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:

Electricity generation from renewable sources – Windfarm Campo dos Ventos II
Version: 02
Date: 30/11/2011

A.2. Description of the project activity:

The proposed project activity consists in the implementation and operation of a new wind electricity generation facility, Campo dos Ventos II, located in Parazinho and João Câmara, in the Rio Grande do Norte state, Brazil. The project activity will employ 15 horizontal-axis aerogenerators (model: Enercon E82 E2), each with 2.0 MW (total nominal capacity: 30 MW). By the time of completion of this document, the physical implementation of the project activity had not yet begun.

The project activity is being developed by the company Campo dos Ventos II Energias Renováveis S.A, which is owned by CPFL Energias Renováveis S.A. It will deliver 131,750 MWh/year of renewable electricity to the National Interconnected System (*Sistema Interligado Nacional* - SIN[1]). In the baseline[2], electricity delivered to the grid by the project activity would have 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. Hence, the project activity will promote GHG emissions reductions by displacing fossil fuel-based electricity generation that would otherwise occur.

The project boundary includes CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. Project and leakage emissions are not expected.

The project activity contributes to the host country's sustainable development in the following ways:

- **Contribution to local environmental sustainability**: The project activity will produce renewable electricity from low environmental impact wind power plants;
- **Contribution to the net workplace generation**: New job posts will be created by the project activity, especially during project implementation;
- **Contribution to diversification of the electric matrix and energetic security**: The period when there is the greatest abundance of wind resources is coincident with the period of the smallest hydraulic availability, in Brazil. Hence, wind-based electricity generation is complementary to hydroelectricity, which contributes to the security of renewable electricity supply throughout the

[1] SIN is the Brazilian system of electricity generation and transmission. It is a large scale hydrothermal system, with great predominance of hydroelectric plants and with multiple owners. Only 3.4% of the national capacity is outside the SIN, in small isolated systems mainly located in the Amazon region. <http://www.ons.org.br/conheca_sistema/o_que_e_sin.aspx>.

[2] The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

year and, hence, to the diminishment of the dependence upon fossil fuels during the dry season[3].

- **Contribution to technological learning and technological development:** This type of project can stimulate similar initiatives inside the Brazilian energy sector and encourage the development of modern and more efficient renewable energy units throughout Brazil.

A.3. Project participants:

Table 1. Project participants.

Name of Party involved	Private and/or public entity(ies) project participants	Kindly indicate if the Party involved wishes to be considered as project participant
Federative Republic of Brazil (host)	Campo dos Ventos II Energias Renováveis S.A.	No
	WayCarbon Soluções Ambientais e Projetos de Carbono LTDA.	

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

Federative Republic of Brazil

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

Rio Grande do Norte

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

Parazinho and João Câmara

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

[3] Brazil Electric Energy Atlas (*Atlas de Energia Elétrica do Brasil)*, National Electric Energy Agency (*Agência Nacional de Energia Elétrica* – ANEEL), Brazil. <http://www.aneel.gov.br/aplicacoes/Atlas/download.htm>.

Figure 1. Geographic location of the project activity[4]. Upper left: Rio Grande do Norte state within Brazil. Left panel with red circle: municipality of João Câmara and; Right Panel with red circle: municipality of Parazinho.

The reference geographic coordinates of the project activity are 5° 19\` 58.4\`\` (-5.3329, latitude) and 35° 56\` 43.8\`\` (-35.9455, longitude). In the Universal Transverse Mercator (UTM) System, they are 9,409,758 m (Y) and 173,507 m (X), zone 25 and datum SIRGAS 2000[5].

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

Sectoral scope 01: Energy Industries (renewable sources).

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

Wind energy is defined as the kinetic energy contained by moving air masses (wind). Its use for the production of electricity occurs by means of the conversion of translational kinetic energy in rotational kinetic energy and, then, by means of the conversion of the former form of energy into electricity, by means of the employment of wind turbines or aerogenerators[3].

Environmental pros of wind-based electricity generation recognizably include: contribution for atmospheric emissions reduction (including non-GHG gases) by thermoelectric plants, smaller demand for the construction of new large hydropower plants reservoirs, and the reduction of the risk derived from hydrological seasonality, in light of the aforementioned complementary nature of wind-based and hydroelectric electricity generation in Brazil[3].

Amongst the main negative environmental impacts of wind power plants, noise generation impacts can be mentioned. The noise is generated by the movement of the blades and varies according to the equipment

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[4] < Instituto Brasileiro de Geografia e Estatística – IBGE (Brazilian Institute of Geography and Statistics: http://www.ibge.gov.br/cidadesat/topwindow.htm?1 >

[5] Camargo Schubert. Certification of Anemometric Measurements and Energy Production (*Certificação de Medições Anemométricas e Certificação de Produção de Energia*). Wind Power Plant (*Parque Eólico*) Campo dos Ventos II 30 MW. The geographic coordinates have been converted from degrees, minutes, seconds of arc to decimal degrees using a DMS Converter <http://vancouver-webpages.com/META/DMS.html>.

specifications. Also, one could mention the possibility of the electromagnetic interference, which may disturb communication and data transmission systems (radio, television, etc.). Such interferences are particularly related to the material used in the manufacture of the blades. Additionally, possible interference upon bird routes should be considered[3].

As previously mentioned, the proposed project activity consists in the implementation and operation of a new wind electricity generation facility, Campo dos Ventos II, located in Parazinho and João Câmara, in the Rio Grande do Norte state, Brazil. The project activity will employ 15 horizontal-axis aerogenerators (model: Enercon E82 E2), each with 2.0 MW (total nominal capacity: 30 MW).

The project proponent calculated the expected energy generation in the investment analysis through the net value of the plant load factor (PLF) provided by Camargo & Schubert's simulations, sent to CPFL on April 15th 2010[6]. All assumptions of the expected energy generation of the investment analysis are described in ***Sub-step 2c.*** The PLF of the project activity is 50.1% and this assumption was used in the Emission Reductions estimative.

The project activity will deliver 131,750 MWh/year of renewable electricity to the SIN. In the baseline[2], electricity delivered to the grid by the project activity would have 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. Hence, the project activity will promote GHG emissions reductions by displacing fossil fuel-based electricity generation that would otherwise occur.

Wobben, the aerogenerator supplier to the project activity, belongs to the Enercon GmbH group, which is one of the world's largest manufacturers of wind turbines[7]. Wobben/Enercon was the first manufacturer of large-scale (800 – 3,000 kW) wind turbines in South America[8], being installed in Brazil since 1995[9]. Its manufacturing facilities are located in Germany, Sweden, Brazil, Turkey and Portugal. By March 2010, Enercon was responsible for over 16,000 installed wind turbines and 20 GW across the world[10].

The aerogenerator "E82 E2" is designed for medium wind speed[11] regime and for a lifetime of 20 years[12]. It is a wind turbine with a three-blade rotor, active blade adjustment (adjustment of pitch) and variable speed operation with a nominal power of 2,000 kW. Its diameter of 82 m and hub height of 78-108 m allows E82 E2 to effectively use the existing wind conditions for electricity generation[13].

The rotating component of the generator and the rotor consist in a single unit. These two parts are connected directly to the hub so they can spin at the same low speed. Once the gearbox and other rotating

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[6] Document from Camargo Schubert with the detailed technical analysis and calculations of plant load factor and expected energy generation, provided to the DOE.

[7] Wobben Windpower. Enterprise (*Empresa*). <http://www.wobben.com.br/empresa1.htm>.

[8] Wobben Windpower. <http://www.wobben.com.br/>.

[9] Wobben Windpower. Common questions about windpower and Wobben (*Perguntas comuns sobre energia eólica e a Wobben*) <http://www.wobben.com.br/TireSuasduvidas.htm>.

[10] ENERCON at a glance <http://www1.enercon.de/en/_home.htm>.

[11] Wobben Windpower. Products and Services (*Produtos e Serviços*). Aerogenerator E-82 (*Aerogerador E-82*). <http://www.wobben.com.br/produtos_Servicos_e82.htm>.

[12] ENERCON GmbH – Lifetime of the Wind Turbine ENERCON E-82.

[13] ENERCON E-82 E2 2 MW – Technical Description (*Descrição Técnica*).

parts do not exist, the energy losses between the rotor and generator, noise emissions, the use of oil in the gearbox and mechanical wear are reduced drastically[13].

The first plant installed by Wobben is in operation since December 1998 (*Taíba*, Ceará, 5 MW)[14], hence wind-power electricity generation technologies developed by Wobben are all well known in the wind power industry and have proven themselves over the time.

In relation to the technology to be employed in the project activity, it's important to emphasize that no technology and know-how transfer is previewed for the present project activity. Also, in Brazil, financing institutions, such as the Brazilian National Bank of Economic and Social Development (BNDES, *Banco Nacional de Desenvolvimento Econômico e Social*), require that at least 50% of the technology employed in the wind power plants, which aim to acquire a financing, shall be provided by the country.

The overview of the technical characteristics of the E82 E2 aerogenerator is provided in Table 2.

Table 2. ENERCON E82 E2 technical overview.

Operational data	
Rated power	2.0 MW
Cut-in wind speed	2.5 m/s
Cut-out wind speed	28-34 m/s
50 years gust wind speed	59.5 m/s
Wind class*	IEC IIA
Rotational speed	6 to18 rpm
Rotor	
Power Control	Pitch
Diameter	82 m
Swept area	5,281 m^2
Blade material type	Epoxy-bounded fibreglass
Generator	
Type	ENERCON direct-drive synchronous annular generator
Rated power	2,000 kW
Protection	IP 23
Braking system	
Aerodynamical brake	- 3 independent systems with blade pitching mechanism - Rotor Brake - Rotor Lock
Certification*	Compliance with IEC 61400-1: Wind turbines – Part 1: Design requirements, 3rd Edition 2005-08 – Wind Turbine Class II A

Source: ENERCON E-82 E2 2MW – Aerogenerator Characteristics (*Características do Aerogerador)*. *Type Certificate TC 100201, Rev. 0

[14] Wobben Windpower. Installed wind plants (*Plantas Eólicas Instaladas*). <http://www.wobben.com.br/usinas.htm>.

Possible interference with environment will be also minimized through the adoption of mitigation and environmental control measures.

The environmental aspects of the project activity are discussed in the Environmental Impact Assessment of the project activity, summarized in Section D.

The information provided above demonstrates that the project activity employs environmentally safe and sound technology.

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

A renewable crediting period is selected for the proposed project activity. The *ex-ante* estimated emission reductions for the first 7-year crediting period are presented in the following table:

Table 3. Estimated amount of emission reductions over the chosen crediting period.

Years	Annual estimation of emission reductions in tonnes of CO_2e
2013 (from September till December)	17,307
2014	51,922
2015	51,922
2016	51,922
2017	51,922
2018	51,922
2019	51,922
2020 (from January till August)	34,615
Total estimated reductions (tonnes of CO_2e)	**363,454**
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	51,922

A.4.5. Public funding of the project activity:

There is no public funding involved on 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:

Approved consolidated baseline and monitoring methodology ACM0002 – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.2.0.

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

- "Tool to calculate the emission factor for an electricity system", version 2.2.0;
- "Tool for the demonstration and assessment of additionality", version 5.2.1.

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

The proposed project activity consists in the installation of a grid-connected renewable power generation facility at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant). This is in accordance with the applicability conditions of ACM0002/Version 12.2.0. Therefore, this methodology was applied to the project activity.

Furthermore, the project activity fulfills the remaining applicability conditions of ACM0002/Version 12.2.0 in the following ways:

- "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";

  Outcome: applicability condition is fulfilled, considering that the project activity is the installation of a "wind power plant unit".

- In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2: on page **Error! Bookmark not defined.** to calculate the parameter EGPJ,y): 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 expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;
- *Outcome:* Considering that the proposed project activity is the implementation of a wind power plant unit, this applicability condition is not applied.

- In case of hydro power plants, one of the following conditions must apply:
  - The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or

- The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m2; or
- 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.

Outcome: Considering that the proposed project activity is based in a wind-based source, this applicability condition is not applied.

- In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2 all the following conditions must apply:
  - The power density calculated for the entire project activity using equation 5 is greater than 4 W/m^2;
  - Multiple reservoirs and hydro power plants located at the same river and where are designed together to function as an integrated project[15] that collectively constitute the generation capacity of the combined power plant;
  - Water flow between multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity;
  - Total installed capacity of the power units, which are driven using water from the reservoirs with power density lower than 4 W/m^2, is lower than 15MW;
  - Total installed capacity of the power units, which are driven using water from reservoirs with power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.

Outcome: Considering that the proposed project activity is based in a wind-based source, this applicability condition is not applied.

- 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 continued use of fossil fuels at the site;

[15] This requirement can be demonstrated, for example, (i) by the fact that water flow from upstream power units spilling directly to the downstream reservoir, or (ii) through the analysis of the water balance. Water balance is the mass balance of water fed to power units, with all possible combinations of multiple reservoirs and without the construction of reservoirs. The purpose of such water balance is to demonstrate the requirement of specific combination of multiple reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum three years prior to implementation of CDM project activity.

- o Biomass fired power plants;
- o A hydro power plant[16] 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 power plant is less than 4 W/m^2.

Outcome: This applicability condition is fulfilled, since the project activity does not involve fuel switch, biomass fired power plants, and is not a hydro power plant.

- 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".

Outcome: Considering that the proposed project activity is the implementation of a wind farm, this applicability condition is not applied.

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

The spatial extent of the project boundary includes the project power plant (i.e. Campo dos Ventos II) and all power plants connected physically to the electricity system that the CDM project power plant is connected to, i.e., SIN. Emission sources and gases included in the project boundary are depicted in Figure 2.

Table 4. Emissions sources included in the project boundary, as per ACM0002/Version 12.2.0.

Source		Gas	Included?	Justification/Explanation
Baseline	Power plants supplying energy to SIN	CO_2	Yes	Main emission source.
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.
Project Activity	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam.	CO_2	No	Not applicable.
		CH_4	No	Not applicable.
		N_2O	No	Not applicable.
	CO_2 emissions from combustion of fossil	CO_2	No	Not applicable.

[16] Project participants wishing to undertake a hydroelectric project activity that result in a new reservoir or an increase in the existing reservoir, in particular where reservoirs have no significant vegetative biomass in the catchments area, may request a revision to the approved consolidated methodology.

	fuels for electricity generation in solar thermal power plants and geothermal power plants.	CH_4	No	Not applicable.
		N_2O	No	Not applicable.
	For hydro power plants, emissions of CH_4 from the reservoir.	CO_2	No	Not applicable.
		CH_4	No	Not applicable.
		N_2O	No	Not applicable.

A flow diagram of the project boundary, physically delineating the project activity, representing emissions sources and gases included in the project boundary and the monitoring variables, is depicted in Figure 2.

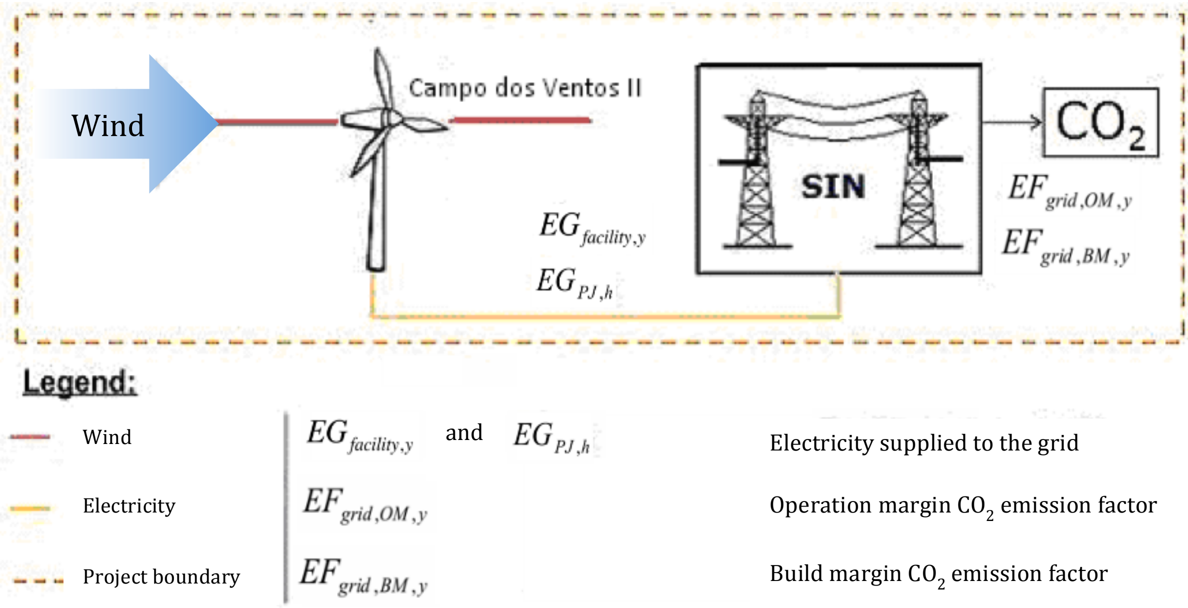

Figure 2. Project boundary. Monitored variables are depicted. Baseline emissions consist of CO_2 emissions from fossil fuel combustion for the generation of electricity by the plants connected to SIN as reflected in its combined margin.

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

As per ACM0002/Version 12.2.0, since the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario 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"".

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):

As per ACM0002/Version 12.2.0, the additionality of the project activity shall be demonstrated and assessed using the latest version of the "Tool for the demonstration and assessment of additionality".

The Starting Date of the project activity, August 26th 2010, represents the realization of Brazilian 3rd Reserve Power Auction (*3º Leilão de Energia de Reserva - Leilão nº 005/2010*[17]), in which the electricity generation facility Campo dos Ventos II had its energy contracted and its contract for the supply of equipment and services validated. According to the Memorandum of Understanding signed with Wobben on August 25th 2010, if the project proponent is successful in its participation at the Brazilian 3rd Reserve Power Auction, the project proponent and Wobben agree to enter into the contracts for the supply of equipment and services for the project activity[18] (the main component of total required investments). So, inline with the Glossary of CDM terms (version 05), the starting date of the project activity is August 26th 2010.

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

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

The identified realistic and credible alternative scenarios available to the project participants are:

- The project activity undertaken without being registered as a CDM project activity;
- The continuation of the current situation (no project activity undertaken).

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

All identified alternatives are in accordance with laws and regulations.

Outcome of Step 1: *The alternatives to the project activity that are consistent with current laws and regulations are (a) the project activity undertaken without being registered as a CDM project activity and (b) the continuation of the current situation (no project activity undertaken).*

Step 2: Investment analysis

The investment analysis determines whether the proposed project activity is not economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

The investment analysis was conducted according to the "Tool for the demonstration and assessment of additionality" version 5.2.1 and the "Guidelines on the Assessment of Investment Analysis" version 5, therefore the following sub-steps shall be undertaken:

Sub-step 2a. Determine appropriate analysis method:

The project activity generates incomes other than CDM related income, hence simple cost analysis cannot be applied. Investment comparison analysis is not used as there is no evidence that the proposed baseline

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[17] 3rd Reserve Power Auction (*3º Leilão de Energia de Reserva - Leilão nº 005/2010*) - http://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=0794ae36a6548210VgnVCM1000005e01010aRCRD - Access in 15/07/2011

[18] Clause 2 of the Memorandum of Understanding signed with Wobben on August 25th 2010.

scenario leaves project proponents no other options than to make an investment to supply the same (or substitute) product or service. Hence, benchmark analysis (Option III) will be used.

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

Identification of the financial indicator

The method of the Equity Internal Rate of Return (Equity IRR) was considered as the most appropriate, once it is the most suitable for the project type and decision context.

Identification of the benchmark

According to "Guidelines on the Assessment of Investment Analysis" vs. 05, paragraph 12: "Required/expected returns on equity are appropriate benchmarks for an Equity IRR".

In this way, the established benchmark is the Required/expected return (K_e) that was calculated according to the Capital Asset Pricing Model (CAPM), a widely used pricing model in finance – academy and businesses[19] (input data includes publicly available data and standard parameters of the Brazilian and utilities market[20]).

i) Calculation of the required/expected return on equity (K_e)

The required/expected return on equity was calculated using the Capital Asset Pricing Model (CAPM) and defined as a benchmark to the financial return of the shareholders of the company. The equations are described below:

$$K_e = R_f + \beta\,(R_m - R_f) \quad \text{(Equation 1)}$$

$$\beta = \frac{Cov(R_i, R_M)}{\sigma_M^2} \quad \text{(Equation 2)}$$

K_e= Required/expected return on equity obtained through equation 1.

β = Sensitivity of the asset's returns to market returns calculated through equation 2. Where:

Cov (R_i,R_m) is the covariance of the Asset Return (R_i) and the Market Return (R_m), and σ^2_M is the Variance of Market Return.

R_f = Expected Return on a Risk Free Asset

<u>Data used:</u> Long Term Brazilian Treasury Bond (type NTN-B) from August 2006 until July 2010, four years prior to the date on which investment decision was taken.

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[19] Cost of Capital to Energy Generation in Brazil by Small Hydroelectric Power Plants (SHPPs) and Hydroelectric Power Plants (HPPs) below 50 MW in the Clean Development Mechanism Context (*Custo de Capital para Geração de Energia Hídrica no Brasil por meio de Pequenas Centrais Hidrelétricas (PCHs) e Usina Hidrelétrica (UHE) até 50 MW no Contexto do Mecanismo de Desenvolvimento Limpo*). ISAE/FGV, Brazil: http://www.carbonnews.com.br/downloads/wacc.pdf

[20] As defined in the "Tool for the Demonstration and Assessment of Additionality" vs. 5.2.1, Sub-step 2b, Option III: "*the financial/economic analysis shall be based on parameters that are standard in the market, considering the specific characteristics of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer*".

Rationale: Governments control the printing of currency, which reduces probability of default, therefore approximating to a risk free asset concept. The Treasury bond used is NTN-B (maturity date: 15th of May 2035), which is a long-term bond that reflects a comparable horizon to an investment in a wind energy project in Brazil.

Source: Publicly Available - Brazilian National Treasury:
http://www.tesouro.fazenda.gov.br/tesouro_direto/

R_m= Expected Return on a Risky Asset (Market Return)

Data used: Daily Return of Bovespa Index from August 2006 until July 2010.

Rationale: According to BMF&Bovespa website: "The *Bovespa Index* is the main indicator of the Brazilian stock market's average performance. Ibovespa's relevance comes from two facts: it reflects the variation of BM&FBOVESPA's most traded stocks and it has tradition, having maintained the integrity of its historical series without any methodological change since its inception in 1968". Therefore it is a credible index to reflect returns on risky assets (market return).

Source: Publicly Available - BMF&BOVESPA: http://www.bmfbovespa.com.br

Note: In order to obtain market return rates (**R_m**) in real terms Fisher equation was used: Real R_m = [(1+Nominal R_m) / (1 + Inflation Rate)] – 1. The inflation index used is the IPC-A, which is the most consistent rate once it is the index for annual energy price inflation adjustments (as per Brazilian 3rd Reserve Power Auction rules - *3º Leilão de Energia de Reserva - Leilão nº 005/2010*) and the inflation type used to calculate NTN-B public bond nominal yield.

R_i= Expected Return on a Energy Sector Asset

Data used: Daily Return of Bovespa Index from August 2006 until July 2010.

Rationale: According to the "Tool for the demonstration and assessment of additionality", Sub-Step 2b, Paragraph 5: "When applying Option II or Option III, the financial/economic analysis shall be based on parameters that are standard in the market, considering the specific characteristics of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer".

The BMF&Bovespa's Electric Power Index (IEE) satisfies this applicable additionality tool as, according to BMF&Bovespa the index has "the purpose of providing a segmented view of the stock market performance. They are composed by the most significant publicly-held companies of specific economic sectors, representing the aggregated performance of the sector considered".

Source: Publicly Available - BMF&BOVESPA: http://www.bmfbovespa.com.br

Public evidence for the formulas provided above can be found in the study: Cost of Capital to Energy Generation in Brazil by Small Hydroelectric Power Plants (SHPPs) and Hydroelectric Power Plants (HPPs) below 50 MW in the Clean Development Mechanism Context (*Custo de Capital para Geração de Energia Hídrica no Brasil por meio de Pequenas Centrais Hidrelétricas (PCHs) e Usina Hidrelétrica (UHE) até 50 MW no Contexto do Mecanismo de Desenvolvimento Limpo*). ISAE/FGV, Brazil, available at: http://www.abce.org.br/downloads/ingleswacc.PDF

All results from the benchmark calculation were provided to DOE in a separated spreadsheet.

ii) Benchmark established

The required/expected rate of return achieved with the assumptions described and calculated in the "Electricity Sector Benchmark-2010 v.01.xlsx" spreadsheet is 12.75% in real terms. This is the benchmark defined to assess the additionality of the project activity and may be compared to the Equity IRR.

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

Calculation of the Equity IRR:

The cash flow spreadsheet contemplates the following main assumptions:

- Assumption 1 – Electricity Tariff

The electricity tariff of R$/MWh 126.19 price is evidenced by the document published by the Electric Power Commercialization Chamber (CCEE) regarding the 3rd Reserve Energy Auction (August/2010) results (provided to the DOE).

- Assumption 2 – Contracted and expected generation

The expected energy generation is evidenced by Camargo & Schubert's simulations sent to CPFL on April 15th 2010 (document with detailed technical analysis and calculations provided to the DOE) and reflects the long-term net expected energy generation with 50% surplus probability (P50).

The contracted capacity of 14 MW is the fixed amount of energy authorized for sale by the Brazilian regulatory agency, and the maximum amount of energy subject to sale in the auction. Variable energy (higher or lower than the fixed amount) must also be considered according to conditions explained in clause 6 of the "Annex II – Reserve Energy Contract" of the "3rd Reserve Energy Auction Rules".

The losses in the Brazilian Grid are shared amongst energy generation players in Brazil and are discounted for effective sales meanings. CPFL Geração de Energia's electricity technicians analysed the losses occurred in recent years and recommended the application of 2.5% of energy losses in the Brazilian Grid for the related project activity (document provided to the DOE for details).

Note: The P50 value used as assumption in the CDM project activity additionality assessment is an optimistic value for decision making for a wind energy generation entrepreneur considering wind natural characteristics and the pioneering factor of wind energy projects in Brazil. To exemplify this, the BNDES considers a 90% surplus probability-P90 (evidenced by the BNDES presentation), therefore a much lower generation (as described in the wind generation certification provided to the DOE) is considered in the decision making process in banker's view.

- Assumption 3 – Investment Values

The investments presented in the financial spreadsheet totalizes R$ 4,057,520.28 / MW installed and has four main components:

- Wind Turbine Generators: it is the major investment component, and is evidenced by the Term sheet signed in August 25th 2010 (evidence provided to the DOE) between the project proponent and the wind turbine generator supplier Wobben Windpower / Enercon (worldwide recognized player of the wind energy sector) and the letter sent a day after the energy auction (August 27th 2010) from Wobben Windpower's Sales Superintendent to CPFL Geração de Energia's Project Development Director to register their negotiation during the energy auction and the consequent discount granted over the wind energy generator price.
- Electrical components: This item was estimated by CPFL's internal technical team that analysed three items: (1) Voltage Network, (2) Substation, (3) Transmission Line. And then the acquisition

and implementation costs were estimated crossing the project needs with the documents: “Transmission lines and Substations Reference Costs” (Portuguese: “Referência de Custos de LTs e SEs”) made by Centrais Elétricas Brasileiras S.A - ELETROBRÁS and “Banco de Preço de Referência” of Brazilian Electricity Regulatory Agency – ANEEL.

- Environmental: Estimated by internal specialists considering several required Environmental Programs and Plans to be conducted before and during the construction of the power facility. The detailed budget was provided to the DOE.
- Others: It includes owner’s engineer and administration services, insurance for during implementation period, anemometric towers, communication systems and consultancies services. The detailed budget was provided to the DOE.

- Assumption 4 – Operation and Maintenance (O&M)

The total O&M value is composed by O&M of the Wind Power Plant and the O&M of the transmission lines.

The O&M of the wind power plant is evidenced by the Term sheet signed in August 25th 2010 (evidence provided to the DOE) between the project proponent and the wind turbine generator supplier Wobben Windpower / Enercon (world recognized player of the wind energy sector) and the letter sent a day after the energy auction (August 27th 2010) from Wobben Windpower’s Sales Superintendent to CPFL Geração de Energia’s Project Development Director to register their negotiation and the discount granted during the auction over the O&M values. The yearly values applied in the financial model are R$ 39,690.00/turbine (for the first six months of third year of Campo dos Ventos II operation), R$88,200.00 (for 4th and 5th years) and R$ 97,020.00 (for 6th year onwards).

The O&M of the transmission lines will be conducted by the project proponent’s team and was estimated according to previous experiences. The amount of 1.5% per year applied over the implementation costs of substation and voltage network was applied. This value has demonstrated to be an adequate estimation in previous projects. The detailed explanation by CPFL’s team was provided to the DOE.

- Assumption 5 – Sectoral Charges and Costs

- TFSEE Tariff:

In accordance with Decree #2410 and ANEEL Dispatch #4774, the TFSEE was calculated according to the following formula: Annual TFSEE = 0.5% X 363.60 X 30,000.00

- Transmission Costs:

The transmission costs considered were defined to the project activity by ANEEL and are referenced in Material Announcement 5 (*Comunicado Relevante 5*[21]) of the Auction 05/2010, from August 13th 2010.

The costs determined by ANEEL in the mentioned Material Announcement for the project activity were depicted below:

[21] http://www.aneel.gov.br/aplicacoes/editais_geracao/documentos/052010_Comunicado_Relevante_5_TUST_.pdf

Generation Plant	Tariff R$/kW.month									
	From July 1st, 2012 till June 30th, 2013	From July 1st, 2013 till June 30th, 2014	From July 1st, 2014 till June 30th, 2015	From July 1st, 2015 till June 30th, 2016	From July 1st, 2016 till June 30th, 2017	From July 1st, 2017 till June 30th, 2018	From July 1st, 2018 till June 30th, 2019	From July 1st, 2019 till June 30th, 2020	From July 1st, 2020 till June 30th, 2021	From July 1st, 2021 till June 30th, 2022
Wind Farm Eurus IV	5.408	5.258	5.108	4.958	4.808	4.658	4.508	4.508	4.508	4.508
Wind Farm Eurus V	5.408	5.258	5.108	4.958	4.808	4.658	4.508	4.508	4.508	4.508
Wind Farm Campo dos Ventos I	5.408	5.258	5.108	4.958	4.808	4.658	4.508	4.508	4.508	4.508
Wind Farm Campo dos Ventos II	5.408	5.258	5.108	4.958	4.808	4.658	4.508	4.508	4.508	4.508
Wind Farm Campo dos Ventos IV	5.408	5.258	5.108	4.958	4.808	4.658	4.508	4.508	4.508	4.508
CGE Asa Branca I	5.408	5.258	5.108	4.958	4.808	4.658	4.508	4.508	4.508	4.508
CGE Asa Branca V	5.408	5.258	5.108	4.958	4.808	4.658	4.508	4.508	4.508	4.508
CGE Asa Branca VII	5.408	5.258	5.108	4.958	4.808	4.658	4.508	4.508	4.508	4.508

- *ICG Charges*

ICG charges (*Interesse Exclusivo de Centrais de Geração para Conexão Compartilhada* – Exclusive Interest of Generation Centres for Shared Connexion), which accounts for transmission costs regarding dedicated transmission solution for the project activity. The value considered is R$725,000 per year and was estimated according to the companies technical team (further explanation was sent to the DOE).

- Assumption 6 – Debt and Financial Costs

BNDES is considered for the financing structure as its standard terms for wind power plants. The terms defined by the company's decision makers are: 71% of the required investment financed by debt and interest rate composed by TJLP rate + 1.72% of risk spread, with two years of grace period and 16 years of amortization. These terms are based in previous projects and market conditions. The spread is in accordance to the indication of the BNDES for wind projects (according to BNDES presentation provided to DOE).

- Assumption 7 – Taxes

Income Taxes – All Special Purpose Companies (SPE) of the project activity are eligible to the presumed profit regime as its gross revenues are lower than R$ 48,000,000.00 (article 46 of Law 10637 dated in 2002). According to the Income Rate Regulation of 1999 (RIR/99) the applicable gross revenues percentage to compose the income rate basis is 8% and the income rate is 25%. And the social contribution on net income (CSLL) is calculated over a 12% of revenues basis (Article 22 of the Law #10,684), and a 9% rate is applied according to Article 3 of the Law #11,727.

PIS/PASEP Tax – 0.65% is applied according to article 52 of the Normative Instruction #247, from November 2002.

Cofins Tax – 3.00% is applied according to article 52 of the Normative Instruction #247, from November 2002.

- Assumption 8 – General Costs, Expenses and Others

- Land Lease – 1.5% of Gross Revenues

This amount is defined by contracts with Land Owners (provided to the DOE).

- Fixed Costs – R$ 100,000.00 per year

Annual fixed budget are calculated according to estimated annual costs of Publications (Local Newspaper, Official Gazette), Vigilance, Auditing and Trips of CPFL's Technical Team. General evidences to certify costs are provided to the DOE.

- Environmental Costs – R$ 143,000.00 per year (1-2nd years of operation) and 93,000.00 per year (from 3rd onwards).

The environmental costs are related to the environmental management programs, degraded areas recuperation, plan for erosion and sedimentation control, noise monitoring, monitoring of bird fauna, environmental education and communication programs, among other activities. The calculation is provided to the DOE.

- Insurance Costs – 0.25% of the project's CAPEX

This assumption was defined by CPFL's Corporate Insurance Department based in three main factors: (1) technical analysis considering the energy sources, location, equipment and others; (2) market analysis; (3) previous experiences in energy projects.

- Project Acquisition – R$ 5,375,333.40

Contracts established before the Energy Auction. The price of R$ 179,177.78 per MW installed (the cost is fixed in the contract provided to DOE).

- Assumption 9 – Depreciation

The average depreciation value is 4.1% per year. It is calculated by applying the depreciation rates defined by the Brazilian Electricity Regulatory Agency (Agência Nacional de Energia Elétrica - ANEEL) and Secretariat of the Federal Revenue of Brazil (Receita Federal). The rate of depreciation has considered the Total Capital Expenditure and was calculated and included in the financial spreadsheet.

ANEEL considers a depreciation Rate of 2% per year for Civil Construction structures; 5% p.a. for generators and 3.33% for electrical components. Such depreciation rates were used in the calculation of the average depreciation value of 4.1% per year.

The company involved in this project activity is qualified as "presumed profit" (please see the item regarding tax rate). In this specific taxation regime, tax rates are calculated over revenues and not over gross profits, therefore the depreciation has no impact in the Equity's internal rate of return.

- Assumption 10 – Period of Assessment

The total period of assessment is 20 years from the start of operations date of 01/September/2013 according to the auction PPA (Power Purchase Agreement) period.

The Annex II – Reserve Energy Contract of the Auction Rules states that the end of the reserve energy contract is set in August 31st 2033 and that this date does not affects rights or obligations of the parts that occurred previously to this event (paragraphs 4.1 and 4.6). As the variable income is received in 24 monthly instalment payments of the next quadrennium (paragraph 8.15 of Reserve Energy Contract), two years must be added after the end of the PPA in order to account variable income receivables.

<u>Result:</u>

After applying the assumptions enumerated above and others described in the investment analysis spreadsheet, the Equity IRR is 9.44% in real terms.

Assuming a CER price ranging from 9 to 16 euros (according to report made by a carbon market specialist company, New Energy Finance) and emission factor of 0.3941 tCO_2/MWh (latest emission factor published by the Brazilian DNA at the decision making moment: $EF_{grid,OM,2010}$ = 0.4787 and $EF_{grid,BM,2010}$ = 0.1404), the Equity IRR with the inclusion of CER Revenues is 10.36%, which is a significant increase in project proponent's financial return.

Comparison of the Equity IRR and the Benchmark rate:

According to the Tool for the demonstration and assessment of additionality, Sub-step 2c, sub-item (b): *"The financial benchmark, if Option III (benchmark analysis) is used. If the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity cannot be considered as financially attractive".*

Thus, the proposed CDM project is not financially feasible, that is, the Equity IRR of 9.44% is lower than the reference of 12.75%, both in real terms.

Equity IRR of 9.44% < Benchmark rate of 12.75 %

Sub-step 2d. Sensitivity analysis:

Sensitivity analysis was carried out to demonstrate that the conclusion regarding financial/economic (un)attractiveness is robust to reasonable variations in the critical assumptions. Variables that constitute more than 20% of either total project costs or total revenues were subject to variation until the benchmark is achieved:

Electricity Tariff

Required variation to achieve the benchmark: +10.97%

Comments: According to the Auction Rules, this price will not change along the PPA period. Therefore this positive variation in the electricity tariff could never occur.

Energy Generation

Required variation to achieve the benchmark: +15.65%

Comments: According to the Auction Rules the contracted energy will not change along the PPA period. The effective energy generation has seasonal variations resulting in lower and higher production levels, the energy generation level estimated by the specialized consultancy Camargo Schubert tends to be achieved in a long-term basis.

So, not the contracted energy in the 3rd Reserve Energy Auction, but the net electricity available to be invoiced was considered in the calculation of the Equity Internal Rate of Return – project's financial indicator, and also it was the base to perform the sensitivity analysis carried out.

Therefore this positive variation in the effective energy generation would hardly occur when the 20 years period of assessment is considered.

Capital Expenditures (CAPEX)

Required variation to achieve the benchmark: -13.12%

Comments: This reduction would hardly occur once over 80% of the expected CAPEX has a price defined (at the decision making time) with turbine supplier. This means that the remaining items of the project's CAPEX such as electrical components, environmental costs and others would have to decrease over 80%% in order to achieve the benchmark, which is a very unlikely scenario.

Operation and Maintenance (O&M)

Required variation to achieve the benchmark: -118.0%

Comments: Even if O&M costs become zero, the benchmark would not be achieved.

The sensitivity analysis shows that the investment analysis provided a valid argument in favour of the additionality of the proposed project activity, since it consistently supports, for a realistic range of assumptions, the conclusion that the project activity without CERs revenues is unlikely to be financially/economically attractive.

Outcome of Step 2: *The project activity without CERs revenues is unlikely to be financially/economically attractive.*

Step 3: Barrier analysis

This step was not applied.

Step 4: Common practice analysis

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

There are 54 operating wind power plants in Brazil, summing 1.04 GW of installed capacity, which represents 0.90% of the total installed capacity in the country (Table 5).

Table 5. Electricity production entrepreneurships in operation in Brazil*

Type	**Units**	**Verified installed capacity**	
		kW	**%**
Mini and Micro Hydroelectric Plants (≤ 1 MW)	343	195,596	0.17
Wind power plants	54	1,036,542	0.90
Small hydroelectric plants (1 MW – 30 MW)	402	3,618,290	3.16
Solar plants	5	87	0
Large hydroelectric plants	176	77,640,889	67.77
Thermoelectric plants	1,464	30,074,627	26.25
Nuclear plants	2	2,007,000	1.75
Total	2,446	114,573,031	100

*Source: National Electric Energy Agency (*Agência Nacional de Energia Elétrica* - ANEEL)/Generation Database (*Banco de Informação de Geração* - BIG). Available at: http://www.aneel.gov.br/aplicacoes/capacidadebrasil/capacidadebrasil.asp. Accession date: 07/07/2011.

The data depicted in Table 5 show that the participation of wind-based electricity is still not significant in the electric matrix in Brazil. Moreover, it should be noted that most wind-based electricity generation entrepreneurships in Brazil accrue from one of the following incentive mechanisms: CDM and PROINFA[22].

PROINFA (*Programa de Incentivo às Fontes Alternativas de Energia Elétrica*/Program of Incentive to Alternative Sources of Electric Energy) was launched in 2002 with the objective of increasing the participation of electricity produced from wind and biomass sources and from small hydroelectric plants in the SIN[22]. PROINFA is based on feed in tariffs and was designed to have 2 phases. The first phase initially set a quota of 3.3 GW of new generation capacity equally distributed among wind, biomass and small hydro. After the program was launched, part of the quota of biomass was transferred to wind projects[22].

The program foresees the implementation of 144 plants, totaling 3,299.40 MW of installed capacity, being 1,191.24 MW from 63 small hydroelectric plants (1 MW - 30 MW), 1,422.92 MW from 54 wind plants and 685.24 MW from 27 biomass plants.

Projects developed under PROINFA have a 20-year Power Purchase Agreement signed with the state-owned electricity utility ELETROBRÁS[22]. PROINFA presets the price of the electricity paid to generators as a technology specific economic value, which is defined as the value that guarantee, for a defined timeframe and efficiency level, the economic feasibility of a typical project based on alternative sources of energy. It is worthy mentioning that the prices paid by PROINFA are higher than those practiced by the market[23].

Besides, electricity generation companies that had Electricity Purchase and Sale Contracts signed with ELETROBRÁS in the ambit of PROINFA could take up a loan from BNDES. Under the so-called Program of Financial Support to Investments in Alternative Sources of Electric Energy in the Ambit of PROINFA (*Programa de Apoio Financeiro a Investimentos em Fontes Alternativas de Energia Elétrica no Âmbito do PROINFA*), borrowers could finance up to 70% of financeable items, where the first installment could be paid up to third month after the operation start date with up to 10-year amortization periods[24].

It is worthy mentioning that "PROINFA also aims at the reduction of GEE, in the terms of UNFCCC, contributing to sustainable development" and "it's the attribution of ELETROBRÁS the direct or indirect development of the processes of preparation and validation of PDDs, registration, monitoring, and certification of the emissions reductions, and the commercialization of carbon credits obtained by PROINFA". "The resources originated from the activities related to the CDM or other carbon markets will be destined to the reduction of the costs of PROINFA"[25]. In that sense 13 PROINFA wind projects in Brazil are being/were developed as CDM projects (**Table 6**).

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[22] Programa de Incentivo às Fontes Alternativas de Energia Elétrica/ *Program of Incentive to Alternative Sources of Electric Energy*. Available at: <http://www.mme.gov.br/programas/proinfa>. Accession date: 07/07/2010.

[23] Alves de Brito, M.L. 2009. Investments in Wind Energy in Brazil: Comparing PROINFA and CDM project finance. Master Thesis. Graduate School of Humanities and Social Sciences. University of Tsukuba, Japan.

[24] Program of Financial Support to Investments in Alternative Sources of Electric Energy in the Ambit of PROINFA/*Programa de Apoio Financeiro a Investimentos em Fontes Alternativas de Energia Elétrica no Âmbito do PROINFA*. Available at: http://www.mme.gov.br/programas/proinfa/galerias/arquivos/programa/resolproinfa.pdf. Accessed in 14/06/2010.

[25] Federal Decree 5025 of March 30th of 2004. Available at: http://www.planalto.gov.br/ccivil/_Ato2004-2006/2004/Decreto/D5025.htm. Accessed in 14/06/2010.

43 out of 54 operating wind plants in Brazil accrue from PROINFA incentives (**Table 6**). Importantly, 5 out of 11 non-PROINFA operating plants are being developed as CDM projects (**Table 6**). Moreover, within the group of the 6 non-CDM and non-PROINFA wind plants, *Prainha*, *Taíba* and *Mucuripe* belong to the company Wobben Wind Power Indústria e Comércio Ltda. Wobben projects, constructs, assembles, operates and maintains wind power plants, and was the first Brazilian company to manufacture large scale aerogenerators (800 – 3,000 kW)8. Hence, they posses an intrinsically higher competitiveness in regards to the acquisition of the aerogenerators in comparison to other project proponents, which do not manufacture the wind turbines themselves, such as the proponents of the current project activity. *Palmas* is currently owned and operated by *Centrais Eólicas do Paraná Ltda.*, which, in turn, is owned by the State-owned power utility *Companhia Paranaense de Energia* (COPEL)[26]. However, *Palmas* was formerly co-owned by Wobben (70%) and COPEL (30%)[27]. Hence, one may affirm that *Palmas* had an environment comparable to that of *Prainha*, *Taíba* and *Mucuripe* at time of its implementation. *IMT* and *Ventos do Brejo* have only 0.002 MW and 0.006 MW of installed capacity, respectively, which is about fifteen thousand times and five thousand times smaller than Campo dos Ventos II installed capacity and therefore, cannot be considered similar to the project activity.

In light of the facts above, it is possible to conclude that, at the moment of the conclusion of this document, there were no operating entrepreneurships comparable to the project activity, in regards to investment climate.

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

Activities similar to the project activity are not widely observed nor commonly carried out.

Table 6. Operating wind electricity generation entrepreneurships in Brazil[28,29].

Plant	Authorized capacity (MW)	State	PROINFA	CDM Status
Albatroz	4.800	PB	Yes	N.A.
Alegria I	51.000	RN	Yes	N.A.
Alhandra	6.300	PB	Yes	N.A.
Atlântica	4.800	PB	Yes	N.A.
Bons Ventos	50.000	CE	Yes	N.A.

[26] COPEL. Entrepreneurhips in operation. http://www.copel.com/hpcopel/root/nivel2.jsp?endereco=/hpcopel/root/pagcopel2.nsf/docs/950F73FF30B18CD2032574020061FAB7. Accessed in 11/06/2010.

[27] ANÁLISE CONJUNTURAL, v.28, n.11-12, p.20, nov./dez. 2006.

[28] ANEEL: Operating wind entrepreneurships. <http://www.aneel.gov.br/aplicacoes/capacidadebrasil/GeracaoTipoFase.asp?tipo=7&fase=3>. Accessed in 07/07/2011.

[29] PROINFA: Contrated entrepreneurships. <http://www.eletrobras.com/elb/services/eletrobras/ContentManagementPlus/FileDownload.ThrSvc.asp?DocumentID={5EE94F36-806D-4A91-956B-326204F743B3}&ServiceInstUID={9C2100BF-1555-4A9D-B454-2265750C76E1}&InterfaceInstUID={18F15ED9-1E73-4990-8CC6-F385CE19FF17}&InterfaceUID={72215A93-CAA7-4232-A6A1-2550B7CBEE2F}&ChannelUID={B38770E4-2FE3-41A2-9F75-DFF25AF92DED}&PageUID={ABB61D26-1076-42AC-8C5F-64EB5476030E}&BrowserType=IE&BrowserVersion=8>. Accessed in 07/07/2011.

Camurim	4.800	PB	Yes	N.A.
Canoa Quebrada	57.000	CE	Yes	Validation[30]
Caravela	4.800	PB	Yes	N.A.
Cerro Chato III	30.000	RS	No	Validation[31]
Coelhos I	4.800	PB	Yes	N.A.
Coelhos II	4.800	PB	Yes	N.A.
Coelhos III	4.800	PB	Yes	N.A.
Coelhos IV	4.800	PB	Yes	N.A.
E. Água Doce	9.000	SC	Yes	Registered[32]
E. Canoa Quebrada	10.500	CE	Yes	N.A.
E. de Bom Jardim	0.600	SC	Yes	N.A.
E. de Prainha	10.000	CE	No	N.A.
E. de Taíba	5.000	CE	No	N.A.
E. Icaraizinho	54.600	CE	Yes	Validation[33]
E. Paracuru	25.200	CE	Yes	Validation[33]
E. Praias de Parajuru	28.800	CE	Yes	N.A.
E.-Elétrica de Palmas	2.500	PR	No	N.A.
Fazenda Rosário	8.000	RS	No	Validation[34]
Fazenda Rosário 3	14.000	RS	No	Validation[34]
Foz do Rio Choró	25.200	CE	Yes	Validation[33]
Gargaú	28.050	RJ	Yes	Validation[35]
Gravatá Fruitrade	4.950	PE	Yes	N.A.
IMT	0.002	PR	No	N.A.
Lagoa do Mato	3.230	CE	Yes	Validation[30]
Macau	1.800	RN	No	Registered[36]
Mandacaru	4.950	PE	Yes	N.A.
Mataraca	4.800	PB	Yes	N.A.
Millennium	10.200	PB	Yes	N.A.
Mucuripe	2.400	CE	No	N.A.
P.E. de Beberibe	25.600	CE	Yes	Consideration[37].

30 <http://cdm.unfccc.int/Projects/Validation/DB/HMOI5ZUNC27YH7DVBYBCFCRPUZWQ09>, access on 07/07/11.

31 <http://cdm.unfccc.int/Projects/Validation/DB/HMOI5ZUNC27YH7DVBYBCFCRPUZWQ09>, access on 07/07/11.

32 <http://cdm.unfccc.int/Projects/DB/SGS-UKL1156244716.38>, access on 07/07/11.

33 <http://cdm.unfccc.int/Projects/Validation/DB/AI2PYN6O2DPDHCZWPCI6KLWF2UZ9S0>, acess on 07/07/11.

34 <http://cdm.unfccc.int/Projects/Validation/DB/7FJT8KR0R6Z7X9P37350KVRFZ61QD6>, access on 07/07/11.

35 <http://cdm.unfccc.int/Projects/Validation/DB/J6EQPTU2VOQJKGG6LHWEERQVH5Z72F>, access on 07/07/11.

36 <http://cdm.unfccc.int/Projects/DB/DNV-CUK1167973931.45>, access on 07/07/11.

37 <http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html>, access on 07/07/11.

P.E. Elebrás Cidreira 1	70.000	RS	Yes	N.A.
P.E. Enacel	31.500	CE	Yes	N.A.
P.E. de Osório	50.000	RS	Yes	Registered[38]
P.E. do Horizonte	4.800	SC	No	Registered[39]
P.E. dos Índios	50.000	RS	Yes	Registered[38]
P.E. de Palmares	8.000	RS	Yes	N.A.
P.E. Sangradouro	50.000	RS	Yes	Registered[38]
Pedra do Sal	18.000	PI	Yes	N.A.
Pirauá	4.950	PE	Yes	N.A.
Praia do Morgado	28.800	CE	Yes	N.A.
Praia Formosa	105.000	CE	Yes	Validation[33]
Presidente	4.800	PB	Yes	N.A.
RN 15 - Rio do Fogo	49.300	RN	Yes	Validation[40]
Santa Maria	4.950	PE	Yes	N.A.
Taíba Albatroz	16.500	CE	Yes	N.A.
Ventos do Brejo A-6	0.006	RN	No	N.A.
Vitória	4.500	PB	Yes	N.A.
Volta do Rio	42.000	CE	Yes	N.A.
Xavante	4.950	PE	Yes	N.A.

Outcome of Step 4: *The project activity is not common practice in the relevant sector in the country.*

Demonstration and assessment of prior consideration of the CDM

As per the “Guidelines on the demonstration and assessment of prior consideration of the CDM” (Version 3 - Annex 22/EB49), “for project activities with a starting date on or after 02 August 2008, the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status”.

Accordingly, project participants informed the Brazilian DNA and the UNFCCC Secretariat of the commencement of the project activity and of their intention in seeking the CDM status. Such notification was made within six months of the start date of project activity and contained a brief description of the project activity and the precise geographical location of the project plant. Such notifications, using the standardized form F-CDM-Prior Consideration, were sent for Brazilian DNA and UNFCCC Secretariat in 27/10/2010 and the receipt of such documents has been subsequently confirmed. Documental evidences of these notifications were made available to DOE during validation.

Outcome of B5: *Since all steps above have been satisfied,* ***the project activity is additional.***

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[38] <http://cdm.unfccc.int/Projects/DB/DNV-CUK1158843861.54>, access on 07/07/11.

[39] <http://cdm.unfccc.int/Projects/DB/SGS-UKL1151534607.76>, access on 07/07/11.

[40] <http://cdm.unfccc.int/Projects/Validation/DB/BQQ32CCBBQ2342SUQ84SKA1T3NLEC0>, access on 07/07/11.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Project emissions

As per ACM0002/Version 12.2.0, since the project activity is neither a geothermal, solar nor a hydropower plant, $PE_y = 0$.

Baseline emissions

The baseline emissions are to be calculated as follows:

(1) $BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$

Where:

BE_y = Baseline emissions in year y (tCO_2/yr);

$EG_{PJ,y}$ = 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/yr);

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the "Tool to calculate the emission factor for an electricity system", v.2.2.0 (tCO_2/MWh).

Calculation of $EG_{PJ,y}$

Since the project activity is the installation of a new grid-connected renewable power plant at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

(2) $EG_{PJ,y} = EG_{facility,y}$

Where:

$EG_{PJ,y}$ = 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/yr);

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

Calculation of $EF_{grid,CM,y}$

The project plants will serve SIN. The Brazilian DNA has published the delineation of SIN to be adopted for the purposes of CDM projects. As per Resolution Nº 8 of the Brazilian DNA, the electric grid considered in this project activity is considered as a single system consisted by the sub-markets of SIN as the definition of the electric system of the project. Off-grid plants will not be included in the calculation of $EF_{grid,CM,y}$.

$EF_{grid,CM,y}$ will be calculated using the "Tool to calculate the emission factor for an electricity system", version 2.2.0. The following formulae apply:

(3) $$EF_{grid,CM,y} = EF_{grid,OM,y} \cdot w_{OM} + EF_{grid,BM,y} \cdot w_{BM}$$

Where:

$EF_{grid,CM,y}$	= Combined margin CO_2 emission factor in year y (tCO_2/MWh);
$EF_{grid,BM,y}$	= Build margin CO_2 emission factor in year y (tCO_2/MWh);
$EF_{grid,OM,y}$	= Operating margin CO_2 emission factor in year y (tCO_2/MWh);
w_{OM}	= Weighting of operating margin emissions factor (75%);
w_{BM}	= Weighting of build margin emissions factor (25%).

The weighting factors for build and operating margin were selected according to guidance provided in the "Tool to calculate the emission factor for an electricity system", version 2.2.0.

The $EF_{grid,OM,y}$ will be calculated according to the *dispatch data analysis*. As per this method OM emission factor is determined based on the grid power units that are actually dispatched at the margin during each hour h where the project is producing electricity and $EF_{grid,OM-DD,y}$ is calculated as follows:

(4) $$EF_{grid,OM-DD,y} = \frac{\sum_h EG_{PJ,h} \cdot EF_{EL,DD,h}}{EG_{PJ,y}}$$

Where:

$EF_{grid,OM-DD,y}$	= Dispatch data analysis operating margin CO_2 emission factor in year y (tCO_2/MWh);
$EG_{PJ,h}$	= Electricity generation by the project activity in hour h of year y (MWh);
$EF_{EL,DD,h}$	= CO_2 emission factor for grid power units in the top of the dispatch order in hour h in year y (tCO_2/MWh);
$EG_{PJ,y}$	= Total electricity displaced by the project activity in year y (MWh);
h	= Hours in year y in which the project activity is generating electricity;
y	= Year in which the project activity is displacing grid electricity.

For the crediting period, the build margin emission factor will be updated annually, *ex-post*, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available.

The parameters $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ are calculated and published by the Brazilian Inter-ministerial Commission for Global Climate Change, the Brazilian Designated National Authority, according to the "Tool to calculate the emission factor for an electricity system".

Leakage

According to ACM0002, version 12.2.0, *"no leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected."*

Emission reductions

The emission reduction by the project activity during a given year y is calculated as follows:

(5) $$ER_y = BE_y - PE_y$$

Where,

ER_y = Emissions reductions of the project activity during the year y (tCO_2e)

BE_y = Baseline emissions during the year y (tCO_2e)

PE_y = Project emissions during the year y (tCO_2e)

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

Data / Parameter:	w_{OM}
Data unit:	Fraction
Description:	Weighting of operating margin emissions factor
Source of data used:	"Tool do calculate the emission factor for an electricity system", Version 2.2.0
Value applied:	75%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value for wind power plants.
Any comment:	-

Data / Parameter:	w_{BM}
Data unit:	Fraction
Description:	Weighting of build margin emissions factor
Source of data used:	"Tool do calculate the emission factor for an electricity system", Version 2.2.0
Value applied:	25%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value for wind power plants.
Any comment:	-

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

Emission reductions were *ex-ante* estimated as follows:

(6) $BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$

Where:

BE_y = Baseline emissions in year y (51,922 tCO_2/yr);

$EG_{PJ,y}$ = 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 (131,750.00 MWh/yr);

$EF_{grid,CM,y}$ = 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" (0.3941 tCO_2/MWh).

As per ACM0002/Version 12.2.0 for this project activity, project emissions are zero ($PE_y = 0$) and leakage emissions are not considered.

(7) $ER_y = BE_y - PE_y$

Where:

ER_y = Emissions reductions of the project activity during the year y (51,922 tCO_2e)

BE_y = Baseline emissions during the year y (51,922 tCO_2e)

PE_y = Project emissions during the year y (0 tCO_2e)

See detailed ex-ante calculation in the annex spreadsheet "ex_ante_Campo dos Ventos II.xls".

The parameters used for *ex-ante* calculations are compiled in Table 7.

Table 7. Parameters used for ex-ante calculations

Parameter	Unit	Value	Description	Comment
ER_y	tCO_2/yr	51,922	Emissions reductions in the year y	Calculated
BE_y	tCO_2/yr	51,922	Baseline emissions in year y	Calculated
PE_y	tCO_2/yr	-	Project emissions in the year y	For this project activity (wind-based electricity generation project), emissions are null, as per ACM0002/Version 12.2.0
$EG_{PJ,y}$	MWh/yr	131,750.00	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	Ex-ante estimated as the predicted average total yearly net electricity generation by the project activity, as per Camargo Schubert Reports, Ref. C&S-CDV-CEG 386/10, 15/04/2010.
$EG_{facility,y}$	MWh/yr	131,750.00	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y	Ex-ante estimated as the predicted average total yearly net electricity generation by the project activity, as per Camargo Schubert Reports, Ref. C&S-CDV-CEG 386/10, 15/04/2010.
$EG_{PJ,h}$	MWh	15.04	Electricity generation by the project activity in hour h of year y	Ex-ante estimated as the predicted average total yearly net electricity generation by the project activity, as per Camargo Schubert Reports, Ref. C&S-CDV-CEG 386/10, 15/04/2010.
$EF_{grid,CM,y}$	tCO2/MWh	0.3941	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the "Tool to calculate the emission factor for an electricity system", version 2.2.0	Calculated
$EF_{grid,OM,y}$	tCO_2/MWh	0.4787	Operating margin CO_2 emission factor in year y	Operating margin emission factor of the National Interconnected System (2010), as published by the Brazilian DNA (http://www.mct.gov.br/index.php/content/view/303076.html, accessed in 30/11/2011)

$EF_{grid,OM-DD,y}$	tCO_2/MWh	0.4787	Dispatch data analysis operating margin CO_2 emission factor in year y	Calculated as the average hourly emission factor, weighted by the hourly net electricity generation, by the Brazilian DNA
$EF_{grid,BM,y}$	tCO_2/MWh	0.1404	Build margin CO_2 emission factor in year y	Build margin emission factor of the National Interconnected System (2010), as published by the Brazilian DNA (http://www.mct.gov.br/index.php/content/view/303076.html, accessed in 30/11/2011)
w_{OM}	Fraction	0.75	Weighting of operating margin emissions factor	Default value for "Wind and solar power generation projects activities", as per Tool to calculate the emission factor for an electricity system, version 2.2.0
w_{BM}	Fraction	0.25	Weighting of build margin emissions factor	Default value for "Wind and solar power generation projects activities", as per Tool to calculate the emission factor for an electricity system, version 2.2.0.

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

Table 8. Summary of the ex-ante estimation of emission reductions

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2013 (From September till December)	-	17,307	-	17,307
2014	-	51,922	-	51,922
2015	-	51,922	-	51,922
2016	-	51,922	-	51,922
2017	-	51,922	-	51,922
2018	-	51,922	-	51,922
2019	-	51,922	-	51,922
2020 (From January Till August)	-	34,615	-	34,615
Total	-	**363,454**	**-**	**363,454**

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 to the grid in year y
Source of data to be used:	Measurements at project activity site.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	131,750
Description of measurement methods and procedures to be applied:	This parameter will be continuously analyzed and monitored values will be recorded monthly and yearly for the project activity.
QA/QC procedures to be applied:	Measurement results will be cross-checked with records for sold electricity (if applicable) and/or through data available at the CCEE databank.
Any comment:	Ex-ante estimated as the predicted average total yearly net electricity generation by the project activity, as per Camargo Schubert Reports, Ref. C&S-CDV-CEG 386/10, 15/04/2010.

Data / Parameter:	$EF_{grid,OM,y}$
Data unit:	tCO_2/MWh
Description:	Operating margin CO_2 emission factor in year y
Source of data to be used:	Brazilian Interministerial Commission on Global Climate Change
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.4787
Description of measurement methods and procedures to be applied:	As per the "Tool to calculate the emission factor for an electricity system", version 2.2.0.
QA/QC procedures to be applied:	As per the "Tool to calculate the emission factor for an electricity system", version 2.2.0.
Any comment:	Ex-ante estimated operating margin emission factor of the National Interconnected System (2010), as published by the Brazilian DNA (http://www.mct.gov.br/index.php/content/view/303076.html, accessed in 30/11/2011).

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO_2/MWh
Description:	Build margin CO_2 emission factor in year y
Source of data to be	Brazilian Interministerial Commission on Global Climate Change

used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.1404
Description of measurement methods and procedures to be applied:	As per the “Tool to calculate the emission factor for an electricity system”, version 2.2.0.
QA/QC procedures to be applied:	As per the “Tool to calculate the emission factor for an electricity system”, version 2.2.0.
Any comment:	Ex-ante estimated build margin emission factor of the National Interconnected System (2010), as published by the Brazilian DNA (http://www.mct.gov.br/index.php/content/view/303076.html, accessed in 30/11/2011).

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Combined margin CO_2 emission factor for grid connected power generation in year y.
Source of data to be used:	Brazilian Interministerial Commission on Global Climate Change
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.3941
Description of measurement methods and procedures to be applied:	As per the “Tool to calculate the emission factor for an electricity system”, version 2.2.0.
QA/QC procedures to be applied:	As per the “Tool to calculate the emission factor for an electricity system”, version 2.2.0.
Any comment:	-

B.7.2. Description of the monitoring plan:

1. General Considerations

The objective of the monitoring plan is to ensure the complete, consistent, clear, and accurate monitoring and calculation of the emissions reductions achieved by the project activity during the whole crediting period. The project operator (CPFL Energias Renováveis S/A) will be responsible for the implementation of the monitoring plan on which is based in monitoring the net electricity dispatched to the grid and the emission factor of the electricity grid.

2. Data and Parameters monitored

Net electricity dispatched to the grid – $EG_{facility,y}$

Monitoring consists of metering the net electricity generated by the project activity. Measurement results will be crosschecked with records for sold electricity and/or with the data provided in the Electric Energy Commercialization Chamber (*Câmara de Comercialização de Energia Elétrica – CCEE*) databank. Data will be measured continuously and will be consolidated hourly and monthly. Monthly values will be used for crosschecking electricity sales records. Records pertaining to the meters used in the project activity (type, model and calibration reports) will be kept accordingly.

The Operator of National Electric System (*Operador Nacional do Sistema Elétrico* - ONS) regulates, by means of its Grid Procedures[41] (*Procedimentos de Rede*), *inter alia*, the measurements of electricity production for invoicing (12nd module). Information related to this module are necessary to maintain the Measurement for Invoicing System (*Sistema de Medição para Faturamento – SMF*) according to the standard specified in the document Technical Specifications of Measurement for Invoicing (*Especificação Técnica das Medições para Faturamento*) to assure not only the control of energy accounting process by CCEE, but also the determination of demands by ONS[42].

Generally, SMF is a system composed of the main and backup measurers, by the potential and current transformers, the channels of communication between energy agent/project participant and CCEE, and the system for data collection and measurement for invoicing[43].

According to the ONS Grid Procedures – Submodule 12.1, the SMF should be installed in the connection of the plants with the energy network to measure the net generation of these plants, which will be used for accounting and settlement of electricity in the CCEE.

Data stored on the meters is collected by the System of Energy Data Collection (*Sistema de Coleta de Dados de Energia – SCDE*) of CCEE, remotely and automatically through direct access to the meters of the project participant. These collected data are processed in SCDE for electricity accounting by CCEE and are available to all energy market participants to control their respective incomes[43].

The energy meters shall be: multi-phase, 3 elements, 4 wire (for 4 wire systems), of system rated frequency, rated current according to the secondary of current transformer, nominal voltage according to the secondary of potential transformer. The meters shall have independence of elements and sequence of phases, ensuring the same performance in monophasic and three-phasic testing[43].

The measurement systems are designed and implemented in accordance with the standards of the Brazilian Association of Technical Standards (*Associação Brasileira de Normas Técnicas – ABNT*) or International Electrotechnical Commission - IEC, ensuring the quality of the system. In addition, the meters will have certificate of conformity of design approved and issued by the National Institute of Metrology Standardization and Industrial Quality (*Instituto Nacional de Metrologia, Normalização e Qualidade Industrial – INMETRO*)[43].

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[41] Operator of National Electric System (*Operador Nacional do Sistema Elétrico* - ONS). Grid Procedures (*Procedimentos de Rede*). www.ons.org.br/procedimentos/index.aspx. Accessed in 14/07/2010.

[42] Operator of National Electric System (*Operador Nacional do Sistema Elétrico* - ONS). Grid Procedures (*Procedimentos de Rede*). Module 12 – Submodule 12.1 (*Módulo 12 - Submódulo 12.1*). www.ons.org.br/procedimentos/index.aspx.

[43] Operator of National Electric System (*Operador Nacional do Sistema Elétrico* - ONS). Grid Procedures (*Procedimentos de Rede*). Module 12 – Submodule 12.2 (*Módulo 12 - Submódulo 12.2*). www.ons.org.br/procedimentos/index.aspx.

Regarding the class of accuracy of energy meters, they will meet all relevant metrological requirements prescribed in Metrological Technical Regulation (*Regulamento Técnico Metrológico – RMT*) for Class 0.2 of energy meters, approved by INMETRO. Class 0.2 of energy meter, also identified as index D energy meters admits error in measurements of up to + / - 0.2%[43].

The energy meters possess mass memory capable of storing the data of active, reactive and demand energy in a bidirectional manner, voltages and currents at intervals of integration programmable from 5 to 60 minutes during the minimum period of 32 days. These meters will also be equipped with a system of preservation and salvage of records in case of power loss, storing data in non-volatile memory for at least 100 hours. In addition, they possess at least two independent communication ports with concurrent access or that allow the prioritization of one of them. One will be for the exclusive use of the CCEE and the other for access of agents involved in the measurement point. The CCEE communication port will be coupled to a stable and good performance internet channel, which will be established under a VPN tunnel (Virtual Private Network) between the meter and the CCEE. The meters will be able to manage concurrent access to its communications ports in order to allow full time access to mass memory records of meters via CCEE communication port[43].

Besides electricity measurements are performed by the project owners, all the electricity dispatched to the grid by the project activity will be monitored online by CCEE. This entity is responsible for the monthly readings and keeping the records of the energy generated. If any problem happens at the local meter level, the reading lecture corresponding to the amount of energy during the time of the problem will not be lost due to online reading performed by CCEE. As mentioned before, in order to assure the quality of data used in the emission reductions calculation, the project proponents will provide access to the DOE the records of CCEE databank, because the data from this entity will serve to crosscheck the electricity dispatched to the grid.

Backup meters are equal or equivalent to the main meters, installed on the same panel, with the same information for current and voltage and under the same technical standards.

In order to ensure the effectiveness operation of SMF, preventive maintenance must be carried out and, where necessary, also corrective maintenance. Inspections are also conducted in order to verify the correct operation of meters[43].

The frequency for preventive maintenance of the SMF is a maximum of two years. This schedule may be changed based on the historical occurrence observed in all plants, considering the schedule of stops. The meter that, after calibration, displays errors outside the range specified by the standard must be replaced[44].

The calibration of meters shall be conducted by a qualified organization that must comply with national standards and industrial regulations to ensure the accuracy. After calibration, the meters must be sealed to assure the safety and the calibration certificates must be archived with the other monitoring records. The deadline for meter's calibration follows, therefore, the "Grid Procedures" from the ONS Module 12, Sub-module 12.3. By the time of completion of this document, the frequency of calibration is a maximum of two years, but in the case of any changes occurred in the ONS Grid Procedures, the project owners shall follow the rules from the relevant sector organizations (e.g. ONS, ANEEL, CCEE, etc).

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[44] Operator of National Electric System (*Operador Nacional do Sistema Elétrico* - ONS). Grid Procedures (*Procedimentos de Rede*). Module 12 – Submodule 12.3 (*Módulo 12 - Submódulo 12.3*). www.ons.org.br/procedimentos/index.aspx.

All the meters installed were tested and calibrated in accordance with regulations provided by CCEE where all the requirements were fulfilled. Moreover if any errors are detected in the measuring device, it will be immediately replaced by the backup meter that will be previously calibrated. The damaged measuring device will be repair, recalibrate and will return to the monitoring system.

Emission Factor – $EF_{grid,OM,y}$, $EF_{grid,BM,y}$ and $EF_{grid,CM,y}$

The monitoring plan also includes parameters such as the operating margin CO_2 emission factor ($EF_{grid,OM,y}$), the build margin CO_2 emission factor ($EF_{grid,BM,y}$) of SIN and the combined margin CO_2 emission factor ($EF_{grid,CM,y}$). These parameters will be obtained from the Brazilian Interministerial Commission for Climate Change, which calculates and publishes $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ according to the "Tool to calculate the emission factor for an electricity system". These published parameters, along with the records of the net electricity supplied to SIN by the project activity, will be used for the calculation of the yearly combined margin ($EF_{grid,CM,y}$) and, ultimately, for the calculation of the emission reductions achieved by the project activity.

All data collected as part of monitoring will be archived and kept at least for 2 years after the end of the crediting period or 2 years after the last issuance of CER for this project activity, whichever occurs later.

3. Monitoring Structure

The monitoring of the data from the project activity will be done centrally at the Generation Operation Center (*Centro de Operação da Geração* – COG), situated at the CPFL Renováveis headquarters, in São Paulo – São Paulo. The COG account with the support of a data remote reading system known as ZFA, manufactured by the German company ITF / EDV. This system is able to communicate with protocols and systems simultaneously, performing the collection, transport and availability of measurement data. The ZFA has a database and a communication server, integrated with the meters used in the monitoring plan.

The generation data are stored, and the system allows the reporting within the daily, weekly, monthly or yearly periodicity, according to user request. The query to the server can be made online by CPFL and CCEE, which access in the real-time the gross and the net electricity generation by the project activity. The monitoring routine is already a common practice for the project proponent, since CPFL has other projects in operation inside the CDM. Thus, the project proponent has the internal procedure *Arquivamento de Documentos para o CDM - Crédito Carbono*[45] that sets the criteria for the storage of data related to CDM project activities.

The operational and management structure that the project operator will implement in order to monitor emission reductions achieved by the project activity is given in the flowchart below:

[45] The document has been provided to DOE.

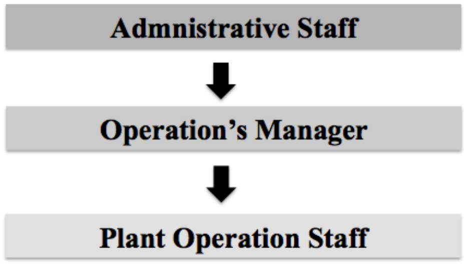

Figure 3. Operational and management structure that the project operator will implement in order to monitor emission reductions achieved by the project activity.

The roles and responsibilities within the structure outlined in are described in detail in the paragraphs below.

Administrative Staff: Responsible for go along with the auditor during the verification visit and provide all necessary documents related to the records of the net electricity supply to the grid. If applicable, at the time of verification by DOE, the Administrative Staff will provide access to the records of CCEE databank in order to demonstrate that electricity generation data is consistent and accurate. The Administrative Staff will forward all electronic media-based information to WayCarbon at a minimum bimonthly frequency.

Operation`s Manager: Responsible for the general supervision of the COG and for the record keeping and indexing of the data pertaining to the net electricity supply to the grid. Its attributions also include ensuring that the monitored data pertaining to the net electricity generation is continuously sent (online) to the CCEE.

Plant Operation Staff**:** Responsible for the general supervision of the plant operation and for the supervision of the metering. Its attributions also include ensuring that meters included in the present monitoring plan are calibrated and undergo maintenance as per the applicable regulations and manufactures' recommendations. Any meter calibration procedures will be reported to the Administrative Staff.

Training procedures

In order to ensure accuracy of the monitored data and to guarantee the quality of the monitoring plan, the Administrative Staff will receive training on monitoring methodologies, procedures and archiving by WayCarbon. Then, they will train the project staff in charge of the CDM monitoring. The training course covers: initial training on CDM, monitoring methodology, monitoring procedures and requirements and archiving.

4. Compilation of Monitoring Reports

As previously mentioned, monitored data will be forwarded to WayCarbon at a minimum bimonthly basis. Besides being responsible for collecting the information pertaining to the calculation of the grid emission factor ($EF_{grid,OM,y}$ and $EF_{grid,BM,y}$), WayCarbon will compile monitoring reports and will be responsible for the calculation of the emission reductions achieved by the project activity.

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):

Date of completion of the application of the baseline and monitoring methodology: 30/11/2011.

Responsible persons:
Mr. Carlos Edson Shiguematsu Junior;
Miss. Gabriela Lopes;
Miss. Iris Gobato Gercov;
Miss. Laura Araújo Alves;
Mr. Luiz Serrano.

WayCarbon Soluções Ambientais e Projetos de Carbono LTDA. (Project Participant)
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E-mail: cdelpupo@waycarbon.com
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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:

26/08/2010

The date indicated above corresponds to that of the 3rd Brazilian Auction of Reserve Energy (3º *Leilão de Energia de Reserva - Leilão nº 005/2010*[17]), in which the electricity generation facility Campo dos Ventos II had its energy contracted and its contract for the supply of equipment and services validated. For the present project activity this is the earliest of the date(s) on which the implementation or construction or real action has begun.

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

>>
20 years and zero months[12]

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

C.2.1. Renewable crediting period:

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

01/09/2013 or the registry date of the project activity at the CDM-UNFCCC, whichever is later.

C.2.1.2. Length of the first crediting period:

7 years and zero months.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

N/A

C.2.2.2. Length:

N/A

SECTION D. Environmental impacts

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

Environmental Licensing is the major tool to implement environmental policies in Brazil. The main objective is to standardize environmental impacts assessments and establish control plans for polluting enterprises. According to Federal Regulation 9.433/1997, article 52nd, the state level environmental agencies are the authority in charge to issue Environmental Permits. In Rio Grande do Norte, the Institute of Sustainable Development and Environment of Rio Grande do Norte (*Instituto de Desenvolvimento Sustentável e Meio Ambiente do Rio Grande do Norte* - IDEMA) is responsible for environmental licensing.

According to the Federal Resolution CONAMA 001/86, activities that utilize natural resources and that are considered as entrepreneurships with high degradation or pollution potential must have their environmental impact assessment and environmental impact report elaborated to obtain the environmental licenses. Electricity generation, independently of the energy source, with potential higher than 10 MW, is amongst these activities.

Therefore, the project activity Simplified Environmental Report (Relatório Ambiental Simplificado – RAS), that describes environmental impacts caused by project implementation and operation, was submitted to IDEMA, in order to obtain its Previous License (*Licença Prévia* - LP). IDEMA emitted the Previous License for the electricity generation facility[46] establishing the basic requirements to the next phases of licensing.

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

The interventions on the physical environment by the project activity in its planning, implementation and operation phases were categorized and their associated environmental impacts were identified in the RAS; Actions to prevent, mitigate or compensate environmental impacts were proposed in this document. As

[46] Parque Eólico Campo dos Ventos II # 2010-036827/TEC/LP-0073, issued on 05/13/2010, with expiration date on 05/13/2012. The Previous License has been provided to DOE.

described in the RAS, there are only two significant negative impacts related to the project activity, which are the change in the landscape due to the installation of the windmills, and the vegetation cover loss due to the land clearing, and most of the negative impacts have low magnitude and short duration. In the LP, IDEMA imposed some requirements to minimize or eliminate the impacts.

The project developer is working in order to meet all requirements set out in Previous License.

SECTION E. Stakeholders' comments

>>

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

>>

Stakeholders' comments were invited in 29/07/2011 following the Designated National Authority procedures for such purpose, defined by Resolution number 07 of the Interministerial Comission for Global Climate Change (CIMGC).

Accordingly, the relevant stakeholders were mapped and invited to visit the website http://www.munduscarbo.com/projetos.htm in order to access the project documentation which includes the CDM-PDD and a correspondent version in Portuguese. This documentation will be accessible on the above mentioned website along the whole registration period.

The following stakeholders received letters communicating the CDM project activity:

- Mayor from project activity Municipality;
- Representatives of the Legislative Chambers from project activity Municipality;
- Local Environmental NGOs;
- State and local environmental agencies;
- Brazilian Forum of NGOs and Social Movements for the Environment and Development (FBOMS);
- National NGOs which objectives are related to the project activity;
- National and international environmental NGOs;
- State and Federal Prosecutors.
- Local organizations representing the rural workers.

E.2. Summary of the comments received:

>>

So far no comments were received

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

>>

Considering the Section E.2 of the PDD, no action shall be taken by the project participants.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Campo dos Ventos II Energias Renováveis S.A.
Street/P.O.Box:	Av. Dr. Cardoso de Melo, 1184, 8º andar
Building:	-
City:	São Paulo
State/Region:	São Paulo
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

This section was left in blank in a purposeful way, since no public funding was granted to the project activity.

Annex 3

BASELINE INFORMATION

This section was left in blank in a purposeful way, since all pertinent information is provided throughout the text.

Annex 4

MONITORING INFORMATION

This section was left in blank in a purposeful way, since all pertinent information is provided throughout the text.

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