

Validation Report

Report for:

OEA Eólica Corredor do Senandes 2 Ltda.
OEA Eólica Corredor do Senandes III Ltda.
OEA Eólica Corredor do Senandes IV Ltda.
OEA Eólica Vento Aragano I Ltda.
Enerbio Consultoria Ltda – ME

Validation of CDM project for Corredor dos Senandes CDM Project

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Date : 27/12/2012
Work carried out by : Iuri de Araújo Barroso
Mara Regina Mendes

Work verified by : Márcio Pragana
Talita Beck
Javier Vallejo Drehs

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1 Executive Summary

Lloyd's Register Quality Assurance Limited has been contracted by OEA Eólica Corredor do Senandes 2 Ltda., representing the project participants (PP), to undertake validation of the proposed project activity "Corredor dos Senandes CDM Project" (hereafter referred as the Project). The validation has been performed through a process of document review based on the project design document, Version 01 dated 05/04/2012 initially submitted for validation and the subsequent revisions, follow-up interviews with the stakeholders, resolution of outstanding issues and issuance of the validation report.

Corredor dos Senandes CDM Project is a greenfield project located in the municipality of Rio Grande, state of Rio Grande do Sul, Brazil. The project will generate electricity by implementing and operating 40 horizontal-axis wind turbines, each with 2.7 MW, with a total nominal capacity of 108 MW and an estimated net electricity generation of 448,365 MWh/year. In the baseline, electricity delivered to the grid by the project activity would have been generated by the operation of grid-connected power plants and by the addition of new generation sources. The project activity will promote GHG emission reductions by displacing fossil fuel-based electricity generation that would otherwise have occurred.

The Starting Date of the project activity, 18th August 2011, is the date of realisation of Brazilian 4th Reserve Power Auction (4^o Leilão de Energia de Reserva - Leilão Nº 003/2011), in which the four electricity generation facilities Corredor do Senandes II, Corredor do Senandes III, Corredor do Senandes IV, and Vento do Aragano I, had their energy contracted. This auction legally binds the PP to supply the agreed amount of energy.

The validation team has found through the validation process 02 CARs and 09 CLs. The PPs have taken actions and submitted to LRQA all necessary additional explanations, evidence and document revisions. The validation team is of the opinion that the proposed project activity as described in the project design document 04.1 dated 17/12/2012 meets all the relevant UNFCCC requirements for the CDM, as well as the host country's national requirements

The fulfilment of the requirements as set forth in Article 12 of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), the modalities and procedures for a CDM (CDM M&P) and relevant decisions of the Conference of the Parties, serving as meeting of the Parties to the Kyoto Protocol (COP/MOP) and the Executive Board of the CDM (CDM-EB) have been evaluated and conformance to the validation requirements were confirmed based on the given information. A risk based approach was taken to conduct the validation and corrective action requests (CARs) and clarifications (CLs) were raised for relevant actions by the PP.

Prior to the submission of the Project Design Document and the Validation Report to the CDM Executive Board, the project received the written approval of voluntary participation from the DNA of Brazil, including the confirmation that the Project assists the country in achieving sustainable development. For details about the validation host country approval please refer to the Validation protocol in Appendix F, section 1.

If implemented as designed, the project is likely to achieve the emission reductions and contribute to the sustainable development of the host country. LRQA therefore will request the registration Corredor dos Senandes CDM Project to the CDM Executive Board as a CDM project activity.

Lloyd's Register Quality Assurance Ltd
Hiramford
Middlemarch Office Village
Siskin Drive
Coventry CV3 4FJ
United Kingdom

Registered office:
Lloyd's Register
71 Fenchurch Street
London EC3M 4BS
United Kingdom

Abbreviations

ANEEL	Brazilian Electric Energy National Agency
BE	Baseline emissions
BNDES	National Bank of Economic and Social Development
CARs	Corrective action requests
CAPEX	Capital Expenditure
CCEE	Brazilian Electric Energy Commercialization Chamber
CDM	Clean development mechanism
CDM-EB	Executive board of clean development mechanism
CDM M&P	Modalities and procedures for a clean development mechanism
CERs	Certified emission reductions
CIMGC	Brazilian Interministerial Commission on Global Climate Change
CLs	Clarification requests
COP/MOP	Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol
CSSL	Social contribution on net profit
DNA	Designated national authority
DOE	Designated operational entity
EIA	Environmental impacts assessment
EF	Emission factor
ERPA	Emissions reduction purchase agreement
FAR	Forward action requests
FEPAM	Fundação Estadual de Proteção Ambiental (Rio Grande do Sul State Environmental Agency)
GHG	Greenhouse gas
GSP	Global stakeholders' consultation process
INCC	National Construction Cost Index
IPCC	Intergovernmental panel on climate change
IRR	Internal rate of return
KP	Kyoto Protocol of the United Nations Framework Convention on Climate Change
kW / kWh	Kilowatt / Kilowatt hour
LE	Leakage emissions
LoA	Letter of approval
LR	Lloyd's Register
LRQA	Lloyd's Register Quality Assurance Limited
MW / MWh	Mega watt / Mega watt hour
NCV	Net calorific value
NGO	Non governmental organisation
ODA	Official development aid
OEA	Odebrecht Energias Alternativas S.A.
O&M	Operation and Maintenance costs
OPEX	Operational Expenditure
ONS	National System Operator
PDD	Project design document
PE	Project emissions
PP	Project participant
PPA	Power Purchase Agreement
PROINFA	Brazilian Incentive Program for Alternative Sources of Electric Energy
SIN	National Interconnected Electric Energy Generation and Transmission System
tCO ₂ e	Tonnes of carbon dioxide equivalent

TUSD	Tariff on the use of electricity transmission and distribution system
UNFCCC	United Nations Framework Convention on Climate Change
CDM VVS	CDM Validation and Verification Standard
WTG	Wind Turbine Generator
WPP	Wind Power Plant

2 Introduction

The project participant (PP) represented by OEA Eólica Corredor do Senandes 2 Ltda., has contracted with Lloyd's Register Quality Assurance Limited (LRQA) to undertake validation of the proposed project activity "Corredor do Senandes CDM Project". This report summarises the findings of the validation process that has been conducted on the validation requirements of the CDM.

The validation has been undertaken by the team formed of the qualified personnel of LRQA as follows:

Iuri A. de Barroso	LRQA Brazil	Team Leader / CDM Lead Validator / Host country expert / Sector Expert
Mara Regina Mendes	LRQA Brazil	CDM Validator Under Training
Márcio Pragana	LRQA Brazil	External Sector Expert supporting the technical review
Talita Beck	LRQA Brazil	Technical Reviewer
Javier Vallejo Drehs	LRQA UK	Decision Maker

P

Personnel being engaged in a CDM project validation are qualified based on the established procedures of LRQA to assure the resource requirements satisfy all the requirements of competence criteria for an AE/DOE under CDM (CDM-Accreditation Standard version 04). LRQA is designated as an operational entity and holds the full responsibility of decision-making regarding the validation, in line with the accreditation requirements of the CDM-EB. The certificate of appointment of the team personnel is attached to this report.

2.1 Objective

Validation is the process of an independent third party evaluation of a project activity on the basis of the PDD, against the requirements of the CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, subsequent decisions made by the COP/MOP and CDM-EB, and other rules applicable to the proposed project activity including the host country's legislation and its specific requirements for sustainable development. The validation follows the requirements of the current version of the CDM validation and verification standard (CDM VVS) and the CDM Project Standards (PS) to ensure the quality and consistency of the validation work and the report.

2.2 Scope

The scope of validation is an independent and objective review of the project design. Review of the PDD is conducted against the requirements of the Kyoto Protocol, the CDM M&P and relevant decisions of the COP/MOP and the CDM-EB. LRQA follows a risk-based approach in the validation focusing on the identification of significant risks for project implementation and generation of CERs. Validation is not meant to provide any consulting towards the PP, however, the corrective actions requests (CARs) and clarifications (CLs) might provide input for improvement of the project design. A validation conclusion shall become final subject to the decision maker's review by LRQA Ltd.

2.3 GHG Project Description

Corredor dos Senandes CDM Project is a greenfield project located in the municipality of Rio Grande, state of Rio Grande do Sul, Brazil. The project will generate electricity by implementing and operating 40 horizontal-axis wind turbines of 2.7 MW each, with a total nominal capacity of 108 MW and an estimated net electricity generation of 448,365 MWh/year. In the baseline, electricity delivered to the grid by the project activity would have been generated by the operation of grid-connected power plants and by the addition of new generation sources. The project activity will promote GHG emission reductions by displacing fossil fuel-based electricity generation that would otherwise have occurred.

The estimated GHG emission reductions are 110,013 tCO₂e per annum.

3 Methodology

3.1 Review of documents

The validation is performed primarily based on the review of the project design document (PDD) and the other supporting documentation.

The PDD Version 01 dated 05/04/2012 was initially reviewed. LRQA requested the PP to present supporting information and documents relating to the project design and such additional information and documents were also reviewed by LRQA.

Through the process of the validation, the PDD and the supporting documents of the same were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by LRQA. The documents reviewed by LRQA are listed in Appendix B. LRQA reviewed the final version of the PDD version 04.1 dated 17/12/2012 to confirm that all changes agreed had been incorporated.

3.2 Site Visit and Follow-up interviews

A site visit and follow-up interviews with the stakeholders were conducted as detailed in the schedule as below:

Date	Location/ Address	Party Interviewed	Subjects Covered	Team Members on Site
07/06/2012	Odebrecht's head office	OEA Corredor do Senandes II	- Project description, boundaries and coordinates - Engineering, procurement and construction - Projects' description / Projects' boundaries and coordinates / Project's Starting Date	Iuri A Barroso (team leader and sector expert)
08/06/2012		OEA Corredor do Senandes III	- Applicability of baseline and monitoring methodology / Baseline identification - Determination of additionality - Emission reductions calculation	
09/06/2012	Location of the future project's premises	OEA Corredor de Senandes IV OEA Vento do Aragano I Enerbio Consultoria	- Environmental study and mitigation measures/ environmental permits - Stakeholders consultation / response to comments received - Monitoring plan and QA/QC procedures - Modalities of communication	

A full list of persons interviewed is shown in Appendix C.

For details of all the findings of the desk review and site visit, please refer to the Validation Protocol and Findings in Appendix F.

3.3 Resolution of clarification and corrective action requests

LRQA applies the risk based approach aimed at focusing on high risk issues to the validation results while not omitting any part of the mandatory processes.

Findings identified in the process are indicated under the titles corrective action requests (CARs) and clarification requests (CLs) and forward action requests (FARs). CARs and CLs require the PP to take relevant actions. Criteria for judging items as CAR or CL are as follows:

Corrective action request (CAR):

- the project participants have made mistakes that will influence the ability of the

- project activity to achieve real, measurable additional emission reductions
- the CDM requirements have not been met, or
- there is a risk that emission reductions cannot be monitored or calculated.

Clarification request (CL):

- information is insufficient or not sufficiently clear to determine whether the applicable CDM requirements have been met.

FARs are to be raised to highlight issues related to project implementation that require review during the first verification of the project activity. FARs do not relate to CDM requirements for registration.

CARs and CLs are to be resolved or closed out if the PP modifies the project design, rectifies the PDD or provides adequate additional explanations or evidence that satisfies the concerns. If this is not completed, the project activity cannot be recommended for registration to the CDM Executive Board.

For details of the nature of the issues raised, the nature of the responses provided, the means of validation of such responses and the resulting changes in the PDD or supporting annexes please refer to the Validation Protocol and Findings in appendix F.

3.4 Internal quality control

A technical review by a qualified person independent from the validation team and a review by an authorised decision maker were conducted before the submission of the validation report to the PP and before requesting the registration of the project activity.

4 Validation protocol and conclusions

This section provides an overview of the validation activities undertaken by LRQA in order to arrive at the final validation conclusions and opinion. It includes general conclusions based on the Clean Development Mechanism Validation and Verification Standard (VVS) version 02.0. Further details in relation to each element of the protocol and each finding are shown in the Validation Protocol and Findings – Appendix F.

The protocol is structured based on the main validation requirements as follows:

- Approval by the Parties involved
- Participation requirements
- Project design document
- Project description
- Baseline and monitoring methodology
 - o Applicability of the selected methodology
 - o Project boundary
 - o Baseline identification
 - o Algorithms and/or formula used to determine emission reductions
- Additionality of a project activity
 - o Prior consideration of the CDM
 - o Identification of alternatives
 - o Investment analysis
 - o Barrier analysis
 - o Common practice analysis
- Monitoring plan
- Local stakeholder consultation
- Environmental impacts.

4.1 **Approval**

A CDM project shall be approved by the Parties involved.

Approval in Brazil occurs after presentation of the LoA, at the final stage of validation. According to the Brazilian DNA's rules, the issuance of the Letter of Approval is conditioned to the presentation of the DOE's validation report by PP to the DNA (Resolution No. 1 of 11th September 2003).

The host Party of the proposed project is Brazil.

Brazil ratified the Kyoto Protocol on 23rd August 2002. The Designated National Authority (DNA) is the Interministerial Commission Global Climate Change (CIMGC).

A letter of approval from the host country, dated 27/12/2012 has been received. This letter of approval confirms the contribution of the project activity Corredor dos Senandes CDM Project to the sustainable development of the Federative Republic of Brazil.

The project has currently been proposed as a unilateral CDM project and the Annex I Party has not yet been identified. In line with the provision of paragraph 57 of the 18th meeting of the CDM-EB, registration of a project activity can take place without an Annex I party being involved at the stage of registration.

The letter of approval of the host country refers to the PDD version 4.1 dated 17/12/2012 therefore the request for registration is made on the basis of this same version and date of the PDD.

The Validation Report was updated to reflect the receipt of the letter of approval from the Brazilian DNA. This is the only change that was made to version 3.1 of the Validation Report, referred to in the letter of approval. In accordance with the VVM paragraph 50 b) the minor number of the validation report version has been increased by one.

For details relating to this section, please refer to the Validation Protocol in Appendix F, section1.

4.2 **Participation requirements**

OEA Corredor do Senandes II, OEA Corredor do Senandes III, OEA Corredor de Senandes IV, OEA Vento do Aragano I, Enerbio Consultoria are private entities having their registered offices in Brazil.

The contact details of the PPs are correctly provided in Annex 1 of the PDD.

Participation of the PPs in the project activity has yet to be authorized and confirmed in the LoA issued by the DNA of the Parties concerned. The team has yet to confirm that no entities other than the authorized entities are indicated as project participants in the PDD.

For details relating to this section, please refer to the Validation Protocol in Appendix F, section 2.

4.3 **Project design document**

The PDD was checked and confirmed as complete against the Guidelines for Completing the Project Design Document Form (CDM-PDD) referring to the latest version applicable.

A valid form of the CDM-PDD is used, being the current form as available on the CDM website.

For details relating to this section, please refer to the Validation Protocol in Appendix F section 4.

4.4 **Project description**

Corredor dos Senandes CDM Project is a greenfield project located in the municipality of Rio Grande, state of Rio Grande do Sul, Brazil. The project will generate electricity by implementing and operating 40 wind turbines, model ALSTOM-ECO122, 2.7MW each, with a total nominal capacity of 108 MW [A29] and an estimated net electricity generation of 448,365 MWh/year [A22]. Despite being a single project, it has been separated into four WPPs, listed below, due to administrative purposes.

Wind Farm	Number of WTG	Nominal Capacity (MW)	Load factor (%) [A22]
Corredor do Senandes II	8	21.6	47.9
Corredor do Senandes III	10	27	47.9
Corredor do Senandes IV	11	29.7	46.4
Vento do Aragano I	11	29.7	47.5
Overall project	40	50.5	47.4

In the baseline, electricity delivered to the grid by the project activity would have been generated by the operation of grid-connected power plants and by the addition of new generation sources. Hence, the project activity will promote GHG emission reductions by displacing fossil fuel-based electricity generation that would otherwise occur.

The project will be located in Rio Grande municipality, Rio Grande do Sul State, Brazil. The reference geographic coordinates of WPP Senandes III, turbine #4 has been confirmed to be 32°24'11"S (Latitude), 52°21'27"W (Longitude).

The amount of GHG emission reductions from the project is estimated to be 770,090 tCO₂e during the first renewable 7-year crediting period.

The Starting Date of the project activity, 18th August 2011, is the date of realisation of Brazilian 4th Reserve Power Auction (4º Leilão de Energia de Reserva - Leilão Nº 003/2011), in which the four electricity generation facilities Corredor do Senandes II, Corredor do Senandes III, Corredor do Senandes IV, and Vento do Aragano I, had their energy contracted. This auction legally binds the PP to supply the agreed amount of energy.

LRQA confirms that the project description included in the PDD is accurate and complete. This description provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation.

The project description was validated by document review including wind certification

study (produced by a third part), turbine generator proposal, turbine purchase agreement, interviews, and the site visit.

Sustainable development

The host Party's DNA has confirmed the contribution of the project activity to the sustainable development of the host Party.

For details relating to this section, please refer to the Validation Protocol in Appendix F.

4.5 Baseline and monitoring methodology

Applicability of the selected methodology to the project activity

The project activity applied the approved baseline and monitoring methodology ACM0002 - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 13.0.0 (EB 67) and the referenced tools in this methodology as following:

- "Tool for the demonstration and assessment of additionality" (version 06.0.0) and
- "Tool to calculate the emission factor for an electrical system" (version 2.2.1).

LRQA confirms that the selected methodology is applicable to this project activity. The project applicability was confirmed against each condition in the approved methodology selected. Appendix F includes the list of each applicability condition, the steps taken to validate each one and the conclusions about its applicability to the proposed project activity.

For details relating to this section, please refer to the Validation Protocol in Appendix F, section 6.

Project boundary

The project boundary has been validated through documentation review on environmental permits and wind certification reports, interviews and a visit to the site of future implementation of the project's activity, which confirmed that the project is greenfield and, as result, there are no processes or equipment affected by the project activity.

Emissions related to the construction, transportation of employees and supporting facilities were identified and ignored, according to the approved methodology ACM0002 version 13.0.0. No significant emission sources were identified that may be affected by the project activity and that are not addressed by the selected approved methodology.

Through the processes taken, the validation team confirmed that the identified project boundary, the selected sources and the gases were justified for the project activity and they meet the requirements of the approved methodology.

For details of whether any discrepancy was identified and the processes taken, e.g. issued CAR or requested clarification of, revision to or deviation from the approved methodology for approval by the CDM-EB before completion of the validation, please refer to the Validation Protocol in Appendix F section 6a.

Baseline identification

The baseline scenario identified in the PDD has been assessed against the

requirements in the approved methodology ACM0002 version 13.0.0. LRQA can confirm that the procedure included in this methodology to identify the most reasonable baseline scenario, has been correctly applied.

The steps taken to assess the baseline identification are described in the Validation protocol in Appendix F, section 6.b.

LRQA confirms that:

- All the assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD;
- Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;
- Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD;
- 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.

Algorithms and/or formula used to determine emission reductions

LRQA has confirmed that the steps taken and the equations applied to calculate project emissions, baseline emissions and emission reductions comply with the requirements of the approved methodology ACM0002 version 13.0.0.

The steps taken to assess the algorithms and/or formula used to determine emission reductions are described in the Validation protocol in Appendix F, section 6c.

LRQA confirms that:

- All assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD;
- All values used in the PDD are considered reasonable in the context of the proposed CDM project activity;
- The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.

4.6 *Additionality of a project activity*

The project additionality was demonstrated by the PP using the Tool for the demonstration and assessment of additionality, version 6.0.0.

Prior consideration of CDM

The Starting Date of the project activity, 18 Aug 2011, is the date of realisation of Brazilian 4th Reserve Power Auction (4o Leilão de Energia de Reserva - Leilão Nº 003/2011), in which the four plants, Corredor do Senandes II, Corredor do Senandes III, Corredor do Senandes IV, and Vento do Aragano I, had their energy contracted. The determination of the starting date is in accordance with the definition of the starting date of a CDM project activity given in the Glossary of CDM Terms. The validation team agrees that the participation in the auctions with the winning bid constitutes real action, once the withdrawal of power supply after winning the auction implies the loss of the collateral deposited [B42].

The validation team agrees that the participation in the auction is the first real action taken in the project. No earlier implementation or construction or real action has been identified during the desk review, interviews or the site visit.

Once the project activity has started after 2 August 2008, the prior consideration of the benefits of the CDM in the decision to undertake the project activity has been assessed by the validation team following the guidance on the VVS version 02.0, paragraph 107.

The steps taken to assess the prior serious consideration of the CDM are described in the Validation protocol in Appendix F, section 7a.

Identification of alternatives

The list in the Validation Protocol – Appendix F section 7b, shows the alternatives given in the PDD, and clearly states how LRQA has validated whether these alternatives are credible and complete.

It is the opinion of LRQA that the list of alternatives provided in the PDD are credible and complete considering the technology and circumstances of the proposed Project activity as well as the investor business.

Investment analysis

The Investment analysis option has been used to demonstrate the additionality of the proposed project activity. LRQA confirms that the PDD provides evidence that this project activity would not be the most economically or financially attractive alternative.

The PPs have shown that the project activity is additional by demonstrating that the financial returns of the proposed CDM project activity would be insufficient to justify the required investment (equity IRR *versus* benchmark).

For assessing the additionality of this project activity LRQA has complied with the latest version of the “Guidance on the Assessment of Investment Analysis” as provided by the CDM Executive Board and with other relevant guidance including the latest guidelines on plant load factors “Guidelines for the reporting and validation of plant load factors”.

Since the proposed project generates economic benefits (from sales of electricity) other than CDM related income and therefore simple cost analysis (Option I) is not applicable, benchmark analysis (Option III) is chosen to conduct the investment analysis.

The 11.75% of benchmark selected is derived from “Guidelines on the Assessment of Investment Analysis” version 05 [B7], page 8, appendix paragraph 7.

The Equity IRR (post tax) is 4.09 and 4.32 % for two different financial scenarios, both lower than the benchmark of 11.75%. The sensitivity analysis was demonstrated both through a threshold analysis by varying the main financial parameters to reach the benchmark and through the $\pm 10\%$ variation of these parameters. The sensitivity analysis confirms the financial unattractiveness of the project. Therefore the CDM project activity cannot be considered as financially attractive.

For details about the validation of the parameters used in the financial calculations and assessment of the benchmark applied, please refer to the Validation protocol in Appendix F, section 7c.

LRQA confirms that the underlying assumptions for the investment analysis are appropriate and that the financial calculations are correct.

Barrier analysis

Barrier analysis has not been used to demonstrate the additionality of the proposed CDM project activity.

Common practice analysis

LRQA confirms that the proposed CDM project activity is not widely observed and commonly carried out in Brazil.

The common practice analysis presented in the PDD followed the latest version of the Guidelines on Common Practice and the Tool for the Demonstration and Assessment of Additionality. Reasonable arguments were presented for considering that there are essential distinctions between these activities and the proposed CDM project.

For details about the validation of the geographical scope, the assessment of the existence of similar projects and also the assessment of the essential distinctions between the proposed project activity and any similar projects, please refer to the Validation protocol in Appendix F, section 7e.

4.7 Monitoring Plan

The PDD includes a Monitoring Plan based on the approved monitoring methodology ACM0002 version 13.0.0.

LRQA confirms that the Monitoring Plan described in the PDD complies with the requirements in the Monitoring Methodology. The operational and management structure that the PPs will implement in order to monitor the emission reductions was described in the PDD, section B.7.3. It clearly indicates the responsibilities and procedures for data collection and archiving. LRQA also confirms that the PPs will be able to apply this Monitoring Plan following the monitoring arrangements described in it.

The assessment has been conducted by the LRQA by means of interview and document revision of the planned procedures and project plans as well as cross-checking with monitoring procedures as regulated by the National Power System Operator (ONS – *Operador Nacional do Sistema*).

For details about the validation of the Monitoring Plan, please refer to the Validation protocol in Appendix F, section 8.

4.8 Local stakeholder consultation

The PPs invited Local Stakeholders to comment on the proposed project activity on the 30/11/2011, prior to the publication of the PDD version 1 on the UNFCCC website. Copies of invitations for comments posted by the PP to the local stakeholders, as well as the corresponding acknowledgments of receipt, were assessed and found in accordance with the Brazilian DNA's resolution No. 7 of 05/03/2008.

LRQA confirms that the stakeholder consultation process targeted stakeholders and was appropriate for identifying stakeholders' opinions about the project and collecting their views. Only one comment was received from the local stakeholders consultation and was properly addressed by PP.

For details about the steps taken to assess the adequacy of the Stakeholder consultation, please refer to the Validation protocol in Appendix F, section 9.

4.9 Environmental impacts

LRQA has confirmed that the PPs have undertaken an analysis of environmental impacts.

The PPs have submitted documentation to LRQA on the analysis of the environmental impacts of this project activity in line with paragraph 37 (c) of the CDM modalities and procedures.

For details about the document review and determination of whether the PPs have undertaken the analysis of environmental impacts, please refer to the Validation protocol in Appendix F, section 10.

4.10 **Summary of Changes**

Significant changes made to the original PDD published for Global Stakeholder Consultation Process are summarised below. The PDD version 01 [A1] dated 05/04/2012 was modified and several changes occurred due to the result of validation process. The PDD version 04.1 dated 17/12/2012 [A2] includes all these changes.

For details about the results of the responses to CARs and CLs, discussions on revisions to project documentation and the detailed changes to the PDD coming from the validation process, please refer to the Validation Findings Log in the Validation Protocol in Appendix F.

Description of project activity: A map was inserted to demonstrate that all plants are located in the same geographical site. (CL10)

Methodology: PDD was updated to adopt the latest version of the methodology, version 13.0.0, of ACM0002 (CL 09). This change has not affected the emission reduction estimation.

Investment analysis:

- a. The term of the cash flows was corrected from 21 to 20 years to be in line with project lifetime and equipment lifetime (refer to CAR01).
- b. Application of more conservative value for TUSD and corrections on maintenance costs and SPC acquisition were done. Some miscalculations concerning ANEEL supervision taxes, referred in the CL05 have been corrected by the PP.
- c. PP has included the results of sensitivity for the financing structure debt/equity (CAR02).

The overall effect of the corrections made has changed the equity IRR from 5.93% (pre) and 5.74% (post-auction) to 4.09% (pre) and 4.32% (post-auction).

Emission reductions calculation: the $EF_{grid,CM,y}$ was updated from 0.3941 tCO₂e/MWh (2010) to 0.2454 tCO₂e/MWh, data for 2011, published by Brazilian DNA [B17]. Consequently, the estimated emissions reduction over the first crediting period (7 years) has been reduced from 1,236,884 tCO₂e to 770,090 tCO₂e (refer to CL 07). PP has also provided more details about $EF_{grid,CM,y}$ calculation.

Monitoring plan: PP has provided more information about monitoring of electricity consumption and has included a schematic diagram, as detailed in the CL 06.

For details about the results of the responses to CARs and CLs, discussions on revisions to project documentation and the detailed changes to the PDD coming from the validation process, please refer to the Validation Findings Log in the Validation Protocol in Appendix F.

Environmental Licenses: PP has included the new and approved previous license and installation license [A46].

5 Comments by parties, stakeholders and NGOs

In line with the requirement of the Procedures for Processing and Reporting on Validation of CDM project activities, the PDD is to be made publicly available for 30 days subject to confidentiality provisions agreed with the PP, to enable comments to be received from Parties, stakeholders, and UNFCCC accredited NGOs on the validation and registration requirements.

The PDD was made publicly available in line with the requirements of the procedure for the period of 21/04/2012 – 20/05/2012 as per <http://cdm.unfccc.int/Projects/Validation/DB/OD0B2IAJM83T1QR7ZR0I57CCVCT1PD/view.html>

No comment was received during this period.

6 Validation Opinion

LRQA has undertaken the validation of the proposed project activity “Corredor do Senandes CDM Project” based on the requirements of CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and the other rules applicable to the proposed project activity including the host country’s legislation and its specific requirements for sustainable development.

Corredor dos Senandes CDM Project is a greenfield project located in the municipality of Rio Grande, state of Rio Grande do Sul, Brazil. The project will generate electricity by implementing and operating 40 horizontal-axis wind turbines, each with 2.7 MW, with a total nominal capacity of 108 MW and an estimated net electricity generation of 448,365 MWh/year. In the baseline, electricity delivered to the grid by the project activity would have been generated by the operation of grid-connected power plants and by the addition of new generation sources. The project activity will promote GHG emission reductions by displacing fossil fuel-based electricity generation that would otherwise have occurred.

The project participants are OEA Corredor do Senandes II, OEA Corredor do Senandes III, OEA Corredor de Senandes IV, OEA Vento do Aragano I, and Enerbio Consultoria. The project applies the approved baseline and monitoring methodology ACM0002 Version 13.0.0, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.

In order to arrive at the final validation conclusions and opinion, LRQA carried out desk review, a site visit and visit to the PP’s head office, interview with the staff involved and independent research of alternative information sources in order to cross check and validate the information, assumptions, calculations and statements presented in the PDD.

The assessment team concluded that the description of the project activity in the PDD version 4.1 is accurate and complete and that all applicability criteria of the methodology ACM0002 Version 13.0.0 are met; the baseline scenario has been correctly identified and the assumptions adopted are sound; the monitoring plan complies with the applicable methodology, with feasible arrangements and sufficient means of implementation to ensure that the emission reductions resulting from the proposed CDM project activity can be reported ex post and verified.

The Project Activity is additional as demonstrated by the financial and common practice analysis; all parameters used in the emission reductions calculations had their sources verified, were correctly interpreted and are conservative choices.

It is reasonably demonstrated that the project is not a baseline scenario and that emission reductions attributable to the project are additional to any that would have occurred in the absence of the project activity.

Local stakeholders, such as the Town Council, the City Hall, the Brazilian Forum of NGOs, neighbouring community representatives and the state and federal prosecutors were invited to comment on the project, in accordance with the requirements of Resolution 7 of the Brazilian DNA, as verified by the corresponding protocols of receipt. Only one comment was received from the local stakeholders’ consultation and was properly addressed.

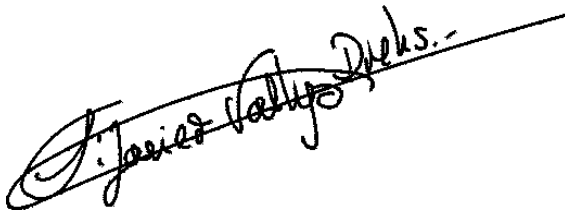
There are no project components or issues excluded from the validation.

Through the validation process, the validation team identified 02 CARs and 09 CLs. The PP has taken action on the raised issues and submitted to LRQA the revised PDD and other supporting evidence. Further details on this can be found in the section "Findings", at the end of Appendix F.

The validation team is of the opinion that the proposed project activity conforms to all the relevant UNFCCC requirements for the CDM as well as the host country's national requirements. Prior to the submission of the Project Design Document and the Validation Report to the CDM Executive Board, the project received the written approval of voluntary participation from the DNA of Brazil, including the confirmation that the Project assists the country in achieving sustainable development.

If implemented as designed, the project is likely to achieve the validated emission reductions of 110,013 tCO₂e as annual average during the first crediting period and contribute to the sustainable development of the host country. LRQA requests the registration of the activity "Corredor do Senandes CDM Project" to the CDM Executive Board as a CDM project activity.

Decision Maker



Javier Vallejo Drehs
CDM Quality Manager
27/12/2012

7 Appendices

7.1 Appendix A: Letter of approval for the project by the host and investing country DNA

Letter of Approval from the DNA, [Comissão Interministerial de Mudança Global do Clima](#), dated 27/12/2012

7.2 Appendix B: List of documents reviewed

Category A documents (documents prepared by the PP)

- [A1] PDD version 01, dated 05/04/2012, published for GSC in the period of 21/04/2012 – 20/05/2012:
<http://cdm.unfccc.int/Projects/Validation/DB/OD0B2IAJM83T1QR7ZR0I57CCVCT1PD/view.html>
- [A2] PDD version 02, dated 12/06/2012
- [A3] PDD version 03, dated 28/08/2012
- [A4] PDD version 04, dated 14/09/2012. PDD version 04.1, dated 17/12/2012.
- [A5] CER estimation, version 1, "Emission Reductions - Corredor dos Senandes.xls"
- [A6] CER estimation, version 2, applying 2011 grid data, "Emission Reductions 2011.xls"
- [A7] Investment analysis, pre-auction design, version 01 ("Pre-auction-cashflowV01.xls")
- [A8] Investment analysis, post-auction design, version 01 ("Post-auction-cashflowV01.xls")
- [A9] Investment analysis, pre-auction design, version 02 ("Pre-auction-cashflowV02.xls")
- [A10] Investment analysis, post-auction design, version 02 ("Post-auction-cashflowV02.xls")
- [A11] Investment analysis, pre-auction design, version 03 ("Pre-auction-cashflowV03.xls")
- [A12] Investment analysis, post-auction design, version 03 ("Post-auction-cashflowV03.xls")
- [A13] Common practice analysis, "Análise Prática Comum - Corredor dos Senandes - atual.xls"
- [A14] Post mail receipt, submission by consulting company to the Host Party DNA on 04/11/2011 (AR – Enerbio.jpg)
- [A15] Host part confirmation to the submission of the CDM Prior consideration form, dated 13/11/2011 (Resposta AND.jpg)
- [A16] Email communication with UNFCCC, submission of prior consideration form (outlook file: Re Prior Consideration UNFCCC – Wind)
- [A17] Modalities of Communication prepared for the project, file "1. MoC Corredor dos Senandes.pdf"
- [A18] Notarized powers of attorney for Mr Walter Tatoni for the four WPPs (Files: "Walter Tatoni - Senandes 2.pdf"; "Walter Tatoni - Senandes III.pdf"; "Walter Tatoni - Senandes IV.pdf"; "Walter Tatoni – Vento Aragano I.pdf")
- [A19] Articles of Incorporation for each one of the WPPs (Fernando Muniz - Senandes 2.pdf; Fernando Muniz - Senandes III.pdf; Fernando Muniz - Senandes IV.pdf; Fernando Muniz – Vento Aragano I.pdf). It has been also confirmed that OEA (Odebrecht Energias Alternativas) is the main owner of each WPP.
- [A20] 2nd Amendment of the "Articles of Incorporation" of Enerbio Consultoria (Eduardo Baltar – Enerbio Consultoria.pdf).
- [A21] Consulting agreement between OEA and Enerbio Consultoria, dated 28/09/2011 (Contrato Enerbio Odebrecht.pdf).
- [A22] Wind certification study, issued by *Inova Energia*, a third part company, on 13/03/2012 (Relatório_Técnico_2012.001A-OEBRECHT_-_120313.pdf).
- [A23] Result of the 4th Auction of Reserve Energy 2011, organized by the Brazilian Ministry of Mines and Energy, file "Resultado_4 LER.pdf".
- [A24] Preliminary study of the WWP, prepared by *MML Energia*, "Previous Wind study.pdf"
- [A25] CAPEX: Signed proposal by turbine supplier, dated 16/08/2011, 70 WTGs model ECO86, 1.67MW each ("Proposta_Alstom_ECO86_CDD signed.pdf")
- [A26] CAPEX: Signed proposal by turbine supplier, dated 06/02/2012, 40 WTGs model ECO122, 2.7MW each ("Proposta_Alstom_ECO122_CDD signed.pdf")
- [A27] OPEX: Land-lease agreements between WPPs and land owners signed in February 2011 (Contrato Cristiano.pdf; Contrato Eloir.pdf; Contrato Espólio Augusto Ferreira.pdf; Contrato Fernando.pdf; Contrato Mário.pdf)

- [A28] Pre-auction CAPEX and OPEX: SPC purchase signed agreement (file “Contrato de Venda e Compra de Quotas.pdf”), dated 15/08/2011.
CAPEX: Clause 5.1 refers to costs paid at development level, totaling 7,412,617.26 BRL. Clause 11.1 refers to the payment of consulting services. This agreement also predicted the commercialization of Corredor do Senandes I WPP, which is not part of the proposed project activity. Clause 5.1.1 demonstrates that 17.14% of the cost is for Corredor do Senandes I, therefore this amount is discounted in the IRR spreadsheet, cell B18.
OPEX: The part of the payment done at the operational period of the project is accounted as operational cost (8,946,000 BRL paid from 3rd to 6th year).
- [A29] Post-auction CAPEX and OPEX: The SPC purchase agreement was amended on 05/11/2011 to reflect the changes in project design.
CAPEX: post-auction SPC purchase cost was based on: (1) Signed amendment to the SPC purchase agreement, dated 05/11/2011, Clause 5.2 which amends Clause 5.1.a to 5.1.d and Clause 5.1.1 (price of Corredor do Senandes I (18.69% of contract, discounted on cell B19)) (“Primeiro Aditivo ao Contrato de Venda e Compra_MML_05nov_2011.pdf”) and (2) agreement between PPs, Epcor and MML for consulting services, dated 29/11/2011 (“Contrato_Prest_Serviços_MML_Epcor.pdf”)
OPEX; 6,671,160 BRL will be paid from 3rd to the 6th year, as per clause 5.2.f of the Agreement amendment, page 5
- [A30] CAPEX: Turbine purchase agreement, dated 27/03/2012, signed between OEA (Odebrecht Energias Alternativas) and turbine supplier (“Contract turbine.pdf”)
- [A31] OPEX: Administrative and operation costs (“Orçamento de Custos de Operação.xls”)
- [A32] CAPEX: Executive Project and Planning costs, dated 18/08/2011, budgeted internally by OEA, Engineering and Implementation Department, based on experience on previous projects (“Custos Indiretos – Odebrecht.xls”)
- [A33] CAPEX: Civil works cost estimation pre-auction scenario, based on several proposals and calculations: “2011_08_17 - Senandes - Orçam Obras Civis.xls”, “2011_08_18 - Valuation - MML - Corredor Senandes - CAPEX e OPEX-4 parques-FINAL”). The estimations were made in August 2011.
- [A34] CAPEX: Civil works cost estimation pre-auction scenario, based on proposals from three construction companies, Pelotense, Sanenco and Bassani, condensed in a single file: “Civilworks pre-auction_v2.xls”
- [A35] Detailed construction proposal by Pelotense construction company and email negotiations with MML Energia (Proposta construtora pelotense)
- [A36] CAPEX: Civil works cost, post-auction Proposal by *Construtora Norberto Odebrecht* (CNO), number DC.CS.001-12, dated 05/03/2012 (Proposta Comp Eólico signed.pdf)
- [A37] CAPEX: Electrical works (substation, distribution and transmission lines), pre-auction scenario, signed proposal by Alstom, dated 18/08/2011 (Alstom Proposal - 18Aug2011.pdf).
- [A38] CAPEX: Electrical works (substation, distribution and transmission lines), post-auction scenario, signed proposal by Alstom, dated 16/02/2012, (Alstom Proposal (page 04) Feb2012.pdf)
- [A39] Power purchase agreement (“CER_EOL_Anexo_02_Edital_Reserva.pdf”)
- [A40] WTG lifetime: technical description of WTG ECO86 (Technical description ECO86.pdf)
- [A41] WTG lifetime: technical description of WTG ECO122 (Technical description ECO122.pdf)
- [A42] Letter from BNDES, dated 13/12/2011, sent to PP as reply to communication categorized as Previous Consultation for Financial Support.
- [A43] OEA. Communication about Transmission Maintenance (OM Transmissao)
- [A44] OEA. Valuation for 7 WPPs, with specific investment and maintenance costs per installed capacity and specific generation (Valuation - MML - Corredor Senandes - CAPEX e OPEX.xls)
- [A45] Common practice analysis between 54 and 162 MW, “Common practice 54-162MW.xls”
- [A46] Environmental licenses: (a) Previous License 00149/2011-DL, granted by FEPAM on February 08, 2011. (b) Previous License 00768/2011-DL, granted by FEPAM on July 12, 2011. Installation License 1258/2012, granted by FEPAM on October 23, 2012.

Letters to local stakeholders - Acknowledgements of receipt:

- [A47] Câmara Municipal de Rio Grande.pdf
[A48] Fórum Brasileiro de ONGS.pdf

- [A49] Ministério Público Federal.pdf
- [A50] Secretaria Estadual do Meio Ambiente SEMA.pdf
- [A51] Sindicato dos Lojistas do Com. de Rio Grande.pdf
- [A52] Fundação de Proteção Ambiental.pdf
- [A53] Ministério Público do Estado do RS.pdf
- [A54] Prefeitura Municipal de Rio Grande.pdf
- [A55] Secretaria Municipal do Meio Ambiente.pdf
- [A56] Manifestação MDL Senandes, email communication (outlook file)

Category B documents (other documents referenced)

- [B1] Glossary of CDM Terms, version 06.0
- [B2] CDM "Validation and Verification Standard", version 02.0
- [B3] CDM "Guidelines for Project Design Document", version 01.0
- [B4] CDM "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", ACM0002, version 12.3.0.
- [B5] CDM "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", ACM0002, version 13.0.0.
- [B6] CDM "Tool for the Demonstration and Assessment of Additionality", version 06.0.0
- [B7] CDM "Guidelines on the Assessment of Investment Analysis" version 05:
http://cdm.unfccc.int/Reference/Guidclarif/reg_guid03.pdf
- [B8] CDM "Guidelines on Common Practice" version 01.0:
http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid44.pdf
- [B9] CDM "Tool to calculate the emission factor for an electricity system", version 02.2.1
- [B10] CDM "Guidelines for the Reporting and Validation of Plant Load Factors"
- [B11] CDM "Guidance on the Demonstration and Assessment of Prior Consideration of the CDM"
- [B12] CDM "Tool to determine the remaining lifetime of equipment", version 1
- [B13] PDD of the CDM registered project "Osório Wind Power Plant Project", ref. 0603,
<http://cdm.unfccc.int/Projects/Validation/DB/XYRSB92C541AXM5SWKCGKIA6IEW0KE/view.html>
- [B14] PDD of the CDM registered project "Zafarana 8 - Wind Power Plant Project - Arab Republic of Egypt, ref. 3501 <http://cdm.unfccc.int/Projects/DB/DNV-CUK1268916200.69/view>
- [B15] PDD of the CDM registered project "Liaoning Fuxin Gaoshanzi 100.5MW Wind Power Project – China, ref. 3344 <http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1265184701.98/view>
- [B16] ANEEL, results of energy auctions:
http://www.aneel.gov.br/aplicacoes/editais_geracao/documentos_editais.cfm?IdProgramaEdital=95#
- [B17] ANEEL, agreement as per the auction results,
http://www.aneel.gov.br/aplicacoes/editais_geracao/documentos/CER EOL Anexo 02 Edital Reserva 4LER Eolica pos AP final.pdf
- [B18] Brazilian integrated grid carbon emission factors for 2011, Brazilian DNA:
<http://www.mct.gov.br/index.php/content/view/333605.html>.
- [B19] Grid carbon emission factor calculation method, Tool to calculate the emission factor for an electricity system, Brazilian DNA
website:<http://www.mct.gov.br/index.php/content/view/74689.html>
- [B20] Decree 2410 dated 28/11/1997
(http://www.planalto.gov.br/ccivil_03/decreto/1997/D2410.htm)
- [B21] Secretary of Federal Revenue of Brazil (*Receita Federal*), TJLP (long term interest rate),
<http://www.receita.fazenda.gov.br/pessoajuridica/refis/tjlp.htm>
- [B22] Secretary of Federal Revenue of Brazil (*Receita Federal*), tax regulation:
<http://www.receita.fazenda.gov.br/principal/Ingles/SistemaTributarioBR/Taxes.htm>
- [B23] Secretary of Federal Revenue of Brazil (*Receita Federal*), tax regulation on PIS/COFINS:
<http://www.receita.fazenda.gov.br/pessoajuridica/pispasepcofins/RegIncidencia.htm>,
- [B24] BNDES – Brazilian Bank of National Development, financing structure:
http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energias_alternativas.html
- [B25] Andrada Tovar, A. C. (2011) *O Apoio do BNDES aos Projetos de Energia Renovável*. 12th International Energy Meeting, 15 August 2011. Available online:
<http://www.fiesp.com.br/energia/pdf/tema6-painel2-antonio-andrada-tovar.pdf>

- [B26] Siffert Filho, N.F, Alonso, L. A., Chagas, E.B. et al. (2009). *O papel do BNDES na expansão do setor elétrico nacional e o mecanismo de Project finance*. BNDES Setorial, Rio de Janeiro, 29, p. 3-36, mar. 2009
- [B27] ANEEL's Energy Generation Data Bank, projects start date information, <http://www.aneel.gov.br/aplicacoes/capacidadebrasil/energiaassegurada.asp>
- [B28] ANEEL's Energy Generation Data Bank, list of WPP in operation in Brazil, <http://www.aneel.gov.br/aplicacoes/capacidadebrasil/GeracaoTipoFase.asp?tipo=7&fase=3>
- [B29] Brazilian Ministry of Mines and Energy, PROINFA program information, <http://www.mme.gov.br/programas/proinfa/>
- [B30] ELETROBRÁS, list of wind power projects that benefited from PROINFA Program ("Proinfa Wind.pdf")
- [B31] Brazilian Central Bank (BCB - Banco Central do Brasil) Inflation target: <http://www.bcb.gov.br/Pec/metast/TabelaMetaseResultados.pdf>
- [B32] Fundação Getúlio Vargas, INCC – Construction Cost Index, available at <http://portalibre.fgv.br>
- [B33] Schaeffer, R.; Szklo, S.A., 2000. Future electric power technology choices of Brazil: a possible conflict between local pollution and global climate change, *Energy Policy* 29 (2001) 355-369, file "FutureElectricPowerTechnologyChoicesOfBrazil"
- [B34] Monthly report from ANEEL on the SIN's power plants results, "Boletim_Eolica_out-2011.pdf", available on http://www.ons.org.br/download/resultados_operacao/boletim_mensal_geracao_eolica/Boletim_Eolica_out-2011.pdf
- [B35] American Wind Energy Association, http://www.awea.org/learnabout/utility/operations_maintenance/index.cfm
- [B36] Wind Measurement International, <http://www.windmeasurementinternational.com/wind-turbines/om-turbines.php>
- [B37] ANEEL resolution 1,074 issued on 19/10/2010 (<http://www.aneel.gov.br/cedoc/ren20101074.pdf>)
- [B38] ANEEL dispatch 4080, dated 27/10/2010 ("Despachos_taxa_2011.pdf")
- [B39] International Monetary Fund, Brazilian inflation rate (projections), <http://www.imf.org/external/datamapper/index.php>, select "Add an item to the chart" → select Brazil → click on "Select subject" → select "Govern finance statistics" → select "Inflation rate, average consumer prices"
- [B40] ONS – National System Operator. Grid Procedures for Invoicing – Module 12: http://www.ons.org.br/procedimentos/modulo_12.aspx
- [B41] ANEEL: General Summary of Power Plants, version December 2011, submitted by PP (Resumo_Geral_das_Usinas_dez_2011.xls). The most updated version of the study can be downloaded at: <http://www.eletrabras.gov.br/ELB/services/eletrabras/ContentManagementPlus/FileDownload.ThrSvc.asp?DocumentoID={9B6832B3-F317-4BF6-A663-E466A250B8A7}&ServiceInstUID={9C2100BF-1555-4A9D-B454-2265750C76E1}&InterfaceInstUID={18F15ED9-1E73-4990-8CC6-F385CE19FF17}&InterfaceUID={72215A93-CAA7-4232-A6A1-2550B7CBEE2F}&ChannelUID={B38770E4-2FE3-41A2-9F75-DFF25AF92DED}&PageUID={ABB61D26-1076-42AC-8C5F-64EB5476030E}&BrowserType=IE&BrowserVersion=6>
- [B42] ANEEL (Agência Nacional de Energia Elétrica) Auction Call #03/2011, Process #48500.000590/2011-27, dated 18/07/2011. File "Edital_LER 20(18-07-2011)_final.pdf". Also available at: http://www.aneel.gov.br/aplicacoes/audiencia/dspListaDetalhe.cfm?attAnoAud=2011&attIdeFasAud=547&id_area=13&attAnoFasAud=2011
- [B43] ANEEL (Agência Nacional de Energia Elétrica) website: <http://www.aneel.gov.br/>
- [B44] ANEEL (2004). Normative Resolution nº 77, 18/08/2004. Available at: <http://www.aneel.gov.br/cedoc/ren2004077.pdf>. Last accessed: August 2012
- [B45] ANEEL. Manual de Aporte de Garantia Leilão 003_2011
- [B46] ANEEL (2009). *Manual de Controle Patrimonial do Setor Elétrico* (Guidance from the Manual of Power Sector Asset Control). Annex of Normative Resolution nº 367/2009, dated 02 June 2009. Available at: http://www.aneel.gov.br/cedoc/aren2009367_2_primeira_Ver.pdf.
- [B47] MME – Ministry of Mines and Energy. Dispatch #27, dated 01/08/2011. Determination of assured (firm) energy for the WPPs of the project activity.

- [B48] ANEEL (Agência Nacional de Energia Elétrica) Ratification of Energy Auction #3/2011 on 05/10/2011 (Auction 03-2011 ratification report.pdf). Notice of ratification published on 11/10/2011 (Homologacao leilao.pdf).
- [B49] Eletrobrás – Centro de Pesquisas de Energia Elétrica (2010) *Curso Básico de Energia Eólica: Avaliação de viabilidade econômica*, 22-24/06/2010 (OeM Eolicas_REFERENCE.pdf). O&M costs for wind projects (2003)
- [B50] Praia Formosa CDM project activity:
<http://cdm.unfccc.int/Projects/Validation/DB/AI2PYN6O2DPDHCZWPCI6KLWF2UZ9S0/view.html>
- [B51] ANEEL. Information about power plant generation:
<http://www.aneel.gov.br/area.cfm?idArea=37&idPerfil=2>
- [B52] Guilherme Eick (2010). *Viabilidade Econômica e financeira de uma pequena central hidrelétrica no Brasil*. Page 58. <http://www.scribd.com/doc/88503223/Econom-i-a-292743>
- [B53] BNDES. Composition of financing costs.
[http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Ferramentas e Normas/Custos Financeiros/Composicao](http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Ferramentas_e_Normas/Custos_Financeiros/Composicao)
- [B54] CIM: “*Plano Nacional Sobre Mudança do Clima*” (“*National Plan for Climate Change*”), also available from http://www.mma.gov.br/estruturas/169/arquivos/169_29092008073244.pdf
- [B55] National Law on Climate Change Policy, N. 12,187, enacted on December 2009, available from http://www.planalto.gov.br/ccivil_03/ato2007-2010/2009/lei/l12187.htm
- [B56] External financial assessment, dated 12 June 2012, carried out by Santander (External financial assessment.pdf). It includes a comparison for insurance, land lease, maintenance, and capex per installed capacity for wind power plants.

7.3 Appendix C: List of persons interviewed

Renato Augusto Patucci	Odebrecht Energias Alternativas (OEA)	Planning Engineer
Gabriel Senarezi	OEA	Electrical Engineer
Albert Cerqueira Santos	OEA	Planning Engineer
Giuliana Moraes de Credico	OEA	Administration/Financing
Rodrigo Garcia	OEA	Sustainability
Eduardo B. de S. Leão	Enerbio Consult	Director

7.4 Appendix D: How due account has been taken to the public input made to the validation requirements

The PDD was made publicly available in accordance with the requirements of the Procedures for processing and reporting on validation of a CDM project activity for the period of 21/04/2012 – 20/05/2012 as per <http://cdm.unfccc.int/Projects/Validation/DB/OD0B2IAJM83T1QR7ZR0I57CCVCT1PD/view.html>.

No comment was received during this period.

7.5 Appendix E: Certificate of Appointment

Validation of “Corredor do Senandes CDM Project”

We hereby certify that the following personnel have engaged in the validation process that has fully satisfied the competence requirements of the validation of the CDM project activity.

Name of Person

Iuri A. de Barroso
Mara Regina Mendes
Márcio Pragana

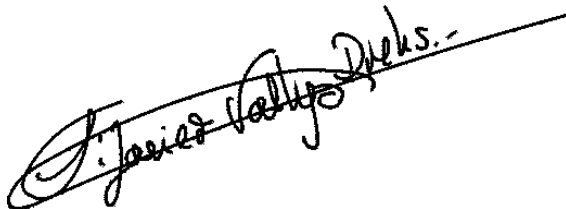
Talita Beck
Javier Vallejo Drehs

Assigned Roles

Team Leader / Sector Expert
Team Member
Sector Expert supporting the technical review
Technical Reviewer
Decision Maker

Signed by

Decision Maker



Javier Vallejo Drehs
CDM Quality Manager
27/12/2012

7.6 Appendix F: Validation Protocol and findings log

	Validated situation	Conclusion
SECTION 1. Approval and contribution to sustainable development		
Host Country Approval		
1. Has the Host country DNA provided a written approval?	Yes ☒ No ☐ NA ☐ ¹ According to the Brazilian DNA's rules, the issuance of the Letter of Approval is conditioned to the presentation of the DOE's validation report by PP to the DNA (Resolution No. 1 of September 11, 2003). The DOE has received the LoA, which mentions the approval of the project activity by the Host country DNA.	OK
2. Confirm that the letter has been issued by the Party's DNA and is valid for the proposed CDM project activity under validation	Yes ☐ No ☐ NA ☐ According to the Brazilian DNA's rules, the issuance of the Letter of Approval is conditioned to the presentation of the DOE's validation report by PP to the DNA (Resolution No. 1 of September 11, 2003). The letter, dated 27/12/2012, has been issued by the Party's DNA and is valid for the proposed CDM project activity under validation.	OK
3. Mention the means of validation employed to assess the authenticity of the Letter of Approval. Indicate the source of the LoA (for example, PP or directly from the DNA)	The DNA (CIMGC) which has approved the participation of the project's PPs is the relevant DNA in Brazil, as can be seen in the official website of the Ministry of Mines and Energy http://www.mct.gov.br/index.php/content/view/4016.html	OK

¹For each section and question where a YES/NO/NA answer is required, explain your choice.

	Validated situation	Conclusion
4. Does the written Letter of Approval confirm the following: (a) The Party is a Party to the Kyoto Protocol (including ratification)? (b) Participation is voluntary? (c) The proposed CDM project activity contributes to the sustainable development of the country? (d) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration?	Yes ☒ No ☐ NA ☐ The Letter of Approval confirms that: (a) The Party is a Party to the Kyoto Protocol (including ratification); (b) Participation is voluntary; (c) The proposed CDM project activity contributes to the sustainable development of the country; The letter refers to the precise proposed CDM project activity title in the PDD being submitted for registration.	OK
5. Is the letter of approval unconditional with respect of (a) to (d) above?	Yes ☒ No ☐ NA ☐ The approval is unconditional.	OK
6. Does the LoA from the host party acknowledge the bundle activity (if applicable)?	Yes ☐ No ☐ NA ☒	OK
Annex I Party Approval		
7. Has the Annex I country DNA provided a written approval?	Yes ☐ No ☒ NA ☐ The project has currently been proposed as a unilateral CDM project and the Annex I Party has not yet been identified. In line with the provision of paragraph 57 of the 18th meeting of the CDM-EB, registration of a project activity can take place without an Annex I party being involved at the stage of registration.	OK
8. Confirm that the letter has been issued by the Party's DNA and is valid for the proposed CDM project activity under validation.	Yes ☐ No ☐ NA ☒ N.A. See above	OK

	Validated situation	Conclusion
9. Mention the means of validation employed to assess the authenticity of the Letter of Approval. Indicate the source of the LoA (for example, PP or directly from the DNA).	N.A See above	OK
10. Does the written Letter of Approval confirm the following: (a) The Party is a Party to the Kyoto Protocol (including ratification)? (b) Participation is voluntary? (c) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration?	Yes ☐ No ☐ NA ☒ N.A. See above	OK
11. Is the letter of approval unconditional with respect of (a) to (c) above?	Yes ☐ No ☐ NA ☒ N.A. See above	OK
Host Country and Annex I Party Approval		
12. Do any of the Letters of Approval contain additional specification of the project activity? Like: - PDD Version number? - Validation report version number? Make sure that the request for registration is made on the basis of the documents specified in any of the letters.	The LoA specifies: - PDD version 4.1 dated 17 December 2012. - Validation Report version 3.1 dated 17 December 2012. The Validation Report was updated to reflect the receipt of the letter of approval from the Brazilian DNA. This is the only change that was made from version 3.1 of the Validation Report, referred to in the letter of approval, to Revision 3.2 being submitted for the request for registration.	OK

		Validated situation	Conclusion
SECTION 2. Authorisation			
1	Confirm that the PPs are listed in a tabular form in section A.3 of PDD and that this information is consistent with the contact details provided in Annex 1 of the PDD and with the contact details in the MoC.	Host Party PP name in PDD/ A.4	• OEA Eólica Corredor do Senandes 2 Ltda. • OEA Eólica Corredor do Senandes III Ltda. • OEA Eólica Corredor do Senandes IV Ltda. • OEA Eólica Vento Aragano I Ltda. • Enerbio Consultoria Ltda – ME.
		Host Party PP name in PDD/ Appendix 1	
		Host Party PP name in MoC	
		Annex 1 Party PP name in PDD/ A.3	The project has currently been proposed as a unilateral CDM project and the Annex I Party has not yet been
		Annex 1 Party PP name in PDD/ Appendix 1	

		Validated situation	Conclusion
		Annex 1 Party PP name in MoC	identified. In line with the provision of EB18 paragraph 57, registration of a project activity can take place without an Annex I party being involved at the stage of registration
2	Confirm that each of the PPs has been approved by at least one Party involved.	Yes ☐ No ☐ NA ☐ To be completed after presentation of LoA, at the final stage of validation.	Pending
3	Confirm that no entities other than those approved as PPs are included in section A.3 of PDD.	Yes ☒ No ☐ NA ☐ No entities other than those approved as PPs are included in section A.3 of PDD.	OK
4	Ensure that the approval of participation has been issued from the relevant DNA. If in doubt verify this with the corresponding DNA.	The approval has been issued by the host party DNA (Brazil) which is the relevant DNA for the Project Activity.	OK

	Validated situation	Conclusion																		
SECTION 3. Modalities of communication																				
1 Validate the corporate identity of all the PPs and the focal point included in the MoC letter: - Validate the signatures - Validate the employment status. To validate this use any of the following options: a. Directly checking with evidence from them and the corresponding companies, e.g. contracts, personal identity card or passport, HR records. b. Notarized documentation, e.g power of attorney for signing on behalf of the company and the other PPs. c. Written confirmation from the PP that all the personal details are valid and accurate.	CL 08: Provide the corporate identity of all project participants and focal points included in the Modalities of Communication (MoC) statement, as well as the personal identities, including specimen signatures and employment status, of their authorized signatories. The signed MoC [A17] and the documentation for the validation of the corporate identities have been provided to the DOE. The authority of the MoC signatories has been validated as shown below: <table><tr><th>PPs</th><th>Focal points</th><th>Primary authorized signatory</th><th>Alternate authorized signatory</th></tr><tr><td>OEA Eólica Corredor do Senandes 2 Ltda.</td><td>OEA Eólica Corredor do Senandes 2 Ltda.</td><td rowspan="4">Walter Milan Tatoni (1)</td><td rowspan="4">Fernando Muniz (2)</td></tr><tr><td>OEA Eólica Corredor do Senandes III Ltda.</td><td>OEA Eólica Corredor do Senandes III Ltda.</td></tr><tr><td>OEA Eólica Corredor do Senandes IV Ltda.</td><td>OEA Eólica Corredor do Senandes IV Ltda.</td></tr><tr><td>OEA Eólica Vento do Aragano I Ltda.</td><td>OEA Eólica Vento do Aragano I Ltda.</td></tr><tr><td>Enerbio Consultoria Ltda. - ME</td><td>Enerbio Consultoria Ltda. - ME</td><td>Eduardo Baltar de Souza Leão (3)</td><td></td></tr></table>	PPs	Focal points	Primary authorized signatory	Alternate authorized signatory	OEA Eólica Corredor do Senandes 2 Ltda.	OEA Eólica Corredor do Senandes 2 Ltda.	Walter Milan Tatoni (1)	Fernando Muniz (2)	OEA Eólica Corredor do Senandes III Ltda.	OEA Eólica Corredor do Senandes III Ltda.	OEA Eólica Corredor do Senandes IV Ltda.	OEA Eólica Corredor do Senandes IV Ltda.	OEA Eólica Vento do Aragano I Ltda.	OEA Eólica Vento do Aragano I Ltda.	Enerbio Consultoria Ltda. - ME	Enerbio Consultoria Ltda. - ME	Eduardo Baltar de Souza Leão (3)		CL 08 Closed OK
PPs	Focal points	Primary authorized signatory	Alternate authorized signatory																	
OEA Eólica Corredor do Senandes 2 Ltda.	OEA Eólica Corredor do Senandes 2 Ltda.	Walter Milan Tatoni (1)	Fernando Muniz (2)																	
OEA Eólica Corredor do Senandes III Ltda.	OEA Eólica Corredor do Senandes III Ltda.																			
OEA Eólica Corredor do Senandes IV Ltda.	OEA Eólica Corredor do Senandes IV Ltda.																			
OEA Eólica Vento do Aragano I Ltda.	OEA Eólica Vento do Aragano I Ltda.																			
Enerbio Consultoria Ltda. - ME	Enerbio Consultoria Ltda. - ME	Eduardo Baltar de Souza Leão (3)																		

1.(continuation)	(1) Walter Milan Tatoni Represents the primary authorized signatory of the focal points: Corredor do Senandes II, Corredor do Senandes III, Corredor do Senandes IV, and Vento do Aragano I as per notarized power of attorney [A18]. His signature has been cross-checked against the turbine purchase contract [A29]. (2) Fernando Muniz Represents the alternate authorized signatory focal points for Corredor do Senandes II, Corredor do Senandes III, Corredor do Senandes IV, and Vento do Aragano I. His authority for representing the companies and his signature have been validated by cross-checking this with Articles of Incorporation of each one of the four WPP [A19]. (3) Eduardo Baltar de Souza Leão Represents the primary authorized signatory of the focal point Enerbio Consultoria Ltda. His authority for representing the company has been validated by cross-checking the MoC with the “Articles of Incorporation” of Enerbio [A20]. His signature has been cross-checked against the consulting contract between Enerbio and Odebrecht Energias Alternativas [A21].	
2 In case a written confirmation is chosen from the options above the following issues shall be validated: - The PP sending the written confirmation and signing it shall be the one signing the contract with LRQA. - The person signing the written confirmation and the person signing the MoC (if they are different persons) is/are dully authorised to do so in behalf of the rest of PPs, i.e. they have a signed authorisation from the other PPs, and the signer for these authorisations is identified and check its identity and role in the company. In general the signature of the CEO or similar can always be accepted, in other cases any evidence of the signer being authorised by the company shall exits.	N.A.	OK

3 Has the MoC been completed as per the latest "Procedures for MoC between the project participants and the Executive Board"? - No modifications to the template / form should be made and each document should be clearly dated - Title of the project and names of project participants and focal points should be fully consistent with those indicated in all other project documentation - Focal point scopes should be clearly and correctly indicated - Contact details and specimen signatures of focal point entities including those of project participants in Annex 1 should be correctly entered. Only one telephone, fax, email contact should be entered per authorized signatory. In cases where additional contact details are included, only the first indicated information will be taken into account and only the official business address of the proposed entity should be provided on the F-CDM-MOC form. - The Statement of Agreement in Section 3 should be signed by one authorized signatory for each project participant; signatures made available in Section 3 should correspond to those indicated in the related Annex 1 document; focal point entities who are not designated as project participants should not sign Section 3.	Yes ☒ No ☐ NA ☐ The PPs have adopted the version 02.1 of the F-CDM-MOC form (according to the VVS track). No modifications to the template were identified. All signatures from the PP and the focal points signatories were clearly dated. The project's title and the names of project participants and focal points are fully consistent with those indicated in all the project documentation (e.g. the PDD and the power of attorney documents). The focal point scopes are clearly and correctly indicated [A17]: Scope a): joint among all focal points Scope b): joint among all focal points Scope c): sole for Enerbio Consultoria Ltda.-ME The Statement of Agreement in Section 3 has been signed by one authorized signatory for each project participant, and only by the PPs. The signatures made available in Section 3 correspond to those indicated in the related Annex 1 document.	OK
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	Validated Situation	Conclusion
SECTION 4. Project design document		
1. Is the project activity Small Scale or Normal Scale?	Normal Scale ☒ Small Scale ☐ Bundled Small Scale ☐ Nominal power > 15 MW (decision 17 CP.7).	OK
2. Has the PDD used the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM Website? Check outputs from the completeness check.	Yes ☒ No ☐ The PDD version 1, submitted for GSC, and version 2 have been prepared using the template F-CDM-PDD - Project Design Document form version 04.0. The versions 3 and 4 of the PDD have been prepared from the version 04.1 of the F-CDM-PDD and the "Guidelines for completing the project design document form" (Version 01.0, EB66, Annex 08).	OK

	Validated situation	Conclusion
SECTION 5. Description of project activity		

	Validated situation	Conclusion																								
1. Describe the process undertaken to validate that the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate, and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity.	The project boundaries and the technical description of the project activity have been assessed against the approved methodology (ACM0002). The PP’s statement that the project is greenfield was considered credible, after the documental review, site visit and interviews with PP’s personnel. The project’s nature, the technology applied, the project’s configuration, capacity, location and contribution to sustainable development have been clearly described in the PDD section A. The project will generate electricity by implementing and operating 40 wind turbines, model ALSTOM-ECO122, 2.7MW each, with a total nominal capacity of 108 MW [A29] and an estimated net electricity generation of 448,365 MWh/yr as per the wind certification study issued by <i>Inova Energia</i>, a third part company, on 13/03/2012 [A22]. <table><tr><th>Wind Farm</th><th>Number of WTG</th><th>Nominal Capacity (MW)</th><th>Load factor (%)</th></tr><tr><td>Corredor do Senandes II</td><td>8</td><td>21.6</td><td>47.9</td></tr><tr><td>Corredor do Senandes III</td><td>10</td><td>27</td><td>47.9</td></tr><tr><td>Corredor do Senandes IV</td><td>11</td><td>29.7</td><td>46.4</td></tr><tr><td>Vento do Aragano I</td><td>11</td><td>29.7</td><td>47.5</td></tr><tr><td>Overall project</td><td>40</td><td>108</td><td>47.4</td></tr></table> The load factor was sourced from wind certification study that fully complies with the CDM “Guidelines for the Reporting and Validation of Plant Load Factors”. Although the project was verified to be installed in the same site during the on site visit, clarification about the reason for having four different wind projects was sought from the PPs. See CL10. PPs have provided explanations about this situation and the CL10 was closed. For more details regarding the accuracy of the information (e.g. project’s capacity, technical features, etc.) please refer to the sections below. As a reference to confirm that no material information is missing, the similar registered projects below have been consulted (Osório Wind Power Plant Project – Brazil, ref. 0603 [B13], Liaoning Fuxin Gaoshanzi 100.5MW Wind Power Project – China, ref. 3344 [B15], and Zafarana 8 - Wind Power Plant Project, Arab Republic of Egypt, ref. 3501 [B14]).	Wind Farm	Number of WTG	Nominal Capacity (MW)	Load factor (%)	Corredor do Senandes II	8	21.6	47.9	Corredor do Senandes III	10	27	47.9	Corredor do Senandes IV	11	29.7	46.4	Vento do Aragano I	11	29.7	47.5	Overall project	40	108	47.4	CL10 Closed OK
Wind Farm	Number of WTG	Nominal Capacity (MW)	Load factor (%)																							
Corredor do Senandes II	8	21.6	47.9																							
Corredor do Senandes III	10	27	47.9																							
Corredor do Senandes IV	11	29.7	46.4																							
Vento do Aragano I	11	29.7	47.5																							
Overall project	40	108	47.4																							

	Validated situation		Conclusion
2. Confirm that the exact project location is provided in the PDD with Geographical coordinates, check the accuracy of them and the format of the notation (Grades, minutes, seconds or decimal indicating latitude N or S and Longitude E or W) Please include here the Geographical coordinates:	According to the PDD, section A.2.4, the project will be installed around the coordinates: 32°24'11"S (Latitude), 52°21'27"W (Longitude),) which corresponds to decimals: Latitude -32,403139; Longitude -52.357595. This location has been checked to be the location of WPP Senandes III, wind turbine 04 (wind certification study, page 15, [A22]). This information has been also confirmed during the site visit, with the aid of GPS equipment.		OK
3. Confirm that the physical site inspection reflects the description in the PDD of the proposed CDM project activity.	It was confirmed during the site visit that the project is greenfield, as stated in the PDD section A, and that no project implementation activity has begun yet.		OK
4. If the team did not undertake a physical site inspection, describe the justification as approved by the CDM Quality Manager. (VVS 02.0: 65-67) Describe briefly the physical site inspection: Travel details and installations, facilities and buildings visited.	N.A.		OK
5. If the proposed CDM project activity involves the alteration of an existing installation or process, ensure that the project description clearly states the differences resulting from the project activity compared to the pre-project situation.	Pre-project	Project activity	OK
	NA. The project activity does not involve the alteration of an existing installation or process. According to the PDD and as confirmed during the desk review and the site visit, the proposed project activity consists in the installation of a grid-connected renewable power generation facility on a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant).		
6. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance (ODA).	As discussed during the desk review and the site visit, there will be no public funding from Annex I parties or from ODA. PP has been looking for finance to the project with resources from BNDES as demonstrated by communication with the BNDES [A42]. The validation team confirms, based on its experience in the host country, that the BNDES has been the only financing source for all intensive capital investments in the energy sector in Brazil.		OK

	Validated situation	Conclusion
7. If the project activity is a small scale one, confirm that it is not a debundled component of a large scale project, in line with the Guidelines for assessment of de-bundling for SSC project activities. Check if there is another registered small scale project activity or an application to register it. Take into account specific debundling requirements for Type I project activities. Describe how this has been assessed.	The project is not small scale. Corredor dos Senandes II, III, IV and Vento Aragano I Wind Power Plants have a total installed capacity of 108MW. Wind Power Plants Corredor dos Senandes II, III, IV and Vento Aragano I have individual installed capacities of 21.6 MW, 27MW, 29.7 MW and 29.7MW, respectively, as per PDD Section A.3 and verified in the wind certification study [A22]. Therefore, the output capacity is greater than 15 MW (decision 17 CP.7).	OK

	Validated situation	Conclusion
SECTION 6. Application of the selected baseline and monitoring methodology		
Applicability		
1. Have the baseline and monitoring methodologies selected by the project participants been previously approved by the CDM Executive Board, that is, does it appear on the methodologies page of the UNFCCC website?	Yes ☒ No ☐ NA ☐ CL 09: Please state if the PP intends to adopt the recently issued version of the methodology ACM0002 (version 13.0.0). The PDD version 1 [A1], submitted for GSC, has been prepared applying the Consolidated baseline methodology for grid-connected electricity generation from renewable sources ACM0002 Version 12.3.0 [B4]. The version 2 of the PDD [A2] has been prepared applying the Consolidated baseline methodology for grid-connected electricity generation from renewable sources ACM0002 Version 13.0.0 [B5]. The PDD refers to the following tools mentioned in the methodology: • “Tool for the demonstration and assessment of additionality” (version 06.0.0) [B6] and • “Tool to calculate the emission factor for an electrical system” (version 2.2.1) [B9]. The Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion is not applied, as the project activity does not involve fossil fuel combustion.	CL 09 Closed OK
2. If the project activity is a Small Scale one; does it qualify within the threshold of the three possible types of small scale projects? Confirm information provided in the PDD.	The project is not small scale. The output capacity (total nominal capacity: 108 MW, according to PDD A.3) is greater than 15 MW (acc. to decision 17 CP.7).	OK
3. If the project activity is a Small Scale one; which approved small scale methodology does the project apply? Confirm that the SSC methodology is applied with the general guidelines to SSC CDM methodologies.	The project is not small scale. The output capacity (total nominal capacity: 108 MW, according to PDD A.3) is greater than 15 MW (acc. to decision 17 CP.7).	OK

	Validated situation	Conclusion																
4. Determine whether the methodology selected is applicable to the project activity including that the used version is valid. Describe steps taken to assess the relevant information contained in the PDD in the table below.	The proposed project activity was confirmed to meet the applicability conditions of the selected methodology and methodological tools mentioned above. The versions adopted are valid.	OK																
	<table><tr><th>Methodology/Tool</th><th>Version of AM/ AT mentioned in the PDD version 2</th><th>Number / date of latest version</th><th>Validation of the version adopted in the PDD</th></tr><tr><td>ACM0002</td><td>13.0.0</td><td>13.0.0, 11 May 2012</td><td>OK, the latest version is being used</td></tr><tr><td>Tool for the demonstration and assessment of additionality</td><td>6.0.0</td><td>06.0.0, 25 Nov 2011</td><td>OK, the latest version is being used</td></tr><tr><td>Tool to calculate the emission factor for an electricity system</td><td>2.2.1</td><td>2.2.1, 29 Sep 2011</td><td>OK, the latest version is being used</td></tr></table>		Methodology/Tool	Version of AM/ AT mentioned in the PDD version 2	Number / date of latest version	Validation of the version adopted in the PDD	ACM0002	13.0.0	13.0.0, 11 May 2012	OK, the latest version is being used	Tool for the demonstration and assessment of additionality	6.0.0	06.0.0, 25 Nov 2011	OK, the latest version is being used	Tool to calculate the emission factor for an electricity system	2.2.1	2.2.1, 29 Sep 2011	OK, the latest version is being used
	Methodology/Tool		Version of AM/ AT mentioned in the PDD version 2	Number / date of latest version	Validation of the version adopted in the PDD													
	ACM0002		13.0.0	13.0.0, 11 May 2012	OK, the latest version is being used													
	Tool for the demonstration and assessment of additionality		6.0.0	06.0.0, 25 Nov 2011	OK, the latest version is being used													
Tool to calculate the emission factor for an electricity system	2.2.1	2.2.1, 29 Sep 2011	OK, the latest version is being used															

No.	Applicability conditions in the ACM0002 Version 13.0.0	Information in the PDD	Steps taken to assess PDD information	Conclusion
1	The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit	PDD A.1: "Corredor dos Senandes CDM Project consists on the implementation and operation of the wind power plants (WPPs) Corredor dos Senandes II, Corredor dos Senandes III, Corredor dos Senandes IV and Vento Aragano I." PDD B.2: "(...) the plants of the project are grid-connected renewable power plant that will be implemented at a site where no renewable power plant was operated prior to the implementation of the project activity." "The project is a wind power plant (...)." [A1]	The project activity has been confirmed, during the site visit and the desk review, as the installation of a greenfield wind power plant.	OK

2	In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2: on page 10 to calculate the parameter $EG_{PJ,y}$): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	PDD B.2: "(...) the project activity does not involve capacity addition or retrofit of (an) existing plants, nor involves a replacement of (an) existing plants." [A1]	The project activity has been confirmed, during the site visit and the desk review, as the installation of a greenfield wind power plant.	OK
3	In case of hydro power plants, one of the following conditions must apply: • The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²; or • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².	PDD B.2: "The project is a wind power plant (therefore it is neither a biomass plant nor a hydro power plant with power density less than 4 W/m ²) and it does not involve switching from fossil fuels to renewable energy at the site of the project activity." [A1]	The project activity has been confirmed, during the site visit and the desk review, as the installation of a greenfield wind power plant.	OK
Inapplicability condition of ACM0002				
4	Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site.	PDD B.2: "The project is a wind power plant (therefore it is neither a biomass plant nor a hydro power plant with power density less than 4 W/m ²) and it does not involve switching from fossil fuels to renewable	The project activity has been confirmed, during the site visit and the desk review, as the installation of a greenfield wind power plant.	OK

		energy at the site of the project activity.” [A1]		
5	Biomass fired power plants.	PDD B.2: “The project is a wind power plant (therefore it is neither a biomass plant nor a hydro power plant with power density less than 4 W/m ²) and it does not involve switching from fossil fuels to renewable energy at the site of the project activity.” [A1]	The project activity has been confirmed, during the site visit and the desk review, as the installation of a greenfield wind power plant.	OK
6	Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m ² .	PDD B.2: “The project is a wind power plant (therefore it is neither a biomass plant nor a hydro power plant with power density less than 4 W/m ²) and it does not involve switching from fossil fuels to renewable energy at the site of the project activity.” [A1]	The project activity has been confirmed, during the site visit and the desk review, as the installation of a greenfield wind power plant.	OK
Applicability condition of “Tool to calculate the emission factor for an electricity system”				
7	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).	PDD section A.1: “(...) consists on the implantation and operation of the wind power plants (...). The enterprises will supply clean electricity to the Brazilian National Interconnected System (SIN). The plants take place in Rio Grande, Rio Grande do Sul State, south region of Brazil.” [A1]	The project activity has been confirmed as a grid connected power plant through the desk review of auction call [B42], proposals [A25] [A26] [A38], contracts [A29] [A39] and interviews with the PP.	OK
Inapplicability condition of the “Tool to calculate the emission factor for an electricity system”				
8	In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	PDD section A.1: “(...) consists on the implantation and operation of the wind power plants (...). The enterprises will supply clean electricity to the Brazilian National Interconnected System (SIN). The plants take place in Rio Grande, Rio Grande do Sul State, south region of Brazil.” [A1]	It has been confirmed during the site visit that the project is totally located in Brazil. It has been also confirmed that the project will be connected to the Brazilian National Interconnected System (SIN) and not to an international grid.	OK

	Validated situation	Conclusion
5. Confirm that any specific guidance provided by the CDM Executive Board in respect to an approved methodology has been correctly applied.	The methodology sets the clear criteria to check the applicability conditions and each condition is checked as detailed above.	OK
6. If a determination regarding the applicability of the selected methodology to the proposed CDM project activity cannot be made, request clarification of the methodology in line with the guidance provided by the CDM Executive Board. Describe the clarification request and response.	N.A.	OK
7. If the Validation Team determines that the proposed CDM project activity does not comply with the applicability conditions of the methodology, the Team may proceed by means of requesting revision to or deviation from the methodology in line with the guidance provided by the CDM Executive Board. Describe the request for revision or deviation and approval by the CDM Executive Board.	NA	OK

	Validated situation	Conclusion
SECTION 6a. Project boundary		
1. Does the project boundary include physical, geographical site of the industrial facility, processes, or equipment that are affected by the project activity?	Yes ☒ No ☐ NA ☐ The project boundary, as described in the PDD section B.3 [A1], is in accordance with the adopted methodology ACM0002, and is described as being the entire National Interconnected System. The methodology states that "the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to." The project activity is a greenfield renewable wind power plant, as verified during the desk review and the site visit.	OK

	Validated situation	Conclusion
2. In case the proposed project activity has both A/R and non-A/R components, in order to avoid double counting of emission sources, LRQA shall confirm that the emissions associated with the A/R activity will be accounted for and documented by the A/R project activity.	N.A. The project has no afforestation or reforestation components.	OK
3. If there are any GHG emissions occurring within the proposed CDM project activity boundary, which are not addressed by the applied methodology and which are expected to contribute more than 1% of the overall expected average annual emissions reductions as a result of the implementation of the project, LRQA shall request clarification of, revision to, or deviation from the methodology as appropriate.	No emissions from the project activity besides those addressed by the methodology were identified, as validated by LRQA's sector expert during the site visit. Also, according to the description of the project activity and to the registered PDD of a similar project activity (Osório Wind Power Plant Project, Brazil, ref. 0603 [B13]), no other relevant emission is expected.	OK
4. Confirm that all sources and GHGs required by the methodology have been included within the project boundary. Describe here if any emission source that will be affected by the project activity and is not addressed by the approved methodology, has been identified. In such case request clarification of, revision to or deviation from the methodology in accordance with EB guidance. Use the table below for this purpose:	All sources and GHGs required by the methodology have been included within the project boundary. (CO ₂ from the grid for the baseline; No emissions for the project activity). No additional emission source was identified during the desk review or the site visit. As a zero emission electricity generation project, CO ₂ emissions in the baseline scenario are the only gas and emission source included in the project boundary. This was confirmed appropriate as detailed below.	OK

Gases and Sources Included In The Project Boundary						
	Source	Gas	Inc./Exc . PDD	Justification PDD	Steps Taken To Assess PDD Justification	Conclusion
BASELINE	Power plants supplying energy to SIN	CO ₂	Yes	Main emission source	The selected baseline is justified, since the project has been confirmed as a greenfield plant and the installation of a new grid-connected renewable power plant/unit. The declared baseline sources are in accordance with the baseline scenario determined by the adopted methodology ACM0002 and the Tool to calculate the emission factor for an electricity system.	OK
		CH ₄	No	Minor emission source		OK
		N ₂ O	No	Minor emission source		OK
PROJECT	For geothermal power plants, fugitive emissions of CH ₄ and CO ₂ from non-condensable gases contained in geothermal steam.	CO ₂ , CH ₄ and N ₂ O	No	Not applicable	Project emission is regarded as zero for the wind farm. Verification during the site visit and desk review. The project sources are in accordance with the similar registered project Osório Wind Power Plant Project, ref 0603 [B13].	OK
	CO ₂ emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants.	CO ₂ , CH ₄ and N ₂ O	No	Not applicable		OK
	For hydro power plants, emissions of CH ₄ from the reservoir.	CO ₂ , CH ₄ and N ₂ O	No	Not applicable		OK

		Validated situation	Conclusion
SECTION 6b. Baseline scenario identification and description.			
1. Determine whether the PDD provides a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity.		The identified baseline scenario and the description of the activities that would take place in the absence of the proposed CDM project activity are clearly described in item B.4 of PDD and are in accordance with ACM0002 version 13.0.0.	OK

	Validated situation	Conclusion
2. Confirm that any procedure contained in the methodology to identify the most reasonable baseline scenario, has been correctly applied.	Yes ☒ No ☐ NA ☐ According to the Tool for the demonstration and assessment of additionality, project activities that apply the Tool in the context of the approved consolidated methodology ACM0002 only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity. Among other alternative scenarios, provision of equivalent amount of electricity by the grid system is considered as a credible and feasible alternative that satisfies the requirement of the methodology/tool. According to ACM0002, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following: <i>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".</i>	OK
3. Check each step in the procedure described in the PDD to identify the baseline scenario against the requirements of the methodology. (Note that if the methodology requires use of tools, that is, such as the tool for the demonstration and assessment of additionality and the combined tool to identify the baseline scenario and demonstrate additionality, the guidance in the methodology shall supersede it in the tool.)	Since the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is determined by applied methodology, as stated in the PDD.	OK

	Validated situation	Conclusion
4. Based on financial expertise and local and sectoral knowledge, determine whether all scenarios that are considered by the project participants and are supplementary to those required by the methodology, are reasonable in the context of the proposed CDM project activity and that no reasonable alternative scenario has been excluded. Use the table below for this purpose:	As confirmed above, provision of equivalent amount of electricity by the grid system is considered as a credible and feasible alternative that satisfies the requirement of the methodology/tool. The PP does not consider any scenario supplementary to those required in the methodology. No reasonable alternative scenario has been excluded.	OK

Alternative Scenario Ref.	Description in the PDD	Cross-checked with	Validation Opinion
The baseline scenario is determined by the applied methodology ACM0002 and no further analysis is necessary.			

5. Determine whether the baseline scenario identified is reasonable by validating the assumptions, calculations and rationales used, as described in the PDD. It shall be ensured that documents and sources referred to in the PDD are correctly quoted and interpreted. Cross check the information provided in the PDD with other verifiable and credible sources, such as local expert opinion. The table above may be used for this purpose.	The baseline scenario identified in PDD, i.e., the operation of grid-connected power plants and the addition of new generation sources, is the current practice and conforms to the methodology applied (ACM002 version 13.0.0). No other plausible and credible alternatives to the project activity were identified, which are economically attractive and technically feasible. Provision of equivalent amount of electricity by the grid system, is considered as a credible and feasible alternative and it satisfies the requirement of the methodology/tool.	OK
6. Is the identified baseline scenario in line with regulatory or legal requirements and does it take into account relevant national and/or sectoral policies?	Yes. The energy generation, transmission and distribution is done by the SIN (Integrated National System), which is regulated in the host country by a governmental body (ANEEL) [B43]. The electricity delivered to the grid by the project would necessarily, in the baseline scenario, be produced by the operation of grid-connected power plants under SIN. The scenario is legally compliant and is current practice.	OK

7. Identify the type of national and/or sectoral policies: - E+: describe how the baseline scenario refers to the hypothetical situation without these national and or sectoral policies in case they have been adopted after the adoption of the Kyoto Protocol (11 December 1997), otherwise they shall be taken into account. - E-: Those adopted since the adoption of the M&P for a CDM (11 November 2001) shall not be taken into account. Please describe the hypothetical situation without these national and/or sectoral regulations took into account for the baseline identification.	No E+ policies have been identified related to the baseline scenario. Two E- policies have been identified which relate to the baseline scenario: • Resolution N°77 [B44], of 18 August 2004 from ANEEL established a discount of 50% on the applicable distribution/transmission fee (TUSD/TUST - G) for complementary renewable energy projects, such as wind power generation projects, with installed capacity injected in the grid lower or equal to 30,000 kW. Since the four WPPs that compose the proposed project activity have nominal installed capacity lower than 30,000kW, they are eligible to receive this benefit. This benefit has not been considered and so the full value of TUSD is being taken into account in the financial analysis calculations. Please refer to section 7.c, Investment analysis, where the validation of the parameter TUSD is explained. • Financing Conditions offered by the National Bank for Economic and Social Development (BNDES – <i>Banco Nacional de Desenvolvimento Econômico e Social</i>). In 2008, BNDES has introduced special financing conditions to hydropower plants and to other low intensive GHG emission power plants as following [B26]: reduction of the spread from 1.8% to 0.9% (lower cost of debt) offered by BNDES to less GHG intensive projects, giving to them an advantage over the more GHG intensive ones [B24]. Moreover, the long term interest rate is reduced from 50% of TJLP plus 50% of the TJ-462 (for thermal generation from coal or oil) to 100% of TJLP (for the other energy sources, including hydroelectric). Once the TJ-462 is the TJLP plus 1 percentage point [B53], this benefit means a reduction of half percentage point in the cost of debt. According to VVS paragraph 93 b) these policies do not need to be taken into account in identifying the baseline scenario. The validation team has checked that the baseline scenario would not be altered in the hypothetical situation where these E- policies did not apply.	OK
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8. Is this identification supported by official and/or verifiable documents (for example, studies, web pages, certificates, etc)?	Yes. Please refer to items above. More information can be found in the ANEEL web page [B43] and BNDES web page [B26]. The National Plan for Climate Change (<i>Plano Nacional sobre Mudanças do Clima</i>) which was developed during the year 2008, also makes clear reference to renewable energies as fundamental for GHG reduction on the basis of a clean expansion of the energy matrix. The national plan makes clear reference to the emission reductions related renewable power projects and also refers to the BNDES financing conditions as being a key policy to promote GHG mitigation activities [B54]. The Law Nº 12,187/09, which defined the Brazilian Law for Climate Change and was enacted in December 2009, defines that the existing and future mechanisms such as i) Preferential licensing and contracting, ii) private public partnerships; iii) preferential financing conditions by private and public Banks, as well as iv) the CDM are among the applicable policy tools to promote GHG mitigation [B55].	OK
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Validated situation	Conclusion
SECTION 6c. Algorithms and/or formulae used to determine emission reductions	

	Validated situation	Conclusion
1. Compare the equations and parameters in the PDD to those in the selected approved methodology and determine if they have been correctly applied to calculate project emissions, baseline emissions, leakage, and emission reductions. Confirm that adequate justification has been provided for selection between different options.	CL 07: Provide the emission reductions calculation worksheet. The PDD mentions in the item B.7.1, parameter $EF_{grid, CM}$, that the ex-ante emission reductions estimation was based on the data issued by the Brazilian DNA. Please detail how the $EF_{grid, CM}$ of 0.3941 tCO₂/MWh has been estimated from the monthly values of $EF_{grid, OM}$ published by the DNA. Also, the PDD considers the DNA's 2010 values for $EF_{grid, OM}$ and $EF_{grid, BM}$, although the 2011 values are already available on the DNA's website. The PDD version 1 [A1], submitted for GSC, has been prepared applying the Consolidated baseline methodology for grid-connected electricity generation from renewable sources ACM0002 Version 12.3.0 and the DNA's 2010 values for $EF_{grid, OM}$ and $EF_{grid, BM}$. The version 2 of the PDD [A2] has been prepared applying the Consolidated baseline methodology for grid-connected electricity generation from renewable sources ACM0002 Version 13.0.0 and the DNA's 2011 values for $EF_{grid, OM}$ and $EF_{grid, BM}$. The equations and parameters in the PDD version 02 [A2] were compared to those in the methodology ACM0002 version 13.0.0 and were found to be correctly applied. According to ACM0002, there are no project emissions ($PE_y = 0$) and the baseline emissions are $BE_y = EG_{PJ,y} \cdot EF_{grid, CM,y}$, where $EF_{grid, CM,y}$ is calculated using the latest version of the "Tool to calculate the emission factor for an electricity system". The PP chose to use the values of $EF_{grid, CM,y}$ supplied by the Brazilian Designated National Authority (DNA), which calculates the emission factors of the SIN according to the tool and makes them available to the public. This source of information was validated by consulting the DNA's site [B17]. The PP applied the latest available values of $EF_{grid, BM,y}$ and $EF_{grid, OM,y}$ by the date of <i>ex-ante</i> calculation of emission reductions (year of 2011) [A6]. For more details please refer to section Findings, at the end of Appendix F. According to ACM0002, the leakage emissions were not accounted.	CL 07 Closed OK

	Validated situation		Conclusion
2. Verify the justification given in the PDD for the choice of data and parameters used in the equations to determine estimated emission reductions. If data and parameters will not be monitored throughout the crediting period and will remain fixed, 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. If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, confirm that the estimates provided in the PDD for these data and parameters are reasonable. List all data and parameters provided in the PDD in the tables in next column.	Data/Parameter title: <i>EG_{facility,y}</i>	Comments	OK
	Title in line with methodology?	yes	
	Fixed throughout the crediting period?	no	
	Data unit correctly expressed?	yes (MWh/yr)	
	Appropriate description of parameter?	yes	
	Source clearly referenced?	yes (wind certification report [A22] prepared a third part, independent company)	
	Value provided is considered reasonable?	yes (estimated ex ante as 448,365)	
	Has this value been verified?	yes (estimated ex ante)	
	Choice of data correctly justified?	yes	
	Measurement method correctly described?	yes	
	Data/Parameter title: <i>EF_{grid,BM,y}</i>	Comments	
	Title in line with methodology?	yes	
	Fixed throughout the crediting period?	no	
	Data unit correctly expressed?	yes (tCO ₂ /MWh)	
	Appropriate description of parameter?	yes	
	Source clearly referenced?	yes (Brazilian DNA)	
	Value provided is considered reasonable?	yes (estimated ex ante, as 0.2454)	
	Has this value been verified?	yes (estimated ex ante)	
	Choice of data correctly justified?	yes	
	Measurement method correctly described?	yes	

	Validated situation	Conclusion																				
2.(continuation)	<table> <tr> <th>Data/Parameter title: $EF_{grid,OM,y}$</th> <th>Comments</th> </tr> <tr> <td>Title in line with methodology?</td> <td>yes</td> </tr> <tr> <td>Fixed throughout the crediting period?</td> <td>no</td> </tr> <tr> <td>Data unit correctly expressed?</td> <td>yes (tCO₂/MWh)</td> </tr> <tr> <td>Appropriate description of parameter?</td> <td>yes</td> </tr> <tr> <td>Source clearly referenced?</td> <td>yes (Brazilian DNA)</td> </tr> <tr> <td>Value provided is considered reasonable?</td> <td>yes (estimated ex ante, 0.1056)</td> </tr> <tr> <td>Has this value been verified?</td> <td>yes (estimated ex ante)</td> </tr> <tr> <td>Choice of data correctly justified?</td> <td>yes</td> </tr> <tr> <td>Measurement method correctly described?</td> <td>yes</td> </tr> </table>	Data/Parameter title: $EF_{grid,OM,y}$	Comments	Title in line with methodology?	yes	Fixed throughout the crediting period?	no	Data unit correctly expressed?	yes (tCO ₂ /MWh)	Appropriate description of parameter?	yes	Source clearly referenced?	yes (Brazilian DNA)	Value provided is considered reasonable?	yes (estimated ex ante, 0.1056)	Has this value been verified?	yes (estimated ex ante)	Choice of data correctly justified?	yes	Measurement method correctly described?	yes	OK
	Data/Parameter title: $EF_{grid,OM,y}$	Comments																				
	Title in line with methodology?	yes																				
	Fixed throughout the crediting period?	no																				
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	Data/Parameter title: $EF_{grid,CM,y}$	Comments																				
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	Has this value been verified?	yes (estimated ex ante)																				
	Choice of data correctly justified?	yes																				
	Measurement method correctly described?	yes																				
	The estimates provided in the PDD for these parameters have been validated. The ex-ante value of $EG_{facility,y}$ is based on the wind certification report, dated 13/03/2012, prepared by Inova Energy [A22]. All calculations have been verified. Please refer to appendix B, “documents prepared by the PP” [A6]. The $EF_{grid,CM,y}$ is calculated according to the “Tool to calculate the emission factor for an electricity system”: $EF_{grid,CM,y} = F_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$																					

	Validated situation	Conclusion
2.(continuation)	where, for wind and solar power generation project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ for the first and the subsequent crediting periods. The ex-ante calculation of $EF_{grid,CM,y}$ was checked against the values on the official site of the DNA (CIMGC), for 2011 [B17].	
3. Confirm that all assumptions and data used by PPs are listed in the PDD including their references and sources, and that the documentation used as the basis for these assumptions and source of data is correctly quoted and interpreted in the PDD. If the project activity has both A/R and non A/R components ensure that no emissions associated with the A/R activity are accounted for.	All assumptions and data used by PPs are mentioned in the PDD, including their references and sources, and are in accordance with ACM0002. $BE_y = EG_{facility,y} * EF_{grid,CM,y}$ Still according to ACM0002, the leakage emissions were left out of account. There are no A/R and non A/R components in the project.	OK
4. Confirm that all estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.	The validation team has cross-checked the data presented on sections A.3 (Table 2) and B.6 with their references and has replicated the estimations of the baseline emissions using the data and parameter values provided in the PDD [A2] and the CER calculation spreadsheet [A6].	OK
5. If any of the parameters used to calculate ERs has been obtained using sampling methods, please use the "Standard for sampling and surveys for CDM project activities and PoA" paragraphs 20-26 to determine whether the sampling plan proposed by the PPs will provide parameter value estimates in an unbiased and reliable manner. Provide the following data for each parameter in the sampling plan: - The size of the sample: n - The acceptance number: c	No sampling methods have been used for the calculation of the ERs.	OK

	Validated situation	Conclusion
SECTION 7. Additionality of a project activity		
1. Does the PDD clearly describe how the proposed CDM project activity is additional?	Yes ☒ No ☐ The argumentation in defence of the project's additionality has been clearly presented in the PDD: The prior consideration has been demonstrated according to the Guidance on the demonstration and assessment of prior consideration of the CDM. The PP has followed in the PDD all the steps required in the "Tool for the demonstration and assessment of additionality" and the "Guidelines on the assessment of investment analysis" (identification of alternatives, investment analysis, common practice). The identification of alternative scenarios, investment analysis and discussion of common practice were assessed during the desk review and the site visit. For details, please refer to the items 7.a to 7.e below in this protocol.	OK
2. List the documents and tools provided by the CDM Executive Board used to demonstrate the additionality	1. Tool for the demonstration and assessment of additionality 2. Guidelines on the assessment of investment analysis	OK
<u>Additionality for small-scale project activities</u> Determine whether the proposed project activity is additional in accordance with CDM requirements applicable for small-scale project activities: Attachment A to Appendix B of 4/CMP 1 annex II and "non binding best practice examples to demonstrate additionality for SSC project activities"		

	Validated situation	Conclusion
3. Describe and assess the relevant criteria for the automatic additionality of the following cases: a) Type I project activities up to 5 MW that employ renewable energy as their primary technology, b) Type II energy efficiency project activities that aim to achieve energy savings at a scale of no more than 20 GWh per year, c) Type III project activities that aim to achieve emissions reductions at a scale of no more than 20 ktCO ₂ e per year.	N.A.	OK

	Validated situation	Conclusion
SECTION 7a. Prior consideration of the clean development mechanism		
1. Does the PDD clearly indicate the start date of the project activity in format: dd/mm/yyyy, and is it in line with the Glossary of CDM Terms?	Yes ☒ No ☐ The PDD [A1] clearly indicates the project's starting date, 18/08/2011 (PDD section C.1.1). This is the date on which the PP has participated in the 4th Auction of Reserve Energy 2011 organized by the Brazilian Ministry of Mines and Energy [A23]. This information was also cross-checked with the official documents of the Auction published by ANEEL [B16] and with the official result: http://www.aneel.gov.br/aplicacoes/editais_geracao/documentos/Resultado_4LER.pdf Another information source was consulted, http://www.acendebrasil.com.br/archives/files/20110818_AnalisePos_Reserva_Rev0.pdf, page 2. The determination of the starting date is in accordance with the Glossary of CDM Terms (Starting date of a CDM project activity). The validation team agrees that the participation in the auction is the first real action taken in the project. The electricity sale in the auction by the PPs brings a number of obligations related to the project implementation. The entrepreneurs commit themselves to incur expenditures related to the project. It implies a deposit of a collateral, following the Auction Call [B42] and the Manual for Reservation of Guarantees [B45]. The amount of collateral for the	OK

	Validated situation	Conclusion
	auction 003/2011 was of 1% of the total investment (checked against item 2.2.1 [B45] and clause 8.2.1 [B42]). The validation team agrees that the participation in the auctions with the winning bid constitutes real action, once the withdrawal of power supply after winning the auction implies the loss of the collateral deposited. Therefore, the date when the electricity of the project was marketed (18/08/2011) sets the starting date of the project activity. No earlier implementation or construction or real action has been identified during the desk review or the site visit. After signing the PPA, then the entrepreneur has other financial commitments as listed in the PDD. As per Clause 13 of the Auction Call [B42], project owners need to collect 5% of the CAPEX as guarantee (<i>Garantia de Fiel Cumprimento</i>); moreover, a penalty from 0.001% up to 10% of CAPEX will be incurred, if the conditions established by the Auction Notice are not fulfilled (clause 17 [B42]).	
If the PDD was published for Global Stakeholder Consultation process after the start date, check that the CDM benefits were considered necessary in the decision to undertake the project activity as a CDM project, following the below queries.		

	Validated situation	Conclusion												
2. For a project activity with a start date on or after the 02 August 2008, confirm that the PPs have informed the host party DNA and the UNFCCC secretariat in writing of their intention to seek CDM Status. If such a notification has not been provided by the PPs within 180 days of the project activity start date, determine that the CDM was not seriously considered in the decision to implement the project activity.	The prior consideration of the benefits of the CDM in the decision to undertake the project activity was assessed and validated by the assessment team as per VVS version 02.0, paragraphs 105-112 [B2]. The start date of the project activity, 18/08/2011, is after 02/08/2008. <u>Host Party DNA</u>: The prior consideration form was sent to the Host Party DNA by post on 04/11/2011, as per the postal receipt [A14]. A letter has been emitted by the host party DNA confirming the receipt on 13/11/2011 [A15]. <u>UNFCCC</u>: The prior consideration form was sent by email on 03/11/2011. Copy of email communication was assessed by the validation team [A16]. The date of receipt of the prior consideration notification is 03/11/2011, as can be seen on UNFCCC's webpage http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html The prior consideration forms were submitted to DNA and UNFCCC within 6 months from the project start date. PP has provided the project timeline on Table 5 of the PDD describing the main CDM events. The validation team has assessed the following CDM milestones: <table border="1"> <thead> <tr> <th>Date</th><th>Event</th><th>Document assessed</th></tr> </thead> <tbody> <tr> <td>28/09/2011</td><td>Contract signed between Odebrecht Energias Alternativas and Enerbio Consultoria Ltda – ME for CDM Project development</td><td>[A21]</td></tr> <tr> <td>05/10/2011</td><td>Auction ratification</td><td>[B48]</td></tr> <tr> <td>27/03/2012</td><td>Contract signed with wind turbines supplier</td><td>[A29]</td></tr> </tbody> </table>	Date	Event	Document assessed	28/09/2011	Contract signed between Odebrecht Energias Alternativas and Enerbio Consultoria Ltda – ME for CDM Project development	[A21]	05/10/2011	Auction ratification	[B48]	27/03/2012	Contract signed with wind turbines supplier	[A29]	OK
Date	Event	Document assessed												
28/09/2011	Contract signed between Odebrecht Energias Alternativas and Enerbio Consultoria Ltda – ME for CDM Project development	[A21]												
05/10/2011	Auction ratification	[B48]												
27/03/2012	Contract signed with wind turbines supplier	[A29]												

	Validated situation	Conclusion
For a project activity with a start date before 02 August 2008		
3. Check the following requirements through document reviews to assess the PPs prior consideration of the CDM: (a) Evidence that must indicate that awareness of the CDM before the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. (b) Reliable evidence from project participants that must indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation.	N.A.	OK
4. Describe the process for cross-checking the evidence. The assessment of real and continuing actions should focus on real documented evidence, including an assessment of the authenticity of the evidence, i.e. letters, e-mail exchanges and other documented communications. These shall be considered as evidence only after assessing the reliability and authenticity of them, inter alia through cross-checking (e.g. interviews)	N.A.	OK

	Validated situation	Conclusion
5. The time gap between the documented evidence of prior CDM consideration and continuing and real actions shall be within the following period: a) Less than two years of a gap: continuing and real actions were taken to secure CDM status for the project activity; b) Greater than two years and less than three years: justify any positive or negative validation opinion based on the context of the evidence and information assessed; c) Greater than three years: continuing and real actions were not taken.	N.A.	OK
6. If evidence to support the serious prior consideration of the CDM as indicated above that is authentic is not available, determine that the CDM was not considered in the decision to implement the project activity	N.A.	OK

	Validated situation	Conclusion
SECTION 7b. Identification of alternatives		
1. Does the PDD identify credible alternatives to the project activity, to determine the most realistic baseline scenario? Assess this list of alternatives and ensure that: (a) The list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity. (b) The list contains all plausible alternatives considered to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity. (c) The alternatives comply with all applicable and enforced legislation. If the Baseline scenario is prescribed in the approved methodology, no further analysis is required and this section is N.A.	N.A. (the baseline scenario is prescribed in the methodology)	OK

	Validated situation	Conclusion
SECTION 7c. Investment analysis		

	Validated situation	Conclusion																								
1. Verify the accuracy of financial calculations carried out for the investment analysis: (a) Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters. (b) Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices. (c) Review feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participants.	CAR 01: (for more details please refer to section Findings, at the end of Appendix F): CAR 01 was raised concerning the extension of the financial cash flows (21 years) compared to the project lifetime (20 years). PP has corrected the financial cash flows to reflect the project lifetime. CAR 01 was closed. CAR 02: (for more details please refer to section Findings, at the end of Appendix F): CAR 02 was raised concerning the ratio of debt/equity applied in the financial estimation. By default, PPs assumed a ratio of 50% of total capital expenditures (CAPEX) as debt. As PP has not reached the financial closure yet, PPs has also estimated the cash flows assuming that BNDES financing may reach up to 80% of CAPEX. The arguments and estimations presented by PPs were regarded reasonable by the validation team. CAR 02 was closed. CL01: (for more details please refer to section Findings, at the end of Appendix F): CL 01 was raised concerning the reference for considering the debt amortization over 16 years in both cash flows. PPs clarified that the debt amortization term used in the project cash flow was projected according to the National Bank of Social and Economic Development (BNDES) policy [B24]. The validation team has confirmed that the amortization period of 16 years is applicable to the project activity as per BNDES financing policy to the energy sector. CL 01 was closed. CL02: Please provide reference to the official publication of the project’s firm energy. The assured electricity or firm electricity was determined in the 4th Auction of Reserve Energy as the amount of electricity sold in the project span of 20 years. As per the auction results [A23], the validation team has confirmed that: <table><tr><th>Unit</th><th>Physical assured energy (MW_{medium})</th><th>Total assured electricity (MWh)</th><th>Average assured electricity (MWh/yr)</th></tr><tr><td>Corredor dos Senandes II</td><td>10.6</td><td>1,858,392</td><td>92,919.60</td></tr><tr><td>Corredor dos Senandes III</td><td>13.2</td><td>2,314,224</td><td>115,711.20</td></tr><tr><td>Corredor dos Senandes IV</td><td>12.9</td><td>2,261,628</td><td>113,081.40</td></tr><tr><td>Vento Aragano I</td><td>13.8</td><td>2,419,416</td><td>120,970.80</td></tr><tr><td>Total</td><td>50.5</td><td>8,853,660</td><td>442,683.00</td></tr></table>	Unit	Physical assured energy (MW _{medium})	Total assured electricity (MWh)	Average assured electricity (MWh/yr)	Corredor dos Senandes II	10.6	1,858,392	92,919.60	Corredor dos Senandes III	13.2	2,314,224	115,711.20	Corredor dos Senandes IV	12.9	2,261,628	113,081.40	Vento Aragano I	13.8	2,419,416	120,970.80	Total	50.5	8,853,660	442,683.00	CAR 01 CAR 02 CL 01 CL 02 CL 03 CL 04 CL 05 All CARs and CLs above have been closed OK
Unit	Physical assured energy (MW _{medium})	Total assured electricity (MWh)	Average assured electricity (MWh/yr)																							
Corredor dos Senandes II	10.6	1,858,392	92,919.60																							
Corredor dos Senandes III	13.2	2,314,224	115,711.20																							
Corredor dos Senandes IV	12.9	2,261,628	113,081.40																							
Vento Aragano I	13.8	2,419,416	120,970.80																							
Total	50.5	8,853,660	442,683.00																							
LRQA Reference: TCSEP110226_ENODE_A MSBSF43847	Date: 27/12/2012	Page 62 of 113 Revision 0.8, 04 May 2012																								

	Validated situation	Conclusion
1. (continuation)	CL03: (for more details please refer to section Findings, at the end of Appendix F): The commercial proposals by ALSTOM, main equipment supplier, to the project and submitted to LRQA were not signed. PPs have provided the signed versions so the authenticity was confirmed. CL 03 was closed. CL 04: (for more details please refer to section Findings, at the end of Appendix F): The validation team has asked the PP to further substantiate the adopted cost of civil works in both cash flows. The reasoning and references for the estimation of cost of civil works were provided. CL 04 was closed. CL 05: (for more details please refer to section Findings, at the end of Appendix F): The validation team has asked the PP to further substantiate the estimation of the ANEEL supervision taxes. PPs clarified that the Inspection Fee of Electric Energy Services (TFSEE) is calculated according to article 12 of the Brazilian Law 9,427 dated 26/12/1996 and ANEEL Dispatch 4080, article II, dated 27/12/2010. CL 05 was closed. As discussed during the site visit and the desk review and explained by the PP, there are two financial scenarios. One defined before the project start date, when PP was planning to apply to the 4th Auction of Reserve Energy, called Pre-auction. The other financial scenario refers to March 2012, when the technical closure of the project was reached. Both scenarios were assessed by the validation team. The validation team confirms that the financial parameters applied in each of the scenarios are valid at the time of the scenario definition, i.e, the pre-auction scenario is valid at the project start date and the post-auction scenario corresponds to the situation at the time of turbine agreement signature date. A thorough assessment of all parameters, assumptions and financial scenarios, including the cross-check of the parameters against third-party or publicly available sources, has been performed. The suitability and accuracy of the parameters and assumptions used in calculation the Equity IRR (the relevant indicators have been validated as detailed in the table below). The validation team has also confirmed that the project activity has been treated as a single complex that has been separated into four WPPs for administrative purposes. The validation team has confirmed that all negotiations with suppliers have assumed the overall project as a single one. The validation team also confirmed in the site visit and in the document review that the plants are in the same site (Figure 1 of PDD).	

	Validated situation	Conclusion																
2. Assess the correctness of computations carried out and documented by the project participants	The financial assumptions, parameters and calculations both for the time of the auction [A9] and for the time of the final plant design setting [A10] were assessed during the desk review and the site visit and were considered reasonable and accurate.	OK																
3. Assess the sensitivity analysis by the project participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions.	The choice of the variables considered in the sensitivity analysis, the calculations and the reasoning presented in the PDD, has been assessed. The calculations of the sensitivity values can be seen in financial spreadsheets [A9] and [A10], worksheet “Sensitivity analysis”. Simulations with other percentages of variation can also be made, for each parameter, directly in the “Assumptions” worksheet. <table><tr><th></th><th>Items included</th><th>Parameter Variation necessary to IRR=11.75% (Pre-auction)</th><th>Parameter Variation necessary to IRR=11.75% (Post-auction)</th></tr><tr><td>CAPEX</td><td>Total investment, including project planning, civil works, electrical works, WTGs purchase and project purchase</td><td>-31.8%</td><td>-30.9%</td></tr><tr><td>OPEX</td><td>Maintenance and operational costs such as expenditures with transmission maintenance, insurance, SPC acquisition, TUSD, ANEEL supervision taxes, land lease</td><td>-100%</td><td>-100%</td></tr><tr><td>Revenues</td><td>Electricity sold to the grid</td><td>+35.3%</td><td>+35.1%</td></tr></table>		Items included	Parameter Variation necessary to IRR=11.75% (Pre-auction)	Parameter Variation necessary to IRR=11.75% (Post-auction)	CAPEX	Total investment, including project planning, civil works, electrical works, WTGs purchase and project purchase	-31.8%	-30.9%	OPEX	Maintenance and operational costs such as expenditures with transmission maintenance, insurance, SPC acquisition, TUSD, ANEEL supervision taxes, land lease	-100%	-100%	Revenues	Electricity sold to the grid	+35.3%	+35.1%	OK
	Items included	Parameter Variation necessary to IRR=11.75% (Pre-auction)	Parameter Variation necessary to IRR=11.75% (Post-auction)															
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Revenues	Electricity sold to the grid	+35.3%	+35.1%															

	Validated situation	Conclusion
	A. <u>CAPEX</u>: The sensitivity analysis indicates that a CAPEX reduction of 30.9 to 31.8% below the estimated value would be necessary for the equity IRR to achieve the benchmark. CAPEX is composed of Wind Turbine Generator (64%), Civil (17%) and Electrical (11%) Works, and Project Design and Project purchase costs. The highest expenditure is for turbine generator, which was based on a signed proposal signed [A26], which was then confirmed by the turbine agreement [A29]. Civil (17% of CAPEX) and electrical (11% of CAPEX) works were based on signed proposals received from a construction company and from the WTG supplier, respectively. Electrical works were based on the proposal signed by the WTG supplier [A26], page 4, which was then contracted on 27/03/2012 [A29]. Regarding civil works, a decrease in the costs is unlikely. From July 2011 to July 2012, the construction costs have increased 7.3259% and as per the National Construction Cost Index [B32] (INCC - <i>Índice Nacional de Custo da Construção, Fundação Getúlio Vargas</i>²). Project acquisition (1.75%) has also been contracted [A29]. The validation team confirms that the CAPEX cannot decrease 30% to reach the benchmark because more than 77% of the cost has been already contracted. The validation team concludes, from the evidence and the scenario presented above, that it is unlikely that the investors, on the project starting date, could seriously count on a reduction of 30.9 to 31.8% in CAPEX from estimations made, which would be necessary for the IRR to achieve the benchmark value. For details on the validation of the parameter “Capital Expenditures (CAPEX)”, please refer to the table below.	

² From January to July 2012, the accumulated INCC is 5.8892%. Source: Fundação Getúlio Vargas. <http://portalibre.fgv.br>

	Validated situation	Conclusion
	The cost per installed MW considered in the investment analysis is lower than the mean cost of the CDM registered Project, Osório [B13]. The fall in the price of MW installed in the period is explained by the intense competition between the wind generator manufacturers. A reference to this situation can be found on the webpage http://www.ecopolitica.com.br/2011/10/28/furacao-competitivo-no-mercado-de-turbinas-eolicas/ (Portuguese) and http://www.ecopolity.com/2011/09/21/a-surge-of-wind-over-brazil/ (English). The validation team finds it reasonable that, under conditions of strong competition as mentioned above, the commercial proposals naturally tend to be more aggressive, with a reduction of the suppliers' profit margins. B. <u>Project's revenues</u>: The sensitivity analysis indicates that a mean revenue increase of 35.1 to 35.3% above the estimated scenarios would be necessary, all through the project's lifetime, to achieve the benchmark. The likelihood of such increase on each of the two parameters that compose the revenue, the amount of Energy Sold and the Energy Price, has been assessed: i) <u>Energy price</u>: No variation on the energy price for any of the four plants (99.50 BRL/MWh) is expected, once the value is fixed throughout 20 years (except for the inflation adjustments) by the respective power purchase agreements as per the auction' results [A23]. ii) <u>Energy sold</u>: Once no variation on the energy prices is expected, an increase of 35.1 to 35.3% on the energy produced above the projected value would be necessary for the project's equity IRR to achieve the benchmark value. (1) <u>Consideration on uncertainties in the wind studies</u>: the wind certification studies indicated uncertainties 9.77% in the yearly electricity production (P50) (for details, refer to the table below, parameter "Electricity generated for sale"). So, considering a 10% higher net energy production due to the studies' uncertainties, an increase of 25.1 to 25.3% should still occur all through the project's lifetime for the benchmark to be achieved. The validation team considers this unlikely to occur.	

	Validated situation	Conclusion																
	(2) <u>Consideration on the difference between the estimates energy produced and the energy actually sold in the auctions</u>: the pre-auction estimation has been estimated based on the auction; the slight difference (lower than 0.1%) shown in the table below is due to rounding errors and it can be ignored. The validation team has observed that the post-auction investment analysis has been made on the net energy production estimated by the wind study. Nevertheless, the amount of energy actually sold in the auction is lower than the amount expected to be generated in the post-auction design: <table><tr><th>Net electricity to the grid</th><th>Amount over project lifetime – 20y (MWh)</th><th>Difference between sold in the auction and planned generation (MWh)</th><th>Variation (%)</th></tr><tr><td>Sold in the auction (1)</td><td>8,853,660</td><td>-</td><td>-</td></tr><tr><td>Estimation – Pre-auction (2)</td><td>8,847,600</td><td>6,060</td><td>-0.07%</td></tr><tr><td>Design – Pos-auction (2)</td><td>8,967,300</td><td>-113,640</td><td>+1.28%</td></tr></table> Sources: (1) Auction result [A23] (2) Parameter Electricity generated for sale multiplied by 20 year of project lifetime For the Post-auction estimation, the amount of energy sold in the auctions is then 1.28% higher than the one considered in the investment analysis. Considering the effect of this difference together with the effect of the wind studies' uncertainties mentioned above, one can conclude that an increase of the net energy production of 24.25% (35.3% minus 9.77% minus 1.28%) should still occur for the equity IRR to reach the benchmark value. The validation team agrees that such increase cannot be reasonably expected. Furthermore, the unlikelihood that the amount of energy produced reaches the breakeven point is even greater if we consider the historical underperformance of the wind power plants in the region, as confirmed by the monthly report from ANEEL on	Net electricity to the grid	Amount over project lifetime – 20y (MWh)	Difference between sold in the auction and planned generation (MWh)	Variation (%)	Sold in the auction (1)	8,853,660	-	-	Estimation – Pre-auction (2)	8,847,600	6,060	-0.07%	Design – Pos-auction (2)	8,967,300	-113,640	+1.28%	
Net electricity to the grid	Amount over project lifetime – 20y (MWh)	Difference between sold in the auction and planned generation (MWh)	Variation (%)															
Sold in the auction (1)	8,853,660	-	-															
Estimation – Pre-auction (2)	8,847,600	6,060	-0.07%															
Design – Pos-auction (2)	8,967,300	-113,640	+1.28%															

	Validated situation	Conclusion												
	the SIN's power plants results, [B34], pg. 5 Table 2. Please refer to graph #1: "Geração Verificada de Usinas Eólicas - REGIÃO SUL" and table 1, "Geração Média (MW) no período de 12 meses" (report from October 2011). An extract is shown below for the plants Osório, Dos Índios and Sangradouro, which are located near to the proposed project activity: <table border="1"> <thead> <tr> <th>Project</th><th>Estimated capacity factor (%)</th><th>Actual capacity factor (%)</th></tr> </thead> <tbody> <tr> <td>Osório</td><td>32</td><td>28.71</td></tr> <tr> <td>Dos Índios</td><td>30</td><td>27.96</td></tr> <tr> <td>Sangradouro</td><td>33</td><td>31.36</td></tr> </tbody> </table> The validation team confirms also that additional energy generated in the project activity compared to the amount set in the auction cannot be commercialized with other buyers or other commercialization environment (4.4.1 of PPA [A39]). Extra amount generated will therefore have same tariff as fixed in the auction (99.50 BRL/MWh). C. OPEX: The project's cash flow shows that the variations on operational, maintenance and other costs have little effect on the equity IRR. Even an extreme and completely hypothetical situation of zero O&M costs (- 100% variation) would not elevate the equity IRR to the required benchmark. Therefore, the validation team concludes that reaching the benchmark is very unlikely. PP has also assessed the effect of the financing structure (debt and equity share) in the IRR results. The validation team confirms that the default 50% equity - 50% debt is conservative.	Project	Estimated capacity factor (%)	Actual capacity factor (%)	Osório	32	28.71	Dos Índios	30	27.96	Sangradouro	33	31.36	
Project	Estimated capacity factor (%)	Actual capacity factor (%)												
Osório	32	28.71												
Dos Índios	30	27.96												
Sangradouro	33	31.36												

Use the table below to list all the inputs to the investment analysis and to describe how each parameter has been validated:

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
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Parameter/in put	Symbol/ Unit	Value	Source	Means of validation	Conclusion				
Benchmark value	%	11.75	For the benchmark value on real terms, 11.75%: “Guidelines on the Assessment of Investment Analysis” version 05, page 8, appendix paragraph 7.	The validation team has agreed with the calculation of equity IRR as the benchmark in real basis from the guideline (11.75%) in accordance with the “Guidelines on the Assessment of Investment Analysis” [B7] version 05, page 8, appendix paragraph 7 (once the project’s cash flow has been calculated in real terms).	OK				
IRR analysis:									
A. Incoming cash flow									
A.1 Pre-auction scenario (70 turbines)									
The project design was formed by 70 wind turbines with 1.67 MW unitary nominal capacity each. The total installed capacity predicted at the time of the auction was 116.9 MW. This financial analysis corresponds to the time of the project start date.									
Installed Capacity	MW	116.9	Preliminary wind study [A24], prepared by MML Energia, PDD Table 8	The original design was constituted of 70 wind turbines, model ALSTOM ECO86 with 1.67MW each, totalling 116.9 MW. The validation team has checked the preliminary wind study prepared by MML Energia [A24]. The study was requested on 30/06/2011. The value in the wind study was cross-checked against that in the Pre-auction financial analysis (file [A9], worksheet “Assumptions”, total value on cell B5).	OK				
Electricity generated for sale	MWh/yr	442,380	Table 8 of PDD	The value was based on the original project configuration: physical guarantee of 50.5 MW/medium multiplied by the operating hours (8760 h/yr). The physical guarantee (assured energy) has been determined by ANEEL (MME Dispatch 27 [B47]) and confirmed to be in line with the auction result [A23]: <table><tr><td></td><td>Installed capacity (MW)</td></tr><tr><td>Senandes II</td><td>10.6</td></tr></table>		Installed capacity (MW)	Senandes II	10.6	OK
	Installed capacity (MW)								
Senandes II	10.6								

Parameter/in put	Symbol/ Unit	Value	Source	Means of validation		Conclusion						
				<table><tr><td>Senandes III</td><td>13.2</td></tr><tr><td>Senandes IV</td><td>12.9</td></tr><tr><td>Aragano</td><td>13.8</td></tr></table>	Senandes III	13.2	Senandes IV	12.9	Aragano	13.8		
Senandes III	13.2											
Senandes IV	12.9											
Aragano	13.8											
				The nominal installed capacity (116.9MW) of the original plan has been confirmed to be sourced from the preliminary wind study prepared to <i>MML Energia</i> [A24].								
Electricity Price	BRL/MWh	99.50	Price fixed at the 4 th Auction of Reserve Energy, call #03/2011 (18/08/2011) [A23] PDD table 8	The validation team has cross-checked with ANEEL webpage, 4 th Auction of Reserve Energy, call #03/2011 [B16]: Select “Resultado”→ see file “Resultado_4LER.xls”, last column. Validation team confirms that as per the PPA [A39], the electricity price will not change during the project lifetime, except for inflation corrections. As determined in the PPA, if a higher amount of energy is generated in the WPPs than the amount sold in the auction, the additional amount cannot be sold elsewhere and same tariff fixed in the auction will be applied. No additional external source was deemed necessary, once the source mentioned above is official (ANEEL).		OK						
A2. Post-auction scenario (40 turbines):												
The final project design is formed by 40 wind turbines with 2.7 unitary nominal capacity each. The total installed capacity of the project activity is 108 MW. This financial analysis corresponds to the time of the purchase of equipment (March 2012).												
Installed Capacity	MW	108	Wind certification studies, issued by <i>Inova Energia</i> on 13/03/2012, PDD Table 2	The values of installed capacity as per the Energy Production Assessment Certificates issued by <i>Inova Energia</i> [A22] were assessed and considered reliable. The values in the wind studies were cross-checked against those in the Post-auction financial analysis [A10] (worksheet “Assumptions”, total value on cell B5).		OK						

Parameter/in put	Symbol/ Unit	Value	Source	Means of validation			Conclusion
					Specification	Installed capacity (MW)	
				Senandes II	8 ALSTOM ECO122 with 2.7MW each	21.6	
				Senandes III	10 ALSTOM ECO122 with 2.7MW each	27	
				Senandes IV	11 ALSTOM ECO122 with 2.7MW each	29.7	
				Aragano	11 ALSTOM ECO122 with 2.7MW each	29.7	
				Total	40 ALSTOM ECO122 with 2.7MW each	108	
				Sources: [A22], [A29]			
No additional source was considered necessary, once the wind studies fully comply with the CDM “Guidelines for the Reporting and Validation of Plant Load Factors”.							
Electricity generated for sale	MWh/yr	448,365	Wind certification studies, issued by <i>Inova Energia</i> on 13/03/2012, PDD Table 2	The values of net annual energy yield in the Energy Production Assessment Certificates issued by <i>Inova Energia</i> [A22] were assessed and considered reliable. The values of net annual energy production considered in the financial analysis are for 50% surplus probability (P50), which was considered satisfactorily conservative from the standpoint of demonstration of additionality. The values in the wind studies were cross-checked against those in the financial analysis worksheet [A10].			OK
					Annual energy production assured (MWh) [A22]	Annual standard uncertainty (MWh) [A22]	
				Senandes II	90,681	8,864	
				Senandes III	113,387	11,084	

Parameter/in put	Symbol/ Unit	Value	Source	Means of validation			Conclusion
				Senandes IV	120,621	11,791	
				Aragano	123,676	12,090	
				Total	448,365	43,829	
Electricity price	BRL/MW h	99.50	Price fixed at the 4 th Auction of Reserve Energy, call #03/2011 (18/08/2011) [A23]. PDD table 9	The validation team has cross-checked with ANEEL webpage, 4 th Auction of Reserve Energy, call #03/2011 [B16]: Select “Resultado”→ see file “Resultado_4LER.xls”, last column. Validation team confirms that as per the PPA [A39], the electricity price will not change during the project lifetime, except for inflation corrections. As determined in the PPA, if a higher amount of energy is generated in the WPPs than the amount sold in the auction, the additional amount cannot be sold elsewhere and same tariff fixed in the auction will be applied. No additional external source was deemed necessary, once the source mentioned above is official (ANEEL).			OK
B. Outgoing cash flow							
B1. Pre-auction scenario (70 turbines):							
CAPEX							
Investment (CAPEX)	BRL	370,496,161	Budgeted according to supplier proposals, suppliers information, internal assumptions, and contracts, PDD table 8	The validation team has cross-checked the values as following:			OK
				Activity	Amount (kBRL)	Cross-che king	
				Executive Project and Planning	21,743.4	Budgeted internally by the Engineering and Implementation Department, based on experience on previous	

Parameter/in put	Symbol/ Unit	Value	Source	Means of validation			Conclusion
						projects [A32] (18/08/2011)	
				Civil works	59,526.1	Budgeted internally after the project owner consulted three potential constructors (Pelotense [A35], Sanenco and Bassani). The rationale of the estimation was provided to validation team and was deemed appropriate (Refer to CL 04) and was summarized on [A34]. The validation team has received copies of communication between MML Energia and construction companies and cross-checked values.	
				Electrical works	43,818.0	Proposal for electrical work dated 18/08/2011 [A37]	
				Wind Turbine Generator (WTG)	238,000.0	Proposal submitted by Alstom: 70 WTG model ECO86 [A25]	
				Project	7,412.6	SPC acquisition cost has been separated on costs at development stage, categorized as CAPEX, and operation stage, which were categorized as OPEX cost. Clauses 5.1 and 11.1.1 of the	

Parameter/in put	Symbol/ Unit	Value	Source	Means of validation			Conclusion
						agreement between OEA, MML and Epcor [A28]	
Validation team has received and checked the signed version of the proposals and agreements. The documents are deemed authentic.							
The CAPEX has also been validated through the comparison with the only similar CDM registered project in the region, Osório Wind Power Plant Project, ref 0603 [B13]. Other two registered projects (Agua Doce, ref. 0575 and Horizonte, ref. 0486) are small scale projects and for this reason were not considered similar the project activity. Despite the scarce information available for comparison, one can observe that the investment cost per output (4,303 BRL/kW) is higher than the pre-auction design of the projects activity (3,169 BRL/kW).							
The validation team has also cross-checked the specific investment per installed kW against the wind energy auctions as reported by BNDES [B25].							
				Reference		Investment cost per output (BRL/kW)	
				Osório Wind Power Plant Project, CDM, ref 0603 [B13]		4,303	

Parameter/input	Symbol/Unit	Value	Source	Means of validation		Conclusion												
				Project pre-auction estimation	3,169													
				LER 2009 [B25]	4,200													
				LER 2010 [B25]	4,000													
OPEX																		
The pre-auction operational cost breakdown is described in the lines below. It includes operation and administrative expenses, turbine maintenance, insurance, TUSD, TFSEE, SPC payments, land lease, transmission maintenance and contingencies. The total operation costs vary from 7,840,937 to 14,945,029 BRL/yr with an average of 11,815,608 BRL/yr (line 11, worksheet 'Cash Flow' [A11]). The validation team has cross-checked the operational cost against third part sources (table below). For comparison purpose the costs of SPC payments, TUSD, TFSEE, which are project-specific, were excluded from total Opex since they are not considered as well in the references adopted for comparison. Therefore, the specific OPEX is 16.07 BRL/MWh, which was found is line with the values presented by international sources. The validation team considers the pre-auction OPEX estimation adequate.																		
<table><tr><td>Source</td><td>O&M cost (BRL/MWh)</td><td>O&M cost (USD/MWh)*</td></tr><tr><td>Corredor do Senandes (pre-auction). Obs.: the costs of SPC payments, TUSD, and TFSEE were not included in this comparison</td><td>16.07</td><td>10.01</td></tr><tr><td>Schaeffer, R.; Szklo, S.A., (2000)³ [B33]</td><td></td><td>10</td></tr><tr><td>American Wind Energy Association (2011) [B35]</td><td></td><td>7 ~ 15</td></tr></table>							Source	O&M cost (BRL/MWh)	O&M cost (USD/MWh)*	Corredor do Senandes (pre-auction). Obs.: the costs of SPC payments, TUSD, and TFSEE were not included in this comparison	16.07	10.01	Schaeffer, R.; Szklo, S.A., (2000) ³ [B33]		10	American Wind Energy Association (2011) [B35]		7 ~ 15
Source	O&M cost (BRL/MWh)	O&M cost (USD/MWh)*																
Corredor do Senandes (pre-auction). Obs.: the costs of SPC payments, TUSD, and TFSEE were not included in this comparison	16.07	10.01																
Schaeffer, R.; Szklo, S.A., (2000) ³ [B33]		10																
American Wind Energy Association (2011) [B35]		7 ~ 15																
* Conversion rate on the project start date: 1.6058 BRL/USD (Brazilian Central Bank, 18/08/2011)																		
Maintenance costs	kBRL/yr	1 st to 2 nd year: 0 3 rd to 5 th	Budgeted according to proposal from potential supplier:	The validation team has cross-checked against the maintenance proposal offered by the WTG manufacturer, dated 16/08/2011 [A25]. The signed		OK												

³ "FutureElectricPowerTechnologyChoicesOfBrazil.pdf": Future electric power technology choices of Brazil: a possible conflict between local pollution and global climate change, Energy Policy 29 (2001) 355-369.

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
		year: 3,360 6 th to 10 th year: 4,139 From 11 th year: 4,130	3 rd to 5 th year: 48 kBRL/WTG 6 th to 10 th year: 59 kBRL/WTG From 11 th year– average of the first 10 years + 12.5% PDD table 8	document was presented to the validation team and it is deemed authentic. No agreement has been signed yet.	
Expenditures with transmission maintenance	BRL/yr	1,230,957	Budgeted according to internal estimative based on experience with other projects (10,530 BRL/MW installed), PDD table 8.	Cross-checking with OEA communication [A43] that refers to [A44]. It is composed of: transmission maintenance, civil maintenance, electrical maintenance (substation, transmission line and connection bay).	OK
Insurance	BRL/yr	926,240	0.25% of CAPEX (based on previous experiences of the PP), PDD table 8	The value was cross-checked with the financial assessment prepared by a third part. WPP insurance cost in average 0.32% (0.13 to 0.80%) of the insured capital [B56]. Therefore, 0.25% is deemed conservative.	OK
SPC Acquisition	BRL/yr	3 rd to 5 th year - 1,482,531 6 th year – 2,965,062	Agreement established with MML Energia Elétrica	The validation team has assessed the agreement for SPC acquisition [A28]. SPC is paid part at construction stage (categorized as CAPEX) and as part at operation stage (categorized as OPEX)	OK
TUSD (Distribution fee)	BRL/yr	4,110,204	ANEEL resolution 1,074 issued on 19/10/2010, Annex II-B and 5 th Article, item II (TUSD definition for Palmares WPP, enterprise located near to the project activity) PDD Table 8	TUSD is always defined by ANEEL, through its resolutions when a power plant is connected to a Shared Transmission Installation (<i>Instalação de Transmissão Compartilhada</i>). Therefore, no TUSD has been defined to project activity and only will be defined when the connection to grid substation is done. Hence TUSD defined to Palmares WPP, 2.93 BRL/kWh, valid at the time of the investment decision, has been applied. The validation team has cross-checked with the ANEEL publication [B37]. The project activity will be connected to Quinta Substation, which is connected to the CEEE-D (<i>Companhia Estadual de Distribuição de Energia Elétrica</i>), a company based on Rio Grande do Sul	OK

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
				State. As per resolution 1,074 [B37], Palmares WPP is also connected to the CEEE-D. Therefore, applying the same value as Palmares WPP is deemed reasonable since TUSD is a fee paid to the distribution company. Obs.: Through Resolution #77 [B44], ANEEL established a discount of 50% of the applicable distribution/transmission fee (TUSD) for complementary renewable energy projects, such as wind power generation projects. This sectoral policy was established on 18/08/2004, and therefore after 11/11/2001. This discount gives a comparative advantage to less emission-intensive technologies over more emission-intensive technologies. The validation team agrees that the incentive can be classified as a Type E- policy, according to the VVS version 02.0 paragraph 93.b. The PP has considered the full value of TUSD in the investment analysis calculation.	
ANEEL Supervision Taxes (TFSEE)	BRL/yr	225,459	Budgeted according to Decree 2,410, November 28, 1997, and ANEEL Dispatch 4,080, December 27, 2010, PDD Table 8	The validation team has confirmed that as per Law 9427 dated 26/12/1996 and per decree 2410 dated 28/11/1997 [B20], the TFSEE is calculated as follows: $TF_g = P \times G_u = P \times 0.5/100 \times B_g$ where: TF_g = annual TFSEE (BRL) P = nominal installed capacity (kW) G_u = 0.5% of the annual Typical Unitary Economic Benefit B_g = annual Typical Unitary Economic Benefit (BRL/kW) The validation team has confirmed that as per ANEEL Dispatch 4080, article II [B38] that the annual Typical	OK

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
				Unitary Economic Benefit for 2011 is 385.73BRL per installed kW. The value presented in the PDD Table 8 was confirmed as following: $116,900 \text{ kW} \times 0.005 \times 385.73\text{BRL/kW} = 225,459 \text{ BRL}$ [A9] The validation team confirms that the calculation method explained above was valid at the time of project decision and it is still valid.	
Land Lease	BRL/yr	660,252	Land lease agreements (1.5% of the project gross revenue), Table 8 of PDD	The validation team has assessed the land-lease agreements signed between MML, Epcor and land owners, all of them with a value of 1.5% of gross revenue [A27]. These agreements were signed in February 2011, before the project start date, in order to assure the project location for the wind certification studies. Payments to land owners will be done when the project starts operation as per the project revenue. The value was cross-checked with the financial assessment prepared by a third part. WPP land lease cost in average 1.25% (0.21 to 1.90%) of the net revenue [B56].	OK
Contingencies	BRL/yr	200,000	Budgeted as per PP experience including general expenses, such as CCEE taxes, ONS taxes and other expenses. PDD table 8	Budgeted internally by the Engineering and Implementation Department, based on experience on previous projects. The validation team has confirmed that the ONS fee corresponds to 50% of the TFSEE and that the CCEE fee also corresponds to 50% of TFSEE [B52]; summing both, the value is 225,459 BRL/yr (in this scenario). Therefore, the value estimated by PP for contingencies is deemed reasonable.	OK
Administrative and plant operation	BRL/yr	487,824	Budgeted according to internal assumptions, PDD tables 8 and 9	Cross-checking with the estimations developed by OEA Executive Project and Planning Department based on experience with previous projects [A31]. It includes the following costs: operators, materials and general	OK

Parameter/input	Symbol/Unit	Value	Source	Means of validation			Conclusion
costs				expenses.			
B2. Post-auction scenario (40 turbines):							
CAPEX							
Investment (CAPEX)	BRL	384,271,827	Budgeted according to supplier proposals, suppliers information, internal assumptions, and contracts established with suppliers PDD table 9	The validation team has cross-checked the values as following:			OK
				Activity	Amount (kBRL)	Cross-checking	
				Executive Project and Planning	21,743.4	Budgeted internally by the Engineering and Implementation Department, based on experience on previous projects [A32]	
				Civil works	65,344.7	Construction proposal [A36]	
				Electrical works	43,143.7	Proposal for electrical work [A38], [A29]	
				Wind Turbine Generator	247,318.8	Proposal for 40 WTG model ECO122 [A26], [A29]	
				Project	6,721.2	Clause 5.2 of Agreement Amendment [A29]	
				Validation team has received and checked the signed version of the proposals and agreements. The documents are deemed authentic.			
				The CAPEX has also been validated through the comparison with the only similar CDM registered project in the region, Osório Wind Power Plant Project, ref 0603			

Parameter/in put	Symbol/ Unit	Value	Source	Means of validation	Conclusion										
				[B13]. Other two registered projects (Agua Doce, ref. 0575 and Horizonte, ref. 0486) are small scale projects and for this reason were not considered similar the project activity. Despite the scarce information available for comparison, one can observe that the investment cost per output (4,303,553.00 BRL/MW) is higher than the post-auction design of the projects activity (3,558 BRL/kW). The validation team has also cross-checked the specific investment per installed kW against the wind energy auctions as reported by BNDES [B25]. As shown in the comparison below, it is clear that the post-auction CAPEX estimation is conservative. <table><tr><th>Reference</th><th>Investment cost per output (BRL/kW)</th></tr><tr><td>Osório Wind Power Plant Project, CDM, ref 0603 [B13]</td><td>4,303</td></tr><tr><td>Project post-auction estimation</td><td>3,558</td></tr><tr><td>LER 2009 [B25]</td><td>4,200</td></tr><tr><td>LER 2010 [B25]</td><td>4,000</td></tr></table>	Reference	Investment cost per output (BRL/kW)	Osório Wind Power Plant Project, CDM, ref 0603 [B13]	4,303	Project post-auction estimation	3,558	LER 2009 [B25]	4,200	LER 2010 [B25]	4,000	
Reference	Investment cost per output (BRL/kW)														
Osório Wind Power Plant Project, CDM, ref 0603 [B13]	4,303														
Project post-auction estimation	3,558														
LER 2009 [B25]	4,200														
LER 2010 [B25]	4,000														
OPEX The post-auction operational cost breakdown is described in the lines below. It includes operation and administrative expenses, turbine maintenance, insurance, TUSD, TFSEE, SPC payments, land lease, transmission maintenance and contingencies. 7,460,503 to 14,260,503 BRL/yr with an average of 10,869,061 BRL/yr (line 11, worksheet ‘Cash Flow’ [A12]). The validation team has cross-checked the operational cost against third part sources (table below). For comparison purpose the costs of SPC payments, TUSD, TFSEE, which are project-specific, were excluded from total Opex since they are not considered as well in the references adopted for comparison. Therefore, the specific OPEX is 14.56 BRL/MWh, which was found is line with the values presented by international sources. The validation team considers															

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
the post-auction OPEX estimation adequate.					
Source			O&M cost (BRL/MWh)	O&M cost (USD/MWh)*	
Corredor do Senandes (post-auction) without SPC payments, TUSD, and TFSEE			14.56	9.07	
Schaeffer, R.; Szklo, S.A., (2000) ⁴ [B33]				10	
American Wind Energy Association (2011) [B35]				7 ~ 15	
* Conversion rate as per the project start date: 1.6058 BRL/USD (Brazilian Central Bank, 18/08/2011)					
Maintenance Costs	BRL/yr	- 0	Budgeted according to supplier proposal. PDD table 9	Validation team has checked the signed version of the proposal [A26]. The document is deemed authentic. The maintenance costs proposed (page 11) by turbine manufacturer are in line with the values applied in the financial analysis spreadsheets:	OK
		3 rd year – 1,200,000			
		4 th year – 1,600,000			
		5 th year – 2,000,000			
		6 th to 7 th year 2,400,000			
		8 th to 10 th year 6,800,000			
		From 11 th year 3,150,000			
				No agreement has been signed yet.	

⁴ "FutureElectricPowerTechnologyChoicesOfBrazil.pdf": Future electric power technology choices of Brazil: a possible conflict between local pollution and global climate change, Energy Policy 29 (2001) 355-369.

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
Expenditures with transmission maintenance	BRL/yr	1,137,240	Budgeted according to internal estimative based on experience with other projects (10,530 BRL/MW installed), PDD table 9	Cross-checking of calculations with OEA communication [A43]. It is composed of: transmission maintenance, civil maintenance, electrical maintenance (substation, transmission line and connection bay).	OK
Insurance	BRL/yr	960,679	0.25% of CAPEX (based on previous experiences of the PP), PDD table 9	The value was cross-checked with the financial assessment prepared by a third part. WPP insurance cost in average 0.32% (0.13 to 0.80%) of the insured capital [B56]. Therefore, 0.25% is deemed conservative.	OK
SPC Acquisition	BRL/yr	3 rd to 5 th year - 1,334,232 6 th year – 2,668,464	Agreement established with MML Energia Elétrica	The validation team has assessed the agreement for SPC acquisition [A29]. SPC is paid part at construction stage (categorized as CAPEX) and as part at operation stage (categorized as OPEX)	OK
TUSD (Distribution fee)	BRL/yr	3,797,280	ANEEL resolution 1,074 issued on 19/10/2010, Annex II-B and 5 th Article, item II (TUSD definition for Palmares WPP, enterprise located near to the project activity) PDD Table 9	TUSD is always defined by ANEEL, through its resolutions when a power plant is connected to a Shared Transmission Installation (<i>Instalação de Transmissão Compartilhada</i>). Therefore, no TUSD has been defined to project activity and only will be defined when the connection to grid substation is done. Hence TUSD defined to Palmares WPP, 2.93 BRL/kWh, valid at the time of the investment decision, has been applied. The validation team has cross-checked with the ANEEL publication [B37]. The project activity will be connected to Quinta Substation, which is connected to the CEEE-D (<i>Companhia Estadual de Distribuição de Energia Elétrica</i>), a company based on Rio Grande do Sul State. As per resolution 1,074 [B37], Palmares WPP is also connected to the CEEE-D. Therefore, applying the same value as Palmares WPP is deemed reasonable since TUSD is a fee paid to the distribution company.	OK

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
				Obs.: Through Resolution #77 [B44], ANEEL established a discount of 50% of the applicable distribution/transmission fee (TUSD) for complementary renewable energy projects, such as wind power generation projects. This sectoral policy was established on 18/08/2004, and therefore after 11/11/2001. This discount gives a comparative advantage to less emission-intensive technologies over more emission-intensive technologies. The validation team agrees that the incentive can be classified as a Type E- policy, according to the VVS version 02.0 paragraph 93.b. The PP has considered the full value of TUSD in the investment analysis calculation.	
ANEEL Supervision Taxes (TFSEE)	BRL/yr	208,294	Budgeted according to Decree 2,410, November 28, 1997, and ANEEL Dispatch 4,080, December 27, 2010, PDD Table 9	The validation team has confirmed that as per Law 9427 dated 26/12/1996 and per decree 2410 dated 28/11/1997 (http://www.planalto.gov.br/ccivil_03/decreto/1997/D2410.htm), the TFSEE is calculated as following: $TF_g = P \times G_u = P \times 0.5/100 \times B_g$ where: TF_g = annual TFSEE (BRL) P = nominal installed capacity (kW) G_u = 0.5% of the annual Typical Unitary Economic Benefit B_g = annual Typical Unitary Economic Benefit (BRL/kW) The validation team has confirmed that as per ANEEL Dispatch 4080, article II, dated 27/12/2010 [B38] that the annual Typical Unitary Economic Benefit for 2011 is 385.73BRL per installed kW. The value presented in the PDD Table 9 was confirmed	OK

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
				as following: $108 \text{ kW} \times 0.005 \times 385.73 \text{ BRL/kW} = 208,294 \text{ BRL [A10]}$. The validation team confirms that the calculation method explained above was valid at the time of project decision and it is still valid.	
Land Lease	BRL/yr	669,184	Land lease agreements (1.5% of the project gross revenue), Table 9 of PDD	The validation team has assessed the land-lease agreements signed between MML, Epcor and land owners, all of them with a value of 1.5% of gross revenue [A27]. These agreements were signed in February 2011, before the project start date, in order to assure the project location for the wind certification studies. Payments to land owners will be done when the project starts operation as per the project revenue. The value was cross-checked with the financial assessment prepared by a third part. WPP land lease cost in average 1.25% (0.21 to 1.90%) of the net revenue [B56].	OK
Contingencies	BRL/yr	200,000	Budgeted as per PP experience including general expenses, such as CCEE taxes, ONS taxes and other expenses. PDD table 9	Budgeted internally by the Engineering and Implementation Department, based on experience on previous projects. The validation team has confirmed that the ONS fee corresponds to 50% of the TFSEE and that the CCEE fee also corresponds to 50% of TFSEE [B52]; summing both, the value is 208,294 BRL/yr. Therefore, the value estimated by PP for contingencies is deemed reasonable.	OK
Administrative and plant operation costs	BRL/yr	487,824	Budgeted according to internal assumptions, PDD tables 8 and 9	Cross-checking with the estimations developed by OEA Executive Project and Planning Department based on experience with previous projects [A31]. It includes the following costs: operators, materials and general expenses.	OK
C. Financing conditions					

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
Nominal interest rate	%	6.5 (50% TJLP + 50% TJ-462)	BNDES conditions to more intensive GHG technologies as described in the presentation of E- policy. A credit risk spread of 1.5% was assumed. These values were available in the BNDES webpage [B24] PDD tables 8 and 9	The validation team has confirmed through an official source [B20]⁵, that between August 2009 and June 2012, the TJLP has been 0.5% per month, leading to a yearly accumulated value of 6%. It has been confirmed in the BNDES webpage that TJ-462 is 1% per year higher than the TJLP. Therefore, at the time of the investment decision, the TJ-462 was 7%.	OK
		3.3 (Financial spread)		The validation team has confirmed that the financial spread has been determined as: 1.8% as per BNDES basic remuneration for more intensive GHG industries (eg. coal) 1.5% risk spread applied by BNDES, which can reach up to 4.18% per year Cross-checked with BNDES official information [B24]. Considering that the risk spread can reach 4.18%, the assumption of 1.5% is conservative. Furthermore, there is also an intermediation fee of 0.5% per year that is usually charged to big companies.	
Amortization Period	years	16	National Bank of Social and Economic Development (BNDES) policy [B24]	The validation team has confirmed that the BNDES allows for an amortization period up to 16 years for projects classified as <i>Alternative Energy</i> [B24]. Validation team has also confirmed that the proposed project activity, wind power plant, is classified as <i>Alternative Energy</i> and therefore the amortization period of 16 years is applicable.	OK

⁵ <http://www.receita.fazenda.gov.br/pessoajuridica/refis/tjlp.htm>

Parameter/in put	Symbol/ Unit	Value	Source	Means of validation	Conclusion								
Leverage of the project	%	50	Since the project does not have a defined capital structure yet, it was adopted the 50% leverage standard, as proposed by UNFCCC in the item 17 of <i>Guidelines on the Assessment of Investment Analysis</i> , Version 05. PDD [A2], tables 8 and 9	The leverage has been estimated by the PP based on item 17 of <i>Guidelines on the Assessment of Investment Analysis</i>, Version 05. The validation team has received and checked the Version 2 of financial spreadsheets provided by PP. It has been confirmed that the financial structure 80% debt/ 20% equity leads to a lower Equity IRR than the default financing structure 50% Debt/50% Equity. Despite the actual debt/equity finance structure can reach 80/20, the default structure 50/50 was deemed more conservative, besides being in line with the Guidelines. PP has also added to the PDD and spreadsheet the results of the financial structure 80% debt/ 20% equity in the sensitivity analysis.	OK								
Inflation rate	%	4.5	Inflation index target (IPCA) published by Brazilian Central Bank ⁶ (BCB)	Inflation rate was only applied to the nominal interest of the debt to carry out the analysis on real terms (See ‘Loan Auxiliary’ worksheet [A9], [A10]). The annual interest rate (9.8%) was converted to real interest (5.07%) considering the inflation rate of 4.5%. The validation team confirms the value applied and source chosen, IPCA (Inflation Index Target published by the Brazilian Central Bank) for the inflation rate. From 2006 to 2011, the Brazilian Central Bank’s inflation target has also been 4.5% per year [B31]. The economic situation of the country is stable and inflation is expected to be flat. The estimation of the future Brazilian inflation rate has been also cross-checked with the International Monetary Fund (IMF) [B38]. <table><tr><td>2012</td><td>5.2</td><td>2013</td><td>5</td></tr><tr><td>2014</td><td>4.8</td><td>2015</td><td>4.5</td></tr></table>	2012	5.2	2013	5	2014	4.8	2015	4.5	OK
2012	5.2	2013	5										
2014	4.8	2015	4.5										

Parameter/in put	Symbol/ Unit	Value	Source	Means of validation				Conclusion
				2016	4.5	2017	4.5	
				From 2017:			4.5	
				The IMF expected inflation rate for Brazil corresponds to current inflation targets published by BCB. Therefore, the value of 4.5% is deemed appropriate.				
D. Taxes								
PIS/COFINS	%	3.65% on Gross revenue	Budgeted as applicable Brazilian law of presumed profit according to the PDD tables 8 and 9	The value budgeted in the tables 8 and 9 of the PDD has been confirmed with information from the Secretary of Federal Revenue [B22]. PIS: 3% COFINS: 0.65% Another official source has been consulted [B23]: See “Regime de incidência cumulativa”, first paragraph.				OK
Income Tax	%	25% on 8% Gross revenue	Budgeted as applicable Brazilian law of presumed profit, according to the PDD tables 8 and 9	Cross-checked with information from the Secretary of Federal Revenue of Brazil [B22]. <u>Income tax (25% x 8% of revenues):</u> http://www.receita.fazenda.gov.br/pessoajuridica/dipi/2005/pergresp2005/pr517a555.htm , questions 520, 531 and 541. The tax rate is 15% of the basis value (8% of gross revenue). The additional tax is 10% over the basis value that exceeds 240,000 BRL per year (60,000 BRL per quarter).				OK
Social contribution	%	9% on 12% Gross revenue	Budgeted as applicable Brazilian law of presumed profit, according to the PDD tables 8 and 9	Cross-checked with information from the Secretary of Federal Revenue of Brazil as following: <u>Social contribution (9% x 12% of revenues=1.08%):</u> http://www.receita.fazenda.gov.br/pessoajuridica/dipi/2005/pergresp2005/pr617a633.htm , questions 619 and 632.				OK

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
E. Other parameters (not listed on IRR analysis)					
PPA length	years	20	Term fixed 4th Auction of Reserve Energy	The contracted energy supply with a term of 20 years has been validated for all plants as shown below: For the 4th Auction of Reserve Energy, 003/2011, type A-3, carried out on 18/08/2011, the contract supply shall occur from 01 July 2014 till 30 June 2034, Clause 3.3 of the agreement [B17] .	OK
Depreciation	%	5	Guidance from the Manual of Power Sector Asset Control published by ANEEL	As per ANEEL publication, the depreciation rate for WTG is 5% (page 209, [B46]). No additional external source was deemed necessary, once the source mentioned above is official (ANEEL).	OK
Operational lifetime	years	20	WTG lifetime ([A40] and [A41]), as per the International Standard IEC 61400-1 PDD table 2	The data was sourced from WTG manufacturer ([A40] and [A41]); therefore it is in line with option (a) of the Tool to determine the remaining lifetime of equipment [B12]. The 20 year WTG lifetime considered by the PP was validated by the sector expert and is in accordance with the external source Wind Measurement International [B36]. For comments on the lifetime see in "Project lifetime, Design lifetime". The sector expert of the validation team has concluded that no residual value of assets can be reasonably expected from the investor's standpoint after the project's lifetime. A 20 year operation period for each plant has been considered in the financial analysis' cash flows ([A9] and [A10]), with no residual value from 2014 to 2034.	OK
Load Factor	%	47.4	Wind certification studies, issued by <i>Inova Energia</i> on 13/03/2012, PDD	The data in the wind studies (page 4) [A22] has been assessed to confirm the overall value of (47.4%) stated	OK

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
			table 2	in the PDD. No additional source was considered necessary, once the wind studies were carried out by a third party, an engineering company contracted by the PP, and fully comply with the CDM "Guidelines for the Reporting and Validation of Plant Load Factors" [B10], paragraph 3 option (b).	

	Validated situation	Conclusion
4. Confirm the suitability of any benchmark applied in the investment analysis: (a) Determine whether the type of benchmark applied is suitable for the type of financial indicator presented. (b) Ensure that any risk premiums applied in determining the benchmark reflect the risks associated with the project type or activity. (c) Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants involved and determining whether the same benchmark has been applied or if there are verifiable circumstances that have led to a change in the benchmark.	The benchmark value adopted by the PP (11.75% in real terms) is in accordance with the "Guidelines on the Assessment of Investment Analysis" version 05 [B7], page 8, appendix paragraph 8, and is suitable for the type of financial indicator chosen (equity IRR). The validation team has agreed with the calculation of equity IRR as the benchmark in real basis from the guideline (11.75%).	OK

	Validated situation	Conclusion
5. If the project participants rely on values from a Feasibility Study Report (FSR) approved by any national authority, the team is required to ensure that: (a) The FSR has been the basis of the decision to proceed with the investment in the project, that is, that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed. (b) The values used in the PDD and associated annexes are fully consistent with the FSR and, where inconsistencies occur, the DOE should validate the appropriateness of the values. (c) On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision. Use the table below to cross-check input values and describe here the results of the comparison.	N.A.	N.A.

Comparison to similar registered project in the region: there is only one similar CDM registered project in the region, as shown below. Other two registered projects (Agua Doce, ref. 0575 and Horizonte, ref. 0486) are small scale projects and for this reason were not considered similar the project activity. Despite the scarce information available on this similar project [B13], one can observe that the investment cost per output in this reference (4,303.5 BRL/kW) is considerably higher than the projects activity's (3,169 or 3,558 BRL/kW).

CDM Ref	Investment cost (BRL)	Tariff (BRL/MWh)	Capacity (MW)	Output (GWh/yr)	Investment cost per output (BRL/kW)
Osório Wind Power Plant Project, ref 0603	645,533,000.00	Not available	150.0	425.0	4,303
Pre-auction estimation	370,496,161.00	99.50	116.9	442.4	3,169
Post-auction estimation	384,271,827.30	99.50	108.0	448.4	3,558

	Validated situation	Conclusion			
SECTION 7d. Barrier analysis					
1. Does the PDD demonstrate that the proposed project activity faces barriers that prevent its implementation and do not prevent at least the implementation of one of the alternatives? Provide here an overall determination of the credibility of the barrier analysis. Use the below table to list each barrier considered in the PDD and to describe how the team undertake their validation.	N.A. The Project Participants have decided not to present a Barrier Analysis since an Investment Analysis has already been presented.	N.A.			
Barriers are issues in project implementation that could prevent a potential investor from pursuing the implementation of the proposed project activity. The identified barriers are only sufficient grounds for demonstration of additionality if they would prevent potential project proponents from carrying out the proposed project activity undertaken without being registered as a CDM project activity.					
Type of Barrier	Description in the PDD	Determination			Conclusion
		Barriers are real	Prevent implementation of PA	Do not prevent implementation of BL	
Access to finance		N.A.			
Risks related barriers					

Technological	
Due to prevailing practice	
Other	
First of its kind	

	Validated situation	Conclusion
SECTION 7e. Common practice analysis		
1. Describe how the geographical scope of the common practice analysis has been validated. Assess whether the geographical scope (for example, the defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project activity's technology or industry type.	The common practice analysis followed the Step 4 of the Tool for the demonstration and assessment of the additionality (version 6.0.0). All the plants currently operating in Brazil have been considered in the analysis. The host country (Brazil) was considered as the geographical scope for the analysis. This scope was validated, once all plants in the country have similar access to financing and technology and are all subject to the same regulatory environment. The operational requirements are defined and controlled by ANEEL. There are no significant differences within the country regarding the environmental control exerted by the government. All plants in the country deliver the energy to the same integrated transmission system (SIN).	OK
2. Determine to what extent similar and operational projects (for example, using similar technology or practice), other than CDM project activities ⁷ ; have been undertaken in the defined region.	The PP has chosen to adopt the installed capacity of each of the four plants in the project in the determination of the +/-50% range. - The number of power plants (279), as mentioned in the PDD, which satisfies the criterion of +/- 50% (from 10.8 to 44.6 MW) of the individual plant's installed capacity (21.6 to 29.7 MW) and have started commercial operation before the project's starting date has been validated from ANEEL's Energy Generation Data Bank [B27]. N _{all} = 279 - The number of total operating wind power plants (19) has been validated	OK

	Validated situation	Conclusion
	from ANEEL's Energy Generation Data Bank [B28], - The validation team has confirmed that 5 plants have started operation after the project start date, 6 plans are being developed as CDM project activities and the remaining 8 wind power plants benefitted from PROINFA, as it has been confirmed in the webpage of Eletrobrás [B30]. The information above has also been cross-checked with the ANEEL General Summary of Plants December 2011 [B41]. For further details on each plant, please refer to the file [A13]. Therefore: - $N_{diff} = N_{all} \rightarrow F=0$ The validation team agrees that, according to the Step 4 of the Tool for the demonstration and assessment of the additionality, the proposed project activity is not common practice. The validation team has also confirmed that if the analysis were done based on the total project output (108 MW), leading to a range of 54 to 162 MW, $N_{all} = 134$ plants [B27], which was cross-checked against ANEEL's Energy Generation Data Bank [B28]. The number of total operating wind power plants (4) has been validated from ANEEL's Energy Generation Data Bank [B28] and ANEEL General Summary of Plants [B41]. It has been confirmed that the four plants have either benefitted from PROINFA or were developed as a CDM project activity as cross-checked with official sources: • Praia Formosa (CE), 104.4 MW [B50] • Icaraizinho (CE), 54.6 MW [B30] • Canoa Quebrada (CE), 57 MW [B30] • Cidreira I (RS), 70 MW [B30] Therefore all projects differ from the proposed project activity by the subsidies	

	Validated situation	Conclusion
	received from the government or CDM consideration.	
2.(continuation)	It has also been confirmed that the participation in PROINFA was not available to the project activity on the project's starting date. According to the Federal Decree 4541 of 23 December 2002, Article 8, the deadline for the inscription in the program was 29 April 2004. A research was made by the validation team on the site of the Brazilian Ministry of Mines and Energy [B29] regarding the current availability of PROINFA. No evidence of a second phase of the program has been found.	OK
3. If similar and operational projects, other than CDM project activities, are already widely observed and commonly carried out in the defined region, assess whether there are essential distinctions between the proposed CDM project activity and the other similar activities.	The validation team has concluded that no similar and operational projects have been undertaken in the defined region.	OK

		Validated situation		Conclusion
SECTION 8. Monitoring plan				
1. Compliance of the monitoring plan with the approved methodology and the applicable tools. Confirm that the MP contains all the necessary parameters and that they are monitored in accordance to the approve Methodology and the applicable tools using the following table:				
Parameter	Monitoring Methodology/Tools Description	PDD description	Validated situation	Conclusion
EG _{facility,y}	<u>According to ACM0002 version 13.0.0</u> Data unit: MWh/yr Description: Quantity of net electricity generation supplied by the project plant/unit to the grid in year y Source of data: Electricity meter(s) Measurement procedures (if any): The following parameters shall be measured: (i) The quantity of electricity supplied by the project plant/unit to the grid; and	Data Unit: MWh/yr Description: Quantity of net electricity generation supplied by the project plant/unit to the grid in year y Source of data to be used: Electricity meter(s) Value of data: The value used to calculate the expected emission reductions is 448,365 MWh/yr. This value is obtained by the multiplication of the electricity supplied by the plants by 8,760 (number of hours in the year). Description of measurement methods and procedures to be applied: The following parameters shall be measured: (i) The quantity of electricity supplied by the project plant/unit	Procedures applicable for the calculation are described for this parameter as appropriate. The ex-ante value indicated is based on the generation estimated by the third party during the plant load factor study. Measurement will be performed as per ONS module 12 procedures [B40]. Meters calibration regulations and the accuracy class 0.2S are according with ONS sub-module 12.3. ACM0002 determines that, for the parameter EG_{facility,y}, the measurement results must be cross checked with records for sold energy. Nevertheless, during site visit interview, PP has stated that the sales receipts for sold electricity cannot be used for cross-checking purposes as the sales receipts will only indicate the monetary amount to be paid as fixed in the Power Purchase Agreement (PPA) and not the amount of electricity sold to the grid. The validation team has checked the general PPA and confirms	OK

		Validated situation	Conclusion
	(ii) The quantity of electricity delivered to the project plant/unit from the grid	to the grid; and (ii) The quantity of electricity delivered to the project plant/unit from the grid. The quantity of electricity supplied by the project plant/unit to the grid and the electricity delivered from the grid to the project will be measured by two bidirectional power meters (one principal and one back up) located in the Quinta Substation. Class 0.2S power meters will be used in accordance with the established Grid Procedures defined by the Electric System National Operator (ONS) ⁸ and Commercialization Procedures by the CCEE. Meters calibration will be performed according to the ONS Grid Procedures (Sub-module 12.3). The information of these meters can be confronted with information of generation provided by CCEE – Chamber of Electrical Energy Commercialization. Continuous measurement and, at least monthly recording will be the monitoring frequency. The quantity of net electricity supplied to the grid by the plant is registered every 5 minutes. Monitoring frequency: Continuous measurement and at least monthly recording QA/QC procedures: The level of uncertainty of these data is low. They will	that the sold amount of electricity is fixed in a PPA and monthly electricity invoicing is done as per the PPA with revisions at every four years (as per Clause 7.15 of the PPA, [A39]). The PP explained that the measurements' reliability level will be assured even in the absence of a cross-check with records for sold energy, once the quantity of net electricity generation supplied by the project activity to the grid needs to be checked through the CCEE's database, which is the official and the most credible source of information for this purpose. The validation team agrees that the methodology's implied intent is achieved through this alternative approach. The validation team confirms the role of CCEE which, as per law No 10848 of March 15, 2004, authorizes the creation of the Energy Commercialization Chamber - CCEE, under regulation and oversight by ANEEL, in order to facilitate the trading of electricity between dealers and authorized service and electricity facilities, as well as those with their consumers, in the National Interconnected System – SIN.

		Validated situation	Conclusion
	Monitoring frequency: Continuous measurement and at least monthly recording QA/QC procedures: Cross check measurement results with records for sold electricity	be used to calculate emission reductions. Electricity generation data will be monitored by project owner and counter-checked with spreadsheets provided by CCEE. This counter-checking process will be carried out monthly by project owner's team or outsources agent determined during operation phase. Moreover, information can also be checked with receipt of sales. Principal meter of the plant have backup meter. In case of failure, the backup meter will register the electricity. More details related to measurement procedures are described in the item B.7.3.	
EF _{grid,CM,y}	According to ACM0002 version 13.0.0 Data unit: tCO₂/MWh Description: Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" Source of data: As per "Tool to calculate the emission factor for an electricity system"	Data Unit: tCO₂/MWh Description: Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" Source of data to be used: <i>Ex-post</i> emission factor will be calculated by Enerbio Consultoria through ONS data supplied by Brazilian DNA. The variables EF_{grid,OM,y} and EF_{grid,BM,y} necessary for EF_{grid,CM,y} calculation will be supplied by Brazilian DNA. The annual EF_{grid,CM,y} will	The EF_{grid,CM,y} will be calculated according to the "Tool to calculate the emission factor for an electricity system": $EF_{grid,CM,y} = F_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$ where, for wind and solar power generation project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ for the first and the subsequent crediting periods. The calculation of the value of EF_{grid,CM,y} has been checked in the PDD Appendix 4 and in the emission reductions spreadsheet [A6], worksheet "Emission factor", against the values on the official site of the DNA (CIMGC) [B17]. OK

		Validated situation	Conclusion
	Measurement procedures (if any): As per “Tool to calculate the emission factor for an electricity system” Monitoring frequency: As per “Tool to calculate the emission factor for an electricity system” QA/QC procedures: As per “Tool to calculate the emission factor for an electricity system”	be calculated through an simple average of the monthly values supplied by Brazilian DNA in its website. Value of data: 0.2454 Description of measurement methods and procedures to be applied: As per the “Tool to calculate the emission factor for an electricity system” Monitoring frequency: As per the “Tool to calculate the emission factor for an electricity system” QA/QC procedures: As per the “Tool to calculate the emission factor for an electricity system”. The uncertainty level for these data is low.	

	Validated situation	Conclusion
2. <i>Implementation of the plan:</i> confirm that the monitoring arrangements described in the monitoring plan are feasible within the project design. Described the steps undertaken to assess this.	The operational and management structure that the PPs will implement in order to monitor the emission reductions was described in the PDD [A2], section B.7.3 The feasibility of the monitoring plan has been assessed by means of interview and document revision of the planned procedures and project plans as well as cross-checking with monitoring procedures as regulated by the National Power System Operator (ONS – <i>Operador Nacional do Sistema</i>, Grid Procedures Module 12, Measurement for Invoicing, [B40]). The arrangements proposed in the PDD are common practice and follow the procedures of Brazil's electric energy national agency for the monitoring of $EG_{\text{facility},y}$ (Grid Procedures Module 12, Measurement for Invoicing [B40]), which must be followed by all grid connected projects in the country. The values of $F_{\text{grid},\text{OM},y}$ and $EF_{\text{grid},\text{BM},y}$ are obtained by all projects from the same source, the Brazilian DNA (CIMGC). It also has been cross checked with other similar registered projects (Osório Wind Power Plant Project, ref. 0603, and Água Doce Power Generation Project, ref. 0575). The validation team concluded that the arrangements proposed in the PDD are feasible and sound and that PPs are able to implement them.	OK
3. <i>Implementation of the Plan:</i> confirm that the means of implementation of the MP, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions achieved by / resulting from the proposed CDM project activity can be reported ex post and verified	CL 06: With respect to the monitoring plan: - clarify the uses of the electricity delivered to the project from the grid (e.g. WECs magnetic field excitation, instrumentation, etc.) and how this energy will be monitored. - explain the QA/QC procedure to cross check the net energy generation supplied to the grid with the records for net sold energy. - please provide a schematic representation of the location of the Quinta substation's and the project's energy meters. PP has clarified that electricity delivery from the grid to project will be minimal, for start-up and instrumentation activities. This and other information were complemented in the PDD version 02 [A2]. Schematic representation of the Quinta Substation was inserted in the PDD. The Project will have two bidirectional meters, main and backup meter, located at Quinta Substation. These meters shall measure the electricity consumed from and supplied to the grid.	CL 06, closed OK

	Validated situation	Conclusion
3. (continuation)	The validation team concluded that the arrangements proposed in the PDD are sound and in accordance with approved methodology and other CDM guidances. - EG_{facility,y}: the fact that the net generated energy will be sold to the National Electric System Operator (ONS) binds the PPs to its official monitoring and measurement procedures [B40], which covers in detail, among others, the arrangements and procedures required for - Installation of measurement system for invoicing - Maintenance of measurement system - Measuring data collection - Certification of work measurement standards - Configuration of measurement system for invoicing Measurement: technical requirements according to the Brazilian Association of Technical Standards and the International Electrotechnical Commission – IEC. There is a main meter and in case of failure, a backup meter is used. Accuracy of energy meters according to Metrological Technical Regulation (<i>Regulamento Técnico Metrológico – RMT</i>) for Class 0.2S of energy meters (error in measurements of up to $\pm 0.2\%$). Monitoring frequency: The measurements will be continuous with at least monthly recording. QA/QC: electricity measurements cross checked against the records provided by the Electricity Commercialization Chamber (<i>Câmara de Comercialização de Energia Elétrica – CCEE</i>), which correspond to the net electricity delivery to the grid. Since the sold amount of electricity is fixed in a PPA and monthly electricity invoicing is done as per the PPA with revisions at every four years (Clause 7.15, PPA [A39]), cross-checking with CCEE records (electricity delivery to the grid) is deemed appropriate and in line with methodology requirements.	OK

	Validated situation	Conclusion
3. (continuation)	Meters calibration will be performed according to the ONS Grid Procedures [B40] (Sub-module 12.3), which establishes the frequency and other maintenance procedures. At the time of validation, the frequency of calibration is a maximum of two years. Verified source of Grid Procedures Module 12 [B40]. • $EF_{grid,CM,y}$: The Brazilian DNA is responsible for calculating the OM and BM emission factors in Brazil. It applies the Tool to calculate the emission factor for an electricity system [B19]. Data archiving: All data collected as part of monitoring will be electronically archived and be kept at least for 2 years after the end of the last crediting period. Based on the monitoring arrangements, required monitoring procedures by the ONS and the experience of PPs in operation of power plants connected to the grid, the validation team confirms the ability of project participants to implement the monitoring plan.	OK

	Validated situation	Conclusion
SECTION 9. Local stakeholder consultation		
1. Determine whether comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity, have been invited.	Copies of invitations for comments posted by the PP to the local stakeholders, as well as the corresponding acknowledgments of receipt (post receipt) together with the Portuguese version of the PDD for local consultation (www.grupoenerbio.com.br), were assessed and found in accordance with DNA's Resolution No. 7 of 05 March 2008. It was found evidence of acknowledgments of receipt of invitations made to: 1. State Federal Attorney of Public Interest [A53] 2. Federal Attorney of Public Interest [A49] 3. State Department of Environment (SEMA) [A50] 4. Henrique Luis Roessler State Foundation of Environmental Protection (FEPAM) - State Environmental Agency [A52] 5. Forum of Brazilian NGO and Social Movements for Environment and Development – FBOMS [A48] 6. Rio Grande City Hall [A54] 7. Rio Grande City Assembly [A47] 8. Rio Grande Environmental Secretariat [A55] 9. Rio Grande Retailers Trade Union [A51] Please refer to Appendix B, “documents prepared by the PP” The Local stakeholder consultation has been conducted in accordance with the DNA's requirements and has therefore been deemed appropriate.	OK

	Validated situation	Conclusion
2. Confirm that the summary of the comments received as provided in the PDD is complete.	The project activity received just one comment from Rio Grande Environmental Secretariat on 15/12/2011 sent by email. According to Environmental Secretariat, Rio Grande is a city that provides good conditions to receive the project. The Secretariat mentioned that the project will provide positive and negative impacts with the positive impacts being the most significant. The Environmental Secretariat also highlights that the project owner will develop environmental programs to assure the environmental quality, aiming to comply to requirements of FEPAM and the applicable regulation. The letter submitted to PP by the local environmental agency [A56] was assessed by the validation team which has no doubt about its authenticity.	OK
3. Confirm that the project participants have taken due account of any comments received and have described this process in the PDD.	The PDD consultant has answered to the Rio Grande Environmental Secretariat. The validation team confirms that the comments received did not require any specific action to be reflected in the PDD.	OK

	Validated situation	Conclusion
SECTION 10. Environmental Impacts		
1. Is an EIA required by the environmental legislation of the host country? Describe the legislation applicable.	According to the federal resolution CONAMA 237/97, the agency responsible for the environmental control shall determine the kind of environmental impact study necessary An environmental impact assessment (EIA) has not been required by the state environmental agency (FEPAM) for the project activity. A Simplified Environmental Assessment Report has been prepared by the PP, as part of the measures to obtain the environmental installation permit, as verified by the validation team (see files "RAS Complexo Corredor dos Senandes Vol 1.pdf" and "RAS Complementações Corredor dos Senandes Vol. 2.pdf").	OK
2. Confirm whether the project participants have undertaken an analysis of environmental impacts and, if required by the host Party, an environmental impact assessment.	A Simplified Environmental Assessment Report has been prepared by the PP, as part of the measures to obtain the environmental installation permit, as verified by the validation team (see files "RAS Complexo Corredor dos Senandes Vol 1.pdf" and "RAS Complementações Corredor dos Senandes Vol. 2.pdf"). The validation team has assessed all the environmental licenses and confirms that the project has received all the required licences as follows. Environmental licenses: (a) Previous License 00149/2011-DL, granted by FEPAM on February 08, 2011. (b) Previous License 00768/2011-DL, granted by FEPAM on July 12, 2011. Installation License 1258/2012, granted by FEPAM on October 23, 2012 [A46].	OK
3. Confirm that environmental impacts considered significant by the PPs or the Host country are described in the PDD, including mitigation measures.	The environmental impacts considered significant by the PPs and the Host country, in accordance with the analysis of environmental impact, are described in the PDD section D.2, including the mitigation measures.	OK

Findings⁹

1. Grade / Ref:	CAR 01	2. Date:	18 June 2012	3. Status:	Closed
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4. Requirement:	VVS V.02.0, paragraph 120
5. Nature of the Issue Raised:	
The cash flows are considering revenues over 21 years, although the project contracted lifetime is of 20 years.	
6. Nature of responses provided by the project participants:	
Cash flow was corrected and project cash flow V02 provides revenues for 20 years.	
7. Assessment of such responses:	
The validation team confirms that the cash flows have been corrected, considering 20 years of project contracted lifetime (refer to “Pre-auction-cashflowV02.xls” [A9] and “Post-auction-cashflowV02.xls” [A10] files). The conditions mentioned in the PDD are now in accordance with the conditions considered by the PP in the investment calculation analysis. Therefore, this CAR is closed.	
8. References to resulting changes in the PDD or supporting annexes:	
The term of the cash flows was corrected from 21 to 20 years to be in line with project lifetime and equipment lifetime. Since the term of the financial analysis decreased, the IRR has decreased slightly. PDD was also edited. For further information, please refer to section 4.10.	

1. Grade / Ref:	CAR 02	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 120				
5. Nature of the Issue Raised:					
The cash flow has assumed 50% debt and 50% equity financing as default, according to the CDM GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS item 18. Nevertheless, BNDES financing may reach up to 80% of the eligible items (see http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energias_alternativas.html). Please clarify.					
6. Nature of responses provided by the project participants:					
PPs assumed that BNDES financing may reach up to 80% of the eligible items. This generally can reach a value between 60% and 70% of the total Capital Expenditures (CAPEX). PPs assumed 50% debt of the CAPEX as default, according to the CDM GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS item 18. The project owners had not contracted any financing agreement with any bank at the time of the investment decision (at the time of the site visit, it hadn't either).					
With this structure (50% Debt/50% Equity), the equity IRR is higher than assuming 70% (or 80%) Debt/ 30% (or 20%) Equity. To avoid any doubt about the additionally, a scenario with 80% debt/ 20% equity was added to the PDD.					
7. Assessment of such responses:					
The validation team has received and checked the Version 2 of financial spreadsheets provided by PP. It was confirmed that the structure 80% debt - 20% equity leads to a lower Equity IRR than the default financing structure 50% Debt/50% Equity. Despite the typical debt/equity finance structure is known to be 60/40, 70/30 or even 80/20, the default structure 50/50 was deemed more conservativeThe validation team considers it appropriate and the CAR is closed.					

8. References to resulting changes in the PDD or supporting annexes:	
PP inserted the results of 80% debt - 20% equity scenario in the PDD and in the financial spreadsheets.	

1. Grade / Ref:	CL 01	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 120				
5. Nature of the Issue Raised:	Please provide reference for considering the debt amortization over 16 years in both cash flows.				
6. Nature of responses provided by the project participants:	The debt amortization term used in the project cash flow was projected according to the National Bank of Social and Economic Development (BNDES) policy. The BNDES is the source for this information: http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energias_alternativas.html [B24]				
7. Assessment of such responses:	The validation team has confirmed that the BNDES allows for an amortization period up to 16 years for projects classified as <i>Alternative Energy</i> , as per BNDES website [B24] accessed on 30/07/2012. Validation team has also confirmed that the proposed project activity, wind power plant, is classified as <i>Alternative Energy</i> and therefore the amortization period is applicable. Therefore this CL is closed.				
8. References to resulting changes in the PDD or supporting annexes:	No changes required.				

1. Grade / Ref:	CL 02	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 120				
5. Nature of the Issue Raised:	Please provide reference to the official publication of the project's firm energy.				
6. Nature of responses provided by the project participants:	The results of the ANEEL auction when the project sold the electricity shows the physical guarantee of the plants (project's firm energy). This evidence was already supplied to DOE (it is same evidence of the electricity price).				
7. Assessment of such responses:	The assured electricity or firm electricity was determined in the 4 th Reserve Energy Auction as the amount of electricity sold in the lifetime of 20 years. As per the auction results [A23], the assured electricity is:				

Unit	Physical assured energy (MW _{medium})	Total assured electricity (MWh)	Average assured electricity (MWh/yr)
Corredor dos Senandes II	10.6	1,858,392	92,919.60
Corredor dos Senandes III	13.2	2,314,224	115,711.20
Corredor dos Senandes IV	12.9	2,261,628	113,081.40
Vento Aragano I	13.8	2,419,416	120,970.80
Total	50.5	8,853,660	442,683.00

Therefore this CL is closed.

8. References to resulting changes in the PDD or supporting annexes:

No changes required.

1. Grade / Ref:	CL 03	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 120				
5. Nature of the Issue Raised:	The proposals received by the PP from ALSTOM, reference numbers ECO-11-0048-01-V01_R01 (before the auction) and ECO-11-0048-02-V02 (after the auction), and presented to the DOE, are not signed. Please provide signed copies or otherwise a means to attest the proposals' origin.				
6. Nature of responses provided by the project participants:	Proposals signed received by PP from ALSTOM are supplied to DOE.				
7. Assessment of such responses:	Validation team has received and checked the signed version of the proposals (Proposta_Alstom_ECO86_CDD signed.pdf [A25]; Proposta_Alstom_ECO122_CDD signed.pdf [A26]). The documents are deemed authentic. The maintenance costs proposed (page 11) are in line with the values applied in the financial analysis spreadsheets. This CL is closed.				
8. References to resulting changes in the PDD or supporting annexes:	No changes required.				

1. Grade / Ref:	CL 04	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 120				
5. Nature of the Issue Raised:	Provide the reasoning and reference for the determination of the adopted cost of civil works in both cash flows.				

6. Nature of responses provided by the project participants:	
Civil Works post auction was based on proposal of construction company. Signed proposal is supplied to DOE. Value: R\$ 65,344,679 Civil Works Pre-Auction was budgeted internally after the project owner consult three potential suppliers. The budget was designed according to the following rationale: 1. MML, project developer that sold the project to the project owner, developed the engineering basic project with the volumes and quantities of the following items: preliminary services, external and internal accesses, assembly platforms and aerogenerators foundations. At this time, the design of project was still been elaborated. The basic project at that time considered 85 wind turbines V-100-1.8 MW, 2. Proposals were required to five potential suppliers: Pelotense, Bassani, Sanenco, Toniollo&Busnello and Setta. The engineering companies Pelotense, Sanenco and Bassani presented the three best proposals. Evidence for that can be checked in the email “Comparativo Obras Civis”, from August 17 2011. Budget required by project owners included 6 wind power plants (153 MW). However, just 4 wind power plants became feasible with the auction organized by ANEEL. 3. The proposal from the company Pelotense was the base for the final budget of the company. The submission of this proposal can be evidenced through the proposal letter and the final budget spreadsheet attached in the email” Orçamento Revisado” from August 17 2011. 4. The values of this spreadsheet (“column E”) were used in the spreadsheet “Odebrecht 2011_08_17 - Senandes - Orçam Obras Civis”. The values from Pelotense proposal are presented in the column “M” of “Odebrecht 2011_08_17 - Senandes - Orçam Obras Civis”. However, items “Mobilização (Mobilization)” and “Operação e manutenção do canteiro e acessos” (Operation and maintenance of the construction site and accesses) were changed because values presented by Pelotense were considered too aggressive comparing to proposals presented by other construction companies. 5. The values presented by Pelotense were updated to the final configuration (at the time of the investment decision) considering 70 ECO-86, reaching R\$ 52,926,143 6. The value of R\$ 52,926,143 considered the execution of 58 foundations as the spreadsheet “2011_08_17 - Senandes - Orçam Obras Civis”. These values can be found between cells M56 to cell N82 of the spreadsheet. Total values for foundation were R\$ 31,787,536 which implies in cost/foundation of R\$ 548,060 (R\$ 31,787,536/58). 7. To reach the final value of R\$ 59,526,143, considered in the budget, which can be found in the cell T13 of the spreadsheet “2011_08_18 - Valuation - MML - Corredor Senandes - CAPEX e OPEX-4 parques-FINAL”, it was necessary to update the budget for “foundation” which was considering just 58 foundations 70 foundation are necessary) [A33]. 8. Therefore, the following calculus was performed: $R\\$ 52,926,143 - 58 \times R\\$ 550,000 + 70 \times R\\$ 550,000 = R\\$ 59,526,143$.	
7. Assessment of such responses:	
The validation team has verified that: Construction cost for post auction estimation was based on construction work cost (65,344,679.47 BRL) and electrical work cost (43.143.711,04 BRL), totalling the value of 108,488,390.51BRL as applied in the spreadsheet. Validation team has checked the proposal by <i>Construtora Norberto Odebrecht</i> (CNO), number DC.CS.001-12, dated 05/03/2012 [A36], and confirms the value of 65,344,679.47 BRL for post auction civil works.	

Validation team has checked the proposal by Alstom (substation, distribution and transmission lines), dated 16/02/2012, and confirms the total value of 43.143.711,04 BRL (Alstom Proposal (page 04) Feb2012.pdf) for **post auction electrical works**.

Construction cost for **pre auction** estimations were checked by the validation team. All values and files mentioned above by PP were submitted to the validation team together with a single file that reflects all the rationale explained by PP (civilworks pre-acution_v2.xls) [A34].

Electrical work cost (43,814,000 BRL) **pre auction** is based on the preliminary agreement for electrical work (substation, distribution and transmission lines), dated 18/08/2011, signed between OEA and Alstom (Alstom Proposal - 18Aug2011.pdf) [A37].

Civil and electrical work cost estimations were described and the evidence were provided to the validation team. Validation team has confirmed their suitability, therefore this CL is closed.

8. References to resulting changes in the PDD or supporting annexes:

No changes required.

1. Grade / Ref:	CL 05	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 120				
5. Nature of the Issue Raised:	Explain the calculation of the ANEEL supervision taxes (244,548 BRL/year).				
6. Nature of responses provided by the project participants:	The Inspection Fee of Electric Energy Services (TFSEE) is calculated according to article 12 of the Brazilian Law 9,427 from December 26 1996. Calculus Rationale: 0.5% X Installed Capacity (KW) X R\$ 385.73 (Typical unitary economic benefit defined by ANEEL Dispatch 4,080, article II from 27/12/2010). Value of the PDD V01 was updated in the PDD.				
7. Assessment of such responses:	The validation team has confirmed that as per Law 9427 dated 26/12/1996 and per decree 2410 dated 28/11/1997 [B20] (http://www.planalto.gov.br/ccivil_03/decreto/1997/D2410.htm), the TFSEE is calculated as following: $TF_g = P \times G_u = P \times 0.5/100 \times B_g$ where: TF_g = annual TFSEE (BRL) P = nominal installed capacity (kW) G_u = 0.5% of the annual Typical Unitary Economic Benefit B_g = annual Typical Unitary Economic Benefit (BRL/kW)				

The validation team has confirmed that as per ANEEL Dispatch 4080, article II, dated 27/12/2010 ("Despachos_taxa_2011.pdf") that the annual Typical Unitary Economic Benefit for 2011 is 385.73BRL per installed kW.

The values presented in the PDD version 02 were confirmed as following:

Auction cash flow:

116,900 kW x 0.005 x 385.73BRL/kW = 225,459 BRL

as per financial spreadsheet Pre-auction-cashflowV02.xls [A9].

Final plant design (post auction) cash flow:

108,000 kW x 0.005 x 385.73BRL/kW = 208,294 BRL

as per financial spreadsheet Post-auction-cashflowV02.xls [A10].

The validation team has confirmed that the Inspection Fee of Electric Energy Services (TFSEE) has been estimated as per the regulation and correct values are applied in the PDD and financial analysis. Therefore this CL is closed.

8. References to resulting changes in the PDD or supporting annexes:

The value of TFSEE was corrected in the PDD and financial analysis spreadsheets.

1. Grade / Ref:	CL 06	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 132.b				
5. Nature of the Issue Raised:	With respect to the monitoring plan: - clarify the uses of the electricity delivered to the project from the grid (e.g. WECs magnetic field excitation, instrumentation, etc.) and how this energy will be monitored. - explain the QA/QC procedure (who, how, when) to cross check the net energy generation supplied to the grid with the records for net sold energy. - please provide a schematic representation of the location of the Quinta substation's and the project's energy meters				
6. Nature of responses provided by the project participants:	- The use of electricity delivered from the grid will be minimal. Project will use electricity for start-up activities, instrumentation, etc. This consumption will be minimal (start-up activities, instrumentation, etc). - QA/QC procedures were complemented in PDD version 02. - Schematic representation of the Quinta substation and the project's energy meters is provided to DOE and was inserted in the PDD version 02.				

7. Assessment of such responses:	
Monitoring method and QA/QC procedures were further described in PDD version 02. Therefore this CL is closed.	
8. References to resulting changes in the PDD or supporting annexes:	
Monitoring procedures were updated in the PDD.	

1. Grade / Ref:	CL 07	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 196				
5. Nature of the Issue Raised:					
Provide the emission reductions calculation worksheet					
The PDD mentions in the item B.7.1, parameter $EF_{grid, CM}$, that the ex-ante emission reductions estimation was based on the data issued by the Brazilian DNA. Please detail how the $EF_{grid, CM}$ of 0.3941 tCO2/MWh has been estimated from the monthly values of $EF_{grid, OM}$ published by the DNA. Also, the PDD considers the DNA's 2010 values for $EF_{grid, OM}$ and $EF_{grid, BM}$, although the 2011 values are already available on the DNA's website.					
6. Nature of responses provided by the project participants:					
2011 Values were published after the PDD publication for stakeholders comments. However, as it is the most updated data, PPs decided to update the emission reduction calculations. A new emission reductions calculation spreadsheet is supplied to DOE considering 2011 values. The calculation of the combined margin (CM) emission factor ($EF_{grid, CM, y}$) is based on Weighted average Combined Margin. The “<i>Tool to calculate the emission factor for an electricity system</i>” recommends that for wind power plants $W_{OM} = 0.75$ and $W_{BM} = 0.25$ should be used as a default for the first crediting period. Annual $EF_{grid, BM}$ is published by Brazilian DNA. Brazilian DNA also supplies monthly $EF_{grid, OM}$. PPs used the simple average of monthly $EF_{grid, OM}$ during the year to get the annual $EF_{grid, OM}$. ACM0002 Methodology says that annual combined margin emission factor must be used for emission reduction calculation. This procedure is used by all renewable energy Brazilian projects registered in UNFCCC that use Dispatch Data Analysis as the operating margin method.					
7. Assessment of such responses:					
The validation team has received and checked the updated Emission Reduction Estimation spreadsheet (Emission Reductions – 2011.xls) and PDD (version 2). The ex-ante calculation of $EF_{grid, CM, y}$ and $EF_{grid, OM}$ were checked against the values on the official site of the DNA (CIMGC) for 2011 [B18]: http://www.mct.gov.br/index.php/content/view/333605.html. The validation team has confirmed that PPs applied the simple average of monthly $EF_{grid, OM}$ during the year 2011 to reach the annual $EF_{grid, OM}$. The procedures adopted are deemed conservative, since the 2011 $EF_{grid, OM}$ is smaller than the 2010 $EF_{grid, OM}$. The validation team confirms that PP updated the PDD and emission reduction estimation applying the latest grid emission factors published by host country DNA. The validation team also confirms that the annual estimation of $EF_{grid, OM}$ is adequate for <i>ex-ante</i> estimation. Actual emission reductions will be based on monitored values of $EF_{grid, CM}$. This CL is therefore closed.					
8. References to resulting changes in the PDD or supporting annexes:					
The value of $EF_{grid, CM}$, was corrected in the PDD and emission reduction spreadsheets.					

1. Grade / Ref:	CL 08	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS V.02.0, paragraph 53				
5. Nature of the Issue Raised:					
Provide the corporate identity of all project participants and focal points included in the Modalities of Communication (MoC) statement, as well as the personal identities, including specimen signatures and employment status, of their authorized signatories.					
6. Nature of responses provided by the project participants:					
MoC has been provided.					
7. Assessment of such responses:					
The signed MoC and the documentation for the validation of the corporate identities have been provided to the DOE. The latest version of the MoC form has been applied. The validation team has checked and confirms the suitability of the documents. Therefore, this CL has been closed.					
8. References to resulting changes in the PDD or supporting annexes:					
NA					

1. Grade / Ref:	CL 09	2. Date:	18 June 2012	3. Status:	Closed
4. Requirement:	VVS v02 paragraph 70 ACM0002 Version 13.0.0				
5. Nature of the Issue Raised:					
Please state if the PP intends to adopt the recently issued version of the methodology ACM0002 (version 13.0.0).					
6. Nature of responses provided by the project participants:					
PDD was updated with ACM0002 (version 13.0.0) methodology.					
7. Assessment of such responses:					
The validation team confirms that the project activity has been described in line with ACM0002 (version 13.0.0). Therefore, this CL has been closed.					
8. References to resulting changes in the PDD or supporting annexes:					
PDD was updated applying ACM0002 (version 13.0.0).					

1. Grade / Ref:	CL 10	2. Date:	12/09/2012	3. Status:	Closed
4. Requirement:	VVS 02 paragraph 123 c)				

5. Nature of the Issue Raised:	
Please clarify why a consolidated investment analysis was submitted for the four different project names included in the wind farm complex.	
6. Nature of responses provided by the project participants:	
The main reasons for a consolidated investment analysis are: • The plants are in the same site; • The plants are considered as a complex (consolidated) in the environmental licensing process; • All negotiations regarding CAPEX and OPEX considered the wind power plants together. Following this strategy, project owners could reach better (lower) prices. For CDM additionality analysis, this is a conservative approach once it assumes lower costs. • All contracts with suppliers established up to now considers all plants together; • Project Owners decided to develop the plants as different projects due some economic benefits offered by Brazilian Regulations. Developing them individually, the plants can be beneficiated with the reduction of the distribution/transmission fee (TUSD/TUST-G). Through the Resolution N°77, from 18 August 2004, ANEEL established a discount of 50% of the applicable distribution/transmission fee (TUSD/TUST-G) for complementary renewable energy projects, such as wind power generation projects, with installed capacity injected in the grid lower or equal to 30,000 kW. This is a E- policy that is treated in the PDD. • Another economic benefit for the plants individually is the tax regime (presumed profit). This regime was considered in the investment analysis of the PDD. All this information has been included in section A of the PDD	
7. Assessment of such responses:	
The PDD now clarifies that this project activity is a single wind farm that will be installed in the same site, but for administrative and legal issues it has been split between four companies that are included in the same Group and owned by the same shareholder. No need for four separate investment analysis is considered for this Project Activity.	
8. References to resulting changes in the PDD or supporting annexes:	
PDD Section A.1 PDD Section A.2.4 PDD section A.3	