Component project activity design document form for CDM component project activities

(Version 04.0)

Complete this form in accordance with the Attachment "Instructions for filling out the component project activity design document form for CDM component project activities" at the end of this form.

COMPONENT PROJECT DESIGN DOCUMENT (CPA-DD)	
Title of the CPA	Santa Mónica Wind Complex
Version number of the CPA-DD	01
Completion date of the CPA-DD	20/11/2015
Title of the PoA to which the CPA is included	Brazilian PoA for NAMA incentivized NCRE Projects
Host Party	Brazil
Estimated amount of annual average GHG emission reductions	212,704

SECTION A. General description of CPA

A.1. Title of the proposed or registered PoA

Brazilian PoA for NAMA incentivized NCRE Projects

A.2. Title of the CPA

Santa Mônica Wind Complex
Version: 01
20/11/2015

A.3. Description of the CPA

The Santa Mônica Wind Complex CPA (hereinafter referred to as the CPA) consists of the installation of a Greenfield wind complex located in the municipality of Trairí, Ceará State, north-eastern region of Brazil and connected to the National Interconnected System (hereinafter referred to as the SIN, from the Portuguese "Sistema Interligado Nacional").

The CPA consists of a 97.2 MW wind farm complex composed of four adjacent wind farms: Ouro Verde (29.7 MW); Estrela (29.7 MW), Cacimbas 1 (18.9 MW); and Santa Mônica I (18.9 MW). The total energy generation of the complex is projected to be 415,600 MWh/year on a P90[1] basis.

Despite Brazil's great wind potential, wind power generation activities such as the Santa Mônica Complex so far only represent a small share of the Brazilian electricity matrix. According to ANEEL (National Electric Energy Agency / Agência Nacional de Energia Elétrica)[2], wind power plants represent only 4.65% of country's installed capacity. Given this context, projects like the Santa Mônica Complex represent an important renewable and clean non-conventional alternative for electricity generation and a valuable contribution to the diversification of the Brazilian energy matrix.

The CPA is of special relevance when considering the necessity to meet Brazil's fast growing demand for electricity, which, according to the Ministry of Mines and Energy Decennial Electric Energy Expansion Plan [3] is projected to grow by 49% at the country level and 50% at the north-eastern region between 2013 and 2022, respectively. Thus, the Santa Mônica Complex will contribute to the improvement of the regional energy infrastructure by providing additional electricity supply to sustain the expansion of economic activities and population growth.

The electricity delivered by the project activity to the grid would otherwise be generated by the operation of grid-connected power plants and by the addition of new generation sources. Thus, the

[1] P90 is the energy that a wind turbine is 90% likely to produce, given the uncertainties in the measurement, analysis and wind turbine operation. The adoption of the P90 is a requirement for the so called Technical Enabling for Wind Ventures, according to the norm N°. EPE-DEE-017/2009-R6 from the Energy Research Company (Empresa de Pesquisa Energética – EPE) and is used in Energy Auctions promoted by the Brazilian Government. The use of P90 meets the requirements required by the document "Guidelines for the reporting and validation of plant load factors" from the CDM Executive Board.

[2] Available at: http://www.aneel.gov.br/aplicacoes/capacidadebrasil/capacidadebrasil.cfm. Accessed on: 03/08/2015.

[3] Brazilian Ministry of Mines and Energy: Decennial Plan for Electric Energy Expansion 2022 (PDE 2022 according to its abbreviation in Portuguese); page 41. Available at: http://www.epe.gov.br/PDEE/Forms/EPEEstudo.aspx. Accessed on: 02/08/2015.

project will generate greenhouse gases (GHG) emission reductions by displacing electricity that in the baseline would be produced by fossil fuel based power plants connected to the SIN.

The estimated average emissions reductions generated by the project are 212,704 tCO_2e/year.

The project will contribute to the sustainable development of Brazil by, among others:

- Reducing GHG and local air pollutants (SO_2, NOx and PM) emissions from the Brazilian energy matrix;

- Improving energy supply security and grid stability by increasing diversification of power generation sources in terms of technologies and geographic location. Particularly, as Brazil's hydro and wind regimes are largely complementary, their combination allows to partially compensate the lack of hydropower storage capacity, which would be compensated with minimal installation and/or operation of thermal power generation units, while still providing sufficient energy security based on a portfolio of these complementary renewable sources;

- Improving the local infrastructure such as roads and electricity transmission systems;

- Stimulating the regional economy by, increasing tax revenues for the local government and job opportunities for local workers and service suppliers. The resulting economic stimulus will improve capital stock and availability in the region, which in turn will allow investment in the improvement of general infrastructure, productive capacity and consequently the satisfaction of the population's basic needs, thus promoting a virtuous cycle in the local economy;

- Stimulating the development of a proficient service sector in the regions where the CPA will be located to be able to satisfy the CPA's need of skilled operators and maintenance staff and therefore creating opportunities for education, professionalization and employment.

- Inducing the development of national technology and improving the domestic know-how. For the first time in the country, Alstom's wind turbines will feature on 119-metre concrete towers which will be built applying an unique craneless construction system based on proven hydraulic lifting techniques used for civil engineering[4];

- Generating extra income for the landowners, while they can continue using the area for other activities. Thus it increases and diversifies the lands productivity.

A.4. Entity/individual responsible for the operation of CPA

Tractebel Energia S.A. is the owner entity and responsible for the operation of the CPA.

A.5. Technical description of the CPA

The CPA is a Greenfield wind power complex to be connected to the National Interconnected System (SIN, as per its name in Portuguese "Sistema Interligado Nacional").

The complex will consist of the installation of 36 aero-generators of 2.7 MW each (ALSTOM ECO 122, 89 m height), totalling 97.2 MW of installed capacity.

[4] Case Study: Wind Power Solutions; Santa Monica Complex – Brazil; Eco 122 wind farm. Alstom; http://www.alstom.com/Global/Power/Resources/Documents/Brochures/santa-monica-brazil-eco-122-wind-farm.pdf

The main technical parameters of the complex are illustrated in the table below:

Technical Parameter	Unit	Cacimbas 1	Estrela	Santa Mônica	Ouro Verde	Santa Mônica Complex	Reference
Installed capacity	MW	18.9	29.7	18.9	29.7	97.2	Projects technical description ("Memorial Descritivo") of the wind farms submitted to ANEEL.
Gross electricity generation	MWh/yr	104,638	157,597	104,109	145,926	512,270	Consistency Certificates of the Anemometric Measurement Campaign and of the Annual Production Estimative; Plant load factors determined by MegaJoule
Wake effect	%	-0.77%	-6.80%	-1.47%	-3.60%	-3.61%	
Degradation per year	%	-0.50%	-0.50%	-0.50%	-0.50%	-0.50%	
Gross electricity generation adjusted – P90	MWh/yr	90,474	123,677	88,988	117,006	420,146	
Plant load factor (%) – P90	%	54.65%	47.54%	53.75%	44.97%	49.34%	
Unavailability (forced + programmed)	%	-0.50%	-0.50%	-0.50%	-0.50%	-0.50%	Data sheets of the winds farms, EPE.
Internal consumption	MWh/yr	514	731	510	690	2,445	Data sheets of the winds farms, EPE.
Project net electricity generation – P90	MWh/yr	89,508	122,328	88,033	115,731	415,600	Calculated.
Average lifetime of the equipment	Years	20	20	20	20	20	Technical Description; ECO 122 – GENERAL DESCRIPTION; DST-0484 Rev. 09; 20/01/2014; ALSTOM

As stated in the table above, the wind farms load factors have been determined by a third party specialized company (MegaJoule) based on more than 3 years historical data (from 18/12/2009 to 09/05/2013). The load factor is estimated based on the long-term average electricity generation with 90% probability of occurrence in any given year (P90).

The energy generated by the complex will be transmitted to an existing substation owned by TRACTEBEL which will be expanded to include the Santa Monica Wind Complex.

The connection to the SIN will happen through a 67 km transmission line connecting TRACTEBEL's substation to PECEM II substation, owned by the transmission company Delmiro Gouveia.

The schematic representation of the energy flow and balance of the system and equipment included in the CPA is presented below:

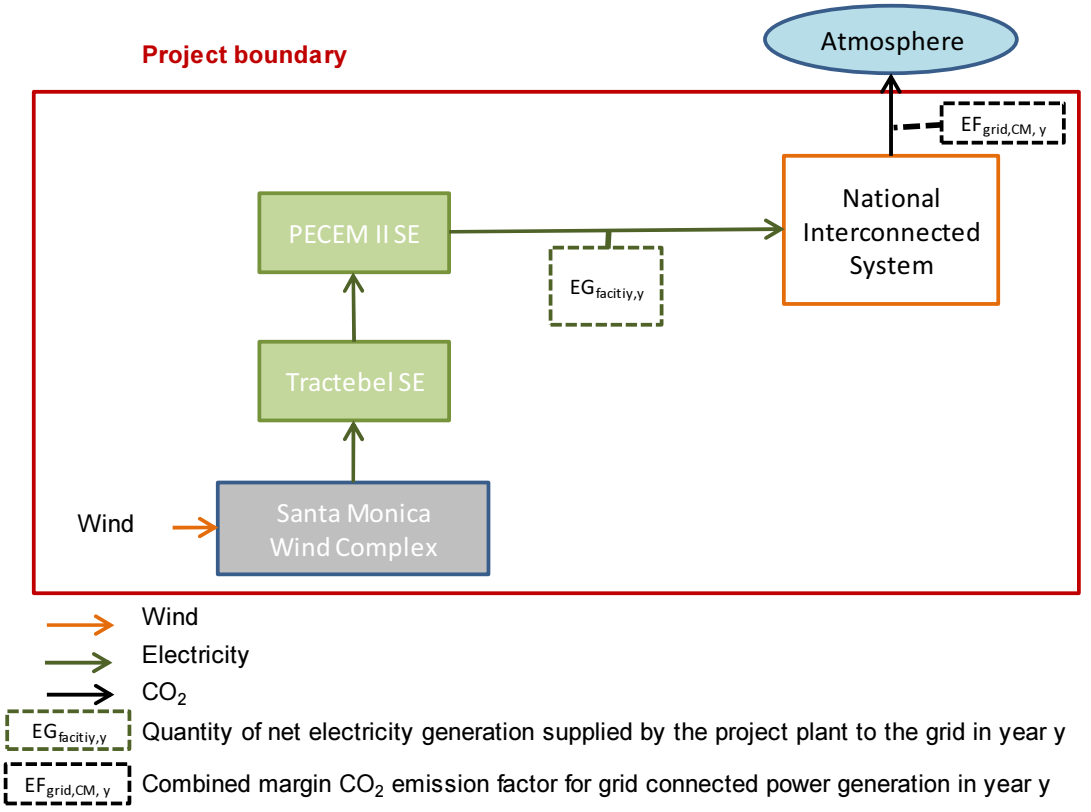


Figure 1. Flow diagram of the project boundary and key monitoring variables

As this is a Greenfield project, there are no facilities, systems and equipment in operation under the existing scenario prior to the implementation of this CPA.

According to the methodology ACM0002 (version 16.0), *"if the project activity is the installation of a Greenfield power plant, the baseline scenario is the 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".*

A.6. Party(ies)

Name of Party involved (host) indicates host Party	Private and/or public entity(ies) CPA implementer(s) (as applicable)	Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)
Brazil (host)	Tractebel Energia S.A. (private entity)	No

A.7. Geographic reference or other means of identification

The CPA will be located in the municipality of Trairí, Ceará State, North-eastern Region of Brazil.

The GPS coordinates of the four sites are as follows:

Coordinates[5]	Cacimbas 1	Estrela	Santa Mônica	Ouro Verde
Latitude	3° 15' 12" S	3° 14' 52" S	3° 15' 34" S	3° 16'10" S
Longitude	39° 16' 52" W	39° 17' 39" W	39° 16' 54" W	39° 18' 38" W

The following map and satellite image identifies the location of the power plant:

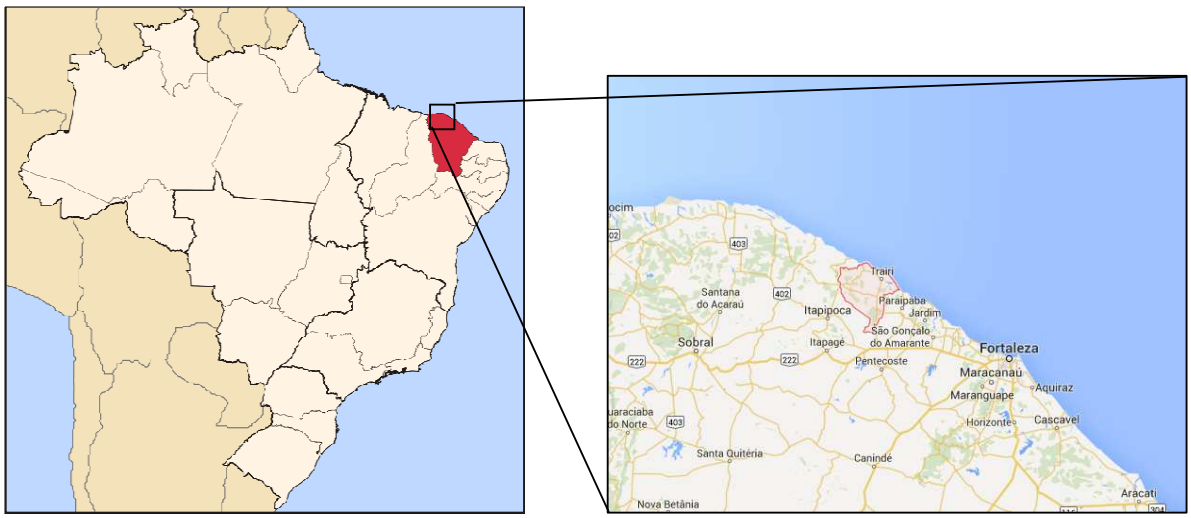


Figure 2. Location of Santa Mônica Wind Complex[6]

A.8. Duration of the CPA

A.8.1. Start date of the CPA

16/06/2014

This is the date when the contracts for the engineering and construction of the project and the supply, transport, assembly, installation and commissioning of the aero-generators were signed with Alstom Brasil Energia e Transporte Ltda. and BAC Eólica Estrutural Ltda.

[5] Information available at the projects technical description ("Memorial Descritivo") of the wind farms, submitted to ANEEL.

[6] Areas in red in the satellite image corresponds to Trairí Wind Complex.

This is in line with the "Glossary of CDM terms" which establishes that start date should be the earliest date at which either the implementation or construction or real action of a project activity begins.

A.8.2. Expected operational lifetime of the CPA

20 years[7]

A.9. Choice of the crediting period and related information

Renewable crediting period.

A.9.1. Start date of the crediting period

01/06/2016[8].

A.9.2. Length of the crediting period

Length of 1st crediting period: 7 years
Number of renewal periods: 2

A.10. Estimated amount of GHG emission reductions

Emission reductions during the crediting period	
Years	**Annual GHG emission reductions (in tonnes of CO_2e) for each year**
Year 2016 (starting on 01/06/2016)	105,525
Year 2017	212,704
Year 2018	212,704
Year 2019	212,704
Year 2020	212,704
Year 2021	212,704
Year 2022	212,704
Year 2023 (ending on 31/05/2023)	107,179
Total number of crediting years	**7**
Annual average GHG emission reductions over the crediting period	**212,704**
Total estimated reductions (tonnes of CO_2e)	**1,488,928**

A.11. Public funding of the CPA

No public funding is received from parties included in Annex 1.

[7] Based on the technical lifetime of the aero-generators guaranteed by Alstom. 'Technical Description; ECO 122 – GENERAL DESCRIPTION; DST-0484 Rev. 09; 20/01/2014.

[8] Expected operation start date of Cacimbas 1 wind farm, the first wind farm of the complex in starting commercial operation as per the construction chronograms.

A.12. Confirmation for CPA

Tractebel Energia S.A. confirms that the CPA is neither registered as an individual CDM project activity nor is part of another registered PoA.

A.13. Contact information of responsible persons/entities for completing the CDM-CPA-DD-FORM

Company name: Tractebel Energia S.A.
Address: Rua Paschoal Apóstolo Pítsica, 5064, Florianópolis, Brazil
Contact person1: Márcio Gugelmin Zimmermann
Telephone number: +48 3221 7035
E-mail: marciogz@tractebelenergia.com.br
Contact person2: Guilherme Slovinski Ferrari
Telephone number: +55 48 3221 7073
E-mail: guilhermes@tractebelenergia.com.br

Company name: ENGIE Brasil[9]
Address: Av Almirante Barroso, 52, 14th floor, Rio de Janeiro, Brazil
Contact person1: Mr. David Freire da Costa
Telephone number: +55 21 3974 5418
E-mail: david.costa@gdfsuezla.com
Contact person2: Mr. Philipp Hauser
Telephone number: +55 21 3974 5443
E-mail: philipp.hauser@gdfsuezla.com

Company name: Climate Link Limited
Address: 115 Magdalen Road, Oxford. OX4 1RQ, UK
Contact person1: Ms. Adriana Torchelo
Telephone number: +44 (1) 1865 600903
E-mail: adriana.torchelo@climate-link.com
Contact person2: Mr. Rodrigo Bezerra
Telephone number: +44 (0) 1865 600903
E-mail: rodrigo@climate-link.com

SECTION B. Environmental analysis

B.1. Analysis of the environmental impacts

According to the Federal Resolution CONAMA 001/86[10], Art. 2, electricity generation projects, with installed capacity higher than 10 MW, shall elaborate and submit the corresponding environmental impact assessment for approval by the competent environmental state agency.

In the state of Ceará, the environmental licencing process is carried out by the Ceará Environment Superintendence (SEMACE), an institution created through the State Law N° 11,481 of 28 December 1987 and which is linked to the Environmental Policy and Management Council (Conselho de Política e Gestão do Meio Ambiente). SEMACE provides the license in consultation with the local municipality council as well as other Federal and State authorities involved in the licensing process.

[9] "ENGIE Brasil" is part of ENGIE Group, which is the new name of GDF SUEZ. However, for legal purposes, the legal name of ENGIE Brasil remains GDF SUEZ Energy Latin America (GSELA), which remains valid until it is formally changed to ENGIE Brasil.

[10] Available at: http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=23. Accessed on: 03/08/2015.

The environmental license system of Ceará State is composed by the following environmental licenses[11]:

- Preliminary License: Granted by SEMACE in the preliminary phase of project implementation, approving its location and design, certifying the environmental viability and establishing basic requirements and conditions to be met in the next phases of its implementation;

- Installation License: Granted by SEMACE for the installation of the project in accordance with the specifications of the plans, programs and projects approved, including the environmental control measures and other conditions;

- Operation License: Granted by SEMACE for the project's operation after verifying compliance with the requirements set forth in previous licenses and establishment of environmental control measures and conditions to be observed during the operation. It is renewed periodically according to its validity through the Renewal of Operating License (OFR), which is granted to allow continued activity operation provided that the conditions established for its renewal are met.

In order to obtain the necessary licenses at this stage, an Environmental Impact Assessments (EIA/RIMA) was undertaken for each of the four wind farms that comprise the Santa Mônica Wind Complex and submitted them to the SEMACE for their approval. SEMASE issued the preliminary and installation licenses as follows:

Wind farm	Preliminary Licence	Installation Licence
Cacimbas 1	N°80/2013, dated 11/06/2013	N° 286/2014, dated 14/10/2014
Estrela	N°81/2013, dated 11/06/2013	N° 287/2014, dated 14/10/2014
Ouro Verde	N°79/2013, dated 11/06/2013	N° 236/2014, dated 14/10/2014
Santa Mônica 1	N°82/2013, dated 11/06/2013	N°282/2014, dated 14/10/2014

B.2. Environmental impact assessment

The environmental influence area of the CPA is defined as the physical, biotic and socioeconomic area likely to be changed as a consequence of its implementation, maintenance and operation. The identification of the impacts occurs in the three phases of the CPA implementation and it includes environmental impacts in abiotic, biotic and socio-economic components.

The operation of the Santa Mônica Wind Complex will use renewable resources and for this reason the impacts on the environment will be minimized. Additionally, the risk of production of effluent or waste during the operation of the wind power complex, as well as vehicle and people traffic will be minimal. The environmental changes resulting from the installation of the complex will be offset or reduced though the adoption of mitigation measures and environmental controls. During the project construction phase the impacts will be more significant on the site due to vegetation removal, excavation, opening and expansion of access roads, material handling and the assembly of towers and wind turbines.

The environmental impact studies for the four wind farms of the complex were developed under the current environmental legislation and following the guidelines of the Terms of Reference (TR) issued by SEMACE. The analysis of the environmental impacts shows satisfactory results to the

[11] Information available at: http://www.semace.ce.gov.br/ Accessed on: 03/08/2015

project implementation. In addition, the wind power plants present socioeconomic benefits in its area of influence.

The mitigating, monitoring and control measures include actions to be implemented during the pre-implementation, implementation and operational phases. The project's Entrepreneur will develop environmental programs and plans to ensure that environmental impacts are properly mitigated and/or compensated. These measures will be designed in conformity with technical legal requirements to meet the applicable environmental legislation.

The table below presents the possible environmental impacts identified and the environmental control and monitoring plant that will be implemented by the project owner as per the environmental studies (EIA/RIMA).

Phases	Environmental Impacts	Environmental Control and Monitoring Plans and Programmes
Implementation	Noise emissions Particulate matter emissions Generation of waste and effluents Loss of vegetation cover Fauna disturbance Changes in the landscape Increase of traffic flow Job creation Increase of tax collection Improvement of local accessibility	Monitoring of Noise and Vibration Level; Worker Protection and Safety in the Workplace; Landscape Conservation; Rational Deforestation Plan (RDP); Program for the Recovery of Degraded Areas and Erosion Process Control (PRDA); Management of Wildlife during Vegetation Suppression; Soil Quality Monitoring; Water Quality Monitoring (surface and underground); Monitoring of Avifauna and Bats Environmental Audit; Risk Management Program (RMP); Emergency Action Plan (EAP); Findings Rescue of Archaeological Heritage, Culture and History; Environmental Education Program (EEP); Communication to the Neighboring Communities around the Project
Operation	Noise emissions Changes in the landscape Visual impact Accidents with Avifauna and Bats Job creation	Program for the Recovery of Degraded Areas and Erosion Process Control (PRDA); Water Quality Monitoring (surface and underground); Monitoring of Noise and Vibration level; Monitoring of Avifauna and Bats; Venture Deactivation

SECTION C. Local stakeholder consultation

C.1. Solicitation of comments from local stakeholders

Local stakeholders consultation is conducted at PoA level in line with the Brazilian Designated National Authority (DNA) requirements to issue the Letter of Approval[12].

Nonetheless, as part of the environmental impact assessment process and according to the applicable environmental regulation (CONAMA resolutions: Nº 001/86, Nº 009/87 and Nº 237/97), the project developer has conducted a public audience, which made explicit mention of the fact that the project developer is pursuing the registration of the CPA as a CDM project.

[12] Brazilian DNA is represented by the Interministerial Commission on Global Climate Change (Comissão Interministerial de Mudança Global do Clima – CIMGC): Resolution no. 9, dated 20 March 2009, which determines the Clean Development Mechanism Programme of Activities. Available at: http://www.mct.gov.br/upd_blob/0201/201428.pdf. Accessed on: 03/08/2015.

Stakeholders were invited to the public audience through publications in the following newspapers: Official Gazette of the State of Ceará (Diário Oficial do Estado do Ceará), Journal "O Povo" and Gazette "Diário do Nordeste". Additionally, the project developer entered into direct contact with the leaders of the communities surrounding the project, and made radio ads, flyers distribution and fixed banners to reach a larger number of participating stakeholders.

The public hearing took place on 10/12/2013 and 120 people attended the event, including representatives of the state environmental agency, members of the surrounding communities, local social leaders, municipal authorities and other stakeholders.

The public hearing was conducted by the SEMACE, the licensor authority. Firstly, the Tractebel Energia team made an introduction about the energy sector, its evolution and the main features of the project, including a mention of the fact that the project would seek CDM benefits. Subsequently, the company responsible for the preparation of the environmental studies (MRS Estudos Ambientais Ltda.) presented the main results of the environmental studies.

The Municipality of Trairi was also consulted, and confirmed the project complies with the local laws governing the use and occupation of land.

Furthermore, during the project design stage, development of the environmental studies and licensing of the wind farms, the project obtained the approval from the Institute of Historical and Artistic Heritage (Instituto do Patrimônio Histórico e Artístico Nacional – IPHAN) and the Regional Air Command (Comando Aéreo Regional – COMAR) and the non-objection from the National Indian Foundation (Fundação Nacional do Índio – FUNAI) and the Palmares Foundation (Fundação Palmares).

C.2. Summary of comments received

At the public hearing, local representatives exposed their points of view about the project that were mostly positive; e.g.: the importance of local labour hiring.[13]

C.3. Report on consideration of comments received

The project developer introduced modifications in the project in light of the stakeholders queries. E.g.: the installed capacity of Cacimbas 1 wind farm was reduced to prevent interference in areas relevant to the stakeholders.

SECTION D. Eligibility of CPA and estimation of emissions reductions

D.1. Reference of methodology(ies) and standardized baseline(s)

- ACM0002 "Grid-connected electricity generation from renewable sources" (version 16.0);
- "Tool for the demonstration and assessment of additionality" (version 0.7.0.0);
- "Tool to calculate the emission factor for an electricity system" (version 4.0);

D.2. Applicability of methodology(ies) and standardized baseline(s)

The table below demonstrates how the applicability conditions of the selected methodology and PoA are met and explains the documentation that has been used:

[13] The public hearing has been recorded and is available for the DOE.

ACM0002 (version 16.0) applicability criteria	ACM0002 (version 16.0) applicability to the CPA	Documentation that has been used as a basis of justification
1. This methodology is applicable to grid-connected renewable energy power generation project activities that: a) Install a Greenfield power plant; b) Involve a capacity addition to (an) existing plant(s); c) Involve a retrofit of (an) existing operating plants/units; d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or e) Involve a replacement of (an) existing plant(s)/unit(s).	The CPA consists in a grid-connected wind energy power generation project activity that installs a Greenfield power plant (option a).	EIA/RIMA and Preliminary and Installation Licenses.
2. The methodology is applicable under the following conditions: a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit 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, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	a) The CPA includes wind energy power plants. b) Not applicable. The CPA consists in a Greenfield project.	EIA/RIMA and Preliminary and Installation Licenses.
3. In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m^2; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m^2; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m^2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m^2;	Not applicable. The CPA consists of grid-connected wind power plants.	Not applicable.

ACM0002 (version 16.0) applicability criteria	ACM0002 (version 16.0) applicability to the CPA	Documentation that has been used as a basis of justification
(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.		
4. In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of 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 five years prior to implementation of CDM project activity.	Not applicable. The CPA consists of grid-connected wind power plants.	Not applicable.
5. The methodology is not applicable to: a) 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; b) Biomass fired power plants/units.	The CPA does not consist of: a) 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; or b) Biomass fired power plants/units.	EIA/RIMA and Preliminary and Installation License/s.
6. In the case of retrofits, rehabilitations, 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, that is 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".	Not applicable. The CPA consists of Greenfield grid-connected wind energy power plants.	EIA/RIMA and Preliminary and Installation License/s.

ACM0002 (version 16.0) applicability criteria	ACM0002 (version 16.0) applicability to the CPA	Documentation that has been used as a basis of justification
7. In addition, the applicability conditions included in the tools referred in the methodology.	The CPA meets the applicability conditions included in the tools referred in the methodology.	See table below.

Tool for the demonstration and assessment of additionality (version 07.0.0) applicability criteria	Additionality tool applicability to the CPA	Documentation that has been used as a basis of justification
The use of the "Tool for the demonstration and assessment of additionality" is not mandatory for project participants when proposing new methodologies. Project participants may propose alternative methods to demonstrate additionality for consideration by the Executive Board. They may also submit revisions to approved methodologies using the additionality tool.	Not applicable. The CPA applies the approved methodology ACM0002 (version 16.0).	This CPA-DD.
Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	The CPA will demonstrate and assess additionality using this tool and the provisions contained in ACM0002 (version 16.0).	This CPA-DD.

Tool to calculate the emission factor for an electricity system (version 04.0) applicability criteria	Grid emission factor tool applicability to the CPA	Documentation that has been used as a basis of justification
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The CPA substitutes grid electricity by supplying clean and renewable electricity to the SIN grid.	EIA/RIMA and Preliminary and Installation Licenses.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants.	The emission factor for the CPA electricity system is calculated for grid power plants only.	Brazilian DNA grid emission factor calculations[14].
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The CPA electricity system (SIN) is located exclusively in Brazil.	Brazilian DNA grid emission factor calculations[14].
Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	A value of zero will be applied to the CO_2 emission factor of biofuels power plants if connected to SIN.	Brazilian DNA grid emission factor calculations[14].

[14] Brazilian DNA grid emission factors. Available at: http://www.mct.gov.br/index.php/content/view/74689/Fatores_de_Emissao_de_CO_sub_2_sub__de_acordo_com_a_ferramenta_metodologica___Tool_to_calculate_the_emission_factor_for_an_electricity_system_versoes_1_11_2_210_220_221_0300_e_040__aprovada_pelo_Conselho_Executivo_do_MDL.html Accessed on: 03/08/2015.

D.3. Sources and GHGs

Since the CPA consists of a Greenfield power plant, the baseline scenario is *"the 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".*

As wind power plants do not use fossil fuel, no project emissions are expected to happen.

The CPA will be located within the geographical boundary of Brazil, in conformity with the PoA.

The greenhouse gases and emission sources included in or excluded from the project boundary are described in the table below.

Source		GHGs	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	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. The CPA consists of a wind power plant.
		CH_4	No	Not applicable. The CPA consists of a wind power plant.
		N_2O	No	Not applicable. The CPA consists of a wind power plant.
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	No	Not applicable. The CPA consists of a wind power plant.
		CH_4	No	Not applicable. The CPA consists of a wind power plant.
		N_2O	No	Not applicable. The CPA consists of a wind power plant.
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Not applicable. The CPA consists of a wind power plant.
		CH_4	No	Not applicable. The CPA consists of a wind power plant.
		N_2O	No	Not applicable. The CPA consists of a wind power plant.

Please refer to the flow diagram provided in section A.5 above which illustrates the equipment, systems and flows of mass and energy including the emissions sources and GHGs included in the project boundary of the CPA.

D.4. Description of the baseline scenario

According to the methodology ACM0002 (version 16.0), *"if the project activity is the installation of a Greenfield power plant, the baseline scenario is the 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".*

D.5. Demonstration of eligibility for a CPA

The demonstration of how the CPA meets each of the eligibility criteria including confirmation of additionality of the CPA for its inclusion into the PoA are provided below:

Eligibility criteria as per the standard	Eligibility criteria for CPA inclusion in the PoA	CPA demonstration of compliance with eligibility criteria
(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;	All installations in the CPA shall take place within the geographical boundaries of Brazil and shall be connected to the SIN system.	As described in section A.7 above the CPA will be located within Brazil boundaries. The CPA will be connected to the SIN. Reference documents: - EIA/RIMA and Preliminary and Installation Licenses.
(b) Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);	The Coordinating/Managing Entity (CME), which is Tractebel Energia S.A., shall demonstrate that each CPA does not lead to double counting of emission reduction by confirming that each CPA is not part of any of the below categories: (1) Standalone CDM project activity, (2) Bundled CDM project activity, (3) Another registered PoA.	The unique geographical co-ordinates of the CPA are provided in Section A.7 above. The CME is the project developer for this CPA and confirms that the CPA is not part of any standalone project or bundled project or PoA under any CDM process stage (i.e.: at validation, requesting registration or registered). This can be checked in the UNFCCC website.
(c) The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;	The CPA shall consist in a Greenfield grid-connected renewable energy power generation project of one of the following types: - Solar power plant/unit, - Wind power plant/unit, - Hydro power plant/unit with or without reservoir, - Geothermal power plant/unit, - Wave power plant/unit; - Tidal power plant/unit. All CPAs will be required to be in conformity with national requirements where available.	The CPA consists of a Greenfield grid-connected renewable energy power generation project of the type “wind power plant”. Reference documents: - Specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications. The name of the reference documents are provided in section A.5 above; - EIA/RIMA and Preliminary and Installation Licenses.
(d) Conditions to check the start date of the CPA through documentary evidence;	The CPA start date shall not be on or before the start date of PoA: **05/05/2014**, date which the Prior Consideration of the CDM has been published in the UNFCCC website. The CPA start date should be the earliest date at which either the implementation or construction or real action of a project activity	As stated in section A.8.1., the start date of the CPA is: **16/06/2014**, thus after the starting date of the PoA**.** Reference documents: Contracts between the project developer and Alstom related to the aero-generators supply.

Eligibility criteria as per the standard	Eligibility criteria for CPA inclusion in the PoA	CPA demonstration of compliance with eligibility criteria
	begins in line with "Glossary of CDM terms". Documentary evidence of the CPA start date shall be provided by the time of inclusion of each CPA in the PoA.	
(e) Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;	The CPA must comply with the requirements as per the provisions established in the methodology ACM0002 (version 16.0).	CPA is in compliance with the methodology ACM0002 (version 16.0) and its applicable tools requirements as it is described in section D.2 above. Reference documents: - EIA/RIMA and Environmental Licenses; - Descriptive memories submitted to ANEEL.
(f) The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in section 3.1 of the standard "Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programmes of activities" (version 03.0);	The CPA shall demonstrate additionality as per stepwise procedure contained in the "Tool for the demonstration and assessment of additionality": Step 0 Demonstration whether the proposed project activity is the first-of-its-kind; Step 1: Identification of alternatives to the project activity; Step 2: Investment analysis; Step 3: Barriers analysis; and Step 4: Common practice analysis. The common practice analysis shall be conducted according to the "Methodological tool: Common practice" (version 03.1) considering similar projects to the CPA which have started commercial operation before the PoA start date (05/05/2014). ANNEL publicly available database shall be used for this purpose. Alternatively, the project proponents have also the option to apply the "simplified procedure to demonstrate additionality", as per the provisions contained in section 5.3.1. of the methodology ACM0002 (version 16.0).	Additionality for the present CPA is demonstrated by conducting an Investment and common practice analysis in accordance with the "Tool for the demonstration and assessment of additionality" (version 0.7.0.0). The required documentation to back-up the assessments is provided to the DOE. The confirmation of the additionality of the CPA is presented below.
(g)The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;	- Environmental impact analysis shall be conducted at CPA level for all CPAs with installed capacity higher than 10 MW, according to the applicable environmental laws and regulations.	- The environmental impact analysis of the CPA has been conducted as described in section B above. - Local stakeholder consultation

Eligibility criteria as per the standard	Eligibility criteria for CPA inclusion in the PoA	CPA demonstration of compliance with eligibility criteria
	- Local stakeholder consultation is conducted at the PoA level and according to the Brazilian DNA requirements to issue the Letter of Approval. The CME does not stipulate any specific for local stakeholder consultations at CPA level.	has been undertaken at PoA level and in line with Brazilian DNA requirements. Reference documents: The documents are referred in section B above.
(h) Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance (ODA);	The financing for the CPA will be confirmed to be consistent with the PoA financing described in the PoA-DD. A confirmation will be required that no funding is coming from Annex I parties, or if it does, that this is not a diversion of ODA.	Tractebel Energia S.A. confirms that the project will receive no funding from an Annex I Party that could result in a diversion of official ODA.
(i) Where applicable, target group (e.g. domestic / commercial / industrial, rural / urban, grid-connected / off-grid) and distribution mechanisms (e.g. direct installation);	The CPA shall correspond with the target group: Greenfield grid-connected (SIN) renewable energy power projects, such as: wind, solar, wave or tidal. The projects are not expected to have any distribution mechanisms.	The CPA is a Greenfield wind power plant connected to the SIN. Therefore, it corresponds with the target group. Reference documents: 1. EIA/RIMA and/or Environmental Licenses; 2. Project technical description.
(j) Where applicable, the conditions related to sampling requirements for the PoA in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities";	Not applicable. All the CPAs included in the PoA shall be monitored individually.	Not applicable.
(k) Where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those thresholds throughout the crediting period of the CPA;	Not applicable. Large scale consolidated methodology ACM0002 (version 16.0) is applied to this CDM-PoA and its CPAs. Thus, even if a CPA total installed capacity is equal or below 15 MW, it must comply with the conditions/criteria established by the methodology ACM0002 (version 16.0).	Not applicable.
(l) Where applicable, the requirements for the de-bundling check, in case CPAs belong to small-scale (SSC) or microscale project categories.	Not applicable. Large scale consolidated methodology ACM0002 (version 16.0) is applied, so no de-bundling check is applicable.	Not applicable.

Confirmation of additionality of the CPA for its inclusion into the PoA

As mentioned at criteria (f) above, the additionality of the CPA is demonstrated by conducting an additionality assessment according to the "Tool for the demonstration and assessment of additionality" (version 0.7.0.0).

The tool provides a step-wise approach to demonstrate and assess additionality. These steps include:

(a) Step 0: Demonstration whether the proposed project activity is the first-of-its-kind;

(b) Step 1: Identification of alternatives to the project activity;

(c) Step 2: Investment analysis;

(d) Step 3: Barriers analysis;

(e) Step 4: Common practice analysis.

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

The project activity is not first-of-its-kind. Thus, step 1 is applied.

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

- *Sub-step 1a: Define alternative scenarios to the project activity*

As per the provisions contained in the methodology ACM0002 (version 16.0) "*if the project activity is the installation of a Greenfield power plant, the baseline scenario is 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"*.

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

The alternative scenarios comply with all applicable mandatory legal and regulatory requirements of Brazil.

Step 2: Investment analysis

The purpose of this step is to determine that the proposed CPA is not the most economically or financially attractive alternative or not economically or financially feasible, without the revenue from the sales of certified emission reductions (CERs).

As stated in the PoA-DD of the Brazilian PoA for NAMA incentivized NCRE Projects where the present CPA is included in, the present CPA investment analysis will take into consideration the "*Treatment of inter alia subsides/financial incentives – E-policies*", as transcribed below:

According to the Tool for the demonstration and assessment of additionality (version 7.0.0), subsidies and incentives shall be included in the calculation of the financial indicator under consideration of CDM-EB guidance on the consideration of national/local/sectorial policies and measures for the baseline setting. At its 22nd meeting, the CDM Executive Board (EB22) defined that national and/or sectorial policies and circumstances are to be taken into account on the establishment of a baseline scenario, without creating perverse incentives that may impact host Parties' contributions to the ultimate objective of the Convention. As a result, the Board agreed to define E- Policy as:

"National and/or sectoral policies or regulations that give comparative advantages to less emissions-intensive technologies over more emissions-intensive technologies (e.g. public subsidies to promote the diffusion of renewable energy or to finance energy efficiency programs)."

Further, the Board agreed that such policies should be addressed as follows:

E- Policies "that have been implemented since the adoption by the COP of the CDM M&P (decision 17/CP.7, 11th November 2001) need not be taken into account in developing a baseline scenario (i.e. the baseline scenario could refer to a hypothetical situation without the national and/or sectorial policies or regulations being in place)."

The importance of the E- Policy concept has been reinforced by the Conference of the Members of the Protocol, CMP 5 in Copenhagen who provided, as part of the decision 2/CMP.5 on "Further guidance relating to the clean development mechanism" the following guidance 157:

"*10. Affirms that it is the prerogative of the host country to decide on the design and implementation of policies to promote or give competitive advantage to low greenhouse gas emitting fuels or technologies;*

11. Requests the Executive Board to ensure that its rules and guidelines related to the introduction or implementation of the policies referred to in paragraph 10 above promote the achievement of the ultimate objective of the Convention and do not create perverse incentives for emission reduction efforts;"

A draft "Guideline on application of E- Policy for additionality demonstration through investment analysis and proposed revision to Combined tool and Additionality tool" [15] prepared by the Secretariat was discussed at the EB74, but further analysis was requested from the Secretariat, however no further documents has been published up to now.

The treatment of these subsidies/financial incentives in the definition of the baseline scenario and thus, investment analysis has also been considered in the PDE 2022 which states:

"It is worth noting that the various actions that contribute to the reduction of GHG emissions in order to meet the pre-set target for 2020, fall into, with regard to the Clean Development Mechanism (CDM), the specific rules established by the CDM Executive Board (Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenarios; EB22, Annex 3). These rules applied to PDE 2022 characterize it as an "E-Policy". This means that the PDE 2022 scenario should not be considered as a baseline for evaluation of emissions reduction policies. Indeed, under "E-Policy" "the baseline scenario could refer to a hypothetical situation without the national and/or sectoral policies or regulations being in place". In other words, the PDE 2022 does not interfere negatively in obtaining carbon credits in the development of sectoral projects that contribute to GHG emission mitigation. Stated in another way: the PDE is not a BAU - Business as usual because already comprises the necessary measures to achieve the basic goals set since its formulation, among which includes the reduction of GHG emissions. According to the classification of the IPCC, the PDE is recognized as a mitigation scenario or intervention because it incorporates specific goal of CO_2e[16] emissions and comprises, explicitly and implicitly, policies and measures to facilitate the achievement of the goal." [17]

As described in the PoA-DD, the Brazilian government has been promoting a set of regulatory and economic measures and incentives aiming at promoting the expansion of the national power generation matrix based on renewable electricity sources and low carbon emitting technologies. In order to achieve these goals, Brazil has instituted the National Policy on Climate Change (*"Política*

[15] EB74 Documents under consideration at the meeting; Annex 8 - Guideline on application of E- policy for additionality demonstration through investment analysis and proposed revision to Combined tool and Additionality tool. Available at: UNFCCC web page/CDM/Governance/EB/EB Meeting Archive/EB74/; http://cdm.unfccc.int. Accessed on: 03/08/2015.

[16] CO_2 equivalent.

[17] Brazilian Ministry of Mines and Energy: Decennial Plan for Electric Energy Expansion 2022 (PDE 2022 according to its abbreviation in Portuguese). Available at: http://www.epe.gov.br/PDEE/Relatório%20Final%20do%20PDE%202022.pdf. Accessed on: 03/08/2015.

National sobre Mudança do Clima – PNMC") through the publication of the Law n° 12.187/2009[18], and regulated by the Decree n° 7.390/2010[19]. It is important to highlight the Article 6 which defines the complementary instruments and tools to promote Greenhouse Gases (GHG) emission reductions, such as:

- Hiring energy sources based on long term contracts by auctions in the regulated market ("*Ambiente de Contratação Regulada – ACR*") or either on the free market ("*Ambiente de Contratação Livre – ACL*"), through bilateral contracts signed with special consumers.
- Specific financing conditions structured with public and private banks.
- Complementary fiscal and sectorial incentives, especially the 50% reduction of the transmission and distribution fees (TUSD/TUST – G) for complementary energies with installed capacity up to 30 MW.
- The use of the CDM by the entrepreneurs.

In order to enlighten the role of the CDM in promoting investments, the MME's Ordinance n° 29 of the 28th of January of 2011 defined that projects hired by means of regulated auctions can claim for themselves the credits from the Clean Development Mechanism (CDM), as described below.

"Art. 2: The entrepreneurs, who negotiate electric energy from alternatives sources in Auctions presented in Decree n° 5.163, from 2004, and Decree n° 6.353, from 2008, can claim for themselves the credits from the Clean Development Mechanism – CDM, being their entire responsibility the development and obtainement of all required documents and the execution of all stages of the registration process for their entrepreneurship, with the CDM Executive Board."[20]

Therefore, the referred CPA pursues these benefits introduced by the Brazilian government. However, provided such instruments to incentivize NCRE are classified as an E- Policy according to the CDM rules the impact of the policy are not to be taken into account for developing the baseline scenario of the CPAs to be included in the present PoA.

- *Sub-step 2a. Determine appropriate analysis method*

The project activity generates financial and economic benefits other than CDM related income, so a simple cost analysis (Option I) cannot be applied.

The available alternatives are investment comparison analysis (Option II) and benchmark analysis (Option III).

Given that the Project Developer does not have alternative and comparable investment choices (to continue the current trend is the only option apart from executing the proposed project activity without registration as a CDM project), benchmark analysis (Option III) is considered appropriate.

- *Sub-step 2b. Option III. Benchmark analysis*

According to the *"Tool for the demonstration and assessment of additionality"*, among other options, discount rates and benchmarks shall be derived from: "*(a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data".*

[18] Available at: https://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/Lei/L12187.htm#art12.

[19] Available at: https://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/decreto/d7390.htm.

[20] Mines and Energy Minister (MME as Ministro de Minas e Energia in Portuguese): Ordinance MME n° 29 from the 28th of January of 2011. Available at: http://www.epe.gov.br/leiloes/Documents/Leil%C3%B5es%20A-3%20e%20Reserva%202011/Portaria%20MME%20n%C2%BA%2029-11.pdf. Last visited at 03/08/2015.

Based on this provision, the present CPA utilizes the default value for the expected return on equity after taxes, expressed in real terms, for Brazilian energy industry projects provided in the Appendix of the "Guidelines on the Assessment of Investment Analysis" (version 05): 11.75%.

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

This section contains the equity cash flow analysis of Santa Mônica Wind Complex which has been conducted in real terms.

All input values and data used in the investment analysis were valid and applicable at the time of the investment decision. The effects of taxing on the cash flow were taken into consideration according to the applicable legislation.

The table below presents the input parameters and supporting documentation utilized in the benchmark analysis selected according to the requirements and orientations provided by the CDM Executive Board (CDM-EB).

The input parameters included in the benchmark analysis is presented below:

Parameter	Units	Value		Reference
Benchmark	%	11.75%		Default value for the expected return on equity (ke) after taxes for Brazilian energy generation projects; Appendix of the "Guidelines on the Assessment of Investment Analysis" (version 05).
Comissioning Date	dd/mm/yyyy	01/06/2016		Commercial operation starting date of the first wind farm (Cacimbas 1) according to the tentative chronograms.
Project Technical Lifetime	years	20		Technical Description; ECO 122 – GENERAL DESCRIPTION; DST-0484 Rev. 09; 20/01/2014; ALSTOM.
Depreciation	years	20		Power Sector Asset Control Manual (Manual de Controle Patrimonial do Setor Elétrico, page 209), published by the ANEEL[21].
Net electricity generation (P90)	MWh/yr	415,600		Calculated, as indicated in table of page 4.
Amount of Wind Turbine Generatoras (WTG)	-	36		Alstom.
Electricity tariff	BRL/MWh	136		Average wind energy price of the latest Energy Auction in Brazil before the project start date (20º LEILÃO DE ENERGIA NOVA A-5/2014); 28/11/2014[22].
Distribution tariff (TUST)	BRL/kW. month	7.716		Calculated based on: Santa Monica Wind Complex TUST as per ANNEL Resolution Nº 1.651, 12/11/2013; multiplied by 2 to compensate the 50% discount in the TUST cost for NCRE which is an E-policy.
CAPEX	kBRL	2014	24,109	Tractebel Energia 22nd Board Meeting; 11/04/2014 & Santa Monica CAPEX budget spreadsheet.
		2015	247,260	
		2016	188,033	

[21] Available at: http://www.aneel.gov.br/cedoc/aren2009367_2_primeira_Ver.pdf. Accessed on: 03/08/2015.

[22] Available at: http://www.epe.gov.br/leiloes/Documents/Leil%C3%B5es%202014/Resumo_Vendedor_20len_a5.pdf. Accessed on: 03/08/2015.

Parameter	Units	Value		Reference
		Total	**459,402**	
	kBRL/MW	4,726		Calculated.
	kUSD/MW	2,118		Calculated.
Exchange rate	kBRL/USD	2.2313		Central Bank of Brazil; 16/06/2014 (CPA starting date)[23].
OPEX				
O&M Wind Farms	kBRL/WTG. year	Years 1, 2	25.325	Alstom, O&M proposal; 13/02/2014.
		Years 3 - 5	156.55	
		Years 6 - 20	173.54	
O&M Substation & Transmission Line	kBRL/year	507		O&M Substation & Transmission Line contracts for Trairí and Santa Mônica Wind Complexes
SG&A	kBRL/year	2,005		Estimated based on Administration Report and Financial Statements of the Exercises 2013 and 2012; Tractebel Energía.
Landlease	% (of energy sales)	1.50%		Santa Monica Complex wind farms land-lease contracts addenda.
Working capital				
Account Receivable	days	40		- Commercialization procedures; Module 5 - Short term market; Sub-module 5.2 - in the short term market; CCEE; 16/12/2012; - 2015 payment schedule; CCEE.
Account Payable	days	30		Tractebel Energia based on Santa Monica Complex contracts.
Taxes		**Tax Rate**	**Tax Base***	* % of revenues
PIS/COFINS[24] (Cumulative)	%	3.65%	100%	Budgeted as applicable Brazilian law.
Income tax base	%	25%	8%	Budgeted as applicable Brazilian law.
Social Contribution Base	%	9%	12%	Budgeted as applicable Brazilian law.
Energy sector charges				

[23] Available at: http://www4.bcb.gov.br/pec/taxas/port/ptaxnpesq.asp?id=txcotacao. Accessed on: 17/09/2015

[24] From the Portuguese: "PIS - Programas de Integração Social / COFINS – Contribuição para Financiamento da Seguridade Social" (Social Integration Program / Contribution to Social Security Financing).

Parameter	Units	Value	Reference
ANEEL fee			
TFSEE[25]	%	0.4%	Art. 12º of Law 9.427/1996[26].
TFSEE Base Tariff	BRL/kW	578.86	ANEEL; "DESPACHO Nº 76", 15/01/2015.
CCEE[27] *fee*	kBRL/MWh	0.0001	Calculated based on the CCEE rules for calculation[28].
ONS[29] *fee*	kBRL/year	14.67	Calculated based on ANEEL rules for the calculation[30].
Total	kBRL/year	239.78	Calculated.
Cost of debt			
Yield of a 10 year bond issued by the Brazilian Government	%	6.45%	Average yield of the 10 year bonds during the last three months prior to the project investment decision (March - May 2014. 6.45%); NTN-B Principal 2014; National Treasure of Brazil[31].
Amortization period	years	16	Contract with BNDES for Trairí Complex.
Grace period	years	1.0	Contract with BNDES for Trairí Complex.
% leverage	%	50%	Default value. UNFCCC Investment Analysis Guidance.

Based on the parameters mentioned above, the Internal Rate of Return (IRR) of Santa Mônica Wind Complex CPA in the absence of CDM revenues is:

Santa Mônica Wind Complex CPA	Project IRR without income from CERs	Benchmark
IRR	1.97%	11.75%

In conclusion, the project IRR is lower than the benchmark, indicating that the investment in the Project, without any incentives from E- Policies or from CDM, is not attractive for a rational investor.

- *Sub-step 2d. Sensitivity analysis*

A sensitivity analysis is conducted by altering the following parameters in order to show that the conclusion of the investment analysis is robust to reasonable variations in the critical assumptions:

- CAPEX decrease;
- Electricity tariff increase;
- Net electricity generation increase (plant load factor);

[25] From the Portuguese: "*Taxa de Fiscalização de Serviços de Energia Elétrica – TFSEE*" (Electric Energy Services Inspection Fee).

[26] Available at: http://www.planalto.gov.br/ccivil_03/LEIS/L9427compilada.htm. Accessed on 03/08/2015.

[27] From the Portuguese: "Câmara de Comercialização de Energia Elétrica – CCEE" (Electric Energy Commercialization Chamber).

[28] Available at: www.ccee.org.br/ccee/documentos/CCEE_076371. Accessed on 03/08/2015.

[29] From the Portuguese: "Operador Nacional do Sistema – ONS" (Electric System National Operator).

[30] Available at: http://www.aneel.gov.br/aplicacoes/audiencia/arquivo/2014/020/documento/nt_-_fixacao_do_orcamento_-_abertura_de_audi%C3%AAncia_publica_-_ons_-_2014-2015.pdf. Accessed on 03/08/2015.

[31] Available at: http://www.tesouro.fazenda.gov.br/tesouro-direto-balanco-e-estatisticas.

- Operation & Maintenance (Opex or O&M costs) reduction.

As per the "Guidelines on the Assessment of Investment Analysis" (version 05), these parameters were selected as they constitute more than 20% of either total project costs or total project revenues are the most likely to fluctuate over time and can significantly affect the financial attractiveness of the Project.

The sensitivity analysis was performed by altering these parameters +/- 10% and by calculating the variation necessary to reach benchmark.

The tables below summarize the results of the sensitivity analysis.

Parameter	Variation	IRR
Investment (Capex)	-10%	4.06%
Electricity tariff	+10%	4.74%
Net electricity generation (Load Factor)	+10%	4.78%
Opex	-10%	2.32%

Parameter	Variation to benchmark	Values of parameters to achieve benchmark	
Investment (Capex)	-36.23%	To achieve benchmark, total investment should be (kBRL/MW):	3,014
Electricity tariff	38.65%	To achieve benchmark, average electricity tariff should be (BRL/MWh):	189
Net electricity generation (Load Factor)	38.33%	To achieve benchmark, the complex load factor should be:	68.25%
Opex	No solution	Even with zero Opex costs the equity IRR is:	5.07%

The likelihood of the variations for each parameter is discussed below based on the market projections, articles and/or technical data:

1. ***Investment (Capex):*** The CAPEX for the project is calculated based on actual proposals provided by the different suppliers.

   The CPA CAPEX was defined based on proposals provided by the suppliers and accepted by the project developer that nowadays are signed contracts.

   The CAPEX of 4,726 kBRL/MW, which includes grid-connection charges, is equivalent to 2,118 kUSD/MW (in 16/06/2014, the project starting date).

   A reduction of 36.23% equivalent to a CAPEX of 3,014 kBRL/MW (1,351 kUSD/MW at the project starting date) to achieve benchmark is unrealistic since, according to the Word Energy Council analysis of cost energy technologies[32], average CAPEX for wind power projects in Brazil is 1,670 kUSD/MW, excluding grid-connection charges. Thus, the Project IRR is unlikely to reach the benchmark.

2. ***Electricity tariff:*** to reach the benchmark the electricity tariff should increase by 38.65% equivalent to 189 BRL/MWh.

[32] World Energy Perspective - Cost of Energy Technologies; World Energy Council; Project partner: Bloomberg New Energy Finance; 2013; Table 2 - Levelised cost of onshore wind by country; Page 15. http://www.worldenergy.org/wp-content/uploads/2013/09/WEC_J1143_CostofTECHNOLOGIES_021013_WEB_Final.pdf. Accessed on: 03/08/2015.

According to Electric Energy Commercialization Chamber (CCEE), the maximum electricity price of wind power projects awarded in 2014 energy auctions was 149.47 BRL/MWh[33].

Therefore, even if the project achieved the highest electricity price of the wind power projects in the previous auction the project would remain additional. Thus, an increase of 38.65% on the average electricity price is extremely unlikely to occur.

3. ***Net electricity generation (load Factor):*** the net electricity generation or electricity sold by the CPA is a product of the installed capacity and the load factor at any given time in the year.

   The electricity sold would need to increase 38.33% along the project operation lifetime to reach the benchmark. This represents an average load factor of 68.25%.

   As stated in section A.5 above, the CPA load factor P90 is 49.34% as determined by MegaJoule, an independent and competent third party, based on three years of historic wind data.

   According to the Word Energy Council analysis of cost energy technologies[32], load factors of wind power projects in Brazil are between 23% and 45%.

   Therefore, the load factor of Santa Mônica Wind Complex is already above the maximum estimated values for wind farms in Brazil. Thus, a further increase of 38.33% resulting in a PLF of 68.25% is unlikely to occur.

4. ***Opex***: The operating and maintenance cost of the wind farm complex, including the transmission line and the substation, is in average 63 kBRL/MW per year along the project lifetime, equivalent to 28 kUSD/MW per year, including the operation and maintenance of the substation and transmission line (5 kUSD/MW).

   According to the Word Energy Council analysis of cost energy technologies[32], Opex for wind power projects in Brazil are around 24 kUSD/MW per year.

   Therefore, Santa Mônica Wind Complex Opex is a realistic value. Furthermore, even assuming the CPA will incur no Opex, the IRR remains below the benchmark.

The above illustrated results prove that only with highly unrealistic and very favourable circumstances the CPA IRR could reach the benchmark.

Step 3: Barrier Analysis

The project developer (Tractebel Energia S.A.) has opted to use the investment analysis to demonstrate the additionality of this CPA. Therefore, Barrier Analysis is not addressed in this CPA.

Step 4: Common practice analysis

The proposed CDM project activity applies measures that are listed in the definitions' section of the "Tool for the demonstration and assessment of additionality" (version 0.7.0.0). Therefore, the analysis should refer to the latest version of the "Methodological tool: Common practice" (version 03.1).

According to the Tool, the applicable geographical area should be the entire host country by default. Therefore, the geographical area of the common practice analysis is limited to Brazil.

[33] Consolidated results of electric energy auctions; 03/2015; CCEE; http://www.ccee.org.br/. Accessed on: 03/08/2015.

The tool provides the following stepwise approach for common practice:

- *Step 1: Calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.*

  The Santa Mônica Wind Complex installed capacity is 97.2 MW, hence, the applicable capacity range is: **48.6 MW – 145.8 MW.**

- *Step 2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:*

  (a) The projects are located in the applicable geographical area;

  (b) The projects apply the same measure as the proposed project activity;

  (c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;

  (d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;

  (e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;

  (f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

  According to data from the National Energy Electric Agency (ANEEL)[34] of Brazil**,** the following plants meet the stated conditions:

Type	Quantity of operational power plants within the +/- 50% capacity range	CDM plants	Nall
Biomass	91	6	85
Wind	14	0	14
Fossil	246	0	246
Hydro	95	3	92
Nuclear	0	0	0
Solar	0	0	0
Total	**446**	**9**	**437**

- *Step 3: within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number* N_{all}.

  Based on the information provided in the UNFCCC website, 9 projects identified in step 2, have been registered as CDM project activities. Therefore,

  N_{all} = 437

[34] Available at: http://www.aneel.gov.br/aplicacoes/capacidadebrasil/OperacaoCapacidadeBrasil.cfm. Accessed on: 03/08/2015.

- *Step 4: within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}.*

  Thirteen similar projects have been identified in step 3. Thus,

  N_{diff} = 423

  Step 5: calculate factor F = 1 – Ndiff / Nall representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

  F = 1 – 423 / 437 = 0.03

  The proposed project activity is a "common practice" within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all} – N_{diff}$ is greater than 3.

  As the factor F is not greater than 0.2, the proposed project activity is not a common practice.

D.6. Estimation of emission reductions

D.6.1. Explanation of methodological choices

The procedures to determine the emission reductions attributable to the project activity are described below, according to the selected approved methodology ACM0002 "Grid-connected electricity generation from renewable sources" (version 16.0).

Project emissions

According to the methodology project emissions (PE_y) for wind, solar, wave or tidal projects that do not use fossil fuels for electricity generation are zero.

Therefore:

$$PE_y = 0$$

Baseline emissions

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

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

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 latest version of the "*Tool to calculate the emission factor for an electricity system*" (tCO_2/MWh)

Calculation of $EG_{PJ,y}$

As the project activity is the installation of a Greenfield power plant, then:

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

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 the combined margin CO_2 emission factor for grid connected power generation in year y ($EF_{grid,CM,y}$)

The Combined Margin (CM) emission factor is calculated from the generation record of all plants connected to the SIN and centrally dispatched by the Electric System National Operator (Operador Nacional do Sistema - ONS). Based on this generation data as provided by the ONS, the Brazilian Designed National Authority (DNA) calculates the SIN's Operating Margin (OM) and Build Margin (BM) emission factors by the dispatch analysis method according to the "*Tool to calculate the emission factor for an electricity system"* and makes them available to the public.[35]

Therefore, to calculate $EF_{grid,CM,y}$ the publicly available data on the SIN operating margin and build margin emission factors provided by the Brazilian DNA are used.

The combined margin is calculated as a weighted average as follows:

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

Where:

$EF_{grid,BM,y}$	=	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 (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

The Brazilian DNA is responsible for calculating the OM and BM emission factors in Brazil.

For calculating the Operating Margin (OM) emission factor, the Brazilian DNA uses the method (c) Dispatch data analysis OM. For the dispatch data analysis OM ($EF_{grid,OM-DD,y}$), it is necessary to use the year in which the project activity (in this case, the CPA) displaces grid electricity and to update the emission factor annually during monitoring. For the verification purposes, the OM emission factor will be calculated *ex-post* and will be annually updated.

For calculating the Build Margin (BM) emission factor, the Option 1 (ex-ante) has been chosen in the PoA and thus, it is consistently applied in the present CPA as it is connected to the SIN. The Build Margin emission factor for 2014, as published by the Brazilian DNA[36], is utilized and fixed for the first crediting period of the present CPA.

[35] Available at: http://www.mct.gov.br/index.php/content/view/74689.html. Accessed on: 03/08/2015.

[36] Brazilian DNA: Build Margin emission factor for the year 2014 ($EF_{grid,BM,2014}$ = 0.2963 tCO_2/MWh). Available at: http://www.mct.gov.br/index.php/content/view/354731.html#ancora.

Although the Build Margin (BM) will be determined as fixed (*ex-ante*), the Operating Margin (OM) and the resulting Combined Margin (CM) will be yearly updated based on data and calculations provided by the Brazilian DNA.

In case the Brazilian DNA discontinues the publication of these data during the monitoring period, Tractebel Energia may choose, for each monitoring period to be verified, the option between: a) to make use of the latest available official data and information as calculated and published by the Brazilian DNA; or b) to conduct the calculations based on data from ONS.

The following table provides the key information and data used to determine the baseline scenario:

Variable	Value	Data Source
Operating Margin Emissions Factor ($EF_{grid,OM,y,}$ in tCO_2/MWh)	0.5837	Calculated as the average of the monthly OM emission factor 2014; Brazilian DNA[37].
Build Margin Emissions Factor ($EF_{grid,BM,y,}$ in tCO_2/MWh)	0.2963	Brazilian DNA[37], BM emission factor for 2014.
Weighting of operating margin emission factor (w_{OM})	0.75	Value for wind projects; "Tool to calculate the emission factor for an electricity system" (version 4.0).
Weighting of building margin emission factor (w_{BM})	0.25	Value for wind projects; "Tool to calculate the emission factor for an electricity system" (version 4.0).
Combined Margin Emissions factor ($EF_{grid,CM,y}$ in tCO_2/MWh)	0.5118	Calculated based on weighting values for wind projects and OM and BM emissions factors.
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* ($EG_{facility,y}$ in MWh/yr)	415,600	Average of the first 7 years calculated based on the power plant technical parameters. Refer to section A.5 above.

Leakage

According to the methodology ACM0002 (version 16.0), the following is stated:

"*No leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport) are neglected*".

Therefore,

$L_y = 0$

Emission reductions

Emission reductions are calculated as follows:

$ER_y = BE_y - PE_y$

Where:
ER_y = Emission reductions in year *y* (tCO_2e/yr);
BE_y = Baseline emissions in year *y* (tCO_2e/yr);
PE_y = Project emissions in year *y* (tCO_2e/yr).

As no project emissions (PE_y) were identified for Santa Mônica Wind Complex project, $ER_y = BE_y$.

[37] Available at: http://www.mct.gov.br/index.php/content/view/354731.html#ancora. Accessed on 03/08/2015.

Therefore,

$ER_y = EG_{facility,y} \times EF_{grid,CM,y}$

D.6.2. Data and parameters fixed ex-ante

Data / Parameter	$EF_{grid, BM,2014}$
Data unit	tCO_2/MWh
Description	Build margin CO_2 emission factor for the project electricity system in year y
Source of data	Brazilian DNA BM emission factor for the year 2014.[38]
Value(s) applied	0.2963
Choice of data or Measurement methods and procedures	The Build Margin (BM) emission factor of the Brazilian electricity grid system is calculated by the Brazilian DNA by applying all steps, data and variables required by the latest version of the "Tool to calculate the emission factor for an electricity system". This data will be archived electronically and according to internal procedures, until 2 years after the end of the crediting period.
Purpose of data	To define the Build Margin emission factor as ex-ante. This data/information will be used for the emission reductions calculation.
Additional comment	This value will be used for the first crediting period of this CPA. The build margin emission factor is based on data from the year 2014 and it has been defined as ex-ante by the project participants.

D.6.3. Ex-ante calculation of emission reductions

As stated in section D.6.1 above:

$ER_y = EG_{facility,y} \times EF_{grid,CM,y}$

In order to estimate the ex-ante emission reductions, estimated figures were used for parameters that are unavailable during validation or that are monitored during the crediting period.

$EG_{facility,y}$ = 415,600415,600 MWh/year (7 years average)

$EF_{grid,CM, y}$ = 0.5118 tCO_2/MWh

Therefore, for the crediting period, the average annual emission reductions are:

ER_y = 212,704 tCO_2e/year

[38] Available at: http://www.mct.gov.br/index.php/content/view/354731.html#ancora. Accessed on 03/08/2015.

D.6.4. Summary of the ex-ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 2016 (starting on 01/06/2016)	105,525	0	0	105,525
Year 2017	212,704	0	0	212,704
Year 2018	212,704	0	0	212,704
Year 2019	212,704	0	0	212,704
Year 2020	212,704	0	0	212,704
Year 2021	212,704	0	0	212,704
Year 2022	212,704	0	0	212,704
Year 2023 (ending on 31/05/2023)	107,179	0	0	107,179
Total	1,488,928	0	0	1,488,928
Total number of crediting years	7			
Annual average over the crediting period	212,704	0	0	212,704

D.7. Application of the monitoring methodology and description of the monitoring plan

D.7.1. Data and parameters to be monitored

Data / Parameter	$EF_{grid, OM,,y}$
Unit	tCO_2/MWh
Description	Operation margin emission factor in year y
Source of data	Brazilian DNA or ONS.
Value(s) applied	0.5837
Measurement methods and procedures	Calculation as per the "Tool to calculate the emission factor for an electricity system" (version 04.0).
Monitoring frequency	Yearly
QA/QC procedures	To guarantee that official data from the sources above mentioned is utilized and that calculations are conducted according to the applicable tool.
Purpose of data	Calculation of baseline emissions

Additional comment	Value applied has been provided by the Brazilian DNA[39] for the operation margin of 2014, which shall be updated annually during the crediting period. In case the Brazilian DNA discontinues the publication of the $EF_{grid,OM,y}$ during the crediting periods, Tractebel Energia may choose, for each monitoring period to be verified, the option between: a) to make use of the latest available official data and information as calculated and published by the Brazilian DNA; or b) to conduct the calculations based on data from ONS.

Data / Parameter	$EF_{grid, CM,,y}$
Unit	tCO_2/MWh
Description	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".*
Source of data	Brazilian DNA or ONS.
Value(s) applied	0.5118
Measurement methods and procedures	Calculation as per the "Tool to calculate the emission factor for an electricity system" (version 04.0).
Monitoring frequency	Yearly
QA/QC procedures	To guarantee that official data from the sources above mentioned is utilized and that calculations are conducted according to the applicable tool.
Purpose of data	Calculation of baseline emissions
Additional comment	Value applied has been calculated according to the operation and build margin data for 2014 as provided by the Brazilian DNA.[40] In case the Brazilian DNA discontinues the publication of the $EF_{grid,OM,y}$ during the crediting periods, Tractebel Energia may choose, for each monitoring period to be verified, the option between: a) to make use of the latest available official data and information as calculated and published by the Brazilian DNA; or b) to conduct the calculations based on data from ONS.

Data / Parameter	$\boldsymbol{EG_{facility,y}}$ (or $EG_{PJ,y}$)
Unit	MWh/yr
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*
Source of data	Electricity meters
Value(s) applied	415,600
Measurement methods and procedures	This parameter will be monitored using bi-directional energy meters Class 0.2S in accordance with the established Grid Procedures defined by the National Electric System Operator (ONS) [41] and Commercialization

[39] http://www.mct.gov.br/index.php/content/view/354731.html#ancora. Access on: 30/06/2015.

[40] http://www.mct.gov.br/index.php/content/view/354731.html#ancora. Access on: 30/06/2015.

[41] Installation of measurement system for billing (Submodule 12.2); ONS; v1.0; 17/06/2009; http://www.ons.org.br/download/procedimentos/modulos/Modulo_12/Submodulo%2012.2_Rev_1.0.pdf. Accessed on: 07/12/2014.

	Procedures by the CCEE (Chamber of Electrical Energy Commercialization)[42]. Each of the four wind farms that are part of the Santa Mônica Wind Complex will have two electricity meters (main and backup meters) located at the Tractebel collector substation. In addition to these meters, at the Tractebel collector substation there are already installed another four couples of main and backup meters from four wind farms that are part of Trairí Wind Complex, a CDM project already operative which is also the property of Tractebel Energia. Please, refer to the diagram in Section D.7.2 below. All the electricity generated by these 8 wind farms is dispatched to the same transmission line that connects the collected substation with the concessionaire substation. At the concessionary substation (grid connection point) there are only two meters that measure the total net electricity dispatched to the grid by the Santa Mônica and Trairí Wind Complexes together. Due to this configuration, the quantity of net electricity generation supplied to the grid by the Santa Mônica Wind Complex will be determined as follows: the proportional share of the Santa Mônica Wind Complex in the total electricity measured at the Tractebel collector substation will be calculated based on the readings of each of the 8 couples of meters (main and backup). This percentage will be multiplied by the total net electricity dispatched to the grid, measured at the concessionaire substation. Refer to section D.7.2 below for further details.
Monitoring frequency	Continuous measurements and monthly recorded.
QA/QC procedures	Meters calibration will be performed according to the ONS Grid Procedures[43]. Data collected from the project meter has low uncertainty levels and to guarantee its accuracy it can be confronted with information of generation provided by CCEE. In case of failure of the main meter, the back-up energy meter will be utilized.
Purpose of data	Calculation of baseline emissions.
Additional comment	Data will be archived at least for two years after crediting period.

D.7.2. Description of the monitoring plan

1. Management Structure and Responsibilities

Overall responsibility for the monitoring activities of the Measurement System for Invoicing Purposes (MSIP) ("*Sistema de Medição para Faturamento - SMF*") will lie within the Tractebel Energia's Production Operation Department ("*Departamento de Operação da Produção - DOP*") and Tractebel's Technical Team.

[42] Available at: http://www.ccee.org.br/portal/faces/pages_publico/o-que-fazemos?_adf.ctrl-state=97nwq4566_45&_afrLoop=307374146798100. Accessed on: 20/12/2014.

[43] By the time of completion of this document, the applicable procedure is established in the procedure "Maintenance of the measurement system for billing" (Submodule 12.3); ONS; v1.0; 17/06/2009; http://www.ons.org.br/download/procedimentos/modulos/Modulo_12/Submodulo%2012.3_Rev_1.0.pdf. Accessed on: 07/12/2014. In case of any changes/updates occurred in the ONS Grid Procedures, the project developer shall follow the rules from the relevant sector organizations (e.g. ONS, ANEEL, CCEE) applicable by that time.

The team will be involved with the CPAs daily operation, supervision of the collection, storage, review and reporting of measured project data and other monitoring activities, such as maintenance and follow-up of calibration procedures. The main duties and responsibilities of the staff allocated for conducting monitoring activities will be:

- *Data Collection*: measurements of the energy generated and delivered to the grid are undertaken by the DOP in accordance with Module 12 of the Grid Procedures from ONS (Measurement for Invoicing). This module provides technical specifications for measuring all electricity generated, transmitted and consumed to/from the National Interconnected Grid System (SIN).

  The Measurement System for Invoicing Purposes – MSIP ("*Sistema de Medição para Faturamento – SMF*") comprises two meters (the main meter and the backup one), transformers for instruments (TI's), communication channels between the Project Developer and the CCEE and data collection systems. Minimum standards for the main and backup meters are also defined by the Module 12 (Sub-Module 12.2, Annex 1).

  Data from MSIP (SMF) will be stored in a database on the Datacenter installed on Tractebel Energia Headquarters, and this information will be available to the Power Plant Supervision Room, which can be extracted in spreadsheet format. As the MSIP was conceived with the clear purpose of assuring high quality and accurate standards for determining the amount of energy produced by the generators connected to the grid, the project data can be also obtained by accessing the CCEE database. As determined by the Module 12 of the Grid Procedures from ONS (Sub-Module 12.1, paragraph 1.7), data that are stored in the meters are remotely and automatically collected by the "Energy Data Collection System - EDCS" of CCEE, through a direct access to the agent's installed meters or through the "Measurement Collection Unit" used by the agent. The data collected by EDCS are the basis for quantifying and invoicing the energy produced by the component project activity (CPA).

  Therefore, the adoption of Module 12 allows for a proper recording and archiving of measured data and assures that all the data generated throughout the crediting period is maintained in at least two databases (project developer's and CCEE). For the emission reductions calculation purposes, data from CCEE will be used as the main source of information for determining the net amount of electricity dispatched to the grid by the component project activity (CPA).

  This means that the amount of net electricity dispatched by the CPA to the national grid (SIN) will be constantly monitored by the power meters which are monitored online and regularly checked by the CCEE. Such practice is warranted because CCEE has free access to the information stored in the power meters installed at the point in which the component project activity is connected to the Interconnected Grid System (SIN) and thus net electricity is dispatched to the national grid (SIN). The information collected in the power meters is stored in CCEE database.

  By accessing the CCEE database, it is possible to obtain different kind of electricity generation reports. CCEE is responsible for the commercialization of electric power within the National Interconnected System, for both Regulated and Free Contracting Environments and for the spot market. Moreover, CCEE is in charge of financial settlement for the spot market transactions. These activities form the Energy Accounting and Financial Settlement Process, which is entirely audited by external auditors, pursuant ANEEL's Normative Resolution nº 109, dated 26 October 2004 (Electric Power Commercialization Convention). The Commercialization Rules and Procedures that govern the activities

performed by CCEE are defined and approved by ANEEL[44]. Therefore, the quantity of net electricity generation supplied by the project plant/unit to the grid shall be checked through the CCEE (Electric Power Commercialization Chamber) database, which is the official and the most credible source of information for this purpose.

Thus, for the emission reductions calculation purposes, data from CCEE will be used as the main source of information for determining the net amount of electricity dispatched to the grid by the component project activity.

Electricity invoices and/or sales receipts are not suitable for cross-checking purposes, as these documents refer to the values established in the electricity supply contracts or PPAs (Power Purchase Agreements), with a fiscal balance or correction that usually happens after the end of each year as a matter of compensate possible divergences or differences between the amount of electricity contracted and the effective amount of electricity delivered. Hence, the electricity invoices and/or sales receipts may not reflect as accurately the amount of electricity dispatched to the grid by the component project activity as data from CCEE.

These information will be kept and archived by the project developer and be made available to the DOE. Other physical documents such as paper-based maps, diagrams and environmental assessments will be collected in a central place, together with this monitoring plan. All paper-based information will be stored by the project owner, and all data including calibration records is kept until 2 years after the end of the total credit time of the CDM project.

- *Calibration:* Calibration of energy meters is regulated by the National Interconnected Power System Operator (ONS) and shall be conducted by a qualified organization in compliance with national standards and industrial regulations to ensure accuracy. By the time of completion of this document, ONS procedure “Maintenance of the measurement system for billing” (Sub-module 12.3) v1.0 from 17/06/2009, establishes that the frequency of calibration is a maximum of two years. In case of any change in the ONS Grid Procedures, the project developer will follow the rules from the relevant sector organizations (e.g. ONS, ANEEL, CCEE).

- *Data Report:* Internally, data recorded will be consolidated on a monthly basis and will be checked for quality control purposes by the appointed staff in the project developer’s head office. The consolidated data will be sent to the CME CDM team member(s) of the PoA or any other person indicated as responsible for assessing the correct monitoring of the CPA.

- *Data Archives:* Generation data will be electronically stored by the Production Operation Department in Tractebel Energia’s corporative database. In order to assure that relevant generation is appropriately and securely stored, the Information Technology Area will conduct an insurance *backup* for all company`s data through a Data Server *backup.* Following these procedures, the CME (Tractebel Energia S.A.) will assure that all relevant data is kept at least 2 years after the end of the crediting period or the last issuance of CERs, whichever occurs later.

2. Quality Assurance and Quality Control

As mentioned above, the meters used for determining the energy supplied to the grid will be high accuracy measurement devices and will meet all relevant metrological requirements prescribed in

[44] Available at: http://www.ccee.org.br/portal/faces/pages_publico/quem-somos/estrutura_e_pessoas/governanca?_afrLoop=59916351702582#%40%3F_afrLoop%3D59916351702582%26_adf.ctrl-state%3Dvxwcite57_82. Assessed on 24/02/2015.

Metrological Technical Regulation (*Regulamento Técnico Metrológico – RMT*) for Class 0.2 of energy meters, approved by INMETRO[45].

Procedures for maintenance of the monitoring equipment will be conducted in accordance with national procedures and standards.

In addition, the accuracy of the field measurements will be assured by coordinated work between the project developer and the CCEE. In this regard, the generation data collected and recorded by the project developer will be monthly cross-checked with the energy readings performed by the CCEE. Reports of CCEE provide information of "gross electricity", losses until the delivery point and net electricity supplied to the grid.

Readings of the electricity generated by the plant are remotely obtained by Tractebel via telemetering. If any problem with data transmission occurs, electricity generation data can be sent when the system is re-established. If the system does not work, a technical professional will be sent to the site and data will be obtained directly from the meters.

3. Training of Monitoring Personnel

Designated people that participate in the monitoring process will receive proper training, in order to assure the correct application of the monitoring plan of the project.

4. Santa Mônica Wind Complex Monitoring Diagram

Each of the four wind farms that are part of the Santa Mônica Wind Complex will have two electricity meters (main and backup meters) located at the Tractebel collector substation.

In addition to these meters, there are other four couples of main and backup power meters already installed at the Tractebel collector substation. These power meters belong to four wind farms that are part of Trairí Wind Complex, comprised by 4 wind farm projects, which are already operational and registered under the CDM. These facilities are also operated and owned by Tractebel Energia. Please, refer to the diagram below, and refer to the description of how $EG_{facility}$ parameter is calculated in Section D.7.1 above.

All the electricity generated by these 8 wind farms is dispatched to the same transmission line of about 72 km that connects the collected substation with the concessionaire substation.

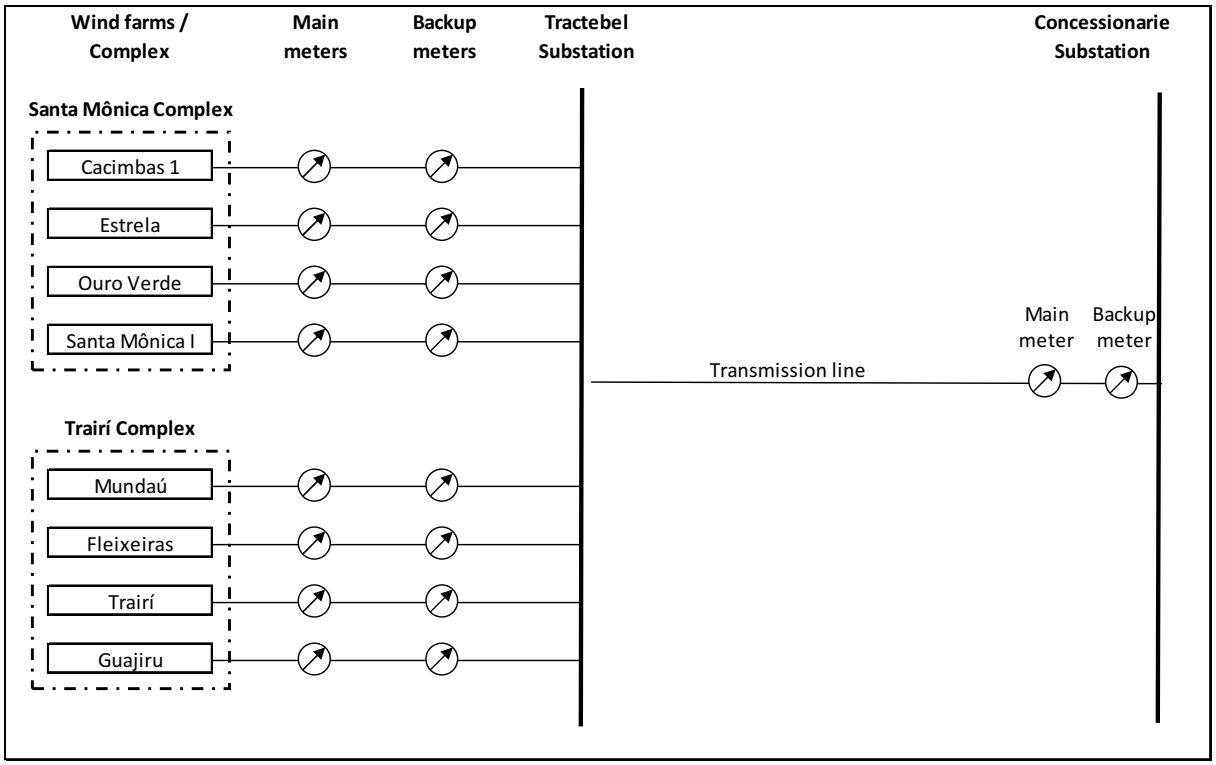
Therefore, at the concessionary substation (grid connection point) there are only two meters that measure the total net electricity dispatched to the grid by the Santa Mônica and Trairí Wind Complexes together.

Due to the above, the net electricity supplied to the grid by the Santa Mônica Wind Complex will be determined as follows: the proportional share of the Santa Mônica Wind Complex in the total electricity measured at the Tractebel collector substation will be calculated based on the readings of each of the 8 couples of meters (main and backup). This percentage will be multiplied by the total net electricity dispatched to the grid, measured at the concessionaire substation.

In practice, the above procedure will be conducted as follows: the Production Operation Department will consolidate the energy generation information until the third business day of the subsequent month. The consolidated data are the same as those sent to the CCEE, and consist of information at the output point of the power plants (individualized measuring points for each wind farm), and the delivery point to the SIN (Pecém Substation). With this information, it is possible to make the weighting of the electrical losses for each wind farm, according to the power generated. This same procedure is performed by the CCEE for billing activities.

[45] From the Portuguese: "Instituto Nacional de Metrologia, Qualidade e Tecnologia – INMETRO" (National Institute of Metrology, Quality and Technology).

The diagram below illustrates the measurement arrangements:



SECTION E. Approval and authorization

The Letter of Approval from Brazil has not been obtained by the time of submitting the CPA-DD to validation.

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Appendix 1. Contact information of CPA implementer(s) and responsible person(s)/entity(ies) for completing the CDM-CPA-DD-FORM

CME and/or responsible person/ entity	☒ CME ☐ Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	Tractebel Energia S. A.
Street/P.O. Box	Rua Paschoal Apóstolo Pítsica, 5064
Building	
City	Florianopolis
State/Region	Santa Catarina
Postcode	88025-255
Country	Brazil
Telephone	+55 48 3221 7073
Fax	+55 48 3221 7073
E-mail	guilhermes@tractebelenergia.com.br
Website	http://www.tractebelenergia.com.br/
Contact person	Guilherme Slovinski Ferrari
Title	Business Development Manager
Salutation	Mr.
Last name	Ferrari
Middle name	Slovinski

CME and/or responsible person/ entity	☐ CME ☒ Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	ENGIE Brasil
Street/P.O. Box	Av Almirante Barroso, 52, 14º floor
Building	
City	Rio de Janeiro
State/Region	Rio de Janeiro
Postcode	20031-000
Country	Brazil
Telephone	+55 21 3974 5400
Fax	
E-mail	carbonmarkets@gdfsuezla.com
Website	http://www.engie.com/
Contact person	Philipp Daniel Hauser
Title	Vice President Carbon Markets
Salutation	Mr.
Last name	Hauser
Middle name	Daniel

CME and/or responsible person/ entity	☐ CME ☒ Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	Climate Link Limited
Street/P.O. Box	115 Magdalen Road
Building	-
City	Oxford
State/Region	-
Postcode	OX4 1RQ
Country	England
Telephone	+44 (0) 1865 600903
Fax	-
E-mail	rodrigo@climate-link.com
Website	http://climate-link.com/
Contact person	Rodrigo Bezerra
Title	Director
Salutation	Mr.
Last name	Bezerra
Middle name	Rodrigo

Appendix 2. Affirmation regarding public funding

No public funding is available for the component project activity.

Appendix 3. Applicability of methodology(ies) and standardized baseline(s)

Baseline information is included in sections above. In addition, no standardized baseline(s) have been used in this CPA.

Appendix 4. Further background information on ex ante calculation of emission reductions

BASELINE INFORMATION

Emission Factor (tCO_2/MWh)		
Combined Margin (2014)		
1st Crediting Period		**0.5118**
Build Margin 2014		**0.2963**
Operating Margin 2014	January	0.6155
	February	0.5989
	March	0.5699
	April	0.5772
	May	0.5605
	June	0.5678
	July	0.5674
	August	0.5862
	September	0.5994
	October	0.5901
	November	0.5885
	December	0.5825
	Average 2013	**0.5837**

Information about the Brazilian Interconnected Grid System Emission Factor (base year 2014)[46].

Ex ante calculation of emission reduction is described above. Details of the calculations can be found in the Excel file attached to the CPA-DD.

Build Margin emission factor for 2014, as published by the Brazilian DNA, will be used for an ex-ante estimation of CERs that will be generated as a result of project's implementation. Therefore, the BM is fixed for the first crediting period. The 2014 data vintage was adopted for build margin calculation as it is the latest data available until the beginning of the validation process.

This Combined Margin emission factor (0.5118 tCO_2e/MWh) is an estimated number with the purpose of calculating the emission reductions estimates for the component project activity (CPA). Although the Build Margin (BM) is determined as fixed (ex-ante) for the first crediting period, the Operating Margin (OM) and the resulting Combined Margin (CM) are to be yearly updated based on data and calculations provided by the Brazilian DNA.

In case the Brazilian DNA discontinues the publication of these data during the current and/or future crediting periods, Tractebel Energia may choose, for each monitoring period to be verified, the option between: a) to make use of the latest available official data and information as

[46] Available at:http://www.mct.gov.br/index.php/content/view/354444.html#ancora , accessed on 03/08/2015.

calculated and published by the Brazilian DNA; or b) to conduct the calculations based on data from ONS.

Appendix 5. Further background information on monitoring plan

The monitoring plan is described in section D.7.2 above.

Appendix 6. Summary of post registration changes

Not applicable.

Appendix 7. Further considerations from the Project Participants concerning the CPA

Please note that all internet links used as references in this CPA have been duly accessed during the CPA elaboration as well as during the validation process. In addition, all these internet links used as references in this CPA have been printed by the project participants and made available for the DOE during the validation process. Project participants have no control and cannot be responsible or penalized for the access to the internet links used as references in this CPA if those become no longer available or accessible. In case of one or more internet links used as references in this CPA become no longer public available, the original printed information can be accessed upon formal request to project participants through the contact information of project participants made available in Appendix 1 of this CPA.

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