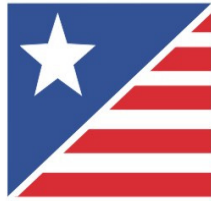


PERRY JOHNSON REGISTRARS



Carbon Emissions Services, Inc.

# VALIDATION REPORT

ARACATI AEOLIS GERAÇÃO DE ENERGIA LTDA.

AEOLIS 2011 WIND PARKS  
IN BRAZIL

REPORT No. C-I-B-0 1-6-0207

REVISION No.2

PERRY JOHNSON REGISTRAR CARBON EMISSIONS SERVICES, INC  
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Date of first issue:	Project No:
2 March 2012	C-I-B-0 1-6-0207
Approved by and date:	Organisational unit:
Bilal Anwar - March 08, 2012	PJRCES
Client:	Client ref.:
Aracati Aeolis Geração de Energia LTDA	72307

**Project Name:** Aeolis 2011 Wind Parks**Country:** Brazil**Methodology:** ACM0002 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources**Version:** 12.2.0**Sectoral Scope:** 01**Project Type and Technology:** Renewable Energy - Wind Power**ER estimate:** 102,053 tCO<sub>2</sub> per year**Size**☒ Large Scale☐ Small Scale**Validation Status**☐ Corrective Actions Requested☐ Clarifications Requested☒ Full Approval and submission for registration☐ Rejected

In summary, it is DOE's opinion that the proposed project activity "Aeolis 2011 Wind Parks" in Brazil, as described in the PDD, version 1.2 of "27 January 2012", meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources, version 12.2.0. PJRCES thus requests the registration of the proposed project as a CDM project activity.

Report No.:	Date of this revision:	Rev. No.	Key words:
C-I-B-0 1-6-0207	2 March 2012	1	CDM Validation, Kyoto Protocol, CDM Executive Board, Renewable Energy
Report title:			<div><input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organisational unit</div> <div><input type="checkbox"/> Limited distribution</div>
Aeolis 2011 Wind Parks			
Work carried out by:			
Cláudia Freitas Ricardo Costa João Hildebrandt			
Work verified by:			
Bilal Anwar			



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### ABBREVIATIONS

ANNEE	National Agency of Electric Energy (in Portuguese Agencia Nacional de Energia Eletrica)
BAU	Business as usual
BM	Building Margin
BNDES	Brazilian Development Bank (in Portuguese Banco Nacional de Desenvolvimento Economico e Social)
CAR	Corrective Action Request
CCEE	Electric Energy Commercialization Chamber (in Portuguese Camara de Comercializacao de Energia Eletrica)
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CM	Combined Margin
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
EB	Executive Board
EIA	Environmental Impact Assessment
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operational Margin
ONS	National Interconnected Power System Operator (in Portuguese: Operador Nacional do Sistema)
PDD	Project Design Document
SIN	National Interconnected System (in Portuguese: Sistema Interligado Nacional)
UNFCCC	United Nations Framework Convention on Climate Change



# VALIDATION REPORT

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### 1 INTRODUCTION

Aracati Aeolis Geração de Energia Ltda. has commissioned PJRCES to perform a validation of the “Aeolis 2011 Wind Parks”, in Brazil (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. The UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent and relevant decisions by the CDM Executive Board (EB) and COP/MOP.

#### 1.1 OBJECTIVE

The purpose of this validation is to have an independent third party assessment of the project design. In particular, the project’s baseline, additionality, the monitoring plan (MP), and the project’s compliance with:

- The requirements of Article 12 of the Kyoto Protocol;
- The CDM modalities and procedures as agreed in the Marrakesh Accord under decision 17/CP.7; and
- Other relevant rules, including the Host Country legislation and sustainability criteria.

The above requirements are validated, in order to confirm that the project design, as documented in version 1.2, dated 27 January 2012 of the PDD /49/, is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen necessary to provide assurance to stakeholders on the quality of the project and its intended generation of certified emission reductions (CERs).

#### 1.2 SCOPE

The scope of validation is given as an independent and objective review of the project design, the project’s baseline study, additionality and monitoring plan which are included in the PDD and other relevant supporting documents.

The scope of the validation is defined as below:

- The Kyoto Protocol, in particular article 12 and modalities and procedures for the CDM
- Decision 2/CMP1 and Decision 3/CMP.1 (Marrakech Accords)
- Further COP/MOP decisions with reference to the CDM (e.g. decisions 4 – 8/CMP.1)
- Decisions and specific guidance by the EB published under <http://cdm.unfccc.int>
- Guidelines for Completing the Project Design Document (CDM-PDD), and the Proposed new Baseline and Monitoring Methodology (CDM-NM)
- Baselines and monitoring methodologies (including GHG inventories)



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- Management systems and auditing methods
- Environmental issues relevant to the sectoral scope applied for
- Applicable environmental and social impacts and aspects of CDM project activity
- Sector specific technologies and their applications
- Current technical and operational knowledge of the specific sectoral scope and information on best practice

The information included in the PDD and the supporting documents have been reviewed against the requirements and criteria mentioned above and the quality management system (QMS) of PJRCES. The validation team has employed, based on the recommendations in the Validation and Verification Manual (version 1.2) /29/, a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consultation to the organization(s). However, stated requests for clarifications and/or corrective actions may provide inputs for improvements of the project design.

## 2 VALIDATION TEAM AND QUALITY CONTROL

The validation of the project activity has been carried out by qualified personnel in line with the procedures defined in PJRCES's quality manual for validation and team definition. The validation report has undergone a technical review before requesting registration of the project activity. The technical review was performed by an independent technical reviewer.

### Validation team:

Name	Country	Role	Type of work carried out
<i>Claudia Freitas</i>	<i>Brazil</i>	<i>Lead Validator</i>	<i>Desk review, site visit and management of the validation activity.</i>
<i>Ricardo Costa</i>	<i>Brazil</i>	<i>Team Member</i>	<i>Desk review, site visit and expert inputs.</i>
<i>Joao Hildebrant</i>	<i>Brazil</i>	<i>Technical expert</i>	<i>Technical expert inputs</i>
<i>Bilal Anwar</i>	<i>USA</i>	<i>Technical reviewer</i>	<i>Independent technical review.</i>

Table 1: Validation team



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### 3 METHODOLOGY OF VALIDATION

The validation of the project activity is carried out in the following phases:

- Desk review of the PDD made available for global stakeholder comments and other relevant documents
- Follow up interviews (site visits) with the relevant stakeholders
- Resolution of the identified corrective action requests (CARs), clarification requests (CL) and forward action requests (FARs) if any
- Issuance of the final validation opinion and final validation report.

#### 3.1 DESK REVIEW

The desktop review includes:

- A review of the PDD (including annexes) /1//10//48/ and the relevant supporting documents. The detailed list of documents reviewed throughout the validation process are included in section 6, under References;
- Preparation of a project specific validation protocol in line with the requirements of the Validation and Verification Manual;
- Background investigation and follow-up interviews with personnel of the project proponent, the consultant, legal authorities and other stakeholders;
- Reporting of validation findings taking into account the public comments received on the UNFCCC website.

In order to ensure consideration of all relevant assessment criteria, a validation protocol was used. The protocol shows, in a transparent manner, criteria and requirements, means of verification and the results from pre-validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements that a CDM project is expected to meet
- It ensures a transparent validation process where the DOE documents how a particular requirement has been validated and the result of its validation.

The validation protocol consists of three tables:

- Table 1 (Mandatory Requirements)
- Table 2 (Requirement Checklist)
- Table 3 (Resolution of Issues Identified) as described in figure 1

The completed validation protocol is enclosed in Appendix A to this report identifying Corrective Action Requests and Clarification Requests and FARs (if any).





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**Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities**

<b>Requirement</b>	<b>Reference</b>	<b>Conclusion</b>
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either, acceptable based on evidence provided (OK), a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> where further clarifications are needed.</i>

**Validation Protocol Table 2: Requirement Checklist**

<b>Validation requirement</b>	<b>Checklist Question / check point</b>	<b>Remarks / comments</b>	<b>Evidence</b>
<i>The various requirements as per para 37 of the CDM modalities and procedures, in line with the validation and verification manual.</i>	<i>The various requirements in Table 2 are linked to checklist questions the project should meet.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable</i>

**Validation Protocol Table 3: Resolution of Issues Identified in Table 2**

<b>Draft report clarifications, corrective action requests and forward action requests</b>	<b>Ref. to checklist question in table 2</b>	<b>Summary of project owner response</b>	<b>Validation conclusion</b>
<i>If the conclusions from the draft Validation are either a CAR, FAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR, FAR or CL is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>



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### 3.2 FOLLOW-UP INTERVIEWS

PJRCES, during the site visit, 19-21 December 2011, performed interviews with project stakeholders to confirm the information presented in the PDD /1/ and to resolve issues identified in the document review. Representatives of Aracati Aeolis Geração de Energia, BRZ Consultoria and Surubim of Aracati Association (local stakeholder) were also interviewed as below.

The main topics of the interviews are summarised in the table below.

Date	Name	Organization	Topic
19/12/2011	Marco Galhardo	BRZ	<ul style="list-style-type: none"> <li>- Letters of Approval</li> <li>- Project boundaries</li> <li>- Technical description</li> <li>- Applicability of selected methodology</li> <li>- Baseline determination</li> <li>- Additionality/ investment analysis</li> </ul>
20/12/2011	Marco Galhardo	BRZ	<ul style="list-style-type: none"> <li>- Emission reduction calculation</li> <li>- Monitoring plan</li> <li>- Environmental aspects and permits</li> <li>- Stakeholder process (local and global)</li> </ul>
20/12/2011	Jose Nasser Hissa	Aracati Aeolis Geração de Energia	<ul style="list-style-type: none"> <li>- Project implementation</li> </ul>
21/12/2011	Joao Silva	Surubim of Aracati Association	<ul style="list-style-type: none"> <li>- Local opinion regarding the project</li> </ul>

Table 2: Main topic of interviews

### 3.3 RESOLUTION OF CLARIFICATION AND CORRECTIVE ACTION REQUESTS

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to PJRCES's positive conclusion on the project design and its compliance with the CDM requirements.



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In order to ensure transparency, a validation protocol is customised for the project. The protocol shows the criteria (requirements) in a transparent manner, means of verification and the results from validating the identified criteria.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified.

Corrective action requests (**CAR**) are issued, where:

- i) Mistakes have been made with a direct influence on project results;
- ii) CDM and/or methodology specific requirements have not been met; or
- iii) There is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

A request for clarification (**CL**) may be used where additional information is needed to fully clarify an issue.

Additionally, a forward action request (**FAR**) may be raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. The FARs so identified however, shall not relate to the CDM requirements for registration.

The validation process resulted into a total of 7 CARs and 5 CLs. No FARs has been raised. All the CARs and CLs have been satisfactorily addressed by the PP before the final validation opinion is established.

Main changes between the PDD published for global stakeholder consultation process, version 1.1, dated 13 November 2011 /1/ and the final version of the, dated 27 January 2012 PDD /49/ submitted for registration are as follows:

- The description of the project activity further elaborated and clarified;
- Project background information, prior consideration further elaborated to clarify the decision of the board;
- Additionality section improved by applying the *guidelines on common practice* approved by the Executive Board at EB 63;
- Further information provided relating to investment barrier;
- Calculation of baseline emissions and parameters for emission reductions revised;
- Environmental licenses (as per host country legislation) has been detailed;
- Overall generic consistency and completeness of the PDD improved.

## 4 VALIDATION FINDINGS

The details of the assessment and the main results have been described below in accordance with the VVM v1.2 (approved at EB 55) reporting requirements. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.



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### 4.1 PARTICIPATION REQUIREMENTS

The project participants are Aracati Aeolis Geração de Energia Ltda. and BRZ Consultoria Empresarial Ltda., of Brazil and Electrade S.p.A. of Italy. The host Party Brazil and the Annex I Party Italy are parties to the Kyoto Protocol, meet the requirements to participate in the CDM and have approved the project activity and the participants involved in the project.

The designated national authority (DNA) of Brazil has issued a Letter of Authorization (LoA<sup>1</sup>) /38/, authorizing Aracati Aeolis Geração de Energia Ltda. as a project participant and confirming that the project assists in achieving its sustainable development. Annex I country Italy issued LoA referring to the project title and the participating entity /39/. This LoA authorizes Electrade S.p.A. as a project participant.

Written approvals of voluntary participation of the Parties involved were confirmed against the LoA of Brazil and Italy (refer to footnote 1). The letters of approval were received from the project participants. The authenticities of LoAs will be confirmed by checking the original letters /38//39/ and comparing with other letters issues by both Annex and Non Annex I countries for other registered CDM projects. Validation team considered the letters to be in accordance with the requirements of the paragraphs 45- 48 of the VVM v01.2.

The project does not involve public funding, and the validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards Brazil. The project will be funded by Brazilian Bank for Development (BNDES) /47/.

### 4.2 PROJECT DESIGN

The project consists of three wind farms called Aeolis Aracati III (27.3 MW), Aracati IV (27.3 MW) and Aracati V (29.4 MW) with a total installed capacity of 84 MW. The generated renewable energy will be supplied to the National Interconnected System (SIN from Portuguese language) through 40 turbines of 2.1 MW each. The annual estimated electricity generation is 258,511MWh, being 92,535MWh/y of Aracati III, 83,773 MWh/y of Aracati IV and 82,203 MWh/y of Aracati V. The plant load factor was calculated for each farm: 38.69% (Aracati III), 35.03% (Aracati IV) and 31.92% (Aracati V) and for the entire project activity as 35.21%. The estimated power generation is based on the available energy for sale based on the basis of the Plant Load Factor of each wind farm /2//3//4/.

Plant load factor has been calculated by Braselco/2//3//4/, a third party project consulting company and certified by an independent wind company Megajoule based on the wind estimation in the region /46/. Since the plant load factor has been calculated and certified two separate independent entities, hence, it complies with the requirements of *'Guidelines for the reporting and validation of plant load factors'* /35/.

<sup>1</sup> According to the Brazilian DNA resolutions LOAs will be issued after validation documents are analysed and approved by the DNA. After that the report will be modified accordingly. Annex I country will issue its LoA right after Brazilian DNA.



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The project will be connected to the National Interconnected System- SIN (Brazilian power grid). The project is developed by Aracati Aeolis Geração de Energia Ltda. (hereinafter "Project Developer") for the period of 20 years as per the design descriptions provided by Braselco for Servicos, Comercio de Equipamentos e Participacoes Ltda. /2//3//4/. This period is also indicated as the lifetime of the project activity. The project will be located in the municipality of Aracati, state of Ceará in Northeast region of Brazil /1//2//3//4/.

The project design and its techno-economic features are based on the Design Descriptive Memorial of Aracati III /2/, Aracati IV /3/ and Aracati V /5/, developed by Braselco for the alternative energy auction of 2011 approved by the Brazilian National Electric Energy (ANEEL) in February 2011 /2//3//4/. Braselco is a third Party engineering company specialized in undertaking such technical consultancy work. Based on the analysis and the findings presented, Suzlon S97 type wind turbines were recommended for project implementation. During the site visit the geographic coordinates of the polygon where the project will be located were confirmed. The coordinates are as follows:

Wind power	Geographic Coordinates (SIRGAS <sup>2</sup> 2000)	UTM Coordinates (Zone 24M)
Aracati Aeolis III	04° 38' 02.1'' S	649.757E
	37° 38' 59.7''W	9.487.657N
Aracati Aeolis IV	04° 38' 16.8''S	648.505E
	37° 39' 40.3''W	9.487.208N
Aracati Aeolis V	04° 38' 24.7''S	647.687E
	37° 40' 06.8''W	9.486.969N

Table 3: Project coordinates

The net electricity generation (MWh/year) is 258,511 based on the 84 MW of installed capacity and the calculated load factor. This estimated total power generation value is used to calculate emission reductions which results into estimated annual emission reductions of 102,053 tCO<sub>2</sub>e and a total reduction of 714,372 tCO<sub>2</sub>e during the first crediting period, of 7 (seven) years.. The estimated ER calculations are in accordance with the Design Descriptive Memorials /2//3//4/ and are found to be conservative.

PJRCES is able to confirm that the final PDD (version 1.2) /49/ is in compliance with the guidance and has followed the structure and guidance in the latest Guidelines for Completing the Project Design Document (CDM-PDD) and the Proposed New Baseline and Monitoring Methodology (CDM-NM) /28/.

The project description in the final PDD is found to be complete and accurate.

<sup>2</sup> SIRGAS is the geocentric reference system for the Americas



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### 4.3 CREDITING PERIOD AND PROJECT DURATION

The project starting date is indicated to be 12 September 2011 which is the date at which the board of directors decided to develop the project using CDM revenues/11/. The decision to proceed with the development and implementation of the project as the CDM project was taken based on the feasibility study, dated 01 September 2011/48/. Further details of project start date and prior consideration can be found in section 4.8.1 of this report. Operational lifetime is determined as 20 years which is based on the Megajoule wind certification /46/.

The starting date of the crediting period is indicated to be from 01 January 2013, or the date of registration, whichever is later.

### 4.4 ELIGIBILITY AS SCALE OF PROJECT ACTIVITY

The project activity is a renewable energy project with an installed capacity of 84 MW, qualifying as a large scale project activity. The scale of the installed capacity has been verified by reviewing the following project documentation and equipment purchase contracts:

- Design Descriptive Memorial Aracati Aeolis III /2/
- Design Descriptive Memorial Aracati Aeolis IV /3/
- Design Descriptive Memorial Aracati Aeolis V /5/
- Datasheet Aracati Aeolis III /24/
- Datasheet Aracati Aeolis IV /25/
- Datasheet Aracati Aeolis V/26/
- Technical proposal of turbine with the supplier which indicates the scale of the equipment /18/
- Preliminary Environmental licenses: Aracati Aeolis III issued on 7 July 2011, Aracati Aeolis IV issued on 11 July 2011 and Aracati Aeolis V issued on 11 July 2011 for the development of the project activity to the PP /20//21/ /22/.

Based on the above assessment and evidences the scale of the project activity is confirmed.

### 4.5 APPLICABILITY OF METHODOLOGY TO PROJECT ACTIVITY

#### *Applicability of the approved baseline methodology*

The project activity correctly applies the approved consolidated baseline and monitoring methodology - ACM0002 "Consolidated baseline methodology for grid connected electricity generation from renewable sources" version 12.2.0, valid from 17 September 2010 onwards /27/.

The validation of compliance of the project activity with the applicability conditions of the applied methodology /27/ by PJRCES has been undertaken as follows:



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Applicability Conditions	Validation	Reference Document
This methodology is applicable to grid connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of an existing plant(s).	<p>The project activity is a Greenfield wind power plant with an installed capacity of 84 MW. The electricity generated will be dispatched to the Sistema Interligado Nacional - SIN (national grid).</p> <p>The compliance with the applicability condition has been confirmed through the review of Design Descriptive Memorials, PDD and technical proposal for equipment supply.</p>	<p>/27/ /2/ /3/ /4/ /18/</p>
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydropower plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.	<p>The project activity is a Greenfield wind power plant with an installed capacity of 84 MW. The electricity generated will be dispatched to the Sistema Interligado Nacional - SIN (national grid).</p> <p>The compliance with the applicability condition has been confirmed through the review of Design Descriptive Memorials, PDD and technical proposal for equipment supply.</p>	<p>/27/ /2/ /3/ /4/ /18/</p>
The project activity does not involve switching from fossil fuels to renewable energy sources at the site of the project activity.	<p>The project activity does not involve fuel switching from fossil fuels to renewable energy sources. The project activity is a Greenfield wind farm project.</p> <p>The compliance with the applicability condition has been confirmed through the review of Design Descriptive Memorials, PDD and technical proposal for equipment supply.</p>	<p>/27/ /2/ /3/ /4/ /18/</p>
The methodology is not applicable to Biomass fired power plants.	The project is not a biomass fired power plant.	/27//2//3//4/
The methodology is not applicable to Hydro power plants that result in new single reservoir or in the increase in an existing single reservoir where the power density of the power plant is less than 4 W/m <sup>2</sup>	The project is not a hydro power plant.	<p>/27/ /2/ /3/ /4/</p>

Table 4: Methodology conditions





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In addition, the applicability conditions included in the tools applied and referred to above apply as follows:

Tool	Applicability conditions	Applicability
Tool for demonstration and assessment of additionality (v06)	Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	The chosen methodology prescribes the use of this tool. There is no further applicability condition for using the tool.
Tool to calculate the emission factor for an electricity system (v02.21)	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The proposed project activity is the installation of a wind power plant supplying electricity to the grid.  Estimation of operating margin, build margin and combined margin has been calculated applying the steps of the tool.
	The tool is not applicable if the project electricity system is located partially or totally in an Annex-I country.	The project electricity system is located in a non-Annex I country.

Table 5: Applicability of the methodology

Based on the above analysis, PJRCES is able to confirm that the approved baseline methodology ACM0002 “Consolidated baseline methodology for grid connected electricity generation from renewable sources” version 12.2.0 is applicable to the project activity. It is further confirmed that the referred tools are also applicable and appropriately applied in the context of the project activity.

### *Appropriateness of the baseline scenario selection methodology*

The project activity consists of the installation of a new grid-connected renewable electricity generation plant (wind farm) that will be installed at a site where no renewable power plant was operated previously and the electricity generated will be dispatched to the Sistema Interligado Nacional - SIN (national grid) in Brazil.

The baseline scenario has thus been correctly identified in accordance with applied baseline and monitoring methodology ‘ACM0002 version 12.2.0’ /27/ as follows:





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*Electricity delivered to the grid by the project activity would otherwise have been generated by the operation of grid-connected power plants in Sistema Interligado Nacional - SIN (national grid) of Brazil 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" version 2.2.1 /33/.*

It is confirmed that the approved baseline methodology has been correctly applied and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

### 4.6 PROJECT BOUNDARY

As per the requirements of the applied baseline and monitoring methodology ACM0002 /27/, the spatial extent of the project boundary includes all the power plants physically connected to the Sistema Interligado Nacional - SIN (national grid) and the project power plant. The spatial extent of the project boundary is clearly defined as the site of project activity and the grid system comprising all power plants connected physically to the grid.

The details of project boundary have been determined by means of reviewing the project documentation, such as, Design Descriptive Memorials /2//3/ /4/ and also by the physical inspection during the site visit. The selected sources and gases are justified for the project activity. Emission sources and gases included in the project boundary are:

	<i><b>GHGs Included</b></i>	<i><b>Description of Sources</b></i>
<i><b>Baseline emissions</b></i>	<i><b>CO<sub>2</sub></b></i>	According to 'ACM0002 version 12.2.0' only CO <sub>2</sub> emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity are accounted for.
<i><b>Project Emissions</b></i>	<i><b>N/A</b></i>	As the project is a wind power plant no GHG emissions from the project have to be considered according to 'ACM0002 version 12.2.0'.
<i><b>Leakage</b></i>	<i><b>N/A</b></i>	N/A

Table 6: Emission sources

PJRCES is able to confirm that the application of the baseline methodology is transparent and conservative. The identified project boundary and selected sources and gases are justified for the project activity.



## VALIDATION REPORT

The validation of the project activity did not reveal other GHG emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by the applied baseline methodology ACM0002 (version 12.2.0).

### 4.7 BASELINE ASSESSMENT

The applied baseline and monitoring methodology 'ACM0002 version 12.2.0' prescribes the baseline as the *electricity delivered to the grid by the project that 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" /33/.*

The connected power grid for the proposed project is the Brazilian grid /24//25//26/. Therefore, the baseline scenario is the continuation of the current situation, i.e. 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 calculations according to *"Tool to calculate the emission factor for an electric system"*.

As per the paragraph 105 of the CDM-VVM version 01.2 /29/, if the applied approved baseline methodology prescribes the baseline scenario, no further analysis of baseline alternatives is required. It is confirmed by PJRCES that the baseline identified in the final version of the PDD /49/ is correctly identified following the conditions and requirements of the applied baseline methodology /27/. It is further confirmed that:

- (a) All the assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- (b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD;
- (c) Assumptions and data used in the identification of the baseline scenario are appropriately justified, supported by evidence and can be deemed reasonable;
- (d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD;
- (e) The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

### 4.8 ADDITIONALITY ASSESSMENT

The additionality of the proposed project is demonstrated by applying the *"Tool for the demonstration and assessment of additionality"*, version 06.0.0 /32/.



## VALIDATION REPORT

### Start date of the project activity

The project start date is indicated to be 12 September 2011 which is the date of board of direction (Shareholders) decision to develop the proposed project activity using CDM revenues /11/. The decision to proceed with the development and implementation of the project as the CDM project was taken based on the feasibility study, dated 01 September 2011/48/ which clearly reflected that the project on its own was not financially viable.

The validation team reviewed both documents and could verify that the start date shows an important milestone in the implementation of the project activity considering the fact that the project is at the early stage of its development and implementation and no contractual arrangements for the equipment purchase and/or construction have been made. However, with the completion of design and planning phase of the project activity /2//3//4//48//50/ and also committing financial resources on the validation process demonstrates significant commitment of PPs to proceed with the implementation of the project as a CDM project activity.

The table below lists the documents PJRCES reviewed to validate the background of the project activity and also its eligibility as the CDM project:

Document	Description & Validation	Date	Document Reference
Report from BRZ Consultoria Empresarial pointing the proposed project activity as a CDM potential.	PJRCES has reviewed the report and is able to confirm that the report carried out the assessment of the wind farms as a CDM project activity.	1 September 2011	/50/
Feasibility study of BRZ	Studies regarding the implementation availability of the project activity. PJRCES has reviewed the study and is able to confirm that PP has invested in the project activity.	1 September 2011	/48/
Letter of board direction decision to implement the project activity using the CDM revenues (project starting date)	Letter mentioned the feasibility study and the meeting report when the members of direction have decided to follow with the project applying the CDM benefits as per its relevance of the developing of the project activity. PJRCES reviewed the document and the feasibility study.	12 September 2011	/11/

Table 7: Background of the project activity

The review of above evidences showed that the project was considered as a CDM project activity from its early stage given the fact that its financial viability would not have allowed its implementation otherwise. It also shows that only consideration of CDM benefits enabled the board of directors to decide to proceed with its implementation as a CDM project activity. Since the project developer was aware of CDM before the start date of the project therefore the decision to proceed with the implementation under CDM is demonstrated.



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### 4.8.1 PRIOR CDM CONSIDERATION AND CONTINUED ACTION TO SECURE CDM STATUS

The project activity is a new project with the starting date after 02 August 2008, as per the “*Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM*” /31/. In accordance with the requirements of the guidelines the PPs informed Brazilian DNA on 05 October 2011 /8/ and the UNFCCC secretariat on 05 October 2011 /6/ of the project commencement and their intention to seek CDM status. Both notifications were submitted within 6 months of the project activity start date, as per the requirements of the guidance/31/.

PJRCES reviewed notifications and their confirmations /6//7//8//9/ and also cross-checked on the UNFCCC website and found them to be in line with the “*Guidelines on the demonstration and assessment of prior consideration of the CDM*”/31/.

PJRCES has undertaken a review of the status of activities related to the project’s implementation in order to verify the prior consideration. The table below presents details of some key events, timelines and also how PJRCES validated these events.

Date	Event	Validation	Document Reference
7 July 2011	Aracati Aeolis III Preliminary License - LP <sup>3</sup>	PJRCES reviewed the document and its contents.	/20/
7 July 2011	Aracati Aeolis IV Preliminary License - LP (see footnote 2)	PJRCES reviewed the document and its contents.	/21/
11 July 2011	Aracati Aeolis V Preliminary License - LP (see footnote 2)	PJRCES reviewed the document and its contents.	/22/
1 September 2011	Feasibility study Completed	PJRCES reviewed the document and its contents.	/48/
12 September 2011	Letter of board direction decision to implement the project activity using the CDM revenues (project starting date)	Refer to table 7 above.	/11/
21 September	BZR and Aracati Aeolis	PJRCES reviewed the agreement	/12/

<sup>3</sup> As per Brazilian environmental legislation the Preliminary License is issued as per the Environmental Assessment approval.



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2011	Geração de Energia service agreement for CDM project development	which is to develop the project as a CDM project activity.	
5 October 2011	CDM Prior Consideration Form submitted to the UNFCCC	PJRCES verified form submitted to UNFCCC and confirmed it is in accordance with the UNFCCC prior consideration guidelines.	/6/ /31/
5 October 2011	Confirmation of reception of CDM Prior Consideration Form	PJRCES verified the confirmation from UNFCCC.	/7/
5 October 2011	CDM Prior Consideration Form submitted to the Brazilian DNA	PJRCES verified form submitted to DNA and confirmed it is in accordance with the UNFCCC prior consideration guidelines.	/8/ /31/
05 October 2011	Prior Consideration DNA confirmation	PJRCES has reviewed the confirmation sent by DNA.	/9/
10 October 2011	Local stakeholder consultation	According to the Brazilian DNA resolutions PDD shall be available for consultation 15 days before the global stakeholder consultation.  PJRCES reviewed all the stakeholders' process: letters, receipts of deliver and site publication.	/51/ /52/
7 November 2011	Validation contract signed with Perry Johnson Registrars	PJRCES has the contract signed	/37/
17 November 2011	Global stakeholder consultation commenced.	PJRCES confirmed date in the UNFCCC site.	/36/

Table 8: Key events of the project activity

The validation team of PJRCES has assessed and verified the evidence for the starting date of the project as well as the activities presented with respect to prior consideration and continued real actions undertaken by the PP. Based on the review of the evidence, PJRCES is able to confirm that the choice of the starting date (board direction decision for developing CDM based on the feasibility study) demonstrates the commitment of PPs with the implementation of the project and is in accordance with the 'Glossary of CDM terms'/30/.



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Furthermore, the PP have demonstrated to follow the ‘*Guidelines on the demonstration and assessment of prior consideration of the CDM, (EB 62 Annex 13 )/31/*.

PJRCES has determined that the CDM was seriously considered before the decision to go ahead with the proposed project. In fact only CDM consideration made the project implementation possible. And that continued action to secure CDM status was taken by PPs in accordance with the “*Guidelines on the demonstration and assessment of prior consideration of the CDM” version 4 /31/*. It has been further noted that due to barriers faced by the project the implementation of the project was only possible with the CDM consideration.

### 4.8.2 STEP 1: IDENTIFICATION OF ALTERNATIVES TO THE PROJECT ACTIVITY CONSISTENT WITH CURRENT LAWS AND REGULATIONS

According to the applied baseline methodology ACM0002 version 12.2.0 /27/, if the project activity is the installation of a new grid connected renewable power plant/unit, the baseline scenario is the following:

***“Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system” /33/.***

The proposed project is a new wind park project activity that would deliver 258,511 MWh/yr of electricity to the Sistema Interligado Nacional - SIN (national grid) in Brazil. As per paragraph 105 of the VVM, no analysis of baseline alternatives is required if the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario. However, PPs have identified alternative scenarios in the PDD which have been validated by PJRCES.

Alternative scenarios for the project activity have been identified as per the applied baseline methodology ACM0002 v12.2.0/27/ and the applicable tool for demonstration and assessment of additionality (v.6) /32/. PP has analyzed the identified alternatives and summary of the analysis is presented below:

***Alternative 1:*** Continuation of the current situation. Electricity will continue to be provided by the existing grid (SIN).

***Alternative 2:*** The proposed project activity without CDM: construction of wind farms connected to the grid, implemented without considering CDM revenues.

The identification of alternatives and their substantiation have been found consistent and in accordance with the requirements of the applied baseline methodology as well its applicable tool. The alternatives listed in the PDD are found to be credible and complete as per the requirements of the approved applied methodology, VVM and tool for demonstration and assessment of additionality (v.6) /32/.



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

Alternatives mentioned above are in compliance with Brazil legislation. PJRCES, based on its local and sectoral expertise, and review of related legislations and regulations is able to confirm that above two alternative scenarios are in compliance with the local laws and regulations. No local regulation have been noted which prohibits the implementation of wind farms and similarly for continuation of electricity to be provided by the grid which is also baseline for the project activity and will be discussed at the next steps.

## 4.8.3 STEP 2: INVESTMENT ANALYSIS

According to the “Tool for the demonstration and assessment of additionality” /32/, since the proposed project generates financial and economic benefits other than CDM related income through the sales of energy and the baseline alternative does not involve an investment for the project participants, a benchmark analysis is justified for conducting the investment analysis.

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

As per the applicable tool /32/ there are three options:

Option I: simple cost analysis

Option II: investment comparison analysis

Option III: benchmark analysis

Option I was not the most applicable option due to CDM project activity and the alternatives identified in the Step 1 above generate benefits (financial and economic) other than the CDM incomes. Option II is not appropriate since the implementation of other technologies of renewable energy generation is not feasible alternatives in the site of the project activity. Hence option III has been used which is in compliance with the “Guidelines on the assessment of investment analysis” /43/, paragraph 19: if the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate. The proposed project activity will supply renewable energy to the national grid (SIN).

### Sub-step 2b. Option III. Apply benchmark analysis

The economic and financial indicator equity internal rate of return (equity IRR) calculated in the financial model of the project activity /13/ was used to compare with the benchmark.

Benchmark has been selected as per the Guidelines on the assessment of investment analysis / 43/, paragraph 8, of the Appendix Default value for the expected return on equity: group 1, energy industries, Brazil: which is indicated as 11.75%.

PJRCES is able to confirm the benchmark of 11.75% is applicable for this project.

### Sub-step 2c. Calculation and comparison of financial indicators (only applicable to options II and III)





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As per paragraph 34 (b) of the additionality tool /32/ if benchmark analysis has been used, PP has to demonstrate that the CDM project activity results into less favourable financial indicator (in this project lower IRR) than the CDM project activity. The Financial Model /13/ established by PP is based on the following documents:

### Investment analysis: input parameters

The input parameters used in the financial analysis of this project are taken from the following documents:

- Design Descriptive Memorial Aracati Aeolis III dated February 2011 /2/
- Design Descriptive Memorial Aracati Aeolis IV dated February 2011 /3/
- Design Descriptive Memorial Aracati Aeolis V dated February 2011/4/
- Megajoule /46/
- Manual of Power Sector Asset Control data /53/
- BNDES loan costs for energy projects <sup>4</sup> /47/
- Proposal of equipments /18/
- Proposal of construction /19/
- Feasibility study /48/
- Brazilian official tributes available at  
<http://www.receita.fazenda.gov.br/pessoajuridica/dipj/2000/orientacoes/determinacaolucropresumido.htm>

Input values used for the equity IRR is presented below:

Parameter	Description	Value	Reference
Installed capacity	Project design of the wind farms	84 MW	/2/ /3/ /4/
Plant load factor	PLF= available output capacity/ installed capacity.	35.21%	/46/
Energy generation for sale	Electricity generation projected on the basis of the PLF for each wind farm	258,511 MWh/year	/2/ /3/ /4/ /46/
Total investment	Total investment based on the number of wind turbines	R\$ 203,531,699.00	/18/ /19/ /48/
Loan (a)	BNDES financing cost for GHG intensive energy sources (Type E-policy)	50% TJLP <sup>5</sup> and 50% TJ-462 that totals 6.5% p.a.	/47/
Loan (b)	Credit risk for GHG intensive energy sources	Calculated according credit risk: from 0.46% up to 3.57%.	/47/

<sup>4</sup> the Brazilian development bank supports energy projects in Brazil and publishes the loan cost for energy projects at:  
[http://www.bndes.gov.br/SiteBNDES/bndes/bndes\\_pt/Institucional/Apoio\\_Financeiro/Produtos/FINEM/energia\\_eletrica\\_geracao.html](http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energia_eletrica_geracao.html)

<sup>5</sup> Long term interest rate





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		Considered 1% that is half of the average as to be conservative.	
TFSEE <sup>6</sup>	Defined by ANEEL	R\$ 385.73/kW	/53/
O&M costs	Budgeted according to equipment manufactures recommendations	R\$ 33,251.00/year	/18/ /48/
PIS/COFINS <sup>7</sup>	Based on presumed profit	3.65%	Federal revenue site <sup>8</sup>
TUSD – G <sup>9</sup>	Aneel Resolutions 968 and 1,141	From 2012 up to 2031 – R\$ 6.46/KWh	ANEEL site <sup>10</sup>
Income Tax	Based on the presumed profit	Up to 240,000 – 15% More than 240,000 – 25%	/48/
Social contribution	9% of the gross revenue basis	9%	Brazilian government site <sup>11</sup>

Table 9 - Investment analysis - input parameters and validation cross check

Based on above parameters and assumptions equity IRR for the project activity was calculated to be 1.87%. It has been confirmed that the project IRR with CDM revenues reaches to the level of 4.62 % which is confirmed to be still lower than the benchmark of 11.75%. It has been further noted that the project has been subject to favorable financing conditions by Bendes /47/ (E-policy) under the Brazilian Climate Change Mitigation Policy /55/ which offered comparative advantages for less GHG intensive energies (renewable technologies) in the form of lower cost of debt in comparison with the cost for financing for more GHG intensive technologies. In accordance with the clarification provided by the Board /56/ on treatment of national and sectoral policies, it has been reviewed that the above-mentioned policy is a E- Policy and confirmed that the policy has been adopted in August 2004 and hence need not to be taken into consideration.

PJRCES, having compared input parameters for the financial analysis included in the Financial Model /13/, verifying the overall financing of the project activity and cross-checking with the documents referenced in the table above is able to confirm that the project is not a economically attractive and viable investment option on its own. It is further confirmed that the project IRR is below the benchmark. Further evaluation of input values and sensitivity analysis is presented below.

### Plant load factor

Determined as per Guidelines for the reporting and validation of plant load factors/35/ by a third party company and verified by another third party engineering company /3/ /4//5//46/ and considered acceptable by PJRCES.

### Electricity generation for sale

PJRCES has verified that this value is in accordance with Design Descriptive Memorials/2//3//4/ and considered plausible as per the Brazilian regulation for electric energy and project activity installed capacity.

<sup>6</sup> Electric energy rate monitoring

<sup>7</sup> Social integration program/ contribution for financial of the social security

<sup>8</sup> <http://www.receita.fazenda.gov.br/pessoajuridica/dipi/2000/orientacoes/determinacaolucropresumido.htm>

<sup>9</sup> Tariff of distribution system

<sup>10</sup> <http://www.aneel.gov.br/cedoc/reh20111141.pdf>

<sup>11</sup> [http://www.planalto.gov.br/ccivil\\_03/leis/L7689.htm](http://www.planalto.gov.br/ccivil_03/leis/L7689.htm)



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### Total investment

The value is based on the proposal for the wind turbines (R\$ 175,929,160.00) and the proposal of construction (R\$ 27,602,539.79), totalizing R\$ 203,531,699.79, in accordance to the Feasibility study /48/.

### O&M costs

The value in the table above has been calculated considering zero for the 3 first years and R\$ 95,002.86 for the next 7 years in accordance to the equipment proposal /18/. The relation between O&M (annual cost) and total investment reaches 1.37%. O&M value has been cross-checked with the Feasibility study /48/.

### Tax and depreciation

PJRCES can confirm that the special purpose societies formed for the project are eligible for the presumed (or assumed) profit regime, in accordance to the national fiscal legislation.

Income tax (15% - 25%), PIS/COFINS 3.65% and a 9% rate applied as social contribution on gross revenue basis were established accordingly to the Brazilian legal requirements. In the presumed profit regime, depreciation has no impact in the project's internal rate of return. In this case, tax rates are calculated over revenues and not over gross profits.

### Equity IRR calculation:

Equity IRR was calculated to be 1.87%.

Equity IRR project benchmark is 11.75%.

The IRR calculations were provided in spreadsheet /5/ and verified by PJRCES. The assumptions and calculations were verified and found to be correct. The IRR is for the assessment period of 20 years is equivalent to the lifetime of the project. This confirms that the project in the absence of CDM benefits and compared to the benchmark of 11.75% is not financially attractive.

### Sub-step 2d. Sensitive analysis

The sensitivity analysis has been carried out for parameters that most likely to fluctuate over time and contributing for more than 20% to project costs or total revenues as per the Guidelines on the assessment of investment analysis /43/. Parameters considered: energy price, volume of energy generated, CAPEX and O&M cost.

Key indicators	Variation of the parameter indicator needed to reach benchmark project 11.75%
Energy price	1.87% (-10% would be - 1.31%; +10% 4.76%)
Volume of energy generated	1.87% (-10% would be - 1.31%; +10% 4.76%)
CAPEX	1.87% (-10% would be +3.81%; +10% +0.19 %)
O&M cost	1.87% (-10% would be +2.23%; +10% + 1.51%)

### Energy price



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The revenue of the proposed project activity depends on two factors: the electricity generated and the electricity sales price. It is not probable that the sales price will change over the time according to the last auctions occurred in Brazil/53/. The average price of the last auction prior to the time of the investment decision was used for the cash flow projection. The price considered is the one presented in the auction A-3 of 2011 and which was crosschecked in the Energy Research Company<sup>12</sup> Even if the energy price changes it is not probable that it achieve the average price before the investment decision. If an unexpected reason takes place to achieve the benchmark the price has to be 36.61% above the projected (during the 20 years of the lifetime of the project) which is unlikely to happen.

### Volume of energy generated

It is unlikely that the scenario of revenue generation in result to quantity of total power generated will be consistently 10% above the projected in the investment analysis. Effective revenue of 36.61% above the one projected is necessary to achieve the benchmark which means that the volume of electricity sold should reach the average of 36.61% above the value projected for the lifetime of the project activity.

### CAPEX

A reduction of 10% reduction in capital expenditure is a conservative as per investments in infrastructure usually are overrun high. In a scenario like this the equity IRR would increase, but would not reach the benchmark. This would occur if the CAPEX were 38.00% below the original projections, considered not a realistic scenario as per the construction and equipment supplying proposals were received.

### O&M cost

O&M costs are operational costs including sectoral taxes, transmission costs, costs for O&M, regular overhaul and land lease expenses. The 10% reduction in all these costs would not affect the project's return, hence would not elevate the project IRR to the project benchmark.

As per the sensitivity analysis presented above it is demonstrated that equity IRR remains lower than the benchmark in all reasonably evaluated scenarios.

### **Comparison with similar projects**

The main input parameters used in the financial analysis of the proposed project activity would be compared with the data of CDM registered wind farm project in Brazil: Osorio Wind Power Plant Project (OWPPP), reg. no. 0603, installed capacity 150 MW which is the only CDM wind farm registered in the UNFCCC site<sup>13</sup>.

It was not possible to do this comparison as per the project has been registered on 28 December 2006 and information related to PLF, Investment/kW and annual O&M cost was not available in the Validation Report.

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<sup>12</sup> Energy Research Company site - data of the A-3 2011 auction  
<http://www.epe.gov.br/leiloes/Paginas/default.aspx?CategoriaID=6734>

<sup>13</sup> <http://cdm.unfccc.int/Projects/projsearch.html>



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### 4.8.4 STEP 3: BARRIER ANALYSIS

According to the “Tool for the demonstration and assessment of additionality” /32/, an investment analysis was chosen; therefore no barrier analysis has been performed.

### 4.8.5 STEP 4: COMMON PRACTICE ANALYSIS

The PP has undertaken the common practice analysis of the project following the *Guidelines on common practice* /44/. As per the guidance, a proposed project activity is considered common practice in a sector in the applicable geographical area if the factor F ( $F = 1 - N_{diff}/N_{all}$ ) is greater than 0.2 and  $N_{all} - N_{diff}$  is greater than 3.

PP has applied the approach recommended in the *common practice guideline* /44/. Four steps of the guidance are applied as follows:

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

Based on the installed capacity of the project activity (84 MW) output range is calculated as **42 MW to 126 MW**.

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. ( $N_{all}$  - registered CDM projects shall not be included).

The applicable geographical area is the host country (Brazil) and the boundary is the renewable projects connected to the national grid (SIN).

Nine wind farm projects under the characteristics above (output range) have been identified: Bons Ventos (50 MW), Canoa Quebrada (57 MW), Eólica Icaraizinho (55 MW), Parque Eólico de Osório (50 MW), Parque Eólico dos Índios (50 MW), Parque Eólico Sangradouro (50 MW), Praia Formosa (105 MW), RN 15 - Rio do Fogo (49 MW) and Eólico Elebrás Cidreira I (70 MW).

From these nine, seven are in process to be registered as a CDM project activity and shall not be considered. The two that are not applying for CDM are Bons Ventos and Eólico Elebrás Cidreira I.

Hence  $N_{all} = 2$

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity ( $N_{diff}$ ).



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Both projects identified as  $N_{all}$  have received subsidies and incentives from Government program PROINFA<sup>14</sup>. These two projects have been implemented as per the use of resources of this Brazilian program which involves special contractual arrangements and favourable financing conditions for the development of the wind projects applying new technology. Considering that the proposed project had not received any special contractual considerations or finances from the Government, hence it can be concluded that all mentioned projects are different from Aeolis 2011 wind parks.

Therefore  $N_{diff} = 2$

Step 4: Calculate factor  $F = 1 - N_{diff}/N_{all}$  representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

$$F = 1 - N_{diff}/N_{all} = 1 - 2/2$$

$$F = 0$$

Based on the common practice guidelines /44/, the proposed project activity is not a common practice.

PJRCES, confirms that based on the above information and various barriers associated with the project activity, it is sufficiently demonstrated that the project is not a likely baseline scenario and thus project is additional.

### 4.9 MONITORING PLAN

The monitoring plan is in line with the approved monitoring methodology ACM0002, version 12.2.0 /27/ and monitoring arrangements are sufficient for the real measurement of emission reductions resulting from the project activity. As a newly developed wind power project and in accordance with the applied monitoring methodology, the required monitoring parameter is 'net electricity supplied by the project plant/unit (the three wind farms) to the grid' ( $EG_{facility\ III, IV\ and\ V, y}$ ) which is calculated from the continuous measurement of electricity import and export.

In accordance with the "Tool to calculate the emission factor for an electricity system" /33/, the dispatch data analysis OM method was considered for the determination of the operating margin (OM). The combined margin CO<sub>2</sub> emission factor ( $EF_{grid, CM, y}$ ) will be monitored *ex post*. The Brazilian grid emission factor is published by the DNA of Brazil /42/. The calculations are based on electricity generation data provided by the National Operator System (ONS) for the electricity generated in the grid.

The power exported to and imported from the SIN will be monitored continuously and recorded on monthly basis. In addition, the electricity sales receipts will be provided for data quality control and cross check. In addition, this data will be verified against data provided in the Electric Energy Commercialization Chamber (CCEE) /54/.

There will be two electricity meters (main and backup meters) located at the collector substation and other two metering devices will be installed at the grid connection point. The meters located at the grid connection point will register the electricity dispatched to the grid by the project activity.

<sup>14</sup> Federal program from the Minister of Mining and Energy for supporting of alternative sources of electricity



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The PDD defines the accuracy of the meter to be based on the manufacturer's specifications. PJRCES confirms that monitoring arrangements and equipment are adequate for the monitoring of a wind power plant.

### 4.9.1 MANAGEMENT SYSTEM AND QUALITY ASSURANCE

Details of the data to be collected, the frequency of data recording and its format, responsibilities and authorities for project management, procedures for monitoring and reporting, QA/QC procedures, procedures for calibration of metering equipment and procedures for training and maintenance have been elaborated in the monitoring plan described in the PDD version 81.2. All data will be archived electronically and be kept for at least 2 years after the end of the last crediting period. All these elements will also be further verified during verification.

The application of the monitoring methodology is transparent and PJRCES considers that the project participants are able to implement the monitoring plan.

Following the requirements of the paragraph 123 of the CDM-VVM, PJRCES is able to confirm that:

- (a). The monitoring plan is fully in compliance with the requirements of the applied monitoring methodology ACM0002, version 12.2.0;
- (b). The monitoring arrangements described in the PDD are feasible and adequate with the project design; and
- (c). The PPs are able to implement the monitoring plan.

### 4.9.2 PARAMETERS DETERMINED EX ANTE

PJRCES has assessed the data sources and assumptions of the data and parameters that will not be monitored and will remain fixed throughout the crediting period. The parameters are found to be correct and in accordance with the applied baseline methodology ACM0002 version 12.2.0 /27/ and the 'Tool to calculate the emission factor for an electricity system, version 2.2.0' /33/.

PJRCES is able to confirm that all parameters are appropriate, applicable to the project activity and will result in a conservative estimate of the emission reductions. Following parameters are determined ex-ante:

Parameter determined ex ante is the electricity generated and delivered to the grid by each wind farm used for OM/BM calculations in year y and is presented below:

Parameter	Description	Source Verified	Value Verified
EG <sub>y</sub>	Net electricity generated and delivered to the grid by each power plant used for OM/BM calculations in year y	Yes. The source of data is official statistical data.	Yes. The values are based on the official statistical data.

Table 10: Parameters determined ex ante



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### 4.9.3 PARAMETERS MONITORED EX POST

There are two parameters to be monitored: the net electricity generation supplied by the project plant to the grid and the grid emission factor.

The net electricity generated from the project will be measured through two bidirectional electricity meters (as described in the beginning of the section 4.9. This data will be cross verified against the sales receipts from the Sistema Interligado Nacional - SIN (national grid).

#### Grid emissions factor:

Following the requirements of the ACM0002 version 12.2.0 /27/ and steps of the '*Tool to calculate the emission factor for an electricity system to calculate the grid emission factor*' /33/, the grid emission factor is calculated as a combined margin (CM) which is the combination of operating margin (OM) and build margin (BM).

The PDD was published for Global Stakeholders consultation on 17 November 2011 and the calculation of the grid emission factor has been calculated with the latest data which was the most recently available at the commencement of validation. Electricity exports and imports from and to the grid have been appropriately considered as per the tool as described in the PDD. Off-grid power plants have not been considered.

**Operating Margin (OM):** The OM is calculated based on the simple OM method which is found justified since the low cost /must run resources constitute less than 50% of total grid generation from the year 2011 to 2006 (91% in 2006, 92% in 2007, 87% in 2008, 93% in 2009, 87% in 2010 and 91% in 2011) /33/, /42/. The data used in the emission factor calculation is in accordance with data provided by National Operator of the System (ONS) for years 2006, 2007, 2008, 2009, 2010 and 2011 /55/. The simple OM was calculated using the ex ante option using a 3-year generation-weighted average based on the most recent data available at the time of the CDM-PDD to the DOE for validation.

The OM is calculated to be 0.4795 tCO<sub>2</sub>/MWh. The sources and calculation has been verified by PJRCES and confirmed to be consistent with the applied tool.

**Build Margin (BM):** The BM is calculated as the generation-weighted average emission factor (tCO<sub>2</sub>/MWh) of all power units in during the most recent year y for which power generation data is available.

PP was chosen option 2: for the first crediting period the build margin emission factor shall be updated annually, *ex post*, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emission factor shall be calculated *ex ante* as per option 1 of the applicable tool. For the third crediting period, the built margin emission factor calculated for the second crediting period should be used.

The BM is calculated to be 0.1404 tCO<sub>2</sub>/MWh. The sources and calculation has been verified by PJRCES and confirmed to be consistent with the applied tool.

The combined margin emission factor ( $EF_{grid,CM,y}$ ) is calculated as the weighted average of the Operating Margin emission factor ( $EF_{grid,OM,y}$ ) and the Build Margin emission factor ( $EF_{grid,BM,y}$ ). The default weights for





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wind projects are defined as follows:  $w_{OM} = 0.75$  and  $w_{BM} = 0.25$  (owing to their intermittent and non-dispatchable nature).

The resulting combined margin emission factor 0.3948 tCO<sub>2</sub>e/MWh which is will be calculated ex post as per BM emission factor, in accordance with Brazilian DNA for the entire crediting period.

<i>Data/ parameter</i>	<i>Unit</i>	<i>Value</i>
Operating Margin (OM)	tCO <sub>2</sub> /MWh	0.4795
Build Margin (BM)	tCO <sub>2</sub> /MWh	0.1404
Emission Factor (CM)	tCO <sub>2</sub> /MWh	0.3948

### 4.10 CALCULATIONS OF GHG EMISSION REDUCTIONS

The emission reductions (ER<sub>y</sub>) by the project activity during the crediting period is the difference between baseline emissions (BE<sub>y</sub>), project emissions (PE<sub>y</sub>) and emissions due to leakage (L<sub>y</sub>), as follows:

- a) **Baseline emissions:** Baseline emissions (BE<sub>y</sub> in tCO<sub>2</sub>) are the product of the grid emission factor ( $EF_{grid,CM,y}$  in tCO<sub>2</sub>/MWh) times the electricity that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

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

Where:

$BE_y$	=	Baseline emissions in year y (tCO <sub>2</sub> /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 <sub>2</sub> emissions factor in year y (tCO <sub>2</sub> /MWh)

As the project activity is the installation of a new grid-connected wind farm at a site where no wind farm was operated prior to the implementation of the project activity.

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

$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant to the grid in year y (MWh/yr)
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- b) **Project emissions:** there are no emissions from the project, which is a wind energy project with no fossil-fired backup power source (ACM0002 v12.2.0).





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- c) **Leakage:** as per the requirements of the applied baseline methodology, no leakage has to be considered for the project activity.

As mentioned above, the grid emission factor is determined *ex post* as a combined margin, consisting of a weighted average of the operating margin (OM) and build margin (BM). Based on the above mentioned emission factor and net power generation of approximately 258,511 MWh (considering an installed capacity of 84MW) annual estimated emission reductions are calculated as follows:

$$\begin{aligned} ER_y &= BE_y = EG_{PJ,y} * EF_{Grid,CM,y} \\ ER_y &= BE_y = 258,511 \text{ MWh} * 0.3948 \text{ tCO}_2/\text{MWh} \\ ER_y &= 102,053 \text{ tCO}_2\text{e/year} \end{aligned}$$

The estimated emission reduction data and parameter values provided in the PDD and supporting files submitted to the DOE have been verified by PJRCES.

In summary,

- (a) The GHG calculations presented in the Aeolis wind parks GHG reductions & grid emission factor calculation spreadsheet /10/ is complete and transparent, and their accuracy has been verified.
- (b) No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been identified.
- (c) All assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- (d) All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD;
- (e) All values used in the PDD are considered reasonable in the context of the proposed CDM project activity;
- (f) The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- (g) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.

### 4.11 ENVIRONMENTAL IMPACTS

According to the Brazilian Environmental Regulation, wind power projects shall develop an environmental study. The approval of this study is the environmental licenses issuance.

The state agency of Ceara required the environmental studies for the 3 wind farms which have been approved to the publication of the following environmental licenses (LP for preliminary licenses):

- Aracati Aeolis III – 2011-009255/TEC/LP, dated 7 July 2011, valid until 06/07/2013;



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- Aracati Aeolis IV – 2011-009250/TEC/LP, dated 11 July 2011, valid until 10/07/2013;
- Aracati Aeolis V – 2011-009260/TEC/LP, dated 11 July 2011, valid until 10/07/2013.

PJRCES has assessed during the onsite visit the environmental studies and the licenses and can confirm that the project activity fully complies with the Brazilian environmental. It is further confirmed that appropriate measures were undertaken to address the identified environmental impacts.

### 4.12 COMMENTS BY LOCAL STAKEHOLDERS

As per Brazilian DNA resolution (Resolution # 7 of 5 March 2008) local stakeholders shall be informed about the project activity by letters and also PDD in Portuguese language shall be available in the internet for consultation /51/ and /52/. In both cases stakeholders are invited to send comments regarding the project activity.

The same resolution defined the following as required local stakeholders:

- City Hall of Aracati
- City Council of Aracati
- Environmental Agency of Ceará (SEMACE)
- Environmental Agency of Aracati
- Community Associations of Aracati
- Federal Attorney for the Public Interest
- State Attorney for the Public Interest of Ceará
- Brazilian Forum of NGOs and Social Movements for Environment and Development

Validation team checked during the onsite visit that letters were sent by all required stakeholders and the Portuguese version of the PDD is available in the site: <https://sites.google.com/site/consultamd1/>.

Both (letters and site with Portuguese version of the PDD) have met the required deadline of 15 days previous to the starting of the global stakeholder process. Portuguese version of PDD was available in the site above mentioned on 10 October 2011.

No comments have been received.

PJRCES has reviewed letters of the invitations /51/ and considers the local stakeholder consultation was carried out adequately and followed local practices.



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### **4.13 COMMENTS BY PARTIES, GLOBAL STAKEHOLDERS AND NGOS**

The PDD, version 1.1, 13 November 2011, was made publicly available through the CDM website for a global stakeholder process for period of 30 days period from 17 November 2011 - 16 December 2011.

No comments has been received.



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### VALIDATION OPINION

*“Perry Johnson Carbon Emission Services, Inc (PJRCES) has performed a validation of the “Aeolis 2011 Wind Parks” in Brazil. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.*

*The review of the project design documentation and the subsequent follow-up interviews have provided PJRCES with sufficient evidence to determine the fulfillment of stated criteria.*

*The Host Country is Brazil and the Annex I Party is Italy. Both countries fulfill the participation criteria and have approved the project and authorized the project participants. The DNA from Brazil confirmed that the project assists in achieving its sustainable development objectives. The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards Brazil.*

*The project correctly applies ACM0002 version 12.2.0: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.*

*By generating renewable energy the project will displace fossil fuel based grid electricity in Brazil. The project results in reductions of CO<sub>2</sub> emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.*

*The monitoring plan complies with the applied methodology ACM0002 version 12.2.0. Adequate training and monitoring procedures have been developed and will be implemented before the starting date of the crediting period (01 January 2013).*

*The total emission reductions from the project are estimated to be on the average 102,053 tCO<sub>2e</sub> per year over the 7 year renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.*

*In summary, it is PJRCES’s opinion that the “Aeolis 2011 Wind Parks” in Brazil, as described in the PDD version 1.2 of “27 January 2012”, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002 version 12.2.0. This DOE thus requests the registration of the project as a CDM project activity.”*



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### 5 REFERENCES

/1/	PDD - Aeolis 2011 Wind Parks – 13112011 version 1.1
/2/	Design Descriptive Memorial Aracati Aeolis III made by Braselco for Servicos, Comercio de Equipamentos e Participacoes Ltda. for Aracati Aeolis Geracao de Energia S.A. dated February 2011
/3/	Design Descriptive Memorial Aracati Aeolis IV made by Braselco for Servicos, Comercio de Equipamentos e Participacoes Ltda. for Aracati Aeolis Geracao de Energia S.A. dated February 2011
/4/	Design Descriptive Memorial Aracati Aeolis V made by Braselco for Servicos, Comercio de Equipamentos e Participacoes Ltda. for Aracati Aeolis Geracao de Energia S.A. dated February 2011
/5/	ANEEL Manual of Power Sector Asset Control dated 2 June 2009
/6/	Prior Consideration form for UNFCCC dated 05 October 2011
/7/	Prior Consideration UNFCCC confirmation dated 5 November 2011
/8/	Prior consideration form for Brazilian DNA dated 5 October 2011
/9/	Prior Consideration DNA confirmation dated 05 October 2011
/10/	Wind power plant CER model dated 3 November 2011
/11/	Letter for the direction deciding to consider CDM for the implementation of the wind farms dated 12 September 2011.



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/12/	Contract Agreement Aracati Aeolis Geracao de Energia/BRZ dated 21 September 2011
/13/	Aracati Aeolis Financial Model 1 September 2011
/14/	Use of the Land Aeolis III
/15/	Use of the Land Aracati Aeolis IV
/16/	Use of the Land Aracati Aeolis V
/17/	Aracati/BRZ Power of attorney (Pages from Aracati agreement)
/18/	Proposal turbine Suzlon dated 16 August 2011
/19/	Proposal Construction CCB dated 02 August 2011
/20/	Preliminary License Aracati Aeolis III (LP 64.2011)
/21/	Preliminary License Aracati Aeolis IV (LP 60.2011)
/22/	Preliminary License Aracati Aeolis V (LP 69.2011)



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/23/	Aracati Aeolis Invitation Letter for Stakeholders Consultation – Receipt warning
/24/	Datasheet Aracati Aeolis III
/25/	Datasheet Aracati Aeolis IV
/26/	Datasheet Aracati Aeolis V
/27/	ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources (version 12.2.0)
/28/	Guidelines for completing the Project Design Document (CDM-PDD) and the Proposed New Baseline and Monitoring Methodologies (CDM-NM) (version 07)
/29/	Clean Development Mechanism Validation and Verification Manual version 01.2
/30/	Glossary of CDM terms (version 05)
/31/	Guidelines on the demonstration and assessment of prior consideration of the CDM version 4, (EB 62 Annex 13)
/32/	Tool for the demonstration and assessment of additionality (version 6.0.0)



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/33/	Tool to calculate the emission factor for an electricity system (version 2.2.1)
/34/	Modalities of Communication – dated 3 March 2012
/35/	Guidelines for the reporting and validation of plant load factors version 1 (EB 48 Annex 11)
/36/	Global stakeholder comments <a href="https://cdm.unfccc.int/Projects/Validation/DB/LT97F24DG37R3ZSY8NB0I5UBSF98VE/view.html">https://cdm.unfccc.int/Projects/Validation/DB/LT97F24DG37R3ZSY8NB0I5UBSF98VE/view.html</a>
/37/	Contract agreement between Aracati Aeolis Geração de Energia Ltda. and PJR CES dated 7 November 2011
/38/	Letter of Approval - LoA from Brazil  Brazilian DNA issues LoAs after review project documents including Validation Report.
/39/	Letter of Approval - LoA from Annex I country  Will be issued after Brazilian DNA LoA
/40/	Modalities and procedures for a clean development mechanism
/41/	PDD template version 3 of 28 July 2006
/42/	Brazilian DNA website ( <a href="http://www.mct.gov.br/index.php">www.mct.gov.br/index.php</a> )
/43/	Guidelines on the assessment of investment analysis version 5.0 (EB 62 Annex 5)
/44/	Guidelines on common practice version 1.0 (EB 63 Annex 12)
/45/	National Operator of the System (ONS) historic of generation 2011
/46/	Megajoule Certificate of wind estimation for Aracati Aeolis III, IV and V dated 14 March 2011
/47/	BNDES (information of loan cost) <a href="http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energia_eletrica_geracao.html">http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energia_eletrica_geracao.html</a>
/48/	Feasibility study dated 1 September 2011
/49/	PDD version 1.2 dated 27 January 2012  PDD submitted for registration
/50/	BRZ Consultoria Empresarial report - CDM potential for the wind farms dated 1 September 2011
/51/	Letters for local stakeholders and their receipts of deliver





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/52/	Local stakeholders site for consultation <a href="https://sites.google.com/site/consultamdl/">https://sites.google.com/site/consultamdl/</a>
/53/	Energy Research Company - data of the A-3 2011 auction <a href="http://www.epe.gov.br/leiloes/Paginas/default.aspx?CategoriaID=6734">http://www.epe.gov.br/leiloes/Paginas/default.aspx?CategoriaID=6734</a>
/54/	CCEE Electric Energy Commercialization Chamber Responsible for the collect, control and storage of data. It is done by the official System of Energy Data Collection
/55/	ANEEL (2004). Normative Resolution n° 77, 18 August 2004. Available at: <a href="http://www.aneel.gov.br/cedoc/ren2004077.pdf">http://www.aneel.gov.br/cedoc/ren2004077.pdf</a> .
/56/	Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenario (version 02), EB 22, Annex 3



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# APPENDIX A VALIDATION PROTOCOL



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**Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities**

Requirement	Reference	Conclusion
<b>About Parties</b>		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	<del>CAR-1</del> OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	<del>CAR-1</del> OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	<del>CAR-6</del> OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK
<b>About additionality</b>		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of	Kyoto Protocol Art. 12.5c,	OK



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Requirement	Reference	Conclusion
greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	CDM Modalities and Procedures §43	
<b>About forecast emission reductions and environmental impacts</b>		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
<b>For large-scale projects only</b>		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	<del>CL</del> OK
<b>About small-scale project activities (if applicable)</b>		
13. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK
15. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK
<b>About stakeholder involvement</b>		
16. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
17. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK



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Requirement	Reference	Conclusion
<b>Other</b>		
18. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
19. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies & circumstances.	CDM Modalities and Procedures §45c,d	OK
20. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
21. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
22. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK



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**Table 2: Requirements Checklist**

<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
<b>A. General requirements</b>			
<b>A.1 Project description and PDD</b>			
<b>A.1.1</b> Does the PDD sufficiently cover all the relevant elements of the project activity, is accurate as per the planned and/or implemented scheme, and provides a clear understanding of the nature of the project activity?	<p>The proposed project "Aeolis 2011 Wind Parks" will be a wind farm interconnected to the National Interconnected System in Brazil. The project will have 84 MW of installed capacity, consisting of 40 turbines, each with a 2.1 MW capacity.</p> <p>The project, consisting of three wind farms called Aeolis Aracati III (27.3 MW), Aracati IV (27.3 MW) and Aracati V (29.4 MW), will supply 84 MW of renewable energy to the SIN.</p> <p>The electricity generated will be sold to the Electric Energy Commercialization Chamber (in Portuguese Câmara de Comercialização de Energia Elétrica – CCEE) through a 20 years/100MW Power Purchase Agreement (PPA).</p> <p>The validation team has reviewed the project implementation schedule and lay outs and has carried out an on-site visit to assess the project.</p> <p>The project has not acquired its equipment or started the construction up to this moment, though it is not possible to state the commissioning date. The commissioning date will be defined after the equipments and services acquisition that will be done after the proposed project CDM Validation process.</p> <p>The technology to be implemented according to the</p>	<p>/1/</p> <p>/2/</p> <p>/3/</p> <p>/4/</p> <p>/5/</p> <p>/11/</p> <p>/12/</p> <p>/14/</p> <p>/15/</p> <p>/16/</p> <p>/17/</p> <p>/18/</p> <p>/19/</p> <p>/20/</p> <p>/21/</p> <p>/22/</p> <p>/24/</p> <p>/25/</p> <p>/26/</p> <p>/45/</p>	<p><del>CAR-2</del></p> <p><del>CLS</del></p> <p>OK</p>



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
	<p>engineering design is the Suzlon S97 wind turbine model, IEC Class III-A, based on a machine with three-blade rotor, horizontal axis upwind design. The machine is designed to produce electricity with wind speeds from 4 m/s (cut-in), reaching its rated capacity at speeds close to 13 m/s interrupting its generation in wind speeds higher than 20 m/s (cut- out). The hub of the rotor 3 fixed blades that sweep a circular area of 7,386 m<sup>2</sup> and 97 meters in diameter. The turbine is a tower made of tubular steel with about 96.2 meters high (resulting in 100 meters hub height). The tower will be attached to the ground on 16x16 meters concrete foundations. Figure 2 of the PDD presents main dimensions of the turbine. The tower of the wind turbine must have a mass of 248.90 tons, with a total of 368.20 tons. The minimum speed of the rotor is 12.0 RPM and a maximum of 15.5 RPM. The noise level of a single wind turbine at its base is 57dBA.</p> <p>The geographical coordinates of the project presented in the PDD has been cross checked with the concession land use agreement (see ref docs /14/, /15/ and /16/), this layout included the geographical coordinates of each of three sites. During the onsite visit the validation team visited locations by helicopter.</p> <p>The project will be located in the municipality of Aracati, Ceará state, and Northeast region of Brazil.</p>	/46/	
<b>A.1.2</b> Is the project a new installation and already commissioned, or does the project involve alteration of existing installation or process?	<p>The project will be a new installation hence it is not installed or commissioned.</p> <p>It consists of the installation of a new grid-connected renewable plant. The validation team has carried out an</p>	<p>/1/</p> <p>Site visit assessment plan</p> <p>Site visit photographs</p>	<p><del>CL5</del></p> <p>OK</p>



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
	onsite visit to Aracati municipality where the wind farm site is located during the week of 22 December 2011 in order to confirm that the description in the PDD reflects this proposed project activity.	Opening closing meeting form Attendance meeting sheet	
<b>A.1.3</b> What category does the project activity fall under: <ul style="list-style-type: none"> <li>▪ Large scale CDM project</li> <li>▪ Non-bundled small scale CDM project with annual emission reductions more than 15,000 tonnes</li> <li>▪ Bundled small scale with annual emission reductions more than 15,000 tonnes</li> <li>▪ Small scale CDM project activity with annual emission reductions less than 15,000 tonnes</li> </ul> Has a site visit been carried out for the project activity? If not, please justify	<p>The project activity falls under large scale CDM project since the project will supply 84MW according to the Design Descriptive Memorial.</p> <p>Team was able to confirm project activity is large scale during the site visit as project activity consists on the installation of 40 Suzlon turbines of 2.1 MW each.</p> <p>According to reference /10/ the estimate of emission reductions is 102,053 tCO<sub>2</sub>/year.</p> <p>The validation team has reviewed the Assessment Report /5/ and Emission Factor/ CERs spreadsheet /10/ in order to confirm that the description in the PDD reflects the proposed CDM project activity. This information was assessed during the onsite visit.</p>	/1/ /5/ /10/ Site visit photographs Site visit assessment plan	<del>CAR 4</del> <del>CL 5</del> OK
<b>A.1.4</b> Is the PDD prepared in accordance with the latest guidance from the CDM EB available on the UNFCCC website	PDD has been prepared in accordance with the latest template and guidance from CDM EB available on the UNFCCC CDM website.	/1/ /40/	CAR 4 OK
<b>A.2 Participation and Approval</b>			
<b>A.2.1</b> Please include and confirm the details of the participating project participants and the Parties involved.	<p>Project participants are stated on the PDD section A.3, as below:</p> <p>1) Aracati Aeolis Geração de Energia Ltda. (private entity)</p> <p>2) BRZ Consultoria Empresarial Ltda. (private entity)</p> <p>The Parties involved do not wishes to be considered as</p>	/1/	OK





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	project participant.		
<b>A.2.2</b> Has the participation of each project participant been approved by at least one Party involved, either in a letter of approval or in a separate letter specifically to approve participation?	<p>There will be two approvals, one from the Brazilian DNA and another from the Annex I Party. During the onsite visit LoAs were not available.</p> <p>LoA of host country is submitted after Brazilian DNA receive the final PDD, Validation Report (positive validation opinion) and other documents related to the validation of this project activity.</p> <p>Annex I Party was defined to be Italy and its LoA will be available after the Brazilian DNA LoA.</p>		<del>CAR-1</del> OK
<b>A.2.3</b> Has the letter of approval (LoA) been submitted and reviewed by the DOE? Please, confirm if the same was provided by the PP or directly by the DNA of the Party involved?	<p>Brazilian DNA requires final Validation Report (positive validation opinion) to issue the LoA.</p> <p>LoAs were provided by PP and revised by PJRCES.</p>		<del>CAR-1</del> OK
<b>A.2.4</b> Does the LoA confirm the following: <ul style="list-style-type: none"> <li>- Ratification of the Kyoto Protocol</li> <li>- Voluntary participation</li> <li>- The CDM project activity contributes to Host country's sustainable development</li> <li>- Title of the project activity is same as the PDD sent for registration</li> </ul>	Please, refer to A.2.2 and A.2.3		<del>CAR-1</del> OK
<b>A.2.5</b> Is the LoA conditional to a specific version of PDD or the validation report?	Please, refer to A.2.2 and A.2.3		<del>CAR-1</del> OK
<b>B. Baseline and monitoring methodology</b>			



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
<b>B.1 Methodology applicability</b>			
<b>B.1.1</b> Has the project proponent applied the relevant baseline and monitoring methodology that has been previously approved by the CDM Executive Board?	<p>The project proponent has applied the approved baseline and monitoring methodology ACM0002: "Consolidated baseline methodology for grid connected electricity generation from renewable sources" Version 12.2.0, valid from 17 September 2010 onwards, this methodology has been correctly applied since the project activity consists of the installation of a renewable electricity generation plant (wind farm) that will be installed at a site where no renewable power plant was operated previously.</p> <p>PDD version 1,1 stated version is 12.1.0 of the methodology. PP updated methodology version.</p>	<p>/1/ /5/ /10/ /27/</p>	<p><del>CAR-2</del> <del>CLS</del> OK</p>
<b>B.1.2</b> Does the project activity meet all of the applicability criteria defined in the approved methodology? Please clarify	<p>The applicability conditions for ACM0002 are met as follow:</p> <p>Applicability: this methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity.</p> <p>Validation opinion: the methodology has been correctly applied because the project activity consists of the installation of a renewable electricity generation plant (wind farm) that will be installed at a site where no renewable power plant was operated previously. The electricity generated will be dispatched to the National Interconnected System.</p> <p>Project activity involves installation of a wind farm with</p>	<p>/1/ /10/ /27/</p>	<p><del>CAR-2</del> <del>CLS</del> OK</p>



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	an installed capacity of 84 MW; it meets the applicability criteria defined in the approved methodology.		
<b>B.1.3</b> Does the project activity involve any emissions within the project boundary that contribute to more than 1% of the total expected annual average emission reductions which are not addressed/considered in the methodology? Please explain, if any.	Since the project activity consists of the installation of a renewable electricity generation plant (wind farm) that will be installed at a site where no renewable power plant was operated previously, project activity does not involve any emission within the project boundary that contribute to more than 1% of the total annual average emission reductions which are not considered in the methodology ACM 0002 version 12.2.0	/1/ /10/ /27/ /29/	<del>CAR-2</del> <del>CL-5</del> OK
<b>B.1.4</b> Does the project boundary defined include all emission sources and the clear demarcation on the physical and geographical boundary of the proposed CDM project activity? Is the selection of all emission sources (baseline, project and leakage) been justified?	The project boundary defined in the PDD section B3 includes all emission sources, in accordance with the applied methodology ACM0002. For baseline, CO <sub>2</sub> emissions from the grid electricity generation (including existing grid-connected power plants and the addition of new grid-connected power plants) have to be accounted. For project activity (wind electricity production) no greenhouse gas emissions have to be considered. The validation team has reviewed the Design Descriptive Memorial (Ref. /2/, /3/ and /4/).	/1/ /2/ /3/ /4/ /10/ /27/	<del>CAR-2</del> <del>CL-5</del> OK
<b>B.2 Baseline Selection</b>			
<b>B.2.1</b> Does the methodology define a specific baseline directly for the project type, or does it refer to a tool for arriving at the baseline for the project activity?	The approved methodology ACM0002 version 12.2.0 defines a specific baseline directly for the wind farm projects. It states that If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:	/1/ /2/ /3/ /4/	<del>CAR-2</del> <del>CAR-4</del> OK



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	Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin calculations (PDD section B.6.1) and emission reduction calculation in PDD section B.6.3 as per the “Tool to calculate the emission factor for an electricity system”.  The validation team has confirmed during the desk review and onsite visit that the baseline described in the PDD has been correctly applied with the methodology ACM0002 version 12.2.0.	/10/ /27/	
<b>B.2.2</b> Has the CDM project activity considered all alternatives available to the project proponent?	The approved methodology ACM0002 version 12.2.0 defines a specific baseline directly for the wind farm projects.  The baseline described in the PDD is in accordance with the methodology ACM0002 version 12.2.0.	/1/ /10/ /27/	<del>CAR-2</del> OK
<b>B.3.1</b> Is the documentation of the baseline determination clear regarding the following: - All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. - All Documentation is relevant as well as correctly quoted and interpreted. - Assumptions and data can be deemed reasonable. - Relevant national and/or sectoral policies and	Information webhosted on the Brazilian Ministry of Science and Technology (MCT) website, the Brazilian DNA, confirms that in the absence of the project activity, the electricity delivered to the grid 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 information/historical data provided by MCT used to calculate the CM.  The methodology ACM0002 has been correctly applied,	/1/ /10/ /27/ /33/ /42/	<del>CAR-2</del> OK



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<i><b>CDM Validation Requirement</b></i>	<i><b>Remarks</b></i>	<i><b>Evidence</b></i>	<i><b>Conclusion</b></i>
<p>circumstances are considered and listed in the PDD and the same has been confirmed.</p> <p>- The methodology is correctly applied to identify what would have happened in the absence of the CDM project activity proposed.</p>	<p>according to the baseline methodology procedure, if the project activity is the installation of a new grid-connected renewable power plant/unit, 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"</p>		
<p><b>B.3.2</b> Have all the assumptions, calculations, rationale and other sources described in the PDD been verified to determine if the baseline scenario identified is reasonable.</p>	<p>The data provided by Brazilian Ministry of Science and Technology (MCT) confirms that baseline scenario identified in the PDD is in accordance with the approved methodology ACM0002 version 12.2.0. The validation team can conclude that the assumptions, calculations, rationale and other sources described in the PDD used to determine the baseline scenario are reasonable and have correctly applied.</p>	<p>/1/ /10/ /27/ /42/</p>	<p><del>CAR-2</del> OK</p>
<p><b>B.2.3</b> Cross check the information provided in the PDD with other verifiable and credible sources, such as local expert opinion, if available</p>	<p>The information provided in the PDD regarding to the baseline determination and combined margin calculation have been cross checked with the information available from MCT, this data confirms that in the absence of the project activity, the electricity delivered to the grid 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 information/historical data.</p> <p>The information used is available at:</p>	<p>/1/ /10/ /27/ /42/</p>	<p><del>CAR-2</del> OK</p>



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	<a href="http://www.mct.gov.br/index.php/content/view/327118.html#ancora">http://www.mct.gov.br/index.php/content/view/327118.html#ancora</a>		
<b>B.3 Additionality</b>			
<b>B.3.1</b> Is the tool applied to discuss additionality in line with the CDM tools and documents provided CDM EB and the specific methodology applied for the project activity?	PP has applied the “Tool for the demonstration and assessment of additionality” version 6.0.0	/1/ /27/ /32/	<del>CAR-2</del> OK
<b>B.3.2</b> If the start date of the project activity prior to the date of publication of the PDD for stakeholder comments it shall be demonstrated that the CDM benefits were considered necessary in the decision to undertake the project as a proposed CDM project activity in line with the “Guidance on the Demonstration and Assessment of prior consideration of the CDM”?	According to evidence documentation the starting date of the project activity is post to the date of the publication of the PDD for global stakeholder consultation. Section C.1.1. states starting date of the project is 15 March 2011. PP shall clarify the starting date of the project. According to the CDM glossary the starting date of a CDM project activity means the starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins, based on this, the audit team confirms that the starting date will be taken in the future. The validation team has confirmed that this is a new project activity, the PP has submitted a letter of prior consideration dated on 5 October 2011, is information is available on the UNFCCC website.	/1/ /6/ /7/ /8/ /9/ /30/	<del>CAR-7</del> OK
<b>B.3.3</b> Does the PDD identify all credible alternatives to the project activity in order to assess additionality, if applicable?	PP has applied the Tool for the demonstration and assessment of additionality version 6.0.0.	/1/ /27/ /32/	<del>CAR-2</del> OK



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
<b>B.3.4</b> What are the barriers applicable to the project activity that have been discussed to prove the project additionality?	PP has selected the investment analysis to demonstrate the additionality of the proposed project activity.	/1/ /27 /18/ /19/ /5/ /10/	<del>CAR-3</del> OK
<b>B.3.5 <u>Investment Analysis:</u></b>			
a) In case of investment cost analysis, please confirm if a suitable indicator has been considered for the remaining alternatives available to the project activity.	a) Yes, team was able to confirm that the Internal Rate Return (IRR) is the indicator as per Guidelines on the assessment of investment analysis version 5.0 paragraph 3 (Ref.43/).	/1/ /5/ /10/ /18/ /19/ /27/ /43/	<del>CAR-3</del> OK
b) In case of Benchmark analysis, please confirm whether the benchmark applied is relevant to the type of the financial indicator	b) Yes, according to the Guidelines on the assessment of investment analysis, paragraph 19, the benchmark analysis is the appropriate method to demonstrate the additionality of this project Activity as it is a wind power plant.		
c) Is the period of assessment considered for the financials in line with the guidance?	c) Yes, the period considered is 20 years which is the life time of equipments, and it is in accordance to the Guidelines on the Assessment of Investment Analysis - Version 05, paragraph 3.		
d) Are the input values considered in the investment analysis are valid and applicable at	d) Yes, the validation team can conclude that the		



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the time of the investment decision taken by the project participant?	assumptions, calculations, rationale and other sources described in the PDD used on the investment analysis are valid and have correctly applied.		
e) In cases where the financials source any input value from Feasibility Study Reports (FSRs) approved by National authorities ensure that the same is in line with the guidance in the VVM. (Paragraph 111 of VVM, ver 01.1)	e) Yes, the validation team conducted a thorough assessment of all parameters and assumptions used in financial calculations. Financial parameters used are available from the auction of energy of August of 2011 on the first page of the report from the Energy Research Firm (EPE) of the Brazilian Ministry of Energy and Mining <a href="http://www.epe.gov.br/imprensa/PressReleases/20110817_1.pdf">http://www.epe.gov.br/imprensa/PressReleases/20110817_1.pdf</a>		
f) Have any sunk costs, if any, been used for the financials?	f) No, there are no sunk costs involved on this project activity.		
g) Has the fair value/salvage value been considered at the end of the assessment period? Is the value considered for fair value in line with the guidance?	g) Yes, fair value has been considered and calculated in accordance with local accounting regulations.		
h) Has the depreciation and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, are added back to net profits	h) Yes, they are properly considered to net profits for the purpose of calculating the financial indicators.  i) No, financial expenditures have not been considered in		





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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
<p>for the purpose of calculating the financial indicators (e.g. IRR, NPV)</p> <p>i) Have any cost of financing expenditures (i.e. loan repayments and interest) included in the calculation of project IRR? Please ensure the same is not considered in IRR calculation.</p> <p>j) In case the project involves calculation of equity IRR, please ensure that only the portion of investment costs, which is financed by equity is considered as the net cash outflow.</p> <p>k) Has the financials been presented transparently in a separate spreadsheets with formulas readable for the DOE?</p> <p>l) <u>Sensitivity analysis</u>:</p> <ul style="list-style-type: none"> <li>▪ Have all variables, which constitute more than 20% of either total project costs or total project revenues subjected to reasonable variation?</li> <li>▪ Have the results of this variation presented in</li> </ul>	<p>IRR calculation.</p> <p>j) The portion of investment costs which is financed by equity considered is as the net cash outflow.</p> <p>k) Yes, financials are presented transparently in separate spreadsheets with formulae readable accordingly.</p> <p>l)</p> <ul style="list-style-type: none"> <li>• Yes, variables have been properly subjected to reasonable variation.</li> <li>• Yes, the variation results presented in the PDD and the spreadsheets were reproducible by the team.</li> </ul>		



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<p>the PDD and the spreadsheets (reproducible manner)?</p> <ul style="list-style-type: none"> <li>Has a reasonable variation been considered in the sensitivity analysis in the project context?</li> </ul>	<ul style="list-style-type: none"> <li>Yes, considered variation is considered proper and reasonable in the sensitivity analysis for this project activity.</li> </ul>		
<p><b>B.3.6</b> Have the data, rationales, assumptions, justifications and documentation provided by Project Participants to demonstrate the additionality of the project been assessed and verified for the reliability and credibility? Assess the presented evidence using local knowledge and sectoral and financial expertise.</p>	<p>The data provided by the project participants to demonstrate the additionality were cross checked.</p> <p>Brazilian Ministry of Science and Technology (MCT), the Brazilian Ministry of Mining and Energy (MME), Brazilian Electricity Regulatory Agency (ANEEL), Electric System National Operator (ONS), Eletrobras, Ceará Environmental Agency, UNFCCC regulate and webhost information used to demonstrate additionality.</p> <p>Validation team visited all websites, checked and assessed all information used to demonstrate and assess the additionality presented by the various governmental and non-governmental entities.</p> <p>The investment analysis was conducted according to option III of the “<i>Tool for the demonstration and assessment of additionality</i>”. According to it project activity is not the most economically or financially attractive; nor economically or financially feasible, without the revenues from the sale of certified emission reductions (CER).</p> <p>According to guidelines of investment analysis, paragraph 19, benchmark analysis is the most appropriate method to demonstrate the additionality of the project Activity once the alternative to the</p>	<p>/1/ /27/ /32/ /43/</p>	<p><del>CAR-2</del> <del>CAR-3</del> OK</p>



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
	<p>implementation of the wind power plant is the supply of electricity from the grid.</p> <p>According to PDD, PP has demonstrated and assessed the additionality by using the benchmark analysis.</p> <p>The validation team can conclude that the data, rationales, assumptions, justifications and documentation and sources presented in the PDD and used to demonstrate and assess the additionality are reliable and have correctly applied.</p>		
<p><b><i>B.3.7 Barrier Analysis:</i></b></p> <p>a) Has it clearly been demonstrated that the issues identified in project implementation prevent a potential investor from pursuing the implementation of the proposed project activity without the project being registered as a CDM project activity?</p> <p>b) Do any of the issues identified have a clear direct impact on the financial returns of the project activity, except in cases of issues related to risk (like technical risks), or barriers related to unavailability of sources of finance, been discussed?</p> <p>c) Please conclude if the barriers discussed are ‘<i>real and prevent the implementation of the project but not prevent at least one of the possible alternatives</i>’?</p>	NA	<p>/1/ /27/ /33/</p>	OK
<p><b><i>B.3.8 Common practice analysis:</i></b> Has a common practice analysis been carried out as a credibility</p>	<p>PP has applied the “Tool for the demonstration and assessment of additionality”, version 05.2.1. PP is</p>	/1/	<del>CAR 2</del>



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<i><b>CDM Validation Requirement</b></i>	<i><b>Remarks</b></i>	<i><b>Evidence</b></i>	<i><b>Conclusion</b></i>
check of the other available evidence used by the project participants to demonstrate additionality, in case of large-scale CDM project activities (unless the proposed project type is first-of-its kind). Please confirm this is in line with the VVM and the additionality tools.	requested to apply the guideline on common practice (Ref. /44/)	/29/ /32/ /44/	OK
<b>B.4 Emission Reduction Calculations</b>			
<b>B.4.1 Baseline Emissions</b>			
B.4.1.1 Are correct equations and parameters used in accordance with the approved methodology selected in calculating the baseline emissions?	<p>Yes, baseline emission calculation of the project has been calculated accordingly, through the multiplication between the net electricity to be supplied to the grid and the combined emission factor of the Brazilian grid.</p> <p>The validation team has reviewed the following documents in order to confirm that the electricity generation has been estimated in conservative manner:</p> <p>Design Descriptive Memorial Aracati Aeolis III</p> <p>Design Descriptive Memorial Aracati Aeolis IV</p> <p>Design Descriptive Memorial Aracati Aeolis V</p> <p>Proposal Turbine Suzlon</p> <p>Proposal Construction</p> <p>Emission Factor/ CERs spreadsheet</p> <p>Datasheet Aracati Aeolis III</p>	/1/ /2/ /3/ /4/ /10/ /18/ /19/ /24/ /25/ /26/ /27/	<del>CAR-2</del> <del>CAR-5</del> OK



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CDM Validation Requirement	Remarks	Evidence	Conclusion
	Datasheet Aracati Aeolis IV  Datasheet Aracati Aeolis V		
B.4.1.2 In case of data and parameters that are not monitored throughout the crediting period, and have already been determined and will remain fixed throughout the crediting period, assess that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions ( <i>less baseline emissions</i> )	<p>The emission factor of Brazil is calculated based on all power plants connected to the SIN and centrally dispatched by the ONS. The Brazilian Designed National Authority (DNA) calculates and provides in a monthly basis <i>ex-post</i> emission factors of the SIN according to the “<i>Tool to calculate the emission factor for an electricity system</i>”. Emission factor is available at: <a href="http://www.mct.gov.br/index.php/content/view/307492.html">http://www.mct.gov.br/index.php/content/view/307492.html</a></p> <p>A spreadsheet has been provided by the PP with all calculations.</p> <p>The validation team confirms that <i>ex ante</i> values, assumptions and data were used by the project participant for 2010 estimate. For the operation margin, the project activity will calculate the Operating on an <i>ex post</i> basis.</p> <p>All parameters are listed in the PDD and their reference and sources were checked and considered appropriated.</p>	/1/  /27/ /33/ /10/ /42/	<del>CAR 5</del>  OK
<b>B.4.2 Project Emission</b>			
B.4.2.1 Are correct equations and parameters used in accordance with the approved methodology selected in calculating the project emissions?	According to the approved methodology ACM 0002 version 12.2.0 project emission PEy = 0.	/1/  /27/	<del>CAR 2</del>  OK
B.4.2.2 In case of data and parameters that are not	Not applicable. Please, refer to B.4.2.1	/1/	OK



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
monitored throughout the crediting period, and have already been determined and will remain fixed throughout the crediting period, assess that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions ( <i>higher project emissions</i> )		/27/	
<b>B.4.3 Leakage Emissions</b>			
B.4.3.1 Are correct equations and parameters used in accordance with the approved methodology selected?	According to the approved methodology ACM 0002 version 12.2.0 no leakage emissions are considered.	/1/ /27/	<del>CAR-2</del> OK
B.4.3.2 In case of data and parameters that are not monitored throughout the crediting period, and have already been determined and will remain fixed throughout the crediting period, assess that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions ( <i>less baseline emissions</i> )	Please, refer to B.4.3.1.	<del>/1/</del> <del>/27/</del>	<del>CAR-2</del> <del>OK</del>
<b>B.4.4</b> Please mention the expected emission reductions generated from implementation of the project activity.	Expected emission reductions during the crediting period 714,372 tCO <sub>2</sub> e Expected annual emission reductions: 102,053 tCO <sub>2</sub> e.	/1/ /10/ /27/	OK



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
<b>B.5 Monitoring Plan</b>			
<b>B.5.5</b> Does the monitoring plan defined in the PDD, contain all necessary parameters required for calculating 'baseline emissions' in line with the methodology?	<p>The monitoring plan described in the PDD includes the quantity of net electricity generation supplied by the project plant/unit to the grid in year and it will be monitored in accordance with monitoring methodology of the approved methodology ACM 0002 version 12.2.0.</p> <p>The project consists of 3 zones where the wind turbines will be located. Each turbine includes a complete operational, meters and control system which measures the energy produced and sends it to a Class 0.2S power meter and controlling software.</p> <p>The plants will include one main and one backup meters located at the collector substation and other two metering devices installed at the grid connection point. These two meters located at the grid connection point will register the electricity dispatched to the grid by the Aracati project, the three wind power plants that compose the Aracati project</p> <p>According to Design Description Memorial (Refs. /2/, /3/ and /4/), the net electricity "EGy" will be monitored using the meters and the amount of electricity generated will be cross checked with energy company invoice.</p> <p>Electric Energy Commercialization Chamber (CCEE) should carry out the electricity payment in a monthly basis.</p>	/1/ /2/ /3/ /4/ /10/ /18/ /19/ /24/ /25/ 26/ /27/	OK
<b>B.5.6</b> Does the monitoring plan defined in the PDD, contain all necessary parameters required for calculating 'project emissions' in line with the methodology?	Please refer to B.4.2.1	/1/ /27/	OK



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
<b>B.5.7</b> Does the monitoring plan defined in the PDD, contain all necessary parameters required for calculating 'leakage emissions' in line with the methodology?	Please refer to B.4.3.1.	/1/ /27/	OK
<b>B.5.8</b> Has the feasibility of the monitoring arrangements within the project design been confirmed through interviews and physical visits to the site, where required?	<p>Based on the Design Descriptive Memorial (Refs. /2/, /3/ and /4/),, the validation team can confirm the feasibility of the monitoring.</p> <p>The project consists of 3 zones where the wind turbines will be located. Each turbine includes a complete operational, meters and control system which measures the energy produced and sends it to a Class 0.2S power meter and controlling software.</p> <p>The plants will include one main and one backup meters located at the collector substation and other two metering devices installed at the grid connection point. These two meters located at the grid connection point will register the electricity dispatched to the grid by the Aracati Project, the three wind power plants that compose the Aracati Project</p> <p>According to Design Description Memorial, the net electricity "EGy" will be monitored using the meters and the amount of electricity generated will be cross checked with CCEE invoice.</p>	/1/ /2/ /3/ /4/ /10/ /18/ /19/ /24/ /25/ /26/ /27/	OK
<b>B.5.9</b> The implementation of the monitoring plan, quality assurance and quality control procedures are verifiable	According to PDD and Design Descriptive Memorial, the implementation of the monitoring plan, quality assurance and quality control are according to ONS, ANEEL and CCEE requirements.	1/ /2/ /3/ /4/ /10/ /18/ /19/	<del>CAR-2</del> <del>CAR-5</del> OK





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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
		/24/ /25/ /26/ /27/	
<b>C. Crediting Period</b>			
<b>1.1</b> Has the start date of the project activity been defined in line with the latest EB guidance? What has been defined as the start date of the project activity?	According to the CDM glossary the starting date of a CDM project activity means the starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins.	/1/ /30/	<del>CAR-7</del> OK
<b>1.2</b> Has a crediting period been clearly defined in the PDD?	A seven year twice renewable crediting period has been chosen.	/1/	OK
<b>2. Local stakeholder consultation</b>			
<b>D.1</b> Have all relevant stakeholders been identified for the project activity?	The stakeholders includes: Federal Attorney for the Public Interest; State Attorney for the Public Interest of Ceará; Environmental Agency of Ceará (SEMACE); Brazilian Forum of NGOs and Social Movements for Environment and Development; City Hall of Aracati; City Council of Aracati; Environmental Agency of Aracati; Community Associations of Aracati; The PP has carried out local stakeholder consultation on 17 October 2011. Attendance list and invitation letter are available as evidence, stakeholder were invited by the PP by mail.	/1/ /23/	OK



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## VALIDATION REPORT

<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
	<p>The validation team has interviewed the following person during the onsite visit:</p> <p>João Silva – Surubim of Aracati Association</p> <p>The validation team has received positive comments about the project and can confirm that all relevant authorities and neighbors have been involved in the project.</p>		
<b>D.2</b> What means have been used for the inviting comments from the stakeholders?	<p>Stakeholders were invited by the PP by letters sent by mail. All sent letters have warning receipts proving the reception by the stakeholders.</p> <p>Letters were sent on 17 October 2011 and warning receipts were signed on 18 by the stakeholders.</p>	<p>/1/ /23/</p>	OK
<b>D.3</b> Does the PDD include a summary of the comments received from the stakeholders?	No comments were received by the PP	/1/	OK
<b>D.4</b> Has a report on the due account taken of any comments received been described clearly in the PDD?	No comments were received by the PP.	/1/	OK
<b>E. Environmental impacts Assessment</b>			
<b>E.1</b> Have the project participants undertaken an analysis of environmental impacts and if the host country requires and environmental?	<p>The PP has presented preliminary environmental licenses.</p> <p>Environmental study has been approved by the Environmental Agency of Ceará state when preliminary licenses were issued.</p>	<p>/1/ /20/ /21/ /22/</p>	<p><del>CL</del> OK</p>
<b>E.2</b> Does the project create any adverse environmental effects? Have the same been recorded in the PDD?	No, refer to E.1.	/1/	<del>CL</del>



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<i>CDM Validation Requirement</i>	<i>Remarks</i>	<i>Evidence</i>	<i>Conclusion</i>
			OK
<b>E.3</b> Does the project comply with environmental legislation in the host country?	Yes, refer to E.1.	/1/ /20/ /21/ /22/	<del>CL</del> OK



## VALIDATION REPORT

***Table 3: Resolution of issues identified in table 2 of the validation protocol***

<b><i>Draft report clarification requests, corrective action requests and forward action request</i></b>	<b><i>Ref. to the section of the table 2 above</i></b>	<b><i>Summary of project owner response</i></b>	<b><i>Validation team conclusion</i></b>
CAR 1 LoAs have not been presented by the PP.	A.2.2.	The LoA is issued after the validation report by the DNA Brazil. Annex 1 Party has been defined (ERPA signed) but LoA will be done after Brazilian DNA LoA issuance.	It is regular procedure in Brazil. After having the positive validation opinion from DOE, Brazilian DNA issues LoA and having this host country LoA the Annex I country will issue its LoA.  CAR 1 is closed (after submitting PDD and the validation report to the DNA and having its approval).
CAR 2 PP shall use in the PDD updated versions of methodology, tools and guidelines.	Sections: A. B. C. D. E.	All methodologies, tools and guidelines versions were updated according to the last version available in the UNFCCC website. Regarding the Common Practice, it was used the Guideline on Common Practice, v 1.0, EB. 63. It was also used the ACM0002 - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" - version: 12.2.0., Tool for the demonstration and assessment of additionality, version 06.0.0., Tool to calculate the emission factor for an electricity system, version 2.2.1.	Final version of PDD (version 1.2) and spreadsheets have been reviewed by the validation team and the updated versions of the methodologies, tools and guidelines have been used. Guidelines on Common Practice v.1.0 has been approved on EB 63 (Annex 12), 29 September 2011 which was applied in a consistent and transparent way.  CAR 2 is closed.
CAR 3 PP shall correct the statement of the financial indicators.	B.3.4 B.3.5 B.3.6	The statement was corrected accordingly, changing “,” per “.” and vice versa.	Final version of PDD (version 1.2) and spreadsheets have been reviewed by the validation team and the necessary changes have been done accordingly.



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			CAR 3 is closed.
<b>CAR 4</b> PP shall indicate on the PDD project design documentation of the wind farms	A.1.3 B.1.4 B.2.1 B.4.1.1 B.5.8 B.5.9	The project design documentation was indicated in page 7, table 2: all wind project technical characteristics was described as installed capacity, net generation, plant load factor, manufactor, number of units, life time, etc. All information was obtained in documents references: /2/, /3/ /4/ and /5/.	Documents provided by the PP (Ref.: /2/, /3/, /4/ and /5/ mention the technical characteristics related to the wind farm. These documents have been crosschecked with PDD version 1.2 by validation team. Information considered satisfactory.  CAR 4 is closed.
<b>CAR 5</b> PP shall provide plant load factor according to the Guidelines for reporting the plant load factors (Ref. /35/).	B.4.1.2	The Plant Load Factor was based on the calculation provided by an engineering company called “Braselco”, mentioned in PDD Table 6. The plan load factor was also verified by a third specialized company called Megajoule.	Plant load factor applied was the average for the all wind farms of the site and was determined by a engineering company (/2/, /3/ and /4//) and confirmed by third party company (Megajoule, /46/) and in accordance to the Guidelines for reporting the plant load factors. Documents and values were crosschecked by the validation team.  CAR 5 is closed.
<b>CAR 6</b> Parties participating in the CDM shall designate a national authority for the CDM as per M&P paragr. 29	Validation protocol table 1 item 6	The national designated authority for the CDM is the representative of BRZ Consultoria Empresarial Ltda.(host party) as F-CDM-MOC	PP has defined the authority and presented F-CDM-MOC (/34/) filled.  CAR 6 is closed.
<b>CAR 7</b> PP is required to explain choice of the starting date of the project activity.	C.1.1	The starting date of the project activity is 12/09/2011, when the shareholders decided to develop Aeolis project considering CDM revenues. (Ref. /11/)	PP has clarified the choice of the starting date and the letter of the board decision was available for DOE. This date and the evidences presented justify sufficiently the choice.



## VALIDATION REPORT

			CAR 7 is closed.
CL1 PP shall clarify which Preliminary Licenses are related to Wind Farms III, IV and V	E	It was adjusted accordingly in PDD page 40.	This windfarm has 3 different preliminary licenses (LP) one for each farm: - Aracati Aeolis III LP valid until 06/07/2013; - Aracati Aeolis IV LP valid until 10/07/2013; - Aracati Aeolis V LP valid until 10/07/2013. Information included in the PDD version 1.2.  CL 1 is closed.
CL 2 PP shall indicate the data and parameters that were available at validation.	B	The CER calculation was based on the ex ante available information (BM and OM). It was used the 2010 BM and OM information. The monitoring will be done based on an ex ante basis.	PP included the year base used for emission factor and CER calculation both in the PDD and spreadsheets.  CL 2 is closed.
CL 3 PP shall clarify acronyms used in the PDD	Sections: A. B. C. D. E.	It was adjusted accordingly, mainly ANEEL (In Portuguese: Agencia Nacional de Energia Elétrica) and ONS (In Portuguese: Operador Nacional do Sistema.)	Validation team has reviewed the final version of PDD (version 1.2) and all acronyms were explained.  CL 3 is closed.
CL 4 ex 5 PP shall clarify the currency exchange rates	B.3.4. B.3.5.	It was adjusted accordingly, page 17, Table 6.	Table 6 of the PDD refers to assumptions used for cash flow analysis. Some data have not had the currency used. PP has revised PDD and currency exchange is presented.  CL 4 is closed.



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<p>CL 5 ex CL 7 PP shall clarify the number of the figure in the PDD describing the turbine.</p>	<p>A.1.1. A.1.2. B.1.1. B.1.2. B.1.3. B.1.4. B.2.1. B.2.2. B.2.3.</p>	<p>It was adjusted accordingly, Page 8, Table 2.</p>	<p>Table 2 of the PDD refers to technical characteristics of the wind farm and some figures were not as per the technical design descriptive memorial and datasheets (Refs.: /2/, /3/, /4/, /24/, /25/ and /25/. PP has updated PDD and validation team checked the figures in version 1.2 of the PDD which are consistent with the mentioned references.</p> <p>CL 4 is closed.</p>
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# **APPENDIX B**

## **VALIDATION TEAM DETAILS**





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**VALIDATION REPORT**

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<i><b>Team Member Name</b></i>	<i><b>Role</b></i>	<i><b>Experience</b></i>
Claudia Freitas	Lead validator	CDM lead validator and lead verifier mainly for renewable energy projects.
Ricardo Costa	Team member	CDM validator team member
João Hildebrandt	Technical expert	Expert renewable energy (wind)
Bilal Anwar	Technical Reviewer	CDM Expert, Technical expert on CDM and other GHG reduction Projects.