



**CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006**

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**SECTION A. General description of project activity****A.1 Title of the project activity:**

Loreto Bay Wind Farm Project
Version 1
17/05/2007

A.2. Description of the project activity:

The Loreto Bay Wind Farm Project (LBWFP) is a 20 MW wind project that consist of ten 2 MW wind turbines. It is under development by Econergy in the state of Baja California Sur, Mexico. The wind farm is projected to have an annual capacity factor of 20% producing on average 35.6 GWh per year. The power from the wind farm will be supplied to four Municipalities in the state of Baja California Sur, Los Cabos, La Paz, Loreto and Comondú as well as to the facilities of the Village of Loreto Bay, owned by Loreto Bay Company. The Villages of Loreto Bay will be a seaside community of approximately 6,000 homes with mixed-use buildings, narrow, walkable streets and authentic Baja architecture that exists in harmony with its surroundings.

The project activity involves the development, design, engineering, procurement, financing, construction, operation, maintenance and monitoring of the Loreto Bay plant's facilities.

Even though Mexico has significant fossil fuel reserves, it is necessary to continue promoting the use of alternative sources of energy, taking advantage of the vast national potential for energy generation through renewable sources, such as solar, wind, mini-hydro and biomass. There are many wind potential regions in Mexico such as: Baja California, Baja California Sur, Zacatecas, Quintana Roo, Hidalgo and Tlaxcala, with a potential capacity between 3,000 and 5,000 MW.

CDM projects have, among others, the main objective of assisting the host country in achieving sustainable development. In this content, Baja California Sur will benefit from the project and will contribute to sustainable development in the following way:

- diversification of primary energy sources, reducing the risks to energy supply and stabilizing energy prices in the medium and long terms and improving the use of renewable resources;
- no contamination and erosion in the soil;
- avoidance of installation and operation of carbon plants and emission of greenhouse gases;
- 100 employees contracted during the construction and 10 during operation phases;
- revenue for the local economy through local employment, tax and land lease payments;
- this type of renewable energy project based on wind is not common in Mexico and therefore supporting the development of this industry will assist building capacities in Mexico, through advanced technology transfer from industrialized countries. The LBWFP will contribute to the technology transfer process and will foster manufacturing of wind turbines and related equipment in Mexico.



Concluding, LBWFP will allow Mexico to foster regional development that in turn will facilitate a better management of the natural resources, reducing environmental pollution and improving the quality of life of the society.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity (ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
United Kingdom of Great Britain	Econergy International Corporation UK Limited (private entity)	No

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

Mexico

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

Baja California Sur

A.4.1.3. City/Town/Community etc:

Comondú / Matancitas

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

It is located on the pacific coast of southern Baja California Sur near the municipality of Ciudad Constitucion and close to the deep sea port town of Puerto San Carlos, as shown below.

coordinate



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

Sectoral Scope 1: Energy Industries (renewable/non renewable sources).

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

Wind-driven power plants converts wind energy to electric power by wind turbine. It is based on making useful a dynamic flow of changing continuance and horizontal displacement. The amount of energy obtained is three times proportional to wind speed, which shows how important this factor is.



Wind generators take advantage of wind speed going between 5 and 20 meters per second. With speeds lower to 5 meters per second, the wind generator will not operate, and with speeds over the higher limit it must stop in order to avoid equipment injury.

The 10 wind turbines to be installed for the LBWFP project are manufactured by DeWind (Germany company), with a nominal power output of 2 MW, achieving a total installed capacity of 20 MW. The turbines make use of 100 meter towers and 90 meter rotors. The project is expected to generate approximately 35.6 GWh per year. Also, approximately 5 km of 115 kV transmission lines will be installed between the substation and aero-generators.

DeWind has proven in the past that it can design, manufacture, and operate wind turbines with good success. The most recent D8 model which is a 2MW has been successfully operating for 4 years with 41 machines in operation. This model has experienced zero gearbox failures which is fairly unique in the industry. The wind site where the project is operating has Class IV winds which are much lower than the design conditions of the turbine which will provide a forgiving operating environment, further favoring the conservative German engineering and design of the DeWind Turbine.

The project will be signing an O&M agreement with DeWind for their 2-year warranty period which can be extended for up to 5 years at our option. DeWind related companies operate hundreds of MWs of wind turbines in Germany. The O&M agreement contains typical and appropriate guarantees from the operator. This includes a 97% availability guarantee and a 98% power curve performance guarantee.

DeWind will be operating the turbines and providing maintenance and will have contractual responsibility for the equipment performance. The local employees will attend DeWind training seminars in Texas, in order to eventually take over the operation and maintenance of the equipments.

DeWind will transfer the following skills to Loreto Bay Project:

- Wind energy measurement and prediction, and electric energy output estimate;
- Wind turbine assessment according to site conditions;
- Wind farm construction and operation, environmental evaluation and monitoring of wind farms.

Wind Feasibility studies were performed by Jack Kline and 3Tier Environmental Forecast. Jack Kline and 3Tier are leaders in their field and have provided conservative estimates of the long-term wind resource and the performance of the DeWind turbines. The wind resource at the site is very consistent year to year and the estimates are based on the average wind resource. There is significant conservatism built into the DeWind performance curves (which is why they will guarantee 98%) and based on their previous turbine model, the D8, it is expected a 5% increase in performance which will help offset risk associated with the wind resource.

TIC-The Industrial Company of Steamboat Springs, Colorado is fully capable of performing all construction aspects of a major wind farm, from foundations to turbine and tower erection, as well as the complete balance-of-plant installations and electrical collection systems. TIC has successfully installed more than 1,000 wind turbines units throughout the United States in various sizes. This will be the first wind project performed by the Mexico Division of TIC, MexTICa S.A. de C.V. They will be supervised by the experienced US staff.



SACMAG de Mexico, S.A. de C.V. as a subcontractor will perform the final civil, electrical and mechanical engineering.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

For the first crediting period the total estimation of emission reductions is:

Years	Annual estimation of emission reductions in tonnes of CO ₂ e
01/10/2008	6,452
2009	25,810
2010	25,810
2011	25,810
2012	25,810
2013	25,810
2014	25,810
31/09/2015	19,357
Total estimated reductions (tonnes of CO₂e)	180,669
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO₂e)	25,810

A.4.5. Public funding of the project activity:

There is no Annex I public funding involved in the LBWFP activity.

SECTION B. Application of a baseline and monitoring methodology

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

“Version 6 of ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources”;

“Version 3 of the tool for demonstration and assessment of additionality”.

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

The ACM0002 is applicable to LBWFP as it is a grid-connected renewable power generation project activity under the following conditions:

- Applies to electricity capacity additions from wind sources;
- Does not involve switching from fossil fuels to renewable energy at the site of the project activity;



- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.

B.3. Description of the sources and gases included in the project boundary.

	Source	Gas	Included?	Justification / Explanation
Baseline	Grid Electricity generation	CO ₂	Yes	Project participants shall only account CO ₂ emissions from electricity generation in fossil fuel fired power that is displaced due to the project activity.
		CH ₄	No	
		N ₂ O	No	
Project Activity	There is no emission of the project activity	CO ₂	No	There is no emission to be accounted for wind projects.
		CH ₄	No	
		N ₂ O	No	

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity. The baseline scenario is determined analyzing data from the electricity grid to which the project causes emission reductions. The emission reductions will occur within the Baja California Sur grid. Annex 3 provides details of the Mexican grid.

The project activity follows the steps provided by ACM0002. For the calculation of the operating margin emission factor in the STEP 1, the calculation method chosen was: (b) *Simple Operating Margin*, since data are not available for the application of the preferred method – (c) *Dispatch Data Analysis OM*. For the calculation of the build margin emission factor in the STEP 2, the Option 1 was chosen.

B.5. 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 (assessment and demonstration of additionality):

Additionality was determined using the “Tool for the demonstration and assessment of additionality (version 3)”. The CDM consolidated tool to determine additionality, includes the following steps:

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations
Sub-step 1a. Define alternatives to the project activity

The following alternatives have been considered:

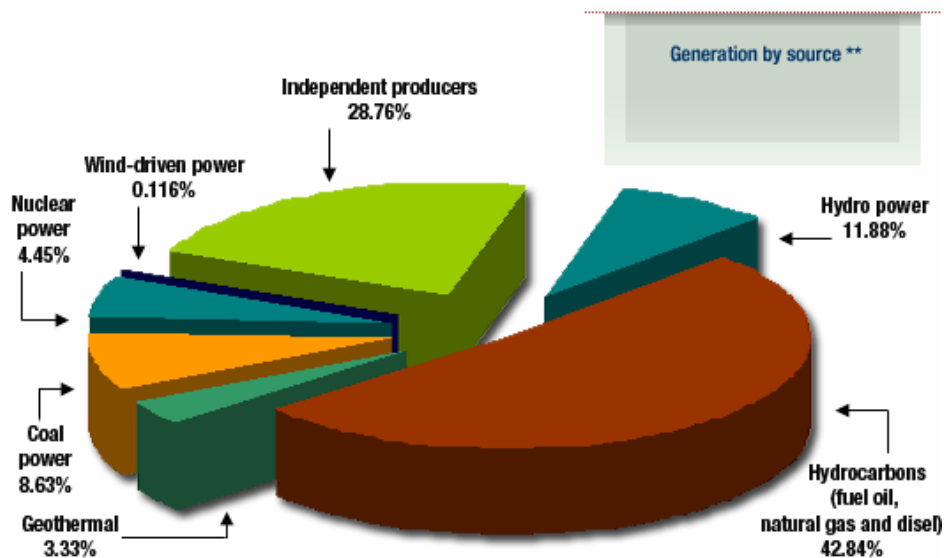
Alternative 1: The proposed project activity undertaken without being registered as a CDM project activity.

Alternative 2: Continuation of the current situation (no project activity or other alternatives undertaken).

By the end of March 2007, CFE (Comisión Federal de Electricidad), including power independence producers, had an effective rated capacity to generate electricity of 48,259.59 MW, out of which 10,321.90 are generated by Power Independent Producers (thermal power plants), 10,669.98 MW are generated by hydro power plants, 22,257.86 MW by CFE thermal power plants consuming hydrocarbons; 2,600.0 MW by coal fired plants; 959.50 MW by geothermal power plants; 1,364.88 MW by nuclear power plants and 85.48 MW by wind-driven power plants. CFE is a company that provides services of generation, transmission and distribution of electrical power services to 24.5 million customers, nearly 80 million Mexicans. New power installation is planned by CFE to be mainly from Combined Cycle power plants. The plans for renewable energy projects are limited.

Generation by sources

Source: CFE (<http://www.cfe.gob.mx/en/LaEmpresa/generacionelectricidad/>)



Sub-step 1b. Consistency with mandatory laws and regulations

Both alternatives comply with Mexican legislation and regulations.

Step 3. Barrier analysis

The proposal project activity faces barriers that prevent the implementation of this type of project activity and do not prevent the implementation of at least one of the alternatives.

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

Investment Barrier:



There are no private wind projects in Mexico so the offtakers and finance companies have been hesitant to get involved.

Producers have to pay for their own transmission lines if they want to connect to the grid.

Technological barrier:

There is a supply shortage for wind turbines in the industry causing price increases over the past two years.

Additionally, the electrical distribution system in the region is stressed. So getting commitments for transmission access has been difficult.

Barriers due to prevailing practice:

Mexico is rich in oil and gas reserves; this clearly explains why the prevailing practice in Mexico is fossil fuel-fired electricity generation as of today, and this path is envisaged to continue, as the country still has a vast gas potential unused for electricity generation, which is to be further explored in the coming years.

Today, oil-fired power plants still account for almost 50% of Mexican electricity generation, compared to 11% gas-fired and 10% coal-fired plants. However, the government is encouraging brownfield private investments to convert the majority of these plants into natural gas. Official estimates for the year 2012 forecast the share of natural gas generation as 63% of the total power production in the country, while the use of fuel oil is expected to decrease by 25%.

Moreover, the regulations for renewable energy projects in Mexico are evolving and have not been tested on many projects.

Renewable-energy producers also are faced with certain wariness in the population at large, a problem that wind-power operators encounter in particular when they try to obtain land-use permits.

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

In case of Alternative 2 (continuation of current situation), there will be no effect of the identified barriers as this alternative represents a continuation of current practices (development of thermal power plants in Mexico).

Step 4. Common practice analysis

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

There are only two facilities generating from wind in Mexico:

- La Venta: located in Oaxaca and started operation in 10 November 1994 with an installed capacity of 1.58 MW;
- Guerrero Negro, located in Baja California Sur and started operation in 10 April 1982 with an installed capacity of 0.6 MW.

Then, the LBWFP is not comparable to these power plants, comparing the technology used.

The main driver for other activities similar to the proposed project activity is the CDM mechanism that provides additional income and makes these projects viable.

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



As shown in *Sub-step 4a*, no similar activities are observed and commonly carried out in Mexico without the CERs revenue.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The emission reduction (ER_y) by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as follows:

$$ER_y = BE_y - PE_y - L_y$$

Where the baseline emissions (BE_y in tCO₂) are the product of the baseline emissions factor (EF_y in tCO₂/MWh) calculated in Step 3, times the electricity supplied by the project activity to the grid (EG_y in MWh) minus the baseline electricity supplied to the grid in the case of modified or retrofit facilities ($EG_{baseline}$ in MWh), as follows:

$$BE_{y} = (EG_{y} - EG_{baseline}) * EF_{y}$$

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	Emission factor / EF_y
Data unit:	tCO ₂ /MWh
Description:	CO ₂ emission factor of Baja California Sur subsystem
Source of data used:	CFE (Comisión Federal de Electricidad) http://www.cfe.gob.mx/es/
Value applied:	0.725
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated <i>ex-ante</i> as weighted sum of the OM and BM emission factors, as explained in section B.6.3 and Annex 3.
Any comment:	None

B.6.3 Ex-ante calculation of emission reductions:

In order to calculate the ex-ante estimation of emission reductions for the first crediting period, estimated figures were used for parameters that are not available when validation is undertaken or that are monitored during the crediting period.

No potential emission sources of leakage and project emissions were identified for this project.

Thus,

$$ER_y = BE_y$$

$$BE_{y} = (EG_{i,y} - EG_{baseline,i}) * EF_{i,y}$$



The project activity does not involve retrofits or modifications to existing facilities.
Thus, $EG_{baseline,ex,i}=0$.

Then, $BE_y = EG_y * EF_y$

Where:

$EG_y = 35,600 \text{ MWh}$

The baseline emission factor (EF_y) is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors. Calculations for this combined margin were based on data from an official source and made publicly available.

Power plant capacity additions registered as CDM project activities were excluded from all calculations below (subsets j, m, n below).

STEP 1. Calculate the Operating Margin emission factor ($EF_{OM,y}$)

Option (a) *Simple OM*, was chosen since the preferable choice (c) *Dispatch Data Analysis OM* would face the barrier of data availability in Mexico and low-cost/must run resources constitute less than 50% of total grid generation in average of the five most recent years.

The provided information comprised years 2003, 2004 and 2005, and is the most recent information available at this stage. The CFE data as well as the spreadsheet data with the calculation of emission factors have been provided to the DOE (Designed Operational Entity) and are indicated in Annex 3.

According to the methodology, the Simple OM Emission Factor is determined using the following equation:

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

Finally, to determine the baseline *ex-ante*, the mean average among the three years is calculated, finally determining the EF_{OM} :

$$EF_{OM\ 2003_2005} = \frac{EF_{OM,2003} * \sum_j GEN_{j,2003} + EF_{OM,2004} * \sum_j GEN_{j,2004} + EF_{OM,2005} * \sum_j GEN_{j,2005}}{\sum_j GEN_{j,2003} + \sum_j GEN_{j,2004} + \sum_j GEN_{j,2005}} = 0.746$$

STEP 2. Calculate the Build Margin emission factor ($EF_{BM,y}$) as the generation-weighted average emission factor (tCO₂/MWh) of a sample of power plants m , as follows:



$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m}}{\sum_m GEN_{m,y}}$$

Option 1 was chosen to calculate the Build Margin emission factor $EF_{BM,y}$ *ex-ante* based on the most recent information available on plants already built for sample group m at the time of PDD submission. The sample group m consists of either the five power plants that have been built most recently, or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. Then, the sample group comprises the second option.

$$EF_{BM,2005} = 0.665$$

STEP 3. Calculate the baseline emission factor EF_y as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

$$EF_y = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y}$$

For wind and solar projects, the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature).

$$EF_{2003-2005} = 0.75 * 0.746 + 0.25 * 0.665 = 0.725 \text{ tCO}_2\text{e/MWh}$$

Therefore:

$$BE_y = 35,600 * 0.725 = 25,810 \text{ tCO}_2\text{e}$$

For the first crediting period, the estimated emission reduction in year y is:

$$ER_{,y} = BE_y = 25,810 \text{ tCO}_2\text{e}$$

Loreto Bay Wind Farm Project									
Item	2008	2009	2010	2011	2012	2013	2014	2015	CERs
Installed Capacity (MW)	20	20	20	20	20	20	20	20	
Estimated net generation (MWh)	8,900	35,600	35,600	35,600	35,600	35,600	35,600	26,700	
Baseline emission factor (tCO ₂ /MWh)	0.725	0.725	0.725	0.725	0.725	0.725	0.725	0.725	
GHG emissions reductions (tCO ₂)	6,452	25,810	25,810	25,810	25,810	25,810	25,810	19,357	180,669

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emission (tonnes of CO ₂ e)	Estimation of baseline emission (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of overall emission reductions (tonnes of CO ₂ e)
01/10/2008	0	6,452	0	6,452
2009	0	25,810	0	25,810
2010	0	25,810	0	25,810



2011	0	25,810	0	25,810
2012	0	25,810	0	25,810
2013	0	25,810	0	25,810
2014	0	25,810	0	25,810
31/09/2015	0	19,358	0	19,358
Total (tonnes of CO ₂ e)	0	180,669	0	180,669

B.7 Application of the monitoring methodology and description of the monitoring plan:
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B.7.1 Data and parameters monitored:

Data / Parameter:	Electricity quantity / EG_v
Data unit:	MWh
Description:	Electricity supplied to the connected grid by the project.
Source of data to be used:	Econergy and CFE
Value of data applied for the purpose of calculating expected emission reductions in section B.5	35,600
Description of measurement methods and procedures to be applied:	Directly measured during the crediting period. This data will be archived electronically and according to internal procedures, until 2 years after the end of the crediting period.
QA/QC procedures to be applied:	This data will be directly used for calculation of emission reductions. Sales record to the grid and other records are used to ensure the consistency and will be monitored monthly.
Any comment:	Electricity supplied by the project activity to the grid. Double check by receipt of sales.

B.7.2 Description of the monitoring plan:
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The measurers of electricity dispatched will be installed at the Loreto Bay Wind Farm's Substation which is the point of connection of the Loreto Bay Power Plant to the Baja California Sur isolated grid.

The meter equipments will be provided by the Utility CFE and calibrated by them according to their procedures. The project participant will install its own meter to check against the utility meter.

Since no leakage nor any off-grid emissions change were identified in this project activity, there will be no need to monitor the variables for these cases.



Data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

The date of completion the application of the methodology to the project activity study is 17/06/2007.

The person/entity determining the baseline is as follows:

Econergy Brasil Ltda, São Paulo, Brazil

telephone: +55 (11) 3555-5700

Contact person: Mrs. Francesca Maria Cerchia.

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:**

01/10/2008

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

40 years and 0 months

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:**

01/10/2008

C.2.1.2. Length of the first crediting period:

7 years and 0 months

C.2.2. Fixed crediting period:**C.2.2.1. Starting date:**

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C.2.2.2. Length:

Left blank on purpose

**SECTION D. Environmental impacts****D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:**

The Environmental Impact Assessment (EIA) has been performed by Universidad Autónoma de Baja California SUR – UABCS, and was submitted to the Secretariat of the Environment and Natural Resources - SEMARNAT (Secretaría de Medio Ambiente y Recursos Naturales).

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

The environmental impacts were not considered significant by the project participants, according to the EIA.

There will be no transboundary impacts resulting from the Loreto Bay Wind Farm. All the relevant impacts occur within Mexican borders and have been mitigated to comply with the environmental requirements for project's implementation. Therefore this project will not affect by any mean Mexico's neighboring countries, except for the reduction of global emission of GHG.

SECTION E. Stakeholders' comments**E.1. Brief description how comments by local stakeholders have been invited and compiled:****E.2. Summary of the comments received:**

No comments have been received.

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

No comments have been received.

**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

Organization:	Econergy International Corporation UK Limited
Street/P.O.Box:	22 Billiter Street
Building:	-
City:	London
State/Region:	-
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Represented by:	Mr. Philip Doyle
Title:	Managing Director
Salutation:	Mr.
Last Name:	Doyle
Middle Name:	-
First Name:	Philip
Department:	-
Mobile:	-
Direct FAX:	+44 (0) 20 3102 3401
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Personal E-Mail:	doyle@econergy.com

Annex 2**INFORMATION REGARDING PUBLIC FUNDING**

There is no Annex I public funding involved in the LBWFP activity.

Annex 3

BASELINE INFORMATION

Considering the planning and operation of the Electric National System (SEN – Sistema Eléctrico Nacional) of Mexico, Electricity Federal Commission (CFE - Comisión Federal de Electricidad), divided it in nine areas of generation and transmission. Then, the regional electric systems function more efficiently and economically. They are: Northeast, Northwest, North, West, Central, East, Peninsular, Baja California and Baja California Sur. However, both regions of the Baja California Peninsula are isolated systems, since their interconnection with the rest of national grid is not justified in technical and economical terms.

Electric National System of Mexico

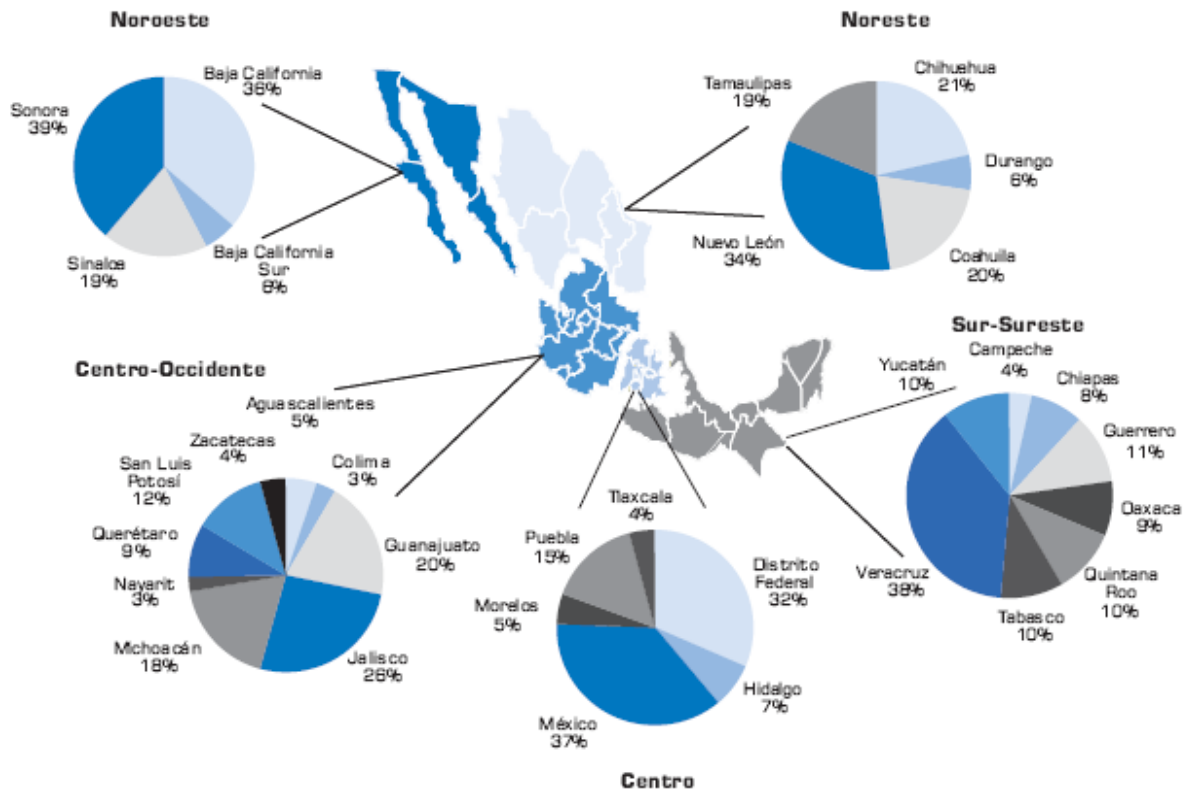
Source: *Programa de Obras e Inversiones del Sector Eléctrico (POISE) 2004-2013*
(<http://www.cfe.gob.mx/>)



On the other hand, Mexico has five regions identified, that are in conformity to the geographic division of Mexico: Northeast (Noreste), Northwest (Noroeste), Central-West (Centro-Occidente), Central (Centro) and South-Southeast (Sur-Sureste), as shown below.

Regional structure of the electricity sent to the grid by each state (average percentage participation in 2005)

Source: *Prospectiva del Sector Eléctrico 2005-2014*; Secretaría de Energía SENER; México, 2006 (<http://www.energia.gob.mx>)





Emission factor for Baja California do Sur according to ACM0002

2005								
Name of the Power Plant within Baja California Sur	Start of operation	Type of technology and combustible	Electricity generation (GWh)	Efficiency	Fuel consumption (MWh)	Fuel consumption (TJ)	Fuel EF (tCO ₂ /TJ)	Emission (tCO ₂)
Agustin Olachea	16-Aug-91	oil/diesel (IC)	586	46%	1,269,406	4,570	77.37	350,019
Baja California Sur I	28-Jul-05	oil/diesel (IC)	121	46%	262,113	944	77.37	72,274
Punta Prieta	1-Aug-79	oil (CT)	634	34%	1,852,176	6,668	77.37	510,710
Tres Virgenes - isolated system	-	GEO	37	-	-	-	-	-

Baja California do Sur	Electricity generation (GWh)	Electricity delivered to the grid (GWh)	Emissions (tCO ₂)	EF (tCO ₂ /MWh)
Operating Margin	1,341	1,205	933,002	0.774
Build Margin - 20%	707	635	422,293	0.665

2004								
Name of the Power Plant	Start of operation	Type of technology and combustible	Electricity generation (GWh)	Efficiency	Fuel consumption (MWh)	Fuel consumption (TJ)	Fuel EF (tCO ₂ /TJ)	Emission (tCO ₂)
Agustin Olachea	16-Aug-91	oil/diesel (IC)	515	46%	1,115,604	4,016	77.37	307,611
Punta Prieta	1-Aug-79	oil (CT)	623	34%	1,820,041	6,552	77.37	501,849
Tres Virgenes - isolated system	-	GEO	30	-	-	-	-	-

Baja California do Sur	Electricity generation (GWh)	Electricity delivered to the grid (GWh)	Emissions (tCO ₂)	EF (tCO ₂ /MWh)
Operating Margin	1,138	1,100	809,459	0.736

2003								
Name of the Power Plant	Start of operation	Type of technology and combustible	Electricity generation (GWh)	Efficiency	Fuel consumption (MWh)	Fuel consumption (TJ)	Fuel EF (tCO ₂ /TJ)	Emission (tCO ₂)
Agustin Olachea	16-Aug-91	oil/diesel (IC)	421	46%	911,979	3,283	77.37	251,464
Punta Prieta	1-Aug-79	oil (CT)	600	34%	1,752,848	6,310	77.37	483,321
Tres Virgenes - isolated system	-	GEO	33	-	-	-	-	-

Baja California do Sur	Electricity generation (GWh)	Electricity delivered to the grid (GWh)	Emissions (tCO ₂)	EF (tCO ₂ /MWh)
Operating Margin	1,021	1,017	734,786	0.722

EF_{OM}	0.746						
EF_{BM}	0.665	coal	98.0%	TG	35%	GEO	Geothermic
EF_{CM}	0.725	natural gas	99.5%	gas (CC)	52%	IC	internal combustion
		oil	99.0%	CT	34%	CT	conventional thermic
		diesel	99.0%	diesel (CC)	46%	TG	Turbogas
						CC	Conventional cycle

Sources:

- Prospectiva del Sector Eléctrico 2005-2014 (Tables 3 and 4, Cuadro 39); Prospectiva del Sector Eléctrico 2004-2013 (Table 4); Prospectiva del Sector Eléctrico 2003 - 2012 (Table 4) - <http://www.energia.gob.mx/webSener/portal/index.jsp?id=48>
- 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Table 1.3: Default values of Carbon Content)

Annex 4**MONITORING INFORMATION**

The Monitoring Plan is described in B.7.2.