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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

>>
Title: EVCSA Wind Power Project
Version: 3.0
Date of completion of PDD: 28/10/2012

A.2. Description of the project activity:

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EVCSA Wind Power Project (hereafter referred to as "the project" or "EVCSA") is a grid connected renewable energy project in Costa Rica. The project is developed by Eólico Valle Central S.A. and involves the installation of 17 wind energy converters (WECs) of 900 kW each, leading to a total installed capacity of 15.3 MW. Once fully operational, the proposed project activity is expected to deliver about 40.764 giga watt hours (GWh) of electricity per year to the National Interconnected System (NIS), the Costa Rican national grid.

The purpose of the project activity is to generate electricity by means of installed WECs, thereby replacing power that would have been generated from fossil fuels, and contributing to the creation of a cleaner energy mix to cope with the country's growing electricity needs.

The estimated emission reductions achieved by the project activity is 13,024 tCO_2 per annum. The baseline scenario is the same as the scenario that existed prior to the start of the implementation of the project activity: Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

Eólico Valle Central S.A. is a Special Purpose Vehicle ("SPV") created under the Law of Costa Rica (e.g. Law 8660) by Compania Nacional de Fuerza y Luz (hereafter referred to as "CNFL"), and the Banco Centroamericano de Integración Económica (Central American Development Bank, hereafter referred to as "BCIE") to develop the project activity.

Contribution to sustainable development

The project will contribute to the sustainable development of Costa Rica as it will foster and stimulate the expansion of renewable energy technologies, reduce the country's dependency on fossil fuel imports and consequently improve its trade balance. Furthermore, the project will strengthen and diversify the national energy supply.

Other benefits to sustainable development in Costa Rica are summarized below:

- Increasing the share of renewable power generation at the level of the regional and national grid;
- Preventing lack of power supply and increasing its stability and reliability during the dry season;
- Reducing GHG emissions compared to a business-as-usual scenario;
- Stimulating the growth of the wind power industry in Costa Rica;
- Creating job opportunities in the project area.

A.3. Project participants:

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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)
Costa Rica	Eólico Valle Central S.A. (EVCSA)	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:

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The project site is located across the Santa Ana Cantón and Piedades and Salitral Districts, and in the Mora Cantón and Colón and Tabarcia Districts, in the Province of San José, Costa Rica.

Geographic coordinates of the project activity: 09°54' 00'' N - 84°12' 00" W or 9.9 º N and 84.2 º W.

A.4.1.1. Host Party(ies):

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Costa Rica

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

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Province of San José

A.4.1.3. City/Town/Community etc.:

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Santa Ana Cantón, Piedades and Salitral Districts, and Mora Cantón, Colón and Tabarcia Districts, near the Pabellón community.

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

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The project activity is to be found in the San José Province, in the Santa Ana and Mora Cantón (see Figure 1), both located southwest of the capital San José, near a small village know as Pabellón. The project site is located in a mountain range (see Figure 1 and Figure 2). The project site is shown in the following map:

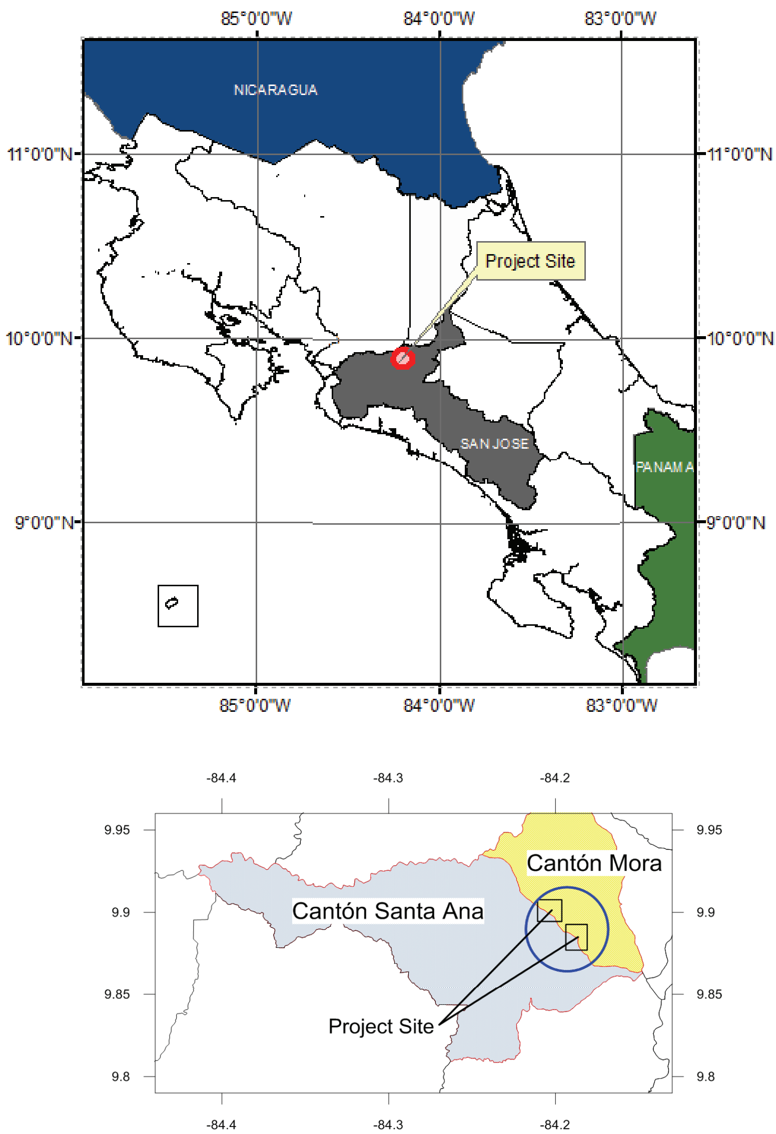

Figure 1: Location of the project activity in the San José Province

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

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Sectoral Scope 1: Energy industries – renewable/non renewable sources.

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

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The project will use an environmentally safe and sound technology in the electricity sector.

As stated in ACM0002, the baseline consists of electricity that would have otherwise been generated by the operation of the grid connected power plants and by the addition of new capacity, excluding the proposed project activity. Therefore, renewable energy projects such as the proposed project activity, shall only account for the amount of CO2 emissions from the electricity generation derived from fossil fuelled power plants that are displaced by the project activity (see section B.4 for a detailed description of the emissions sources and gases involved in the project boundary).

< Applied Technology >
The project activity will install 17 ENERCON E-44 900 kW WECs. These WECs are known for their gearless variable speed design, eliminating the risk of gearbox failure. Table 1 below presents a summary of the technology to be employed in this project. The expected operational lifetime of the WECs is 20 years. The lifetime of the WECs has been certified according to the IEC 61400-1 and NVN-11400-0 standards by DEWI-OCC Offshore and certification Centre GmbH under a statement of compliance for design assessment from 16 /05/ 2008.

Table 1: Technology summary

WEC manufacturer	Enercon
Type designation	E-44
Rated power	900 kW each
IEC Type Class	IA
Capacity factor	30.1%*
Number of WECs	17
Rotor diameter	44 m
Cut in wind speed	3 m/s
Cut-out wind speed	40 m/s
Blade length	20.8m
Hub height	45 m
Rated rotational speed	33.5 rpm

*Directly quoted from the technical feasibility study report.

The project is connected to a 34.5kv line for Escazú substation that is connected to the grid. The 17 WECs will be located in the upper region of a mountain range that extends from the western end of Cerro Pacacua to the vicinity of Cerro Tacuotarí, which is almost perpendicular to the prevailing wind direction (see Table 2 and Figure 2 below).

Table 2: Positioning of the 17 WECs at the site

WECs	Longitude	Latitude
1	84° 12´32.40”	9°54´10.80”
2	84° 12´28.80”	9°54´07.20”
3	84° 12´25.20”	9°54´03.60”
4	84° 12´21.60”	9°54´00.00”
5	84° 12´18.00”	9°54´00.00”
6	84° 12´14.40”	9°53´56.40”
7	84° 12´00.72”	9°53´49.20”

8	84° 12´00.36”	9°53´45.60”
9	84° 12´00.36”	9°53´42.00”
10	84° 12´00.00”	9°53´38.40”
11	84° 11´24.00”	9°54´10.80”
12	84° 11´20.40”	9°52´58.80”
13	84° 07´48.00”	9°49´22.80”
14	84° 11´16.80”	9°52´51.60”
15	84° 11´16.80”	9°52´48.00”
16	84° 11´13.20”	9°52´44.40”
17	84° 11´13.20”	9°52´40.80”

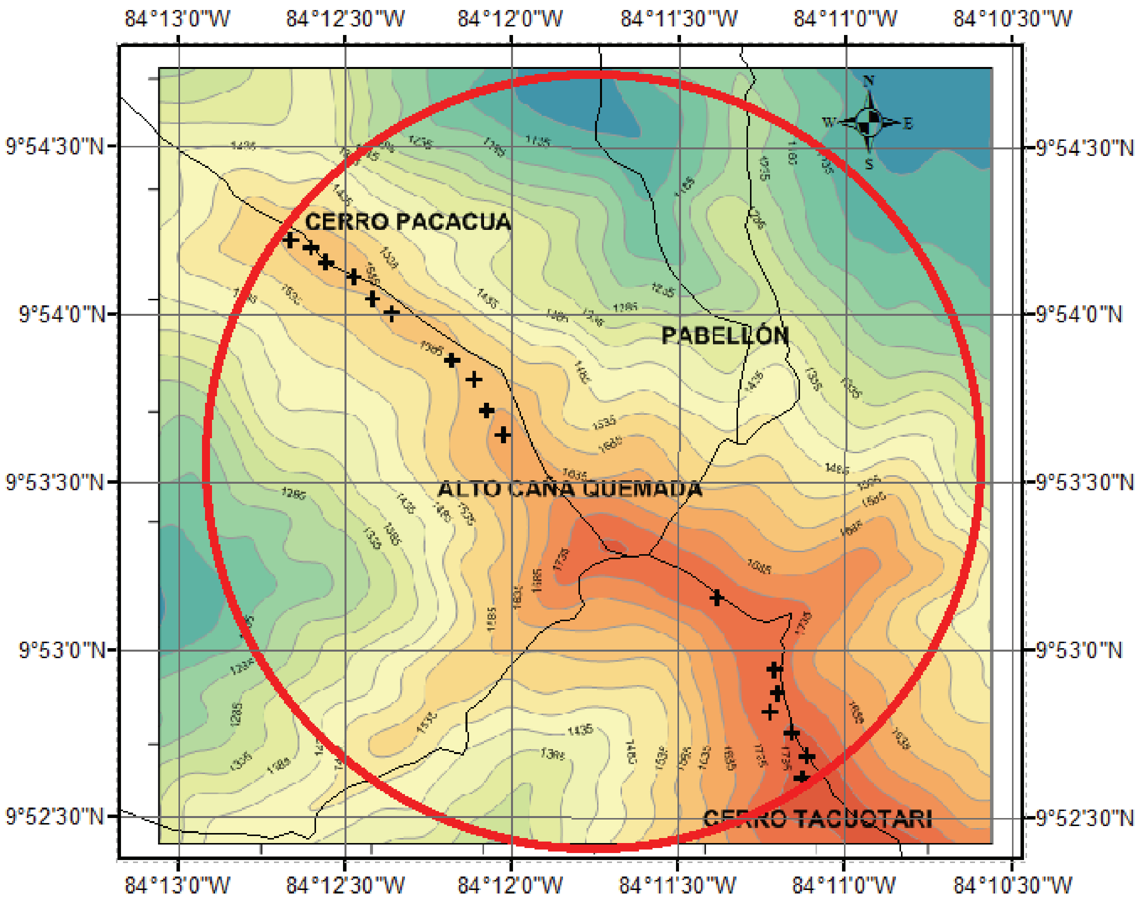

Figure 2: EVCSA project site layout

Furthermore, a general evaluation of the wind resource at the project site was made by the company Lahmeyer International as part of the technical feasibility study report. The data sample consists of 51 weeks from September 2003 to August 2004 of wind speed and direction records at 30m height, with rates data availability greater than the minimum required 90%. Table 3 and the Figure 3 show the average monthly wind speed at the site, showing the existence of a season of high wind speed regime from December to April corresponding to the dry season in Costa Rica, and a low intensity regime from May to

November. Considering the plant load factor for a probability of exceedance P50 of 30.1% as projected by the technical report, the expected average net power supplied to the grid is 40.764GWh/yr[1] with all the 17 WECs in operation. Construction started in August 2010. The expected commissioning date of the project activity is scheduled to be 31 December, 2012, and the project life is expected to be 20 years[2].

Table 3: Monthly average wind speed (m/s)

Month	Wind Speed (m/s)
Jan	9.61
Feb	10.06
Mar	13.25
Apr	7.35
May	5.73
Jun	5.77
Jul	5.44
Aug	5.83
Sep	3.64
Oct	3.22
Nov	5.30
Dec	10.81
Average	7.17

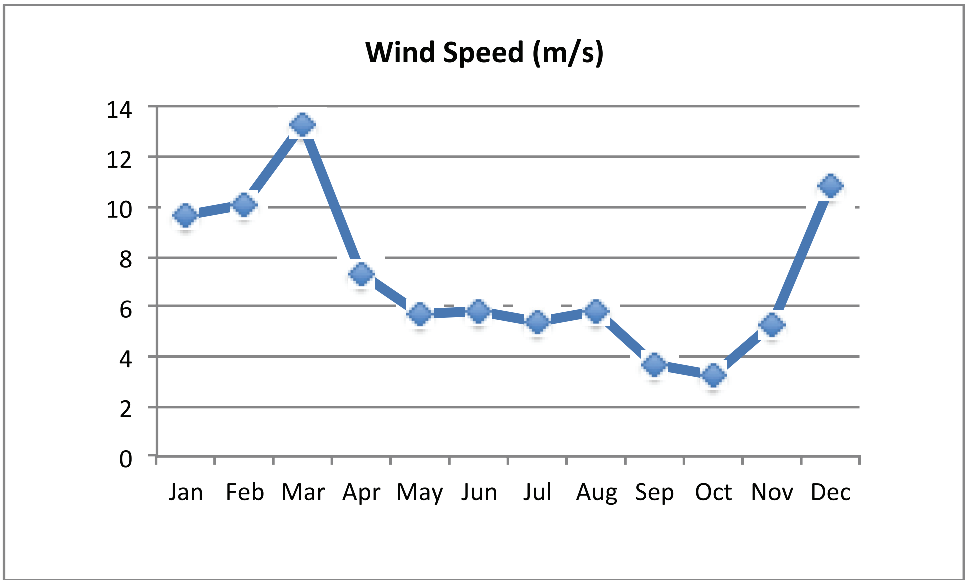

Figure 3: Monthly average wind speed (m/s)

[1] 40.764GWh was directly quoted from the technical feasibility study report.

[2] DEWI –OCC Offshore and Certification Centre Gmbh" under a "Statement of Compliance for design Assessment" from May 16, 2008, certified conform the IEC 61400-1 and NVN-11400-0 standards that the design lifetime of the Enercon E-44 900 KW WECs is 20 years.

< Monitoring equipment and its location in the system >

As planned, a bidirectional (e.g. export and import electricity metering) electricity meter (ION meter) will be located just before the access point to the Escazú substation to monitor the net electricity exported to the grid (in MWh) by the project activity. The net electricity exported to the Escazú substation is defined as the difference between the gross electricity exported to the Escazú substation by the project activity minus the imported electricity from the Escazú substation. Location, parameters and functions of the electricity meter have been illustrated in the flow diagram shown in Figure 4 in section B.3.

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

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The total estimated emission reductions are 13,024tCO_2e per year.

Annual estimated anticipated emission reductions from the project activity are furnished below.

Table 4: Emission reductions over the first crediting period

Years	**Annual estimation of emission reductions in tCO2e**
Year 1	13,024
Year 2	13,024
Year 3	13,024
Year 4	13,024
Year 5	13,024
Year 6	13,024
Year 7	13,024
Total Emission reductions (tCO_2e)	91,168
Total number of crediting years	7 years
Annual average over the crediting period of estimated reductions (tCO_2e)	13,024

A.4.5. Public funding of the project activity:

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There is no public funding from Annex I Party for this project 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:

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This project activity applies the following methodology:

ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 12.3.0)

This methodology refers to the latest approved versions of the following tools:

- Tool to calculate the emission factor for an electricity system (Version 02.2.1, EB63 Annex 19)
- Tool for the demonstration and assessment of additionality (Version 06.1.0, EB69 Annex 20)

In addition it refers to the following Guidelines:

- Guidelines on the demonstration and assessment of prior consideration of the CDM (Version 04.0, EB62 Annex 13)
- Guidelines on common practice (Version 01.0, EB63 Annex 12)
- Guidelines on the assessment of investment analysis (Version 05.0, EB62 Annex 5)

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

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The expected installed capacity of the project is 15.3 MW, which is above the threshold of the small scale project activity; hence “ACM0002 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources” is the most appropriate methodology for the proposed project. Version 12.3.0 is used. The project activity complies with the applicability conditions of the ACM0002, as detailed below:

Table 5: Applicability of ACM0002 (Version 12.3.0)

Applicability Conditions	Project Activity
This methodology is applicable to grid-connected renewable power generation projects that: (a)install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (i.e. greenfield plant); (b)involve a capacity addition; (c)involve a retrofit of (an) existing plant(s); or (d)involve a replacement of (an) existing plant(s).	The proposed project falls into group (a).

The methodology is applicable under the following conditions: • The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; • In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	The proposed project activity is the installation of wind power plant, and it does not involve the capacity addition, retrofits, nor replacements.
In case of hydro power plants: • At least one of the following conditions must apply: o The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or o The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m2 after the implementation of the project activity; or o The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m2 after the implementation of the project activity.	The proposed project activity is a wind project, and it does not involve a hydro power project.
In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m2 after the implementation of the project activity all of the following conditions must apply: • The power density calculated for the entire project activity using equation 5 is greater than 4 W/m2; • All reservoirs and hydro power plants are located at the same river and were designed together to function as an integrated project that collectively constitutes the generation capacity of the combined power plant; • The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity; • The total installed capacity of the power units, which are driven using water from the reservoirs with a power density lower than 4 W/m2, is lower than 15 MW;	The proposed project activity is a wind project, and it does not involve a hydro power project.
The methodology is not applicable to the following: • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the	The proposed project activity is a greenfield wind power project, and it

continued use of fossil fuels at the site; • Biomass fired power plants; • A hydro power plant that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the reservoir is less than 4 W/m2.	does not involve switching from fossil fuels to renewable energy sources, biomass fired power plants, nor hydro power plants at the project site.
In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is .the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance.	The proposed project activity is the installation of wind power plant, and it does not involve the capacity addition, retrofits, nor replacements.
In addition, the applicability conditions included in the tools referred to above apply.	The project activity meets the applicability conditions of the tools mentioned in Section B.1, listed as below:
<Tool to calculate the emission factor for an electricity system (Version 02.2.1)> This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The proposed project activity substitutes grid electricity.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, the conditions specified in .Annex 2 - Procedures related to off-grid power generation." should be met.	The emission factor for the project electricity system will be calculated for grid power plants only.
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The project electricity system is not located partially or totally in an Annex I country.

It can therefore be concluded that ACM0002, Ver. 12.3.0 is applicable to the project activity.

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

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According to the methodology, the spatial extent of the project boundary includes the project power plant and all power plants physically connected to the grid to which the project is connected.

Electricity system: The National Interconnected System ("NIS") is the defined electricity system for the project activity. It is controlled and operated by the Electricity Institute of Costa Rica (*Instituto*

Costarricense de Electricidad "ICE" – a vertically integrated national utility) and all power plants connected to it are included in the project boundary. The GHG and emission sources included in, or excluded from the project boundary are listed in Table 6 below. Figure 4 shows the project boundary.

Table 6: Overview on emissions sources included in or excluded from the project boundary

Source	Gas	Included?	Justification/Explanation
Baseline: CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	In the baseline scenario the electricity would have been sourced from the NIS grid, which includes fossil fuel sourced power plants as detailed in Annex 3 Baseline Information.
	CH_4	No	Excluded for simplification. This is conservative.
	N_2O	No	Excluded for simplification. This is conservative.
Project Activity: Project emissions	CO_2	No	Not applicable to wind power projects
	CH_4	No	
	N_2O	No	

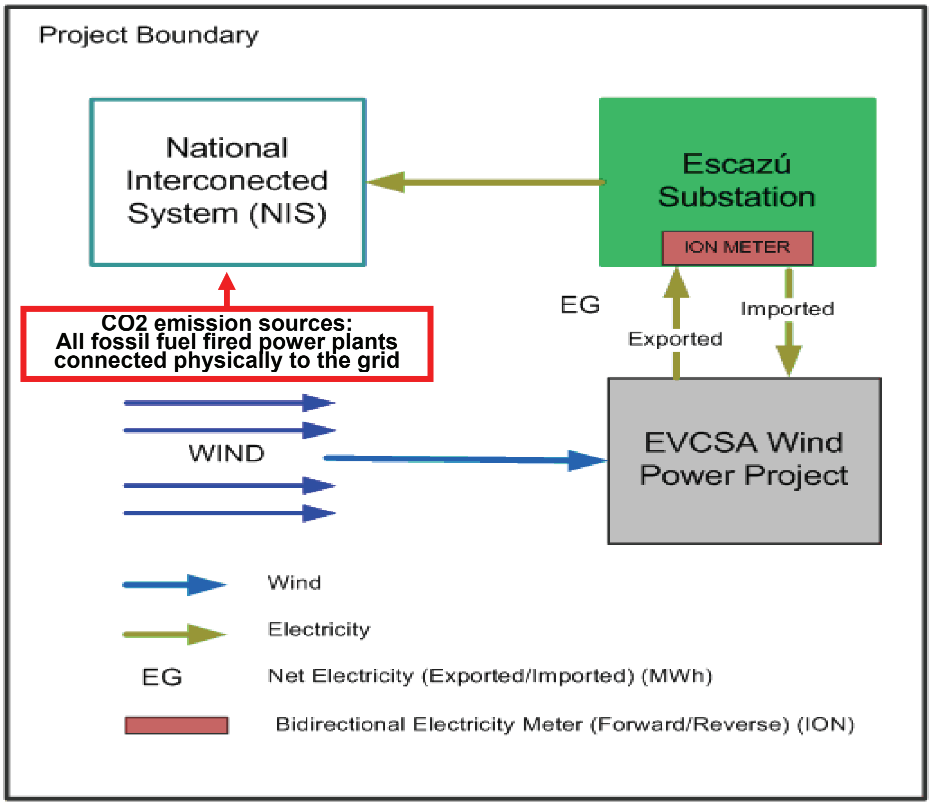

Figure 4: The Project Boundary

Since the project activity is a wind farm, no project emissions are accounted within the project boundaries. This is an assumption in line with ACM0002.

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

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Because the project activity is the installation of a new grid-connected renewable power plant, and is not a capacity addition, retrofit or replacement of existing grid-connected renewable power plant/unit, the baseline scenario is the following as indicated in the methodology:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The baseline is determined and the combined margin calculated in Section B.6 below.

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):

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Prior consideration

Following the "Guidelines on the demonstration and assessment of prior consideration of the CDM" (version 04, EB62 Annex 13) the project participant informed the Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of the intention to seek CDM status, as the starting date of the project activity is after 02 August 2008. This notification was made on the 1st of July 2010, within six months of the project activity start date as shown in the Table 7 below. In addition to this confirmation of serious prior consideration of the CDM by the project participants, the timeline below indicates continuing and real actions to secure CDM status for the project in parallel with its implementation.

Table 7: Key dates in the project's development

Date	Event
25 September, 2003	Started the wind measuring campaign
December, 2004	Technical study was conducted for wind resource analysis and site selection by Lahmeyer International-INSUMA SA
22 March, 2006	Environmental License granted by SETENA under resolution Nº181-2006
15 May, 2007	Legal constitution of EVCSA by CNFL and BCIE, as a SPV to develop the EVCSA wind power project
13 February, 2008	No objection letter for the EVCSA wind power project granted by the Costa Rican DNA
20 June, 2008	EVCSA started a bidding process for the CDM consultancy
03 November, 2008	EVCSA opened an International Private Bid (EVCSA-005/2008). Three bids were submitted of which two were rejected and the third negotiated successfully.

24 September, 2009	Addendum to the Management Agreement to include an increase on EVCSA's patrimony, including changes on share contributions from CNFL (40%) and BCIE (60%)
29 October, 2009	Time of the Invest Decision –Board Meeting to award the bidding contract for a supervised turn-key contract (EPC) to the Consortium "EVC-JBM"* It is to be noted that the cost aspects/financial details for the investment decision were available from EVC-JBM and these were evaluated by the board before going ahead with the decision to award contract to EVC-JBM.
01 July, 2010	CDM Prior Consideration Form submitted to both host country DNA and the UNFCCC
28 July, 2010	Signing of the construction turn-key contract between EVCSA and the Consortium "EVC-JBM"* considered the **start date of the project activity,** the date at which construction of the CDM project activity became valid**
12 August, 2010	Construction started (expected to last for 24 months)
08 December, 2010	Signing of a CDM consultancy contract

* "EVC-JBM" represents the name of the consortium, composed of three companies (Juwi Energías Eólicas, Ltd. and Juwi Wind GmbH (as "J"), Proyectos y Construcciones BC y Asociados, S.A. (as "B"), and Constructora Meco, S.A. (as "M")).
**The investment decision was made based on the wind potential data provided by the technical feasibility study report in 2004 and the direct cost details provided by EVC-JBM.

The technical feasibility study was conducted in December 2004. However, the study did not review the financial aspect of the project. Establishing a SPV (EVCSA) and obtaining all necessary legal authorization took nearly four years to be able to start a call for an international public tender for EPC contract in 2008. The EPC contract was signed on 28 July 2010 to start the construction.

Additionality

As per the methodology, the latest Tool for the demonstration and assessment of Additionality (Version 06.1.0) approved by CDM Executive Board is used to demonstrate project Additionality.

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

For EVCSA, the following hypothetical scenarios were selected as alternatives from the methodology:

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

P1. EVCSA will carry out the project, but without CDM.

P2. Continuation of the current situation, i.e. use all power generation equipment that was already in use prior to the implementation of the project activity. The additional power generated under the project would be generated in existing and new grid-connected power plants in the electricity system.

P3. All other plausible and credible alternatives to the project activity that provide an increase in the power generated at the site, which are technically feasible to implement. Such alternatives include EVCSA to invest in a new thermal power plant.

As will be demonstrated with the financial analysis, the alternative P1 would not have been an option for EVCSA since the proposed project activity is not economically viable or financially attractive without the CDM benefits.

Regarding alternative P3, EVCSA being a private company and SPV, is precluded by national environmental regulation from building its own thermal plant (i.e. Law 7200). Therefore, the development of a thermal plant would not be within the scope of EVCSA and would not be an alternative to the project activity.

Therefore it can be concluded that P2 is the most probable alternative to the project activity.

Sub-Step 1b - Consistency with mandatory laws and regulations:

The proposed Eólico Valle Central, Sociedad Anónima (EVCSA) wind project activity is based on Law 8660 "Strengthening and modernization of public entities from the telecommunication service". Article 6 "Allows ICE [a main player in the Costa Rica energy market, dominating 76% of the national interconnected electric system, the manager of the national grid, the owner of the transmission lines and the main electricity retailer to end-users] to … lend, buy and sell products and electricity…and others products and services…directly or through cooperation agreements, partnerships, strategic alliances or any other form of association with other bodies domestic or foreign public or private".

One of the EVCSA's shareholders is CNFL (Compañía Nacional de Fuerza y Luz), the National Power and Light Company and a subsidiary of Grupo ICE, whose main responsibility is the distribution of electricity in the Greater Metropolitan Area of San José. Therefore, the legal constitution of EVCSA and the possibility of CNFL to buy electricity from EVCSA are based on the prerogatives of Law 8660.

Furthermore, the Environmental Law #7554 (1995) requires wind power projects to present an Environmental Impact Assessment (EIA) and approval by the National Technical Environmental Secretariat (SETENA) prior to start activities, works or projects. Therefore, the Environmental Law also applies to the proposed project activity.

The project activity has been approved by the Costa Rican government and hence comply with all relevant laws and regulations. Therefore, the conclusion of step 1 is that the proposed project activity passes this step of the additionality test.

Step 2 - Investment analysis

Sub-step 2a - Determine appropriate analysis method:

Three options can be applied for the investment analysis: Simple Cost Analysis (Option I), Investment Comparison Analysis (Option II), and Benchmark Analysis (Option III). The simple cost analysis is not applicable for the proposed project because the project activity will produce economic benefits other than the CDM related income, in the form of electricity sales. Investment comparison analysis is not applicable, since the only real alternative to the project activity is the baseline scenario where no new investment takes place.

According to the "Guidelines on the Assessment of Investment Analysis", (Version 05.0 guidance number 19, "If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate".

The alternative of the proposed project activity is the supply of electricity from a grid. Therefore, the benchmark analysis (Option III) will be used.

Sub-step 2b - Option III - Apply benchmark analysis:

Selection of a suitable financial indicator

For the benchmark analysis, it is required to select the most suitable financial indicator. The Internal Rate of Return (IRR) is considered the most suitable financial indicator for the project type. Either Project IRR or Equity IRR is used for the benchmark analysis. The IRR chosen for this project is Equity IRR.

Since EVCSA is a SPV and has no prior record of a benchmark used in the past, the simple default option presented in Appendix A of the revision to the "Guidelines on the assessment of investment analysis" (Ver. 05.0) is chosen for being a good proxy of a "minimum" expectation of return on equity.

This default option is applied as a benchmark to measure the expected return on equity for a wind investments, such as EVCSA, by combining a risk free rate of return with a suitable equity risk premium and a risk premium for the host country, all reflecting the market conditions. Consequently, the expected return on equity represents the minimum return required by equity investors, at a specific time of investment, for a project activity such as EVCSA in the host country of Costa Rica.

Structure of the cost of equity

The equation for the cost of equity is as follows:

$$k_e = r_f + ERP + CRP$$

Where:

Ke:Cost of equity

r_f: Risk free rate

ERP*:* Equity risk premium

CRP*:* Country risk premium

Risk free rate(r_f): Technically, no asset is risk free, but as a proxy, return on assets with a minimal risk of default is used as a risk free rate. A value of 3.0 % is used (ref. "Guidelines on the Assessment of Investment Analysis", Version 05.0, Appendix A).

Equity risk premium (*ERP*): It is a premium for putting an asset at risk and is considered as the difference between the expected rate of return of the market as a whole and the risk free rate. A value of 6.5% is used (ref. same as above).

Country risk premium (*CRP*): This is most reflected in sovereign risk of default, which is shown in sovereign default swaps issued by rating agencies. A value of 2.5 for Costa Rica is used (ref. same as above).

Table 8 summarizes the result of the benchmark applied in the PDD.

Table 8: Summary of the default benchmark for cost of equity for Costa Rica provided by the CDM investment analysis guidelines

Risk Free Rate (r_f)	3.0%
Equity Risk Premium (*ERP*)	6.5%
Country Risk Premium (*CRP*)	2.5%
Return on Equity (*Ke*) in real terms	12.0%

The benchmark based on the default values is 12.0% and is on the conservative side for the proposed project activity.

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

The objective of EVCSA is to generate and feed electricity to the grid by means of renting its power generation facility to CNFL, an authorized market retailer. Furthermore, EVCSA is a SPV created between CNFL and BCIE to develop this project activity. The overall investment cost of the project is shown in the table below.

Table 9: Summary of project costs

	Total	Breakdown		%
	US$	BCIE	EVCSA	
Direct Cost	45,000,000	25,788,030	19,211,970	87.2%
Development Cost	6,576,056	-	6,576,056	12.8%
Total Investment Cost	51,576,056	25,788,030	25,788,026	100.0%
Participation		50%	50%	
Equity				
BCIE Equity Share			15,472,818	60.0%
CNFL Equity Share			10,315,212	40.0%
EVCSA Total Equity			25,788,030	100.0%
BCIE Exposure			41,260,848	80.0%

The total investment cost is US$ 51,576,056, of which US$ 44.5 million (87.2%) corresponds to direct costs (e.g. engineering, procurement, and construction (EPC) turn-key contract between EVCSA and the consortium “EVC-JBM”) and US$ 6,576,056 (12.8%) to development cost. The debt/equity ratio of the project is 50/50.

The US$ 25,788,030 debt amount will be financed by BCIE over 12 years and at an interest rate of 8.25%. The equity component, the remaining US$ 25,788,030, will be provided by BCIE (60%) and CNFL (40%).

BCIE, in addition to holding 60% of the equity share of EVCSA, is co-financing 50% of the total investment cost of the project through a debt loan, amounting to a total financial exposure of 80%. In this case, BCIE’s 60% equity share of EVCSA will gradually be bought back by and transferred to CNFL by means of the project earnings during the twelve years loan period.

Furthermore, under a rental agreement between CNFL and EVCSA, CNFL will rent the power plant to generate electricity to end-users within its concession area. CNFL will be responsible for the operation and maintenance of the plant and other tasks that will allow delivering energy to the national interconnected system (hereafter referred to as the “grid”) and the sale of electricity to end-users within its concession area, the Great Metropolitan Area.

The IRR was calculated using the 22-year Free Cash Flow to Equity (FCFE) model[3] prior to awarding the EPC contract at the Board Meeting, which was later signed on the 28th of July 2010. The main assumptions for the FCFE are presented below.

Table 10: Main assumptions for the FCFE

Data	Value	Description	Evidence
Electricity generation	40.764 GWh/yr	Annual Energy Production w/probability of 50%	Technical feasibility study report
Rental tariff (before the 13th year)	0.174 / kWh or US$ 7,112,000/yr	Annual rental payments from CNFL to EVCSA	EVCSA Rental Agreement EVCSA-CNFL
Tariff (from the 13th year onwards)	0.102/kWh with an annual escalation factor of 1%	Electricity sale price of ICE (“T-CB” tariff) in 2009. Escalation rate was estimated by taking a trend of actual T-CB tariffs between 2005 and 2009**	The National Regulatory Authority for Public Services (ARESEP)’s “T-CB” tariffs between 2005 and 2009
Operation and Maintenance Costs	US$402,250	Direct costs related to maintenance of equipment and land leasing	International bidding document (November 2008)
Total Equity Requirement	US$ 25,788,030	Value estimated as 50% of CAPEX	Project Management Agreement (BCIE-CNFL)

[3] Including two years’ construction and expected starting date of operation from the end of August, 2012. The operation start date has been delayed due to obtaining additional permits. However, 4 months of operation was considered in the investment analysis.

			Addendum 1 – Increase in EVCSA's patrimony, and changes on share contributions from BCIE and CNFL
Financial Debt	US$ 25,788,030	Value estimated as 50% of CAPEX	Project Management Agreement (BCIE-CNFL) Addendum 1, – Increase in EVCSA's patrimony, and changes on share contributions from BCIE and CNFL
Debt Interest Rate	Fixed rate of 8.25%	Value defined by the BCIE	
Depreciation Factor	Sum-of-digits method 20 years	Yearly depreciation factor	Found in the Law Nº 7092 on Income Tax and IAS 16 "Property Plant and Equipment" of the International Accounting Standards
Other Taxes	30%	Tax rate for Corporate Income Tax (CIT)	All references provided by the government at: http://dgt.hacienda.go.cr

*The rental agreement last until 13th year, counting "0 year" in the IRR calculation sheet as one.

**Tariffs during the post-rental agreement period are estimated based on the assumption that CNFL would buy electricity from ICE to satisfy its demand in the absence of the project activity. ARESEP regulates ICE's tariffs for the electricity distributors such as CNFL, and CNFL falls under the category to use the "T-CB" tariff. An annual increase of 1% of the tariff of ICE was determined during the time of the investment decision by analysing the past trend of the T-CB tariff from the year 2005 to 2009). During those five years period, the average increase in tariff was 0.84% per year or 0.07% per month. Therefore, applying the factor of 1% is conservative.

Table 11: Capital Expenditures

Capital Expenses (CAPEX)	Budgeted (US$)	Evidence
A. Development Costs (Engineering, Supervision, Land Acquisition and Rental, Financial Costs during construction, and Others)	6,576,056	Application Analysis for the Project
B. Direct Costs	44,500,000	Minutes of the Board Meeting Turn-key contract between EVCSA and "EVC-JBM"
C. Contingency	500,000	Turn-key contract between EVCSA and "EVC-JBM" (Annex 12)
D. CAPEX (A+B+C)	51,576,056	Project Management Agreement (BCIE-CNFL) Addendum 1

Considering this third party financing, the following table presents the project's Free Cash Flow from the perspective of the shareholders.

For the comparison of the financial indicators, the 12.0% default value summarized in Table 8 was considered as the benchmark. As the default values in the "Guidelines on the Assessment of Investment Analysis" are calculated after taxes, the Equity IRR after taxes will be chosen as the comparator. The following tables show the project's Free Cash Flow from the perspective of the shareholders.

Table 12: Comparison of financial indicators

	Without CERs
Equity IRR after tax deduction (Base case)	8.89%
Equity IRR Benchmark (default value)	12.0%

The Equity IRR of the 20 years projected cash flow without CERs is 8.89%, which is much lower than the post-tax 12.0% benchmark applicable to the project activity. This shows that even under conditions in which access to capital markets for equity and debt financing is granted, the project activity is not the most financial attractive option. Consequently, the CDM benefit improves the Equity IRR of the proposed project activity and therefore, its financial attractiveness.

From the perspective of CNFL, through EVCSA, the objective of implementing this project activity is threefold. First, it will assure electricity supply by diversifying its supply sources and reducing its reliance on the thermal sources of energy supplied by ICE, the national utility.

Secondly, by using a renewable source of energy instead of relying on electricity generated with imported fossil fuels to operate thermal power plants, the project will offset emissions of greenhouse gas that otherwise would be generated.

Thirdly, CNFL will fulfil its wish to contribute to the national effort to increase the availability and supply of renewable energy in coordination with ICE, and thereby forestalling the possibility of national capacity shortages.

Sub-step 2d. Sensitivity analysis:

This sub-step is for a sensitivity analysis that shows whether the conclusion regarding the economic viability and financial attractiveness of the proposed project activity is robust enough to withstand reasonable variations in the critical assumptions. A range of variation from +10% to -10% was chosen to carry out the sensitivity analysis.

Further, as per the "Guidelines on the Assessment of Investment Analysis", Ver. 05.0, guidance number 20, only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation. The variables chosen were: amount of electricity sales and amount of initial investment costs. Table 13 shows the results..

Table 13: Sensitivity analysis

	Equity IRR without CDM
Base case	8.89%
(+) 10% Electricity Sales Income	10.56%
(-) 10% Initial Investment Costs	10.11%
Benchmark (real)	12.0%

The highest IRR we may obtain under the said hypothesis is 10.56% with 10% increase in the electricity sale. However, even with this increase in income from electricity sales, the proposed project activity is still not an attractive financial investment.

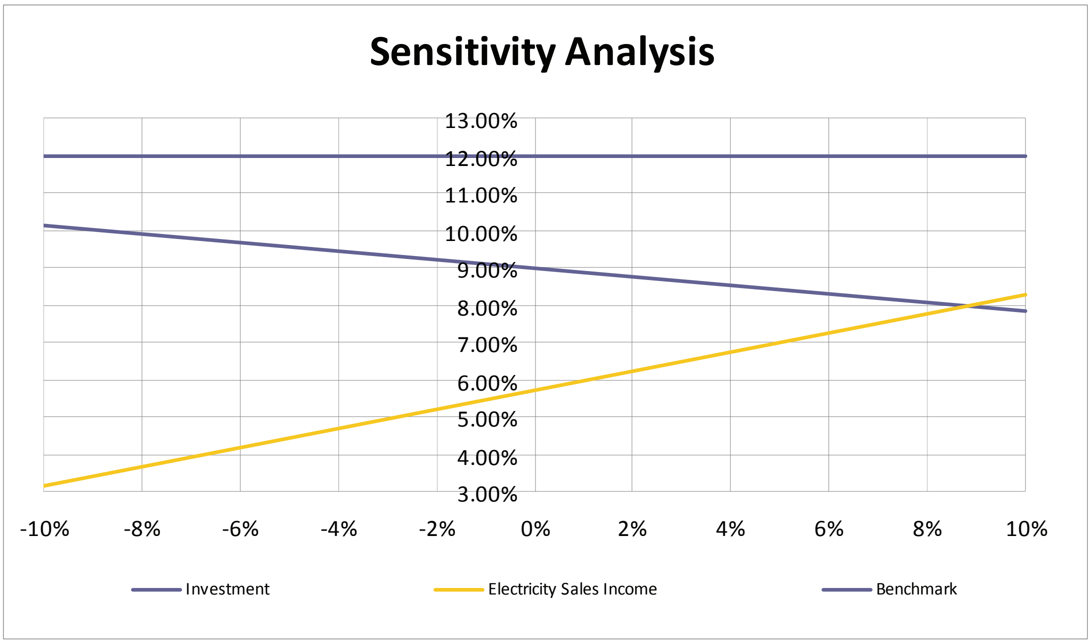

Figure 5: Sensitivity Analysis

Therefore, we can conclude that the Equity IRR from EVCSA is lower than the benchmark for a realistic range of assumptions for the input parameters of the sensitivity analysis, and therefore that the proposed project activity "is unlikely to be financially/economically attractive" as defined by the Additionality Tool.

Step 3 - Barrier analysis

As per the "Tool for the demonstration and assessment of additionality" (Version 06.1.0), the barrier analysis will be skipped.

Step 4 -Common practice analysis

This is an analysis of the extent to which the proposed project type (e.g. technology or practice) has already been diffused in the relevant sector and region. Common practice is analyzed through the following Sub-steps.

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

Projects are considered similar if they are in the same country / region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Below is a table listing the existing wind farms in Costa Rica, including registered CDM wind power project activities prior to the starting date of the proposed project activity.

Table 14: Existing wind power plants in Costa Rica, including CDM

Wind farm	# of WECs	Mfgr.	KW/WEC	Capacity (KW)	With CDM	Commissioning Year
PESA	57	Kennetech	410	23,370		1996
Aeroenergía	9	NEG-Micon	750	6,750		1998
MOVASA	32	NEG-Micon	750	24,000		1999
Tejona	30	Vestas	660	19,800	CDM	2002
PEG	55	Enercon	900	49,500	CDM	2009
Los Santos	15	Gamesa	850	12,750	CDM	2011
Total				136,170		

Source: Centro Nacional de Control de Energía (2009)[4]

However, sub-step 4a also states that other CDM project activities (i.e. registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis, so these projects will be removed from further analysis.

As is evident from table 13 above Costa Rica has only six wind power projects that are operational, despite a high estimated wind power potential of more than 1,000 MW.

Table 15: Status of wind power installed capacity (MW) penetration rate (%) in Costa Rica excluding CDM project activities

Year	1996	1998	1999	2002	2010
a. Wind power capacity(MW)	23.3	47.3	54.12	54.12	54.12
b. Total power capacity(MW)	1,291	1,424	1,064	1,782	2,605
c. Wind power penetration rate(a / b)	1.8%	3.3%	5.0%	3.0%	2.0%

Source: Autoridad Reguladora de los Servicios Públicos (2010)[5]

[4] Centro Nacional de Control de Energía "Informe de Operación Anual 2009".
[5] Autoridad Reguladora de los Servicios Públicos "GENERACIÓN DE ENERGÍA ELECTRICA 2010."

Table 16: Proportion (%) of wind power electricity generation (MWh) to the total electricity demand, excluding CDM project activities

Year	1996	1998	1999	2002	2010
a. Wind power generation (GWh)	22.5	64.2	99.6	195.1	143,3
b. National Demand at the NIS(GWh)	4,894.3	5,756.4	6,198.0	7,378.6	9,316.7
c. Wind Power Penetration(a / b)	0.45%	1.1%	1.6%	2.6%	1.5%

Source: Centro Nacional de Control de Energía (2009)[6]

The low penetration rate of wind power in Costa Rica is even more notable when one takes into account the fact that actually over 90% of the country's electricity is already produced with renewable sources of which almost 70% is from hydro power, mostly run-of-river with limited daily regulation. Therefore, wind power is a necessary source of energy to complement the hydro power during the dry season when the hydro potential is at it minimum level.

The above confirms the fact that despite the abundant availability of wind resources, wind energy in Costa Rica is still not a mature technology and its level of penetration within the Costa Rican energy matrix is marginal, both in terms of installed capacity and electricity generation. Therefore, the wind power technology is currently far from commercially prevalent in Costa Rica.

Furthermore, as per paragraph 6 and 47 of the "Tool for the demonstration and assessment of additionality", the following analysis of common practice is presented.

Step 1- Calculate applicable output range (e.g. +/- 50%) of designed output capacity of the proposed project activity. Since the designed capacity of the proposed project activity is 15.3 MW, the applicable output range is 7.65 to 22.95 MW.

Step 2 - In the applicable geographical area (e.g. Costa Rican interconnected grid), identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step. 1, as the proposed project activity and have started commercial operation before the starting date of the project. Registered CDM project activities shall not be included in this step.

[6] Centro Nacional de Control de Energía "Informe de Operación Anual 2009."

Table 17: Similar plants in Costa Rica within the applicable output range (7.65 – 22.95 MW)[7]

Plants	Capacity	Type	Year	Ownership
1.Los Negros	18	Hydro	2006	ESPH
2. Birris II	18.6	Hydro	1990	JASEC
3. Chocosuela II	14	Hydro	2003	Coopelesca
4. Belén	10.5	Hydro		CNFL
5.Daniel Gutiérrez	21	Hydro	1996	CNFL
6. El Encanto	8.5	Hydro		CNFL
7.Nuestro Amo	8.8	Hydro		CNFL
8. Ventanas	10	Hydro		CNFL
9. Canelete	17.5	Hydro	2008	Coopeguanacaste
10. Platanar	14.6	Hydro	2009	Private
11. Hidro Zarcas	14.2	Hydro	1996	Private
12. Don Pedro	14	Hydro	1996	Private

[7] Sources:
1. Los Negros: Instituto Costarricense de Electricidad “Centro Nacional de Planificacion Electrica Proceso Expansion Intgrada” [National Centre of Integrated Electric Expansion Process Plan] (page 59).
2. Birris I: “Sistema Hidroeléctrico Birrís (SHB)” [Birris Hydroelectric System].
3. Chocosuela II: “Complejo Hidroeléctrico Chocosuela” [Chocosuela hydroelectric complex]
4. Belén: Compañía Nacional de Fuerza y Luz (CNFL) “Boletín Técnico 2011” [“Technical Bulletin 2011”](page 1)
5. Daniel Gutiérrez: Idem to the reference for 4
6. El Encanto: Idem to the reference for 4
7. Nuestro Amo: Idem to the reference for 4
8. Ventanas: Idem to the reference for 4
9. Canelete: Instituto Costarricense de Electricidad [Costarican Institute of Electricity] “Centro Nacional de Planificacion Electrica Proceso Expansion Intgrada” [National Centre of Integrated Electric Expansion Process Plan] (page 59).
10. Platanar: Centro Nacional de Control de Energía [National Center of Energy Control] “Informe de Operación Anual 2009” [“Annual Operation Report 2009”] (page 19)
11. Hidro Zarcas: Idem to the reference for 10
12. Don Pedro: Idem to the reference for 10
13. Rio Lajas: Idem to the reference for 10
14. Volcán: Idem to the reference for 10
15. Doña Julia: Idem to the reference for 10
16. Ingenio Taboga: Idem to the reference for 10
17. MOVASA : Idem to the reference for 10
19. Colima : Idem to the reference for 10
20. Miravalles V: Idem to the reference for 10

13. Río Lajas	11	Hydro	2009	Private
14. Volcán	17	Hydro	1997	Private
15. Doña Julia	16.7	Hydro	1998	Private
16.Ing. Taboga	20	Biomass	2003	Private
17.Ing. El Viejo	20	Biomass	2004	Private
18. MOVASA	20	Wind	1999	Private
19. Colima	19.8	Thermal	1962	ICE
20. Miravalles V	21	Geothermal	2003	ICE

From Table 17 above, N_{all} includes 20 power plants from which: 15 are hydro, 2 biomass, 1 wind, 1 geothermal and 1 thermal power plant.

Step 3 – Within plants identified in Step 2, identify those that apply technologies different that the technology used in the proposed project activity in all plants that deliver the same output or capacity. Note their number N_{diff}.

According to the definitions, different technologies are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed CDM project activity and applicable geographical area): (i) Energy source/fuel, (ii) Feed stock, (iii) Size of the installation power capacity (Micro, Small and Large), (iv) Investment climate in the date of the investment decision, inter alia: access to technology, subsidies or other financial flows, promotional policies, and (v) Other features, inter alia: unit cost.

As above, all those plants from Table 17 that have an energy source different from wind and the size of the installation (power capacity) is Small scale (as defined in paragraph 28 of decision 1/CMP.2) or Micro (as defined in paragraph 24 of Decision 2/CMP.5 and paragraph 39 of decision 3/CMP.6) are considered as different technologies.

The only power plant within the applicable output range (7.65 to 22.95 MW) that does have wind as the energy source and is not within the Small nor Micro scales size (see Table 14) is MOVASA, a wind power plant with 20 MW installed capacity. Therefore, it can be said that all of the 19 power plants from Table 17 apply different technologies than the technology applied in the proposed project activity.

The stepwise approach can be summarised as follows:

N_{all}= 20

N_{diff}=19

N_{all} –N_{diff}= 1

Factor F = 1 – (N_{diff}/ N_{all}) = 1- (19/20) = 1 – 0.95 = 0.05

F = 0.05

N_{aal} – N $_{diff}$ = 20 – 19 = 1

Since the factor F is lower than 0.2 and the N_{all} –N_{diff} is lower than 3, the proposed project activity is not a common practice in the applicable geographic area (e.g. national interconnected grid in Costa Rica).

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

This sub-step is not applicable, as the conclusion from applying the CDM EB "Guidelines on Common Practice" (Version 01.0, EB 63 Annex 12) and its "Stepwise Approach for Common Practice" is that the proposed project activity is not a common practice.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>
According to the methodology ACM0002 (Version 12.3.0), the baseline scenario for installation of a new grid-connected renewable power plant/unit is the following:

"Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system". Therefore, baseline emissions are calculated using the following steps as per the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1).

Baseline emissions – BE_y

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BEy = EG_{PJ,y} * EF_{grid,CM,y}$$

Where:

BE_y	=	Baseline emissions in year *y* (tCO_2)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the Tool to calculate the emission factor for an electricity system (tCO_2/MWh)

For Greenfield renewable energy power plants, $EG_{PJ,y}$ is calculated as follows:

$EG_{PJ,y} = EG_{facility,y}$

Where:

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant to the grid in year *y* (MWh)

Project emissions - PE_y

As per the methodology ACM0002, the project emission is zero for wind project activities.

Leakage - LE_y

As per the methodology ACM0002, the leakage for wind power project activity is zero.

1. Calculation of baseline emission factor - $EF_{grid,CM,y}$

STEP 1. Identify the relevant electricity systems;

STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional);

STEP 3. Select a method to determine the operating margin (OM);

STEP 4. Calculate the operating margin emission factor according to the selected method;
g
STEP 5. Calculate the build margin (BM) emission factor;

STEP 6. Calculate the combined margin (CM) emissions factor.

Step1. Identify the relevant electricity systems:

The project is located in the province of San José in Costa Rica and its reference electricity system is the project electricity system, that is, the National Interconnected System ("NIS"). The electricity transfers from connected electricity systems to the NIS are defined as electricity imports while electricity transfers from the NIS to connected electricity systems are define as electricity exports, as per the "Tool to calculate the emission factor for an electricity system".

The NIS consists of three components: generation, transmission and distribution, and all elements of the NIS are fully interconnected in a single system (see Figure 6). The NIS is controlled and operated by the Electricity Institute of Costa Rica (Instituto Costarricense de Electricidad :ICE – a vertically integrated national utility) and all power plants connected to it are included in the project boundary. All grid power plants connected to the system is identified in Annex 3 - Baseline Information.

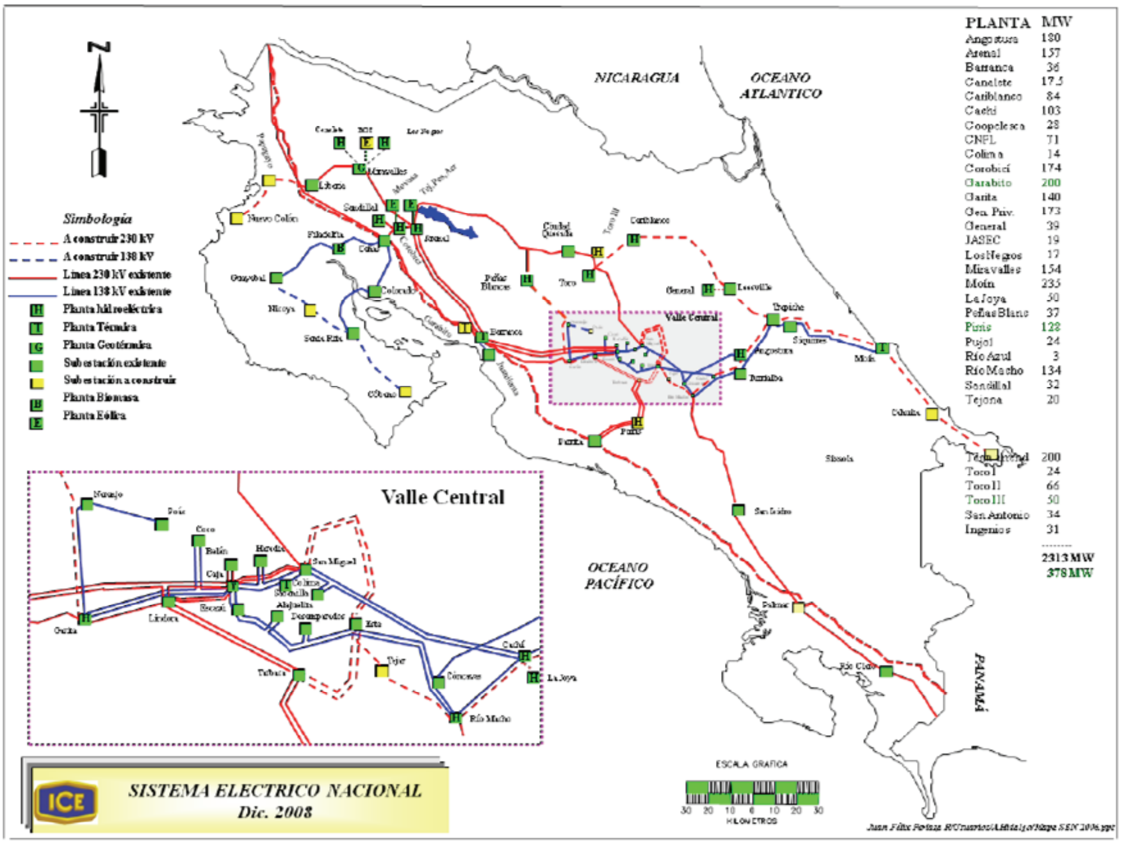

Figure 6 : The National Interconnected System in Costa Rica

The NIS is also interconnected to Interconnected Electricity System for Central America (see Figure 7). Interconnected Electricity System for Central America is comprised of the national transmission systems from Central American countries and interconnections between those countries. Current levels of exchanges represent less than 0.75% of the total generation in the region. In Costa Rica the net exchange was about 0.2% in 2009.

For the purpose of determining the operating margin emission factor, the net electricity imports from neighboring countries through the Interconnected Electricity System for Central America were accounted in as an electricity generation source while the electricity exports are not subtracted as a source for the electricity generation used for calculating the electricity emission factors. Furthermore, as per the “Tool to calculate the emission factor for an electricity system”, the CO_2 emission factor for electricity imports was considered 0 tCO_2/MWh.

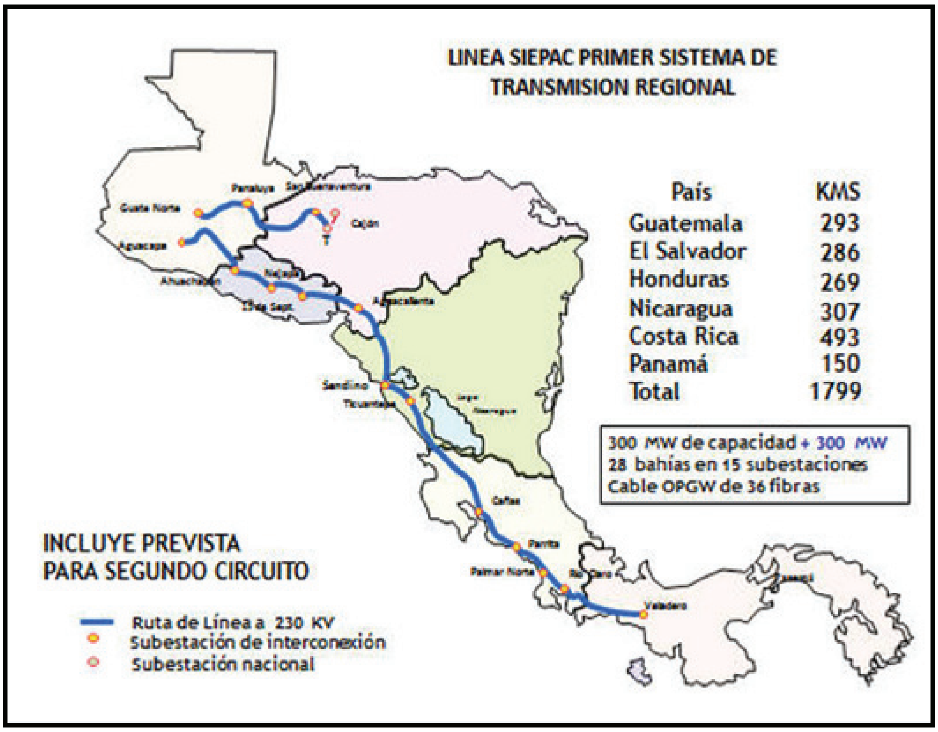

Figure 7: The National Interconnected System in Costa Rica

STEP 2 - Choose whether to include off-grid power plants in the project electricity system (optional):

According to the "Tool to calculate the emission factor for an electricity system", project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.

Option I is applied and only grid power plants are included in the calculation.

STEP 3- Select a method to determine the operating margin (OM):

The "Tool to calculate the emission factor for an electricity system" offers four methods to calculate the OM emission factor ($EF_{grid,OM,y}$):

a) Simple OM, or

b) Simple adjusted OM, or

c) Dispatch data analysis OM, or

d) Average OM.

Of these procedures, Option (b) (Simple adjusted OM) is applied. This is because low-cost / must run resources constitute average 94% of the five most recent years (2006/2010), which is over 50% of total grid generation during the period.

The Simple adjusted OM emissions factor can be calculated using either ex-ante or ex-post data vintages. The project proponents have chosen to use the ex-ante option, and $EF_{grid,OM,y}$ is fixed for the duration of the first crediting period.

Ex ante option: If the *ex ante* option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation is used.

The three most recent years for which data are available are 2008-2010.

As per the aforementioned Tool, power plants registered as CDM project activities are included in the sample group that is used to calculate the OM if the criteria for including the power source in the sample group apply.

STEP 4 - Calculate the operating margin emission factor according to the selected method:

The simple adjusted OM emission factor ($EF_{grid,OM\text{-}adj,y}$) is a variation of the simple OM, where the power plants / units (including net imports from the neighboring countries) are separated in low-cost/must-run power sources (*k*) and other power sources (*m*). As under Option A of the simple OM, it is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OM\text{-}adj,y} = \left(1-\lambda_y\right)\cdot\frac{\sum_m EG_{m,y}\times EF_{EL,m,y}}{\sum_m EG_{m,y}} + \lambda_y\cdot\frac{\sum_k EG_{k,y}\times EF_{EL,k,y}}{\sum_k EG_{k,y}}$$

Where:

$EF_{grid,OM\text{-}adj,y}$	=	Simple adjusted operating margin CO_2emission factor in year *y* (tCO_2/MWh)
λ_y	=	Factor expressing the percentage of time when low-cost/must-run power units are on the margin in year *y*
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EG_{k,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *k* in year *y* (MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$EF_{EL,k,y}$	=	CO_2 emission factor of power unit *k* in year *y* (tCO_2/MWh)
m	=	All grid power units serving the grid in year *y* except low-cost/must-run power units
k	=	All low-cost/must run grid power units serving the grid in year *y*
y	=	The relevant year as per the data vintage chosen in Step 3

$EF_{EL,m,y}$, $EF_{EL,k,y}$, $EG_{m,y}$ and $EG_{k,y}$are determined using the same procedures as those for the parameters $EF_{EL,m,y}$ and $EG_{m,y}$ in Option A of the simple OM method.

Determination of $EF_{EL,m,y}$

The emission factor of each power unit *m* was determined using Option A1 of the Simple OM, as data on fuel consumption and electricity generation is available:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}} \quad \textbf{(1)}$$

Where:

$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$FC_{i,m,y}$	=	Amount of fossil fuel type *i* consumed by power unit *m* in year *y* (Mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
m	=	All power units serving the grid in year *y* except low-cost/must-run power units
i	=	All fossil fuel types combusted in power unit *m* in year *y*
y	=	The relevant year as per the data vintage chosen in Step 3

Determination of $EF_{EL,k,y}$

Likewise, the emission factor of each power unit *k* was determined using Option A1 of the Simple OM, as data on fuel consumption and electricity generation is available:

$$EF_{EL,k,y} = \frac{\sum_i FC_{i,k,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{k,y}} \quad \textbf{(2)}$$

Where:

$EF_{EL,k,y}$	=	CO_2 emission factor of power unit *k* in year *y* (tCO_2/MWh)
$FC_{i,k,y}$	=	Amount of fossil fuel type *i* consumed by power unit *k* in year *y* (Mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)
$EG_{k,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *k* in year *y* (MWh)

k	=	All low-cost/must run grid power units serving the grid in year y
i	=	All fossil fuel types combusted in power unit k in year y
y	=	The relevant year as per the data vintage chosen in Step 3

Net electricity imports were included in $EG_{k,y}$ whose emission factor was considered as 0 tCO_2/MWh.

Determination of $EG_{m,y}$ and $EG_{k,y}$

$EG_{m,y}$ and $EG_{k,y}$ are determined according to section B.6.2.

The parameter λ_y is defined as follows:

$$\lambda_y(\%) = \frac{\text{Number of hours low - cost / must - run sources are on the margin in year y}}{\text{8760 hours per year}} \quad \textbf{(3)}$$

Lambda (λ_y) was calculated as follows:

Step (i) Plot a **load duration curve**. Collect chronological load data (typically in MW) for each hour of the year y, and sort the load data from the highest to the lowest MW level. Plot MW against 8760 hours in the year, in descending order.

Step (ii) Collect power generation data from each power plant/unit. Calculate the total annual generation (in MWh) from low-cost/must-run power plants/units (i.e. $\sum_k EG_{k,y}$).

Step (iii) Fill the load duration curve. Plot a horizontal line across the load duration curve such that the area under the curve (MW times hours) equals the total generation (in MWh) from low-cost/must-run power plants/units (i.e. $\sum_k EG_{k,y}$).

Step (iv) Determine the "Number of hours for which low-cost/must-run sources are on the margin in year y". First, locate the intersection of the horizontal line plotted in Step (iii) and the load duration curve plotted in Step (i). The number of hours (out of the total of 8760 hours) to the right of the intersection is the number of hours for which low-cost/must-run sources are on the margin. If the lines do not intersect, then one may conclude that low-cost/must-run sources do not appear on the margin and λ_y is equal to zero.

In determining λ_y only grid power units (and no off-grid power plants) were considered.

STEP 5 - Calculate the build margin (BM) emission factor:

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which power generation data is available

The sample group of power unit m used to calculate the build margin consists of either:

(a) Identifying the five power units that have been built most recently, excluding CDM or

(b) Identify the units that comprise at least 20% of the system generation, starting with units that started to supply electricity to the grid most recently, excluding CDM.
Project participants should use the set of power units that comprises the larger annual generation.

In the case of the project activity the second option, identifying the units that comprise at least 20% of the system generation, gives the higher total annual generation amount. The sample data comprises of the operation starting date between 2000 and 2010.

The build margin emission factor has been calculated ex-ante based on the most recent information available on units already built for sample group at the time of CDM-PDD submission to the DOE for validation. This option does not require monitoring the emission factor during the crediting period.

As data on fuel consumption and electricity generation is available for power unit m, Option A1 is chosen as the method to calculate the Build Margin, as follows:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}}$$

Where:

$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$FC_{i,m,y}$	=	Amount of fossil fuel type *i* consumed by power unit *m* in year *y* (Mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year *y*(tCO_2/GJ)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
m	=	All power units serving the grid in year *y* except low-cost/must-run power units

i = All fossil fuel types combusted in power unit *m* in year *y*
y = The relevant year as per the data vintage chosen in Step 3

STEP 6 - Calculate the combined margin (CM) emissions factor:

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:
(a) Weighted average CM; or
(b) Simplified CM.

The weighted average CM method (option A) should be used as the preferred option. The simplified CM method (option b) can only be used if:
•The project activity is located in a Least Developed Country (LDC) or in a country with less than 10 registered projects at the starting date of validation; and
•The data requirements for the application of step 5 above cannot be met.

As the data requirements for the application of step 5 above can be met, the weighted average CM is used to calculate the combined margin.

The combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

The default values for w_{OM} and w_{BM} for wind project activities are:

w_{OM}= 0.75 and w_{BM}= 0.25

(owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods.

On the basis of these weights for the first crediting period, the combined margin emission factor is calculated (and rounded down to the fourth digit), and fixed *ex-ante*:

$EF_{grid,CM,y}$ = ((0.424 tCO_2/MWh + 0.359 tCO_2/MWh + 0.383 tCO_2/MWh) / 3 * 0.75)
+ (0.112 tCO_2/MWh * 0.25)
= 0.320 tCO2/MWh

Using Operating Margin and Build Margin emission factors that are fixed for the duration of the first crediting period, the baseline emissions factor is also fixed for the first crediting period.

Table 18: Values obtained when calculating the baseline emission factor

Formula	Value
Operating Margin Emissions Factor ($EF_{grid,OM,2008}$)	0.424 tCO_2/MWh
Operating Margin Emissions Factor ($EF_{grid,OM,2009}$)	0.359 tCO_2/MWh
Operating Margin Emissions Factor ($EF_{grid,OM,2010}$)	0.383 tCO_2/MWh

Average Operating Margin Emissions Factor between 2008 and 2010 ($EF_{grid,OM,2008-2010}$)	0.389 tCO_2/MWh
Build Margin Emissions Factor ($EF_{grid,BM,2010}$)	0.112tCO_2/MWh
Baseline Emissions Factor ($EF_{grid,CM,y}$)	0.320tCO_2/MWh

Note**:** Detailed calculation of the individual OM and BM emission factors between 2008 and 2010 is shown in Annex 3 Baseline Information.

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

Data / Parameter:	$\mathbf{EF_{grid,OM,y}}$
Data unit:	tCO_2 (tonnes of CO_2)/MWh
Description:	Operating Margin Emission Factor of NIS Electricity Grid
Source of data used:	Calculated using data from ICE
Value applied:	0.389 tCO_2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Operating Margin Emission Factor has been calculated using the simple adjusted OM approach in accordance with the latest version of the "Tool to calculate the emission factor for an electricity system". $EF_{grid,OM,2008} =$ 0.424 tCO_2/MWh $EF_{grid,OM,2009} =$ 0.359 tCO_2/MWh $EF_{grid,OM,2010} =$ 0.383 tCO_2/MWh Average of 2008 and 2010: 0.389 tCO2/MWh
Any comment:	The value is calculated on *ex-ante* basis and it will remain same throughout the crediting period

Data / Parameter:	$\mathbf{EF_{grid,BM,y}}$
Data unit:	tCO_2/MWh
Description:	Build Margin Emission Factor of NIS Electricity Grid
Source of data used:	Calculated using data from ICE
Value applied:	0.112tCO_2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Build Margin Emission Factor has been calculated in accordance with the latest version of the "Tool to calculate the emission factor for an electricity system". $EF_{grid,BM,2008} =$ 0.134 tCO_2/MWh $EF_{grid,BM,2009} =$ 0.117 tCO_2/MWh $EF_{grid,BM,2010} =$ 0.112 tCO_2/MWh
Any comment:	The value is calculated on *ex-ante* basis and it will remain same throughout the crediting period

Data / Parameter:	$\mathbf{FC_{i,m,y}}$
Data unit:	Tonnes
Description:	Amount of fossil fuel type *i* consumed by power unit *m* in year y

Source of data used:	Executive Decree Number 24943 15/01/1996 Regulation for wholesale petroleum refinery products of Costa Rica[8]
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Density of the fuel (kg/L) Diesel: 0.84 Bunker: 0.97
Any comment:	The value is calculated on *ex-ante* basis and it will remain same throughout the crediting period

Data / Parameter:	**$NCV_{i,y}$**
Data unit:	GJ/tonnes
Description:	Net calorific value (energy content) of fossil fuel type *i* in year y
Source of data used:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied:	Diesel: 41.40 Bunker: 39.80
Justification of the choice of data or description of measurement methods and procedures actually applied :	Bunker fuel oil used in Costa Rica is imported from different countries, and NCV value for this fossil fuel type is not locally available. Therefore, NCV value from IPCC was used as a default value.
Any comment:	The value is determined on *ex-ante* basis and it will remain same throughout the crediting period

Data / Parameter:	**$EF_{CO2,i,y}$**
Data unit:	CO_2/TJ
Description:	CO2 emission factor of fossil fuel type *i* used in power unit *m* in year *y*
Source of data used:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied:	Diesel: 72.60 Bunker: 75.50
Justification of the choice of data or description of measurement methods and procedures actually applied :	Bunker fuel oil used in Costa Rica is imported from different countries. Therefore, EF value for this fossil fuel type is not locally available. Therefore, EF value from IPCC was used as a default value.
Any comment:	The value is calculated on *ex-ante* basis and it will remain same throughout the

[8] "Regula Venta Mayoreo Productos Refinadora Costarricense Petróleo"[Rules for Selling Costarican Wholesale Refinary Oil Products]

	crediting period

Data / Parameter:	**$EG_{m,y}$**
Data unit:	MWh
Description:	Net electricity generated by power plant/unit *m*, in year *y*
Source of data used:	Calculated using data from ICE
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data for the three most recent years 2008, 2009 and 2010 were used, and determined *ex-ante*.
Any comment:	The value is calculated on *ex-ante* basis and it will remain same throughout the crediting period

Data / Parameter:	**$EG_{k,y}$**
Data unit:	MWh
Description:	Net electricity generated by power plant/unit *k*, in year *y*
Source of data used:	Calculated using data from ICE
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data for the three most recent years 2008, 2009 and 2010 were used, and determined *ex-ante*.
Any comment:	The value is calculated on *ex-ante* basis and it will remain same throughout the crediting period

B.6.3. Ex-ante calculation of emission reductions:

>>

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y= Emission reductions in year y (tCO_2e)
BE_y = Baseline emissions in year y (tCO_2)
PE_y = Project emissions in year y (tCO_2e)

Baseline emissions BE_y

$BEy = EG_{facility,y} * EF_{grid,CM,y}$
= **40,764 MWh/y * 0.320 tCO_2e/MWh**
= **13,024**

Project emissions
PE_y

$PE_y = 0$

Emission reductions – ER_y

$ER_y = BE_y – PE_y$
= 13,024– 0
= 13,024

B.6.4 Summary of the ex-ante estimation of emission reductions:				
Year	**Estimation of project activity emissions (tonnes of CO2e)**	**Estimation of baseline emissions (tonnes of CO2e)**	**Estimation of leakage (tonnes of CO2e)**	**Estimation of overall emission reductions (tonnes of CO2e)**
Year 1	**0**	**13,024**	**0**	**13,024**
Year 2	**0**	**13,024**	**0**	**13,024**
Year 3	**0**	**13,024**	**0**	**13,024**
Year 4	**0**	**13,024**	**0**	**13,024**
Year 5	**0**	**13,024**	**0**	**13,024**
Year 6	**0**	**13,024**	**0**	**13,024**
Year 7	**0**	**13,024**	**0**	**13,024**
Total		**91,168**		**91,168**

B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	**$EG_{facility,y}$**
Data unit:	MWh
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid
Source of data to be used:	Measured continuously at 34.5 kV level
Value of data applied for the purpose of calculating expected emission reductions in section B.5	40,764 MWh/yr
Description of measurement methods and procedures to be	Measured continuously at the 34.5 kV level at the Escazú substation, which is part of the Costa Rican high voltage interconnected grid. The data will be archived electronically on a monthly basis according to internal procedures, until

applied:	2 years after the end of the crediting period.
QA/QC procedures to be applied:	The net electricity exported to the grid will be metered using a bidirectional (e.g. forward and reverse metering capacity) electricity meter (type ION) at the 34.5 KV level at the Escazú substation that is part of the high voltage interconnected grid. This meter will be calibrated on a regular interval in accordance with the national technical standard by the National Regulator Authority for Public Services (ARESEP) under the ARESEP norm AR-DTCON 2002 defined for the "Use, functioning and control of electricity meters". The meter currently considered has an accuracy class of 0.2% at unity power factor. The monitored value will be cross-checked against the monthly production report provided by CNFL to EVCSA.
Any comment:	CNFL will be plant operator

B.7.2. Description of the monitoring plan:

>>

1. Management Structure and Responsibility

The responsibility for daily monitoring lies on the plant operator and the overall responsibility of the monitoring system and reporting lies with EVCSA, the plant owner. According to the Rental Agreement between EVCSA and CNFL, the plant will be operated by CNFL. The staff will be defined by the plant operator to carry out the monitoring work (data recording and archiving, quality assurance and quality control of the data, equipment calibration, scheduled and unscheduled maintenances and adoption of corrective actions, if needed).

1.1 Management Structure

The project owner will hold the overall responsibility for the monitoring process. However, the follow-up of daily operations and the personnel involved with the daily monitoring work, revision of the monitored results/data, and quality assurance of measurements will be responsibility of the plant operator. All data collected will be recorded monthly into an electronic spreadsheet.

1.2 Responsibility of the personnel directly involved

The plant personnel involved with monitoring will be responsible for carrying out the following tasks:

- Supervise and verify metering and recording: the staff will ensure and verify adequate metering and recording of the data, including the net electricity delivered to the grid.
- Calibration: the staff will ensure that calibration of the metering instruments is carried out in accordance with national standards enforced by the Autoridad Reguladora de los Servicios Públicos ("ARESEP").
- Data Archives: the staff will be responsible for keeping all monitoring data on a data log, and making it available to the DOE for the verification of the emission reductions.

1.3 Support and Third Parties Participation

The staff will receive support from a CDM consultant / expert in his responsibilities through the following actions:

- Provide the staff with a calculation template in electronic form for calculation of annual emission reductions;
- Provide a specific CDM monitoring training to the personnel involved in the project's operation;
- Follow-up of the monitoring plan and continuous advice to the staff;
- Compilation of the monitored data and preparation of the monitoring report;

- Review of monitoring reports;
- Coordination with DOEs for the preparation of periodical verifications.

2. Data Collection, Recording and Archiving

Measurements of the electricity generated will also be monitored and stored through the use of a Supervisory Control and Data Acquisition (SCADA) system. This system is used for data acquisition, remote monitoring, and control. It enables the staff to monitor the performance of the plant state and to analyze the operational data on a real time basis. Data monitored by this system will be kept legible, dated, and readily identifiable and be made accessible for audit purposes either in electronic files or physical documents.

Other physical documents such as monthly and annual electricity generation reports from the plant operator (e.g. CNFL) to the project owner (e.g. EVCSA) and other relevant monitoring requirements will be collected and stored in a central place, together with this monitoring plan. All electronical and paper-based information will be stored and kept at least for two years after the end of the crediting period.

3. Quality Assurance and Quality Control

The net electricity exported to the grid will be monitored at the 34.5 KV level at the Escazú substation that is the connection point to the Costa Rican interconnected high voltage grid. This data will be used for the calculation of emission reduction since measurements will account for the transmission loses. The meter will be calibrated on a regular interval according with the national technical standard (e.g. “Use, installation and control of electricity meters”) established by Law and enforced by ARESEP. The data generated will be collected daily by the operational personnel and reviewed by the project manager on a monthly basis.

Data recorded and the control data will be consolidated on a monthly and annual basis, and will be checked for quality control purposes with official reports or statistics to be produced by the plant operator to the attention of the project owner.

4. Periodical Maintenance and Calibration of Metering Equipment

As previously stated, the metering equipment will be properly configured and checked periodically as required by Law and enforced by ARESEP according to national technical standard that is in line with the “American National Standard Code for Electricity Metering” (ANSI). According to the national standards, a start-up configuration and checking of metering equipment is also expected to occur before the project activity starts commercial operation.

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 baseline and monitoring study was completed in 28/October/2012 by Mitsubishi UFJ Morgan Stanley Securities Co., Ltd. and Nórdica de Tecnología y Comercio S.A..

Clean Energy Finance Division
Mitsubishi UFJ Morgan Stanley Securities Co., Ltd. (MUMSS)
5th Floor, Toyosu Front,
3-2-20, Koto-ku, Tokyo, 135-0061, Japan
toyofuku-masayuki@sc.mufg.jp

Nórdica de Tecnología y Comercio S.A. (NORDTECO)
NORDTECO Building, Rohrmoser,
631-1007, Centro Colón
San José, Costa Rica

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:

>>
28/07/2010 the date at which the EPC turnkey contract was signed for the project activity (see Table 7).

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

>>
20 years[9]

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:

>>
31/12/2012[10] , or registration date, whichever is later.

C.2.1.2. Length of the first crediting period:

>>
7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable

C.2.2.2. Length:

>>
Not applicable

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[9] "Statement of Compliance for design Assessment" issued by DEWI-OCC Offshore and Certification Centre GMBh on 16 May, 2008.

[10] Expected Commissioning date

SECTION D. Environmental impacts

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

EVCSA has completed an Environmental Impact Assessment ("EIA") that is required by Costa Rica's Environmental Law #7554 (1995)[11]. On 16 November, 2004, the full EIA report for the project activity was submitted to SETENA - *Secretaria Técnica Nacional Ambiental*, the National Environmental Technical Secretary. Under Resolution Nº 140-2005-SETENA on 13 September 2005, SETENA requires the presentation of an annex to the EIA report, which was provided on 16 December, 2005. The environmental license was finally approved by the Resolution SETENA Nº CP-563-2006 on 22 March, 2006. There has been the modification since the approval, and Authorization 1565-2011-SETENA and 1830-2011 allowed the modification related to the waste management.

The EIA was completed by the consultancy firm "Lahmeyers International" and provides a comprehensive analysis on anticipated environmental, economic and social impacts (positive and negative) on the region and people in the project area.

The environmental impacts identified for this project can be divided into two main components: impacts from the construction phase and impacts from the operational phase.

The following table summarizes the potential environmental impacts and the mitigation measures to be taken:

Table 19: Identified environmental impacts

Identified environmental impacts	Conclusions and Measures taken
Physical and Biotic Impacts	
Air Pollution and Atmospheric Emissions	
Construction Phase The main impacts refer to dust caused by civil works (e.g. excavations, etc.) to adapt external roads and internal access, to settle WECs and interconnections and the production of cement; and emissions from heavy vehicles and machineries to transport materials.	Measures comprise: i) quality assurance of the infrastructure and adequate maintenance of the external roads and internal access; ii) monitor and control emissions and adequate maintenance of heavy vehicles and machineries used at the site; and iii) apply water during excavation to avoid dust.
Operational Phase No impacts on air quality are expected for this phase.	-----

[11] Article 17 of the Environmental Law of 1995 says that any human activities that alter or destroy elements of the environment or generate waste, toxic or hazardous materials, require an environmental impact by the National Technical Environmental Secretariat (SETENA). Approval from SETENA is a prerequisite to start activities, works or projects. This Law requires wind power projects to present an environmental impact assessment. The Environmental Law 7554 can be accessed from:

http://www.oas.org/dsd/fida/laws/legislation/costa_rica/costa_rica_7554.pdf

Impacts on Biodiversity and Ecosystems	
Construction Phase Suppression of vegetation in limited areas to adapt internal roads and access paths; impacts over animal life due to noise and vibration from construction machinery and the transportation of construction materials that could possibly disturb animal life and ecosystems in the affected areas.	Measures comprise: i) assure that only a small quantity of trees will be suppressed and as a compensation measure 2 ha of degraded lands outside the project area will be reforested with endogenous species, and ii) develop a plan to accelerate the natural sprouting of pasture within the project area.
Operational Phase Most important impact is related to the mortality of birds during the operation of the WECs.	The project site is not on a trans-boundary migration route for birds. Nevertheless, there are seasonally local migrations of identified species of birds.
Impacts on Soil	
Construction Phase Impacts on soil relate to the adaptation of the project's external roads and internal ways and paths, construction of the sub-station, preparation of land to install the WECs and excavations for the interconnections.	Measures comprise: i) control runoff in areas considered of high erosion risk (such as the land where the WECs will be settled); ii) solid waste management during the construction phase including collection, treatment, storage, transportation and final disposal on a municipal landfill; iii) land that is extracted will be deposited in a discharge area to be created onsite.
Operational Phase No impacts on soil are observed for this phase.	-----
Impacts on Superficial and Ground Waters	
Construction Phase Contamination of water courses and/or ground waters through potential spilling of fuels or other sediments during the use of cranes to install the WECs, transportation of material for construction, excavations and civil works and the generation of effluents from the cement production at the site.	Measures include: i) ensure good maintenance of vehicles and heavy machineries; ii) construction of drainage and collection wells to avoid contaminants reaching water courses; iii) fuel for the crane and other heavy machinery will be stored onsite in a metallic container to avoid contact with rain and any kind of contamination of water courses, etc.
Operational Phase Contamination of ground waters with fuel spilling during the operation of the sub-station.	Drainage and collection wells will be built to avoid contamination.
Social Impacts	
Construction Phase Increase of traffic surrounding the project site.	Material transportation into the project site will be programmed and monitored in order to avoid intense traffic in the area, and the project proponentis committed to hire local employees as a way to diminish this possible source of conflict.

According to the EIA, there will be no transboundary impacts related to the construction and operation of the EVCSA project. The main impacts outlined in the EIA were considered temporary and, thus, not considered significant.

In addition, there will be many positive environmental impacts generated as a result of the project. For example, local jobs will be created during construction and the operation of the plant and improved access roads will be available for the local communities in the region. Costa Rica will also benefit from having a new source of emissions-free renewable energy producing electricity for its citizens – helping to reduce GHG emissions and reduce the import of fossil fuels.

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:

>>

No environmental impacts caused by the project are considered significant.

SECTION E. Stakeholders' comments

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

In accordance with the Costa Rican procedures to obtain the EIA approval and the Environmental License, the project proponent must conduct a stakeholder's consultation to present the project to the local communities. In the case of the EVCSA, different stakeholder consultations were conducted by EVCSA with the support of CNFL, which has maintained a close working relationship with the municipalities and local communities where the project takes place. The following table summarizes the data and locations of the stakeholders consultation meetings conducted by CNFL and EVCSA.

Table 20: List of stakeholder meetings

Year	Date	Purpose of Gathering	Place/Activity
2005	October 06	Meeting	Project presentation to the Municipality of Santa Ana
	December 13	EIA official stakeholder consultation meeting	Project public presentation and consultation at the local community of Salitral and creation of the "Community Commission"
2006	February 15	Meeting	Project presentation to the Association for the Conservation of the Escazú Mountains (CODECE, Asociación para la Conservación de los Cerros de Escazú)
	February	--	Public presentation of the project to the local community of Pabellón
	March 28	Meeting	First meeting of the "Community Commission"
	November 23	Meeting	Update to the Municipality of Santa Ana
2007	June 1	EIA official stakeholder consultation	Stakeholder consultation at the Public School in Pabellón

		meeting	
	November 22	Meeting	Presentation of the project to the Santa Ana's new Municipal Council
2008	January 23	Meeting	Coordination meeting with the Municipality of Santa Ana to implement the bilateral agreement with CNFL for the improvement of the public and local infrastructure within the project area of influence
2010	July 6	Meeting	Update of the project implementation to the Municipality of Santa Ana
	August 25	EIA official stakeholder consultation meeting	Update of the project implementation to the community of Pabellón
	October 15	Meeting	Consultation with the Central Pacific Conservation Area (ACOPAC, Área de Conservación de la Cordillera Volcánica Central)

The different public consultation meetings conducted by CNFL/EVCSA from the year 2005 to 2010 entailed a public presentation of the project as a CDM project activity and the status of its implementation, and through direct interactions with different stakeholders such as environmental NGO (e.g. CODECE), local municipality (e.g. Santa Ana), public schools (e.g. Pabellón, Salitral, etc.), governmental environmental organization (e.g. ACOPAC), local communities representatives (e.g. Salitral and Pabellón) and residents from the area surrounding the project site, a series of comments, questions, opinions and other views related to the project were gathered together with a series of actions taken or to be taken for mitigation of the potential impacts of the project activity. Therefore, in addition to being informed about the EVCSA wind power project as a potential CDM project activity, stakeholders were invited to provide questions and answers to a number of local concerns directly or indirectly related with the project activity, including economic and social issues the local communities were facing, as well as answers to important communities needs to be addressed by the developers in coordination with the local municipality as a reward for the local residents, so they can benefit from the project.

E.2. Summary of the comments received:

Many comments were raised during the meetings, mainly concerning the environmental impacts of the project activity, during both the construction and the operation phases, and the overall contribution of the project activity to the local communities.

A brief summary of the comments, questions, opinions, concerns and other views received are shown below.

- Interest in more details of the project and its social, economic and environmental positive and negative effects and risks associated, and on the Environmental Management Plan (EMP) required and established by procedures to mitigate the impacts;

- Potential of WECs disturbance of birds flight patterns and its visual impact on the landscape;

- The requirement of improvement and permanent maintenance of the access roads to the project site since the roads will support the transit of heavy machinery for transportation and construction purposes;

- Concerns on the widening of the access roads and its effects on the local properties' fences;

- Concerns on the potential impacts of the increased erosion and runoff on the terrains surrounding the site and on the overall local needs to enhance soil and watershed restorations due to landslides risk in the region;

- Apprehension on the civil works deemed necessary for the installation of the WECs in a rugged terrain that is known to be vulnerable to landslides and on the required slopes for the land cuts that will be necessary to structure the terraces by heavy cranes, in addition to the removals and disposal of the materials at the site;

- Consequences of land use changes in neighbouring lands to the project site, such as reforestation of degraded terrains and its impacts on the wind resource at the site;

- Safety concerns in the area of the project site due to more frequent visitors;

- Interest that the project rewards the community in exchange of the use of its natural resources and for the effects and risks that the project activity poses to the local communities.

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

>>

EVCSA/CNFL clarified all the stakeholders' concerns by providing relevant data and answered all questions to the satisfaction of the participants. Detailed minutes of the meetings delineating the above questions, concerns, opinions and views have been written down and are available upon request.

EVCSA/CNFL also explained to the stakeholders that the project activity would contribute to the sustainable development of the region by facilitating and catalyzing local opportunities and communities needs, thereby creating sustainable support and economic, social and environmental value.

Furthermore, the stakeholder consultation resulted in the creation of a "Community Commission" which is comprised by local community leaders from each of the communities affected by the project activity and which will be advising the execution of a Social Viability Plan established by EVCSA/CNFL to address the needs and opportunities of each community as well as being tasked with supervising the deployment of the agreed upon activities. Activities include support for local infrastructure (e.g. roads improvement and permanent maintenance, commitments for electricity connection to the grid, etc.) education and training, and sustainable development initiatives.

Finally, it is important to emphasize that the entire project activity complies with the environmental laws and their respective requirements and that residents and the local government are all supportive of the proposed project activity.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Eólico Valle Central S.A. (EVCSA)
Street/P.O.Box:	
Building:	Providencia
City:	San José
State/Region:	San José Province
Postcode/ZIP:	
Country:	Costa Rica
Telephone:	(506) 2291-3261
FAX:	(506) 2283-3101
E-Mail:	pmontero@eolicovc.com
URL:	
Represented by:	Pedro Montero
Title:	General Manager
Salutation:	Mr.
Last name:	Montero
Middle name:	
First name:	Pedro
Department:	
Mobile:	(506)8363-2361
Direct FAX:	(506) 2283-3101
Direct tel:	(506) 2283-3096
Personal e-mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No Public Funding was received and no Official Development Assistance (ODA) from parties included in Annex I of the convention is involved in the Project activity.

Annex 3

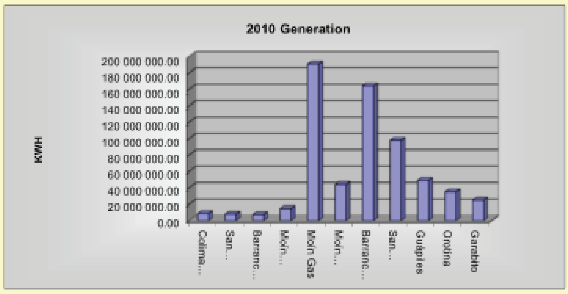
BASELINE INFORMATION

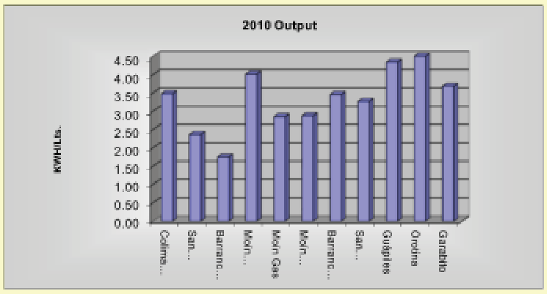
2010

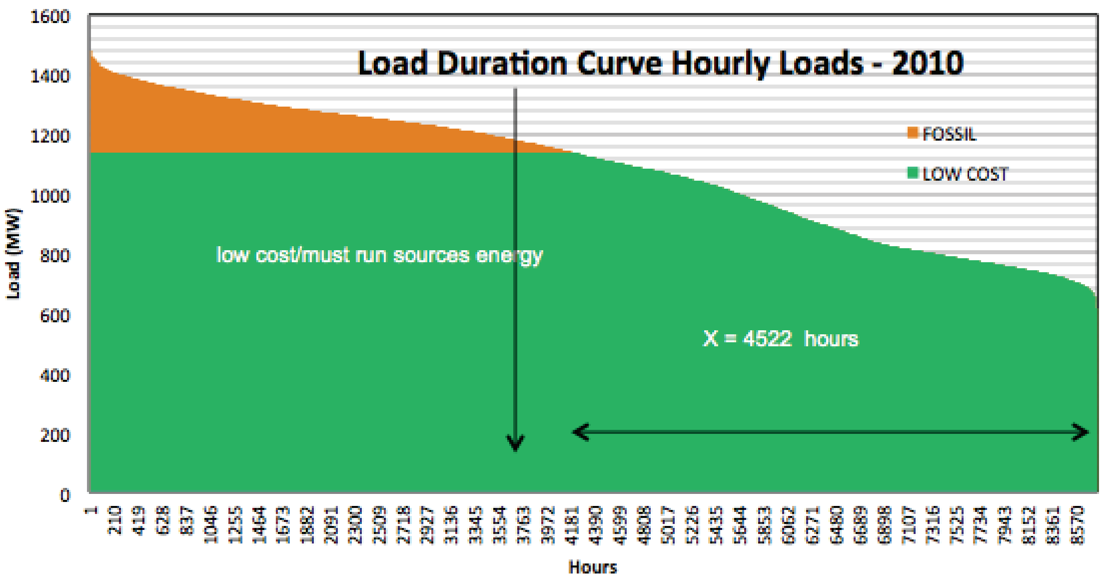
ICE Power Plants Register

Year 2010

Name and Type of Plant	Generation kWH	Fuel Consumption in Liters – Type – Diesel	Fuel Consumption in Liters – Type – Bunker	Fuel Consumption in Liters – Diesel – Boiler	Fuel Consumption in Liters – Diesel – Tests	Output (Efficiency) kWH/LTS	Consumption % – Diesel %	Consumption % – Bunker %
Colima Pistón	8 335 160.00	531 875.63	1 863 961.35	0.00	1 120.00	3.48	22.24	77.76
San Antonio Gas	7 347 972.75	3 087 953.01	0.00	0.00	21 409.41	2.36	100.00	0.00
Barranca Gas	6 882 860.00	2 926 568.00	0.00	0.00	1 002 911.00	1.75	100.00	0.00
Moin Pistón	14 342 572.00	215 867.00	3 309 329.00	36 130.00	6 615.00	4.02	7.25	92.75
Moin Gas	190 563 070.00	66 785 361.57	0.00	0.00	6 776.00	2.85	100.00	0.00
Moin CNFL Gas	43 796 340.00	15 239 837.44	0.00	0.00	0.00	2.87	100.00	0.00
Barranca Alquilada	163 936 618.00	47 389 778.35	0.00	0.00	0.00	3.46	100.00	0.00
San Antonio Alquilada	97 803 732.87	29 943 404.50	0.00	0.00	0.00	3.27	100.00	0.00
Guápiles	48 679 908.00	300 336.00	10 909 380.00	0.00	1 310.00	4.34	2.69	97.31
Orotina	34 769 343.88	317 990.00	7 404 430.00	0.00	6 600.00	4.50	4.20	95.80
Garabito	24 717 001.07	1 299 958.00	5 096 416.00	56 369.00	254 418.00	3.69	24.02	75.98
Total	641 174 578.57	168 038 929.50	28 583 516.35	92 499.00	1 301 159.41	3.24	85.57	14.43







Plant	Technology	Operation Start	Installed Capacity [MW]	2010 Total Production [MWh]	Emissions [t CO2]
E.S.P.H.	Hydraulic	several	2.00	92,591.42	
J.A.S.E.C.	Hydraulic	several	20.32	126,406.75	
C.N.F.L.	Hydraulic	several	88.00	361,924.49	
Coopelesca-Chocosuela	Hydraulic	1999	25.50	98,275.92	
Coopeguanacaste	Hydraulic	2008	17.50	66,309.48	
Conelectricas	Hidraulic	several	several	176,400.92	
Río Azul-Zaret	Biogas	2004	3.70	70.29	
Paralela Hidro	Hydraulic	several	135.40	595,606.72	
Paralela Térmica	Thermal Bagasse	several	24.00	65,326.41	
Paralela Eólica	Wind	several	48.75	143,385.28	
Garita 1 y 2	Hydraulic	1958	37.36	200,692.00	
Garita 3 y 4 (Ventanas)	Hydraulic	1988	97.38	501,641.72	
Río Macho	Hydraulic	1963	120.00	521,694.32	
Cachí	Hydraulic	1967	108.80	593,059.13	
Arenal	Hydraulic	1979	157.40	727,353.72	
Dengo-Corobicí	Hydraulic	1982	174.01	840,241.65	
Sandillal	Hydraulic	1993	32.00	143,601.92	
Toro I	Hydraulic	1996	23.21	105,478.05	
Toro II	Hydraulic	1997	65.74	268,270.66	
Angostura	Hydraulic	2000	172.20	902,136.89	
Peñas Blancas	Hydraulic	2002	38.17	158,861.81	
Caribalnco	Hydraulic	2007	84.00	288,958.72	
Echandi	Hydraulic	1990	4.70	33,784.25	
Cacao	Hydraulic	1922	0.29	962.53	
Pto Escondido	Hydraulic	1940	0.38	1,269.26	
Avance	Hydraulic	1938	0.18	1,113.30	
Los Lotes	Hydraulic	1956	0.38	2,401.65	
Rio Genio	Hydraulic	2006	0.03		
Colima	Thermal Diesel/Bunker	1956	14.0	8 335.16	6 776
San Antonio Gas	Thermal Diesel	1973	34.0	7 347.97	7 796
Barranca Gas	Thermal Diesel	1974	36.0	6 882.86	7 389

Moín Pistón	Thermal Diesel/Bunker	1977	26.0	14 342.57	10 191
Moín Gas	Thermal Diesel	1991	131.0	190 563.07	168 616
Moín Gas-CNFL	Thermal Diesel	2003	78.0	43 796.34	38 477
Barranca Alquilada	Thermal Diesel	2008	99.5	163 936.62	119 647
San Antonio Alquilada	Thermal Diesel	2008	140	97 803.73	75 599
Pujosl Guapiles	Thermal Diesel	2006	14.3	48 679.91	32 556
Pujol Orotina	Thermal Diesel	2006	10.1	34 769.34	22 385
Garabito	Thermal Bunker	2010	200.0	24 717.00	18 137
Miravalles I	Geothermal	1994	55.0	434,521.06	
Miravalles II	Geothermal	1998	55.0	383,793.72	
Boca de Pozo I	Geothermal	1995	5.0	29,531.17	
Miravalles V	Geothermal	2003	18.0	115,991.50	
ICE Eólico (Tejona)	Wind	2003	19.8	64,312.86	
BOT Hidro (El General, La Joya)	Hydraulic	several		453,256.23	
BOT Eolico (PEG)	Wind			150,977.13	
BOT Geotermico (Miravalles III)	Geothermal	2000	26.0	212,244.05	
Intercambio [interconnection system]				164,370.42	
TOTAL			2 443	9,667,991.966	507 568

	2010
tCO_2 low-cost/must-run	0.00
tCO_2 fossil	507 568.09

	2010
Low cost/must run Generation(MWh)	9 026 817.39
Fossil Generation (MWh)	641 174.58
total Generation (MWh)	9 667 991.97

lambda=	0.516

EF_{OM}=	0.383

LAST FIVE PLANTS BUILT

Plant	Technology	Operation Start	Installed Capacity [KW]	2010 Total Production [MWh]	Emissions [t CO2]
Barranca Alquiler (Alstom)	Thermal	2008	99,500.0	6,882.86	119 647
P.E. Guanacaste	Eolic	2009	49,700.0	150,977.13	
El Encanto	Hydraulic	2009	8,400.0	52,000.00	
Pocosol/Agua Gata	Hydraulic	2010	26,500.0	176,400.92	
Garabito	Thermal	2010	200,000.0	24,717.00	18 137
Total				457 876	53 649

LAST PLANTS BUILT THAT REPRESENT 20% OF THE TOTAL MWh OF 2010	1 906 513
TOTAL MWh OF 2010	9 532 566
0.117	tCO_2/MWh

Plant	Technology	Operation Start	Installed Capacity [KW]	2010 Total Production [MWh]	Emissions [tCO2]
Angostura	Hydraulic	2000	172,202.0	902,136.89	
Miravalles III		2000	29,550.0	212,244.05	
Peñas Blancas	Hydraulic	2002	38,172.0	158,861.81	
Chocosuela II y III	Hydraulic	2003	14,000.0	98,275.92	
Ingenio Taboga	Biothermal	2003	20,000.0	36,012.55	
Moin Gas (CNFL)	Thermal	2003	90,000.0	43,796.34	38476.5906
Miravalles V	Geothermal	2003	21,001.0	115,991.50	
Ingenio El Viejo	Biothermal	2004	20,000.0	29,313.87	
Guapiles (Pujol)	Thermal	2006	14,300.0	48,679.91	32556.41767
Guapiles (Orotina)	Thermal	2006	10,100.0	34,769.34	22384.92587
El General	Hydraulic	2006	42,000.0	194,915.58	
Cariblanco	Hydraulic	2007	87,941.0	288,958.72	
Canalete	Hydraulic	2008	17,500.0	66,309.48	
San Antonio Alquiler (TEIC)	Thermal	2008	140,920.0	97,803.73	75 599
Barranca Alquiler (Alstom)	Thermal	2008	99,500.0	6,882.86	119 647
P.E. Guanacaste	Eolic	2009	49,700.0	150,977.13	
El Encanto	Hydraulic	2009	8,400.0	52,000.00	
Pocosol/Agua Gata	Hydraulic	2010	26,500.0	176,400.92	
Garabito	Thermal	2010	200,000.0	24,717.00	18 137
Total				2 739 048	306 801

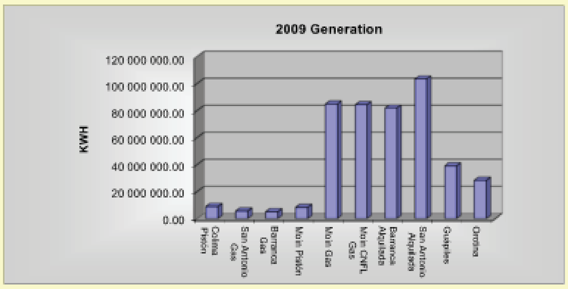
	0.112	tCO_2/MWh
EF_{BM}	0.112	tCO_2/MWh

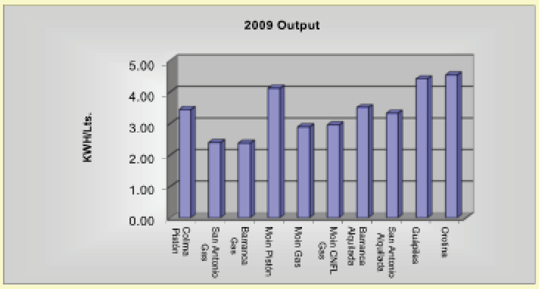
2009

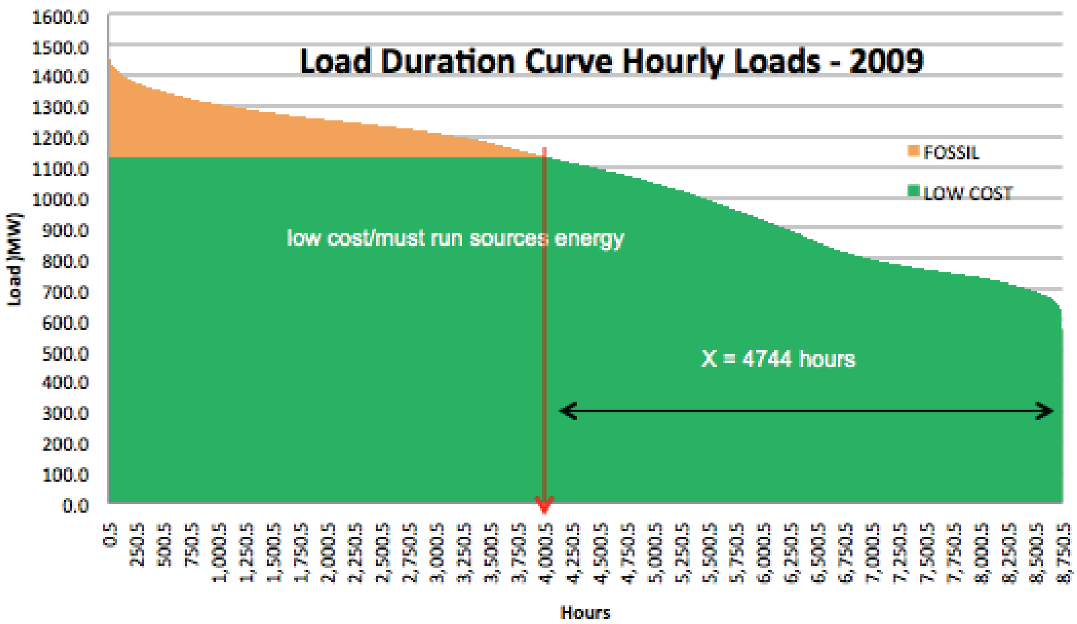
ICE Power Plants Register

Year 2009

Name and Type of Plant	Generation kWH	Fuel Consumption in Liters – Type – Diesel	Fuel Consumption in Liters – Type – Bunker	Fuel Consumption in Liters – Diesel – Boiler	Fuel Consumption in Liters – Diesel – Tests	Output (Efficiency) kWH/LTS	Consumption % – Diesel %	Consumption % – Bunker %
Colima Pistón	9 107 823.00	655 815.00	1 999 740.00	0.00	0.00	3.43	24.70	75.30
San Antonio Gas	5 876 511.00	2 438 633.00	0.00	0.00	26 715.00	2.38	100.00	0.00
Barranca Gas	5 322 627.00	2 193 313.00	0.00	0.00	58 259.00	2.36	100.00	0.00
Moin Pistón	8 510 245.00	190 291.00	1 822 725.00	48 876.00	10 154.00	4.11	12.03	87.97
Moin Gas	85 045 735.00	29 362 738.00	0.00	0.00	65 588.00	2.89	100.00	0.00
Moin CNFL Gas	84 535 590.00	28 652 989.00	0.00	0.00	0.00	2.95	100.00	0.00
Barranca Alquilada	81 869 036.00	23 398 666.00	0.00	0.00	0.00	3.50	100.00	0.00
San Antonio Alquilada	103 465 954.00	31 199 811.00	0.00	0.00	0.00	3.32	100.00	0.00
Guápiles	38 982 233.00	319 338.00	8 519 337.00	0.00	0.00	4.41	3.61	96.39
Orotina	28 493 154.00	583 623.00	5 695 597.00	0.00	470.00	4.54	9.30	90.70
Total	451 208 908.00	118 995 217.00	18 037 399.00	48 876.00	161 186.00	3.29	86.86	13.14







Plant	Technology	Operation Start	Installed Capacity	2009 Total Production	Emissions
			[MW]	[MWh]	[t CO2]
E.S.P.H.	Hydraulic	several	2.00	91,200.47	
J.A.S.E.C.	Hydraulic	several	20.32	139,639.62	
C.N.F.L.	Hydraulic	several	88.00	353,152.18	
Coopelesca-Chocosuela	Hydraulic	1999	25.50	83,467.98	
Coopeguanacaste	Hydraulic	2008	17.50	75,490.21	
Conelectricas	Hydraulic	several	several	-	
Río Azul-Zaret	Biogas	2004	3.70	609.95	
Paralela Hidro	Hydraulic	several	135.40	640,995.89	
Paralela Térmica	Thermal Bagasse	several	24.00	47,607.95	
Paralela Eólica	Wind	several	48.75	194,189.73	
Garita 1 y 2	Hydraulic	1958	37.36	173,313.60	
Garita 3 y 4 (Ventanas)	Hydraulic	1988	97.38	426,691.64	
Río Macho	Hydraulic	1963	120.00	497,284.05	
Cachí	Hydraulic	1967	108.80	628,600.21	
Arenal	Hydraulic	1979	157.40	911,421.40	
Dengo-Corobicí	Hydraulic	1982	174.01	972,432.85	
Sandillal	Hydraulic	1993	32.00	161,094.26	
Toro I	Hydraulic	1996	23.21	101,397.03	
Toro II	Hydraulic	1997	65.74	255,487.12	
Angostura	Hydraulic	2000	172.20	866,954.12	
Peñas Blancas	Hydraulic	2002	38.17	159,562.00	
Caribalnco	Hydraulic	2007	84.00	152,929.74	
Echandi	Hydraulic	1990	4.70	34,787.70	
Cacao	Hydraulic	1922	0.29	5,063.41	
Pto Escondido	Hydraulic	1940	0.38	879.49	
Avance	Hydraulic	1938	0.18	2,139.60	
Los Lotes	Hydraulic	1956	0.38	1,930.85	
Rio Genio	Hydraulic	2006	0.03	-	
Colima	Thermal Diesel/Bunker	1956	14.0	9 107.82	7 485
San Antonio Gas	Thermal Diesel	1973	34.0	5 876.51	6 157
Barranca Gas	Thermal Diesel	1974	36.0	5 322.63	5 538
Moín Pistón	Thermal	1977	26.0	8 510.25	5 793

	Diesel/Bunker				
Moín Gas	Thermal Diesel	1991	131.0	85 045.74	74 133
Moín Gas-CNFL	Thermal Diesel	2003	78.0	84 535.59	72 341
Barranca Alquilada		2008	99.5	81 869.04	59 075
San Antonio Alquilada		2008	140	103 465.95	78 771
Pujosl Guapiles	Thermal Diesel	2006	14.3	38 982.23	25 638
Pujol Orotina	Thermal Diesel	2006	10.1	28 493.15	18 075
Garabito	Thermal Bunker	2010	200.0	0.00	0
Miravalles I	Geothermal	1994	55.0	446,361.16	
Miravalles II	Geothermal	1998	55.0	373,924.91	
Boca de Pozo I	Geothermal	1995	5.0	42,904.06	
Miravalles V	Geothermal	2003	18.0	109,896.32	
ICE Eólico (Tejona)	Wind	2003	19.8	80,343.71	
BOT Hidro (El General, La Joya)	Hydraulic	several		488,544.57	
BOT Eolico (PEG)	Wind			51,649.19	
BOT Geotermico (Miravalles III)	Geothermal	2000	26.0	212,753.50	
Intercambio [interconnection system]				151,036.00	
TOTAL			2 443	9,386,945.361	353 006

	2009
tCO_2 low-cost/must-run	0.00
tCO_2 fossil	353 006.26

	2009
Low cost/must run Generation(MWh)	8 935 736.45
Fossil Generation (MWh)	451 208.91
total Generation (MWh)	9 386 945.36

lambda=	0.542

EF_{OM}=	0.359	

LAST FIVE PLANTS BUILT

Plant	Technology	Operation Start	Installed Capacity	2009 Total Production	Emissions
			[KW]	[MWh]	[t CO2]
El General	Hydraulic	2006	42,000.0	208,233.34	
Cariblanco	Hydraulic	2007	87,941.0	152,929.74	
Canalete	Hydraulic	2008	17,500.0	75,490.21	
San Antonio Alquiler (TEIC)	Thermal	2008	140,920.0	103,465.95	78 771
Barranca Alquiler (Alstom)	Thermal	2008	99,500.0	5,322.63	59 075
Total				457 876	53 649

0.117	tCO_2/MWh

LAST PLANTS BUILT THAT REPRESENT 20% OF THE TOTAL MWh OF 2009 1 850 554

TOTAL MWh OF 2009 9 252 771

Plant	Technology	Operation Start	Installed Capacity [KW]	2009 Total Production [MWh]	Emissions [tCO2]
Angostura	Hydraulic	2000	172,202.0	866,954.12	
Miravalles III		2000	29,550.0	212,753.50	
Peñas Blancas	Hydraulic	2002	38,172.0	159,562.00	
Chocosuela II y III	Hydraulic	2003	19,000.0	83,467.98	
Ingenio Taboga	Biothermal	2003	20,000.0	21,917.75	
Moin Gas (CNFL)	Thermal	2003	90,000.0	84,535.59	72 341
Miravalles V	Geothermal	2003	21,001.0	109,896.32	
Ingenio El Viejo	Biothermal	2004	20,000.0	25,690.20	
Guapiles (Pujol)	Thermal	2006	14,300.0	38,982.23	25 638
Guapiles (Orotina)	Thermal	2006	10,100.0	28,493.15	18 075
El General	Hydraulic	2006	42,000.0	208,233.34	
Cariblanco	Hydraulic	2007	87,941.0	152,929.74	
Canalete	Hydraulic	2008	17,500.0	75,490.21	
San Antonio Alquiler (TEIC)	Thermal	2008	140,920.0	103,465.95	78 771
Barranca Alquiler (Alstom)	Thermal	2008	99,500.0	5,322.63	59 075
Total				2 177 695	253 901

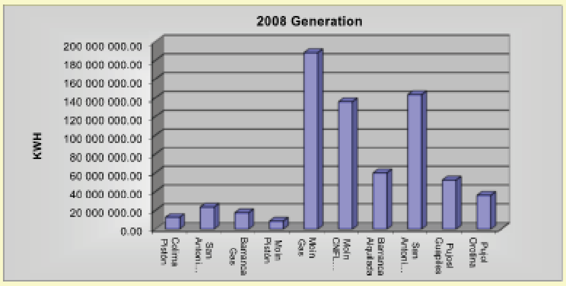
	0.117	tCO_2/MWh
EF_{BM}	0.117	tCO_2/MWh

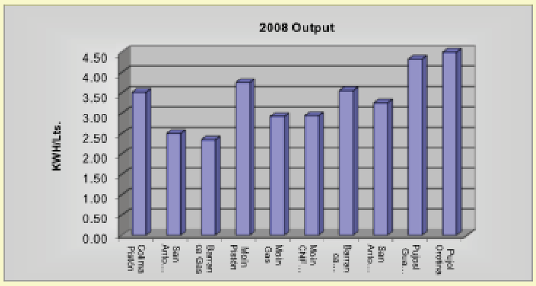
2008

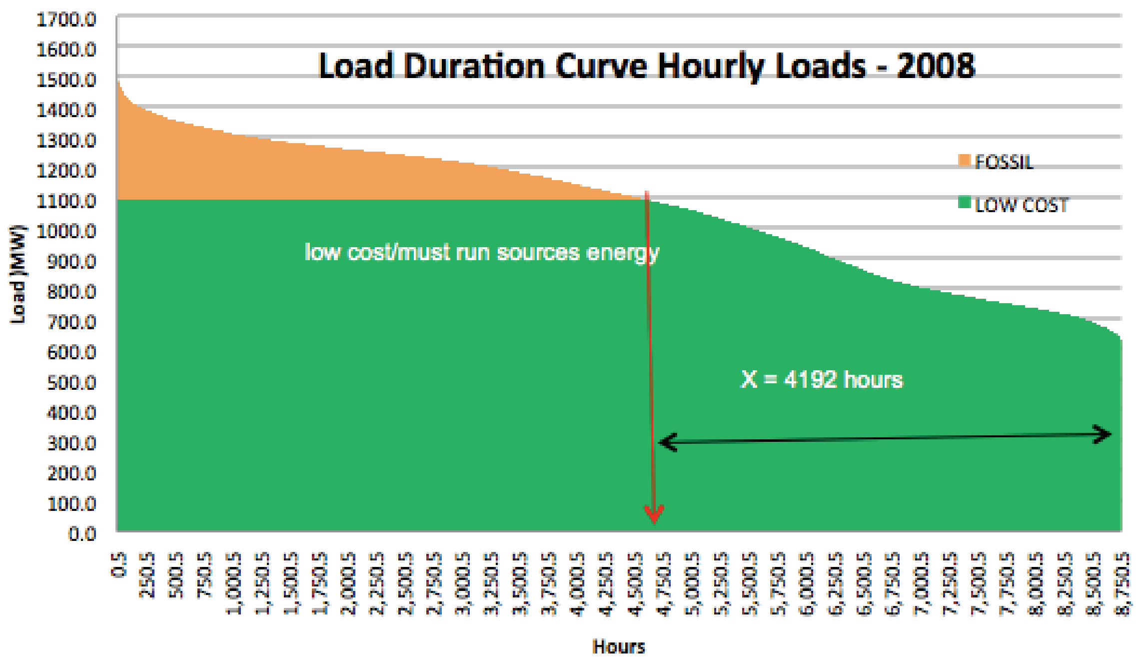
ICE Power Plants Register

Year 2008

Name and Type of Plant	Generation kWH	Fuel Consumption in Liters – Type – Diesel	Fuel Consumption in Liters – Type – Bunker	Fuel Consumption in Liters – Diesel – Boiler	Fuel Consumption in Liters – Diesel – Tests	Output (Efficiency) kWH/LTS	Consumption % – Diesel %	Consumption % – Bunker %
Colima Pistón	12 399 291.00	917 472.00	2 610 292.00	0.00	0.00	3.51	26.01	73.99
San Antonio Gas	23 349 639.00	9 333 438.00	0.00	0.00	0.00	2.50	100.00	0.00
Barranca Gas	17 517 820.00	7 475 097.00	0.00	0.00	0.00	2.34	100.00	0.00
Moín Pistón	8 305 441.00	1 712 657.00	501 613.00	0.00	0.00	3.75	77.35	22.65
Moín Gas	187 937 179.00	64 412 150.00	0.00	0.00	0.00	2.92	100.00	0.00
Moín CNFL Gas	135 591 580.00	46 151 012.00	0.00	0.00	0.00	2.94	100.00	0.00
Barranca Alquilada	59 875 770.00	16 856 319.00	0.00	0.00	0.00	3.55	100.00	0.00
San Antonio Alquilada	143 395 074.00	44 149 843.00	0.00	0.00	0.00	3.25	100.00	0.00
Pujosl Guapiles	52 394 656.00	310 000.00	11 800 000.00	0.00	0.00	4.33	2.56	97.44
Pujol Orotina	36 007 291.00	315 000.00	7 700 000.00	0.00	0.00	4.49	3.93	96.07
Total	676 773 741.00	191 632 988.00	22 611 905.00	0.00	0.00	3.16	89.45	10.55







Plant	**Technology**	**Operation Start** Year	**Installed Capacity** [MW]	**2008 Total Production** [MWh]	**Emissions** [tCO2]
E.S.P.H.	Hydraulic	several	2.00	100,316.85	
J.A.S.E.C.	Hydraulic	several	20.32	139,825.75	
C.N.F.L.	Hydraulic	several	88.00	408,186.51	
Coopelesca-Chocosuela	Hydraulic	1999	25.50	100,093.16	
Coopeguanacaste	Hydraulic	2008	17.50	65,071.02	
Conelectricas	Hidraulic	several	several	-	
Río Azul-Zaret	Biogas	2004	3.70	1,149.31	
Paralela Hidro	Hydraulic	several	135.40	701,866.11	
Paralela Térmica	Thermal Bagasse	several	24.00	22,401.40	
Paralela Eólica	Wind	several	48.75	145,175.12	
Garita 1 y 2	Hydraulic	1958	37.36	111,952.96	
Garita 3 y 4 (Ventanas)	Hydraulic	1988	97.38	507,921.19	
Río Macho	Hydraulic	1963	120.00	539,059.92	
Cachí	Hydraulic	1967	108.80	643,318.22	
Arenal	Hydraulic	1979	157.40	788,676.12	
Dengo-Corobicí	Hydraulic	1982	174.01	847,027.46	
Sandillal	Hydraulic	1993	32.00	150,850.45	
Toro I	Hydraulic	1996	23.21	108,365.71	
Toro II	Hydraulic	1997	65.74	284,006.13	
Angostura	Hydraulic	2000	172.20	903,452.81	
Peñas Blancas	Hydraulic	2002	38.17	161,875.00	
Caribalnco	Hydraulic	2007	84.00	298,939.28	
Echandi	Hydraulic	1990	4.70	34,257.56	
Cacao	Hydraulic	1922	0.29	4,991.21	
Pto Escondido	Hydraulic	1940	0.38	1,156.41	
Avance	Hydraulic	1938	0.18	2,158.50	
Los Lotes	Hydraulic	1956	0.38	686.48	
Rio Genio	Hydraulic	2006	0.03	-	
Colima	Thermal Diesel/Bunker	1956	14.0	12 399.29	9 925
San Antonio Gas	Thermal Diesel	1973	34.0	23 349.64	23 564
Barranca Gas	Thermal Diesel	1974	36.0	17 517.82	18 873

Moín Pistón	Thermal Diesel/Bunker	1977	26.0	8 305.44	5 786
Moín Gas	Thermal Diesel	1991	131.0	187 937.18	162 624
Moín Gas-CNFL	Thermal Diesel	2003	78.0	135 591.58	116 519
Barranca Alquilada		2008	99.5	59 875.77	42 558
San Antonio Alquilada		2008	140	143 395.07	111 467
Pujosl Guapiles	Thermal Diesel	2006	14.3	52 394.66	35 177
Pujol Orotina	Thermal Diesel	2006	10.1	36 007.29	23 239
Garabito	Thermal Bunker	2010	200.0	0.00	0
Miravalles I	Geothermal	1994	55.0	432,171.45	
Miravalles II	Geothermal	1998	55.0	328,691.77	
Boca de Pozo I	Geothermal	1995	5.0	42,456.12	
Miravalles V	Geothermal	2003	18.0	107,536.76	
ICE Eólico (Tejona)	Wind	2003	19.8	52,989.42	
BOT Hidro (El General, La Joya)	Hydraulic	several		479,494.95	
BOT Eolico (PEG)	Wind				
BOT Geotermico (Miravalles III)	Geothermal	2000	26.0	220,007.58	
Intercambio [interconnection system]				95,967.00	
TOTAL			2 443	9,508,869.432	549 731

	2008
tCO_2 low-cost/must-run	0.00
tCO_2 fossil	549 731.13

	2008
Low cost/must run Generation(MWh)	8 832 095.69
Fossil Generation (MWh)	676 773.74
total Generation (MWh)	9 508 869.43

lambda=	0.479

EF_{OM}=	0.424

LAST FIVE PLANTS BUILT

Plant	Technology	Operation Start	Installed Capacity [KW]	2008 Total Production [MWh]	Emissions [t CO2]
El General	Hydraulic	2006	42,000.0	198,066.24	
Cariblanco	Hydraulic	2007	87,941.0	298,939.28	
Canalete	Hydraulic	2008	17,500.0	65,071.02	
San Antonio Alquiler (TEIC)	Thermal	2008	140,920.0	143,395.07	111 467
Barranca Alquiler (Alstom)	Thermal	2008	99,500.0	17,517.82	42 558
Total				457 876	53 649

0.117	tCO_2/MWh

LAST PLANTS BUILT THAT REPRESENT 20% OF THE TOTAL MWh OF 2008 1 868 648

TOTAL MWh OF 2008 9 343 238

Plant	Technology	Operation Start	Installed Capacity [KW]	2008 Total Production [MWh]	Emissions [tCO2]
Angostura	Hydraulic	2000	172,202.0	903,452.81	
Miravalles III		2000	29,550.0	220,007.58	
Peñas Blancas	Hydraulic	2002	38,172.0	161,875.00	
Chocosuela II Y III		2003	19,000.0	100,093.16	
Ingenio Taboga	Biothermal	2003	20,000.0	15,244.21	
Moin Gas (CNFL)	Thermal	2003	90,000.0	135,591.58	116 519
Miravalles V	Geothermal	2003	21,001.0	107,536.76	
Ingenio El Viejo	Biothermal	2004	20,000.0	7,157.19	
Pujol Guapiles	Thermal	2006	14,300.0	52,394.66	35 177
Pujol Caldera	Thermal	2006	10,100.0	36,007.29	23 239
El General	Hydraulic	2006	42,000.0	198,066.24	
Cariblanco	Hydraulic	2007	87,941.0	298,939.28	
Canalete	Hydraulic	2008	17,500.0	65,071.02	
San Antonio Alquiler (TEIC)	Thermal	2008	140,920.0	143,395.07	111 467
Barranca Alquiler (Alstom)	Thermal	2008	99,500.0	17,517.82	42 558
Total				2 462 350	328 959

0.134	tCO_2/MWh

EF_{BM}	0.134	tCO_2/MWh

Annex 4

MONITORING INFORMATION

As per section B.7.2.

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