 (See Annex 3)

Estimation of emissions reductions prior to validation

For the proposed crediting period, it is necessary to present an estimation of likely project emission reduction. For this purpose, the same methodology (simple Operating Margin calculation) will be used, with the difference of the Emission Factor (EF_y, being y each year of the crediting period) will be determined ex-post during monitoring.

For an estimation of emission reductions during the crediting period, the actual data available (2003) and forecast data from 2013 available have been used. The baseline emission factor has been calculated in the same way in these two situations. From the result of this calculation calculations, the trend of the emission factor can be obtained and thus, the emission reductions of each of the years from the crediting period. This trend has been assumed to be linear. For details of the calculation see Annex 3. The results are show in the table:

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Emission rate (tCO_2/GWh)	520.7	511.5	502.2	493.0	483.7	474.5	465.2	456.0	446.7	437.5
Annual generation (MWh)	73,000	365,000	730,000	730,000	730,000	730,000	730,000	730,000	730,000	730,000
Emission reductions(tCO_2)	38,014	186,693	366,634	359,882	353,130	346,379	339,627	332,875	326,123	319,371
Total emission reductions (tCO_2)	2,968,728									

Table 14. Emission reductions

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

>>
The determination of the baseline scenario is explained in the steps above through the application of the baseline method. The project reduces emissions related to the projected emission level in the baseline scenario.

For demonstrating the displacement of emissions otherwise generated by other power plants, it should be mentioned that the project is not part of the baseline, since lower cost alternatives are available in the country. Also, the generation coming from wind sources cannot be the basis for any electric system because it needs to have a back-up power capacity for when there is no wind. All these reasons make wind energy to be very adequate for displacing base energy from any electric grid when wind conditions are suitable. Wind energy is a zero-emission renewable energy.

Moreover, wind energy over-capacity can damage the stability of the grid, and thus provoke blackouts. An example of this situation is the Spanish Electric System, where there are over 6,000MW of wind power installed. In the Spanish Electric System, a production prediction tool and a very strong grid is needed to assure the system stability because of specific technical characteristics of wind turbines.

Due to the size of the power plant and its characteristic as non-system basis energy, the Project does not delay the addition of new capacity to the electric system nor displace old plants from generating. This is the reason why its impact on emissions results exclusively from adjustments in the operation of existing plants.

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

>>
The project boundary related to the baseline methodology is limited to where other power plants could be located. This boundary is defined by:

- System boundary: the electric Mexican system, where power plants can be connected except for areas with transmission constraints because of weak grid.
- Geographic boundary: power plants can be installed almost anywhere in the country, provided that the connection line to the grid does not make the project unfeasible because of its costs.
- Time boundary: the crediting period.

For the baseline methodology applied to the project activity, it has been only considered emission reductions of on-site emissions of all the power plants connected to the National Grid and the forecast of power plants to be connected, this is, the emissions associated to electricity generation. The emissions generated during the building process of future power plants, the emissions generated related to electricity transmission and distribution losses, the emissions related to fossil-fuel transportation, mining, water dumping, etc. have not been considered for the baseline

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

>>
Date of completion: July 2004
Name of entity determining the baseline: Gamesa Energía

SECTION C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
As mentioned in point A.1, the project is divided into phases. The operation of the whole 200 MW will start operations 12/31/2007.

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

>>
The project activity is expected to have a minimum lifetime of 20 years from starting date; this is, until end of 2025.

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

C.2.1. Renewable crediting period

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

>>
N/A

C.2.1.2. Length of the first crediting period:

>>
N/A

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
1/1/2006

C.2.2.2. Length:

>>
10 years

SECTION D. Application of a monitoring methodology and plan

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

>>
The approved monitoring methodology to be applied to the project activity will be ACM0002 *“Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”*

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

>>

This methodology has been chosen because of it to be used with the approved baseline methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources. This methodology is designed for Power plants using wind resources among others.

The methodology is applicable to the project activity because:

- It is applicable to electricity capacity addition from wind resources
- The project activity does not involve switching from fossil fuels to renewable energy at the site of the project activity
- There is enough and clear information to identify the geographic and system boundaries for the relevant electricity grid in which the project activity will be developed. Public information on characteristics of the grid is available at *Comisión Federal de Energía (CFE).*

For this purpose and following the monitoring methodology, the requirements of information to be monitored include:

- Electricity generation from the proposed project activity, measured from the control house in site. Electricity losses related to transportation will not be considered since they would be common to any power plant in operation within the project boundary
- Data needed to recalculate the Operating Margin emission factor, based on the Simple operating margin method chosen consistent with ACM0002 baseline methodology.
- Data needed to recalculate the Build Margin emission factor consistent with ACM0002 baseline methodology.

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

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

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

There are no emissions from the project activity

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

>>

There are no emissions from the project activity

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

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

1. EGy	Electricity supplied to the grid by the project	Wind farm and electricity bill	MWh	Directly measured	Hourly measure-ment and monthly recording	100%	electronic	Electricity supplied by the project activity to the grid. Double check by receipt of sales (taking into account the transportation electric losses)
2. EFy	CO_2 emission factor of the grid		tCO_2/ MWh	Calculated	yearly	100%	electronic	Calculated as the weighted average of the Operating Margin and the Building Margin emission factors
3. $EF_{OM,y}$	CO_2 Operating Margin emission factor of the grid		tCO_2/ MWh	Calculated	yearly	100%	electronic	Calculated as indicated in the AMC0002 baseline method described above
4. $EF_{BM,y}$	CO_2 Build Margin emission factor of the grid		tCO_2/ MWh	Calculated	yearly	100%	electronic	Calculated as $[\Sigma_i F_{i,f}*COEF_i]/[\Sigma_m GEN_{m,y}]$ over recently built power plants defined in the baseline methodology
5. $F_{i,y}$	Amount of each fossil fuel consumed by source	CFE	TJ	Measured	yearly	100%	electronic	Obtained from CFE. This is slightly different from approved methodology, using energy consumed by source, which is more accurate than using the local carbon content consumption per generator
6. $COEF_i$	CO_2 emission coefficient of each fuel type i	IPCC Workbook	tCO_2/ TJ	Measured	yearly	100%	electronic	Country-specific values from IPCC
7. $GEN_{j,y}$	Electricity generation of each power source	CFE	MWh/ year	Measured	yearly	100%	electronic	Obtained from CFE for each year
8. Plant name	Identification of power source for the OM	CFE	Text	Estimated	yearly	100%	electronic	Identification of plants to calculate Operating Margin emission factor

9. Plant name	Identification of power source for the BM	CFE	Text	Estimated	yearly	100%	electronic	Identification of plants to calculate Building Margin emission factor
10. $F_{j,y}$	Amount of fuel consumption for the new installed plants	CFE	TJ	Measured	yearly	100%	electronic	Amount of fuel used by new fossil-fuel fired power plants in order to determine the Building Margin
11	New capacity additions in the electric sector	CFE	Text	Measured	yearly	100%	electronic	Identification of new capacity installed, as well as the type of power plants and the estimated generation
12. GEN_{imp}	Electricity imports to the project electricity system	CFE	MWh	Measured	yearly	100%	electronic	Obtained from interconnection lines measurement with other systems apart from the project activity system
13. $COEF_{imp}$	CO_2 emission coefficient of fuels used in connected electricity systems	IPCC workbook	tCO_2/ MWh	calculated	yearly	100%	electronic	
14 GEN_{exp}	Electricity exports to the project electricity system	CFE	MWh	Measured	Yearly	100%	electronic	Obtained from interconnection lines measurement with other systems apart from the project activity system
15 $COEF_{exp}$	CO_2 emission coefficient of fuels used in electricity exports	IPCC workbook	tCO_2/ MWh	calculated	yearly	100%	electronic	

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

>>

For the baseline emissions estimation, it will be used the following formula:

Annual emission reduction = (project activity's annual electricity dispatched to the grid) * (CO_2 emission rate of the estimated baseline)

Step 1

- Determination of the Operating Margin emission factor (tCO_2/MWh)

Operating Margin emission factor for year y = (Fuel consumption by source in year y* carbon content for each source) / total energy generated in year y

- Determination of the Building Margin emission factor (tCO_2/MWh)

Average emission factor of the five last new power plants built during year y.

- Determination of the baseline emission rate (tCO_2/MWh)

Weighted average (0.5 each) of the Operating Margin emission factor and Building Margin emission factor

Step 2

- Monitoring the generation output from the project activity (MWh)

In order to monitor the generation output of the wind farm, the measurement systems from the control panel of the wind farm will be used. To check the generation output, the electricity measured will be compared with the electricity bill.

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

N/A

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

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

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

>>

D.2.3. Treatment of leakage in the monitoring plan

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

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

There is no leakage associated to the project activity

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

>>

There is no leakage associated to the project activity

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

>>
Calculation of the emission reductions generated by the project activity using the formula:

(Annual electricity dispatched to the grid) * (baseline emission rate for the period) = ERs (tCO_2e)

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored

Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1.	Low	These data will be directly used for calculation of emission reductions. Sales record to the grid and other records are used to ensure the consistency. In order to double check monitoring data, the electricity losses related to transportation to the national-grid, will not be taken into account (all power plants need to evacualte the electricity, so this situation is actually conservative)
Others	Low	Default data (for emission factors) and IEA statistics (for energy data) are used to check the local data.

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

>>
Both project participants, Gamesa Energía and CISA, will monitor the performance of the project activity related to carbon emission. Since no leakeage is expected from the project activity, the emission reductions will be monitored by installing the adequate and calibrated meters according to Mexican standards.

With suitable meters, emission reductions will be calculated by means of measuring the wind farm electricity net production whose emissions are 0.

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

>>
Javier López-Huerta from Gamesa. See contact information in Annex 1

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

>>

There will not exist any GHG emission related to the project activity

E.2. Estimated leakage:

>>

There is no leakage expected related to the project activity

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

>>

The sum of E.1 and E.2 is zero. There will be no project activity emissions

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

>>

Net annual generation of the project activity: 730,000 MWh
Calculated Operating Margin emission factor (for 2003): 701.0 tCO_2/GWh
Calculated Building Margin emission factor (for 2003): 396 tCO_2/GWh
Calculated baseline emission rate (see annex 3): 548.5 tCO_2/GWh

Total emission reductions of the baseline for the crediting period: 2,968,728 tCO_2

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

>>

Since the project activity's emissions are zero, the emission reductions of the project activity are 2,968,728 tCO_2

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

>>

See Annex 3 for detailed calculations

		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
(1)	Emission rate(tCO_2/GWh)	520.7	511.5	502.2	493.0	483.7	474.5	465.2	456.0	446.7	437.5
(2)	Annual generation (MWh)	73,000	365,000	730,000	730,000	730,000	730,000	730,000	730,000	730,000	730,000
(1)*(2)	Emission reductions(tCO_2)	38,014	186,693	366,634	359,882	353,130	346,379	339,627	332,875	326,123	319,371

Table 15: Emission reductions during the crediting period

Total emission reductions of the project activity for the crediting period: 2,968,728 tCO_2

SECTION F. Environmental impacts

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

>>

As part of the intensive documentation on the analysis of the environmental impacts, an abstract of the executive summary of this study is presented:

Title: “*Manifestación del impacto ambiental. Modalidad particular: Sector Eléctrico*”

Abstract

Identification and evaluation of environmental impacts. Quantitative evaluation, showing total negative impacts and benefits, as well as inevitable, irreversible and cumulative impacts of the Project. The environmental impacts that the project will generate during the different project phases will be listed to the detail of all kind of activities and environmental factors to which they will cause major effects.

The study will also propose some measures to mitigate and compensate the identified negative effects.

The construction and operation of Bii Nee Stipa Wind Farm is focused on strengthening the National Electric System, which is considered to be a key project for the social and financial development of the region. The region in which the project is located is considered one of the poorest regions in the country.

The development of the building Works and future installations will not have important effects in the environment, since most of the effects have small impact and will affect for a short period of time. These effects are basically related to the wind turbine installation.

The vegetation in the area was substituted by grassland for livestock use and land for cultivation. This is the reason why most part of the fauna emigrated. From the study performed, the activities to be carried out will not generate any negative impact on these elements.

For the operating phase, there are no emissions to the atmosphere and there is no residual water dumping. Energy produced from wind resources is considered one of the cleanest energies. Also the project accomplishes with public policies defined in *Planes Federal y Estatal de desarrollo*. The project does not interfere in urban development and does not affect to the natural protected area of *Parque Ecológico Regional del Istmo*, which is located eight kilometers away from the site of the wind farm.

From all these reasons, it is considered that Bii Nee Stipa wind farm Project is beneficial for the region from a social and financial point of view and that it is feasible from an environmental point of view.

Environmental Impact Matrix

Parque Eólico Bii Nee Stipa II

ACTIVIDADES PROPUESTAS O ACCIONES QUE MODIFIQUEN AL MEDIO AMBIENTE

		ETAPA DE PREPARACION			ETAPA DE OPERACION Y MANTENIMIENTO					
		Despalme	Generación de Residuos No peligrosos	Recolección de residuos solidos	Generación de ruido	Abastecimiento materiales	Derrames de residuos peligrosos	Generación de Residuos Peligrosos	Recolección permanente residuos	Mantenimiento de maquinaria y
	SUELO:									
E	Superficie del suelo	-3								
	Perfil del suelo									
T	Geomorfologia	-2								
	Estabilidad									
EN	Calidad del suelo		-3	6			-5	-5		
	AGUA SUPERFICIAL:									
	Escurrentia	-3								
	Infiltración	-4								
I	Variación del flujo	-2								
	AGUA SUBTERRANEA:									
	Interaccion con la superficie									
B	Manto freático									
	Variación del flujo									
	Calidad del agua						-8			
	AIRE:									
A	Calidad del aire	-4	-4	-2			-2	-1		
	FLORA:									
	Vegetación nativa									
	Cubierta vegetal	-4								
	Microflora	-4								
O	Sucesión vegetal									
	FAUNA:									
I	Aves									
	Mamíferos menores	-3								
	Reptiles	-4								
D	Habitats									
	Corredores									
	MEDIO SOCIAL:									
E	Calidad de vida	9	2	10	-4	3	-7	-3	10	
	Espacio agricola	-8								
	Espacio urbano		-2							
M	Salud		-2	10	-4		-8			
	Seguridad						-6		7	
	Demanda de empleo	8	8			4			6	6
	Transito	-1				-3		-3	-1	
	Paisaje	-7		10					10	10

OBSERVACIONES

1.- En esta matriz se indica la magnitud del impacto

2.- La magnitud del impacto se indica con números del 1 al 10, donde 1 es la menor y 10 la mayor

3.- El signo (-) indica impacto negativo, los números sin signo indican impacto positivo

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

>>
N/A

SECTION G. Stakeholders' comments

>>

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

>>
The process followed for obtaining local stakeholders comments consisted on contacting the main agents related with the project activity, including the Climate Change Office in Mexico (*Oficina de Cambio Climático Mexicana*).

The first agent to be consulted was the *Presidencia Municipal de El Espinal*, municipal authority were the wind farm would be placed. The municipality has expressed its deep interest in wind farm development and the have issued a No Objection Letter.

The Landowners of the terrains where the wind farm will be placed have given their support to the Project. They have already signed all the land lease agreements for installing the wind turbines.

The *Secretaría de Medio Ambiente Mexicana (SEMARNAT)*, this is, the environmental authority, has authorized the execution of the project activity after preparing a report where the environmental impact is analyzed. Thus, an official Environmental License has been obtained for the whole 200 MW.

The project developers have joined the recently constituted *Asociación Mexicana de Energía Eólica (Mexican wind energy association)*, to which inauguration the *Secretario de Energía* assisted, giving his support to wind energy development in Mexico.

Moreover, the project developers have participated in several conferences and round tables in Oaxaca and in Mexico D.F. *(Coloquio Internacional Corredor del Istmo)*, presenting their project and obtaining the support of all agents attending to these conferences.

The *Comisión Nacional para el Ahorro de la Energía (National Energy Saving Comission)* is promoting the wind energy development in Mexico. An example of this initiative is the Mexico-UE Seminar for the development of energy efficiency and renewable energies that took place in February 2005, where the project developers participated actively.

The *Comisión Federal de Electricidad (CFE)* has prepared an interconnection feasibility study, informing the required infrastructure for this end.

The *Comité Mexicano para Proyectos de Reducción de Emisiones y de Captura de Gases de Efecto Invernadero (Mexican Commission for Emission Reduction Projects and Greenhouse Gas capture)* has issued the No Objection Letter as the initial procedure prior to the Acceptance Letter

As a summary, it can be concluded that the main agents in the energy and environmental sectors in Mexico, as well as all local parties involved after public consulting accomplished have given their support to the project activity

G.2. Summary of the comments received:

>>

All the comments received have been very positive and the general opinion is very favourable for the wind development in the area. Letters of No Objection have been received as mentioned above. The developer has been invited to several seminars to present their project due to the interest of the sector in this project.

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

>>

No opinion against the project activity has been received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

N/A

Annex 3

BASELINE INFORMATION

Total Fuel consumption:

2003: 1,608,190 TJ
2013: 2,303,555 TJ

	(1)	(2)	(3)	(2)*(3)*(44/12)	(5)	(6)	(7)	(6)*(7)*(44/12)
	2003				2013			
	Fuel share	Fuel consumption TJ	Carbon content (tC/TJ)	Emission CO_2 tCO_2	Fuel share	Fuel consumption TJ	Carbon content (tC/TJ)	Emission CO_2 tCO_2
Fuel Oil	42,2%	678,656	21.1	52,505,366	25,1%	578,192	21.1	44,732,811
Natural Gas	37,0%	595,030	15.3	33,381,200	60,6%	1,395,954	15.3	78,313,038
Diesel	1,6%	25,731	20.2	1,905,812	0,3%	6,911	20.2	511,850
Coal	19,2%	308,772	25.8	29,209,877	14,0%	322,498	25.8	30,508,282
Total		1.608.190		117,002,255		2,303,555		154,065,982

Table 16. Fuel consumption per fuel type. Source: *Prospective del sector eléctrico 2004-2013*

Generation by sources:

	2003	2013
Thermal	40.0%	18.7%
Combined cycle	27.0%	45.1%
Hydro	10.1%	7.2%
Coal	8.2%	5.6%
Dual	6.8%	6.0%
Nuclear	5.2%	2.9%
Geo+wind	2.7%	3.7%
Total	203,555 GWh	346,387 GWh

Total % under methodology	
2003	2013
18%	13.8%

Total low/cost-must run+imports (GWh)	
2003	2013
166,915	298,586

Table 17. Generation by sources. Source: Prospectiva del sector eléctrico 2004-2013

Baseline calculations:

- Operating Margin:

Operating Margin = total CO2 emission / total generation under baseline
Operating margin 2003 = 117,002,255 / 166,915 = 701.0 tCO_2/GWh
Operating Margin 2013 = 154,065,982 / 298,586 = 516.0 tCO_2/GWh

- Building margin:

Worst-case efficiency of new Combined Cycle plants installed is 51.01%. The carbon content in Natural Gas is 15.3 x (44/12) =56.1 tCO_2/TJ,
emission factor:
$(56.1\ tCO_2/TJ \times 3.6\ TJ/GWh_{therm}) / 0.5101 GWh_{elec}/GWh_{therm} = 396\ tCO_2/GWh$

Thus:

	2003	2013
Total Generation in baseline (GWh)	166,915	298,589

Operating margin (tCO_2/GWh)	701.0	516.0
Build margin (tCO_2/GWh)	396.2	396
Emission factor (tCO_2/GWh)	548.5	456.0
Annual increment (tCO_2/GWh)	-9.2	

Table 18. Evolution of the emission factor from 2003 to 2013

The Building Margin is considered to remain constant during the crediting period, due to Combined Cycle forecast installation. This assumption is conservative. The emission factor is 548.5 tCO2/GWh in 2003 and is estimated to be 437.5 tCO2/Gwh in 2015 (548.5 – 9.2×12). We have considered estimating a linear reduction of –9.2 tCO2/GWh per year, which is realistic following the Combined Cycle power plant installation forecast from CFE.

This means that for 2006 (first year of operation) the Emission factor is expected to be:
Emission factor (2006) = 524.6 – 9.2*3 = 496.8 tCO_2/GWh

The same formula is used to estimate the emission factor for the rest of the years. The results:

		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
(1)	Emission rate (tCO_2/GWh)	520.7	511.5	502.2	493.0	483.7	474.5	465.2	456.0	446.7	437.5
(2)	Annual generation (MWh)	73,000	365,000	730,000	730,000	730,000	730,000	730,000	730,000	730,000	730,000
(1)*(2)	Emission reductions(tCO_2)	38,014	186,693	366,634	359,882	353,130	346,379	339,627	332,875	326,123	319,371

Table 19. Emission reductions during the crediting period

So the total emission reductions for the crediting period:

Total emission reductions: 2.968.728 tCO_2

Annex 4

MONITORING PLAN

As regard monitoring and assessment of real emission reductions, the wind farm will have an adequate meter, according to Mexican rules, in order to know the net electricity production.

At the end of every year, one specialised technical will be contracted to register the wind farm net production, which will be the basis for the assessment of avoided emissions relative to the corresponding production.

In order to properly calculate the emission factor, a consult to CFE (Comisión Federal de Electricidad) about Electric Sector Prospective will be done.

Wind farms have the advantage of their 0 emission level, therefore estimation of emission reduction is very simple.