VALIDATION REPORT

ROSA DOS VENTOS LTD.

ROSA DOS VENTOS WIND ENERGY PROJECT

Report No: BRS-016/2006 - 06/02

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Approved by: Mr. Wielpütz	Organisational unit: TÜV Nord JI/CDM Certification Program
Client: Rosa dos Ventos Ltda.	Client ref.: Mr. Armando Almeida Ferreira

Summary/Opinion:
Rosa dos Ventos Ltda has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project: *"Rosa dos Ventos wind energy project"* – version 02 of 2006-08-18, with regard to the relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords), the simplified modalities and procedures for small scale CDM project activities of annex II to decision 21/CP.8 and the relevant decisions by COP/MOP and CDM Executive Board.

The purpose of this project activity is to generate energy from a renewable source.

A risk based approach has been followed to perform this validation. In the course of the draft validation 7 Corrective Action Requests (CARs) and 13 Clarification Requests (CRs) were raised and successfully closed.

The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (Brazil) and all relevant UNFCCC requirements for CDM. Nevertheless the LoA´s of both parties are pending.
- The Brazilian DNA will only issue the host country approval on the basis of this positive validation opinion by the validator of the project. Thus the LoA could not be considered at the present validation stage.
- The project additionality is sufficiently justified in the PDD.
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 95,273 t CO_{2e} is most likely to be achieved within the first 7 y (renewable) crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation except the host county approval which will be issued on the basis of this report.

Report No.: BRS–016 /2006-06/02	Subject Group: Environment
Report title: *Rosa dos Ventos wind energy project*	
Work carried out by: Rainer Winter Maria Carolina Crisci Coelho Dr. Gilberto Andrade	
Work verified by: Wolfgang Wielpütz	

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Indexing terms

Climate change
CDM
Validation
Kyoto Protocol

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Abbreviations

BAU	Business as usual
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CP	Certification Program
CR	Clarification Request
DNA	Designated National Authority
EB	CDM Executive Board
EIA	Environmental Impact Assessment
GHG	Greenhouse gas(es)
h PA	Hectopascal
kWh	Kilowatt hour
m	Meter
m/s	meter/second
MW	Megawatt
MWh	Megawatt hours
ODA	Official Development Assistance
PDD	Project Design Document
QC/QA	Quality control/Quality assurance
SER	Simplified Environmental Report
SSC	Small-Scale
UNFCCC	United Nations Framework Convention on Climate Change
WTG	Wind Turbine Generator

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1 INTRODUCTION

Rosa dos Ventos Ltda. has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project:

"Rosa dos Ventos wind energy project"

with regard to the relevant requirements for Small – Scale CDM project activities.

This report is referring to Project mentioned above, in version 02 of 2006/08/18.

1.1 Objective

The purpose of this validation is to have an independent third party assess the project design. In particular the project's baseline, the monitoring plan, and the project's compliance with

- the requirements of Article 12 of the Kyoto Protocol;
- the CDM modalities and procedures as agreed in the Marrakech Accords under decision 17/CP.7; the annex to the decision;
- the simplified modalities and procedures for small scale CDM project activities contained in annex II to decision 21/CP.8,
- subsequent decisions made by COP/MOP & CDM Executive Board and
- other relevant rules, including the host country (Brazil) legislation and sustainability criteria

are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of certified emission reductions (CER).

1.2 Scope

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

The items covered in the validation are described below:

- **UNFCCC & Host Country Criteria**
  - UNFCCC/Kyoto Protocol requirements, in particular,
    - the requirements of the CDM as set out in decision 17/CP.7 (Marrakech Accords), the present annex,
    - the simplified modalities and procedures for small scale CDM project activities of annex II to decision 21/CP.8 and
    - relevant decisions by COP/MOP & CDM Executive Board
  - Host country requirements / criteria

- **CDM Project Description**
  - Project design
  - Project boundaries
  - Predicted CDM project GHG emissions

- **Project Baseline**
  - Baseline methodology
  - Baseline GHG emissions

- **Monitoring Plan**
  - Monitoring methodologies
  - Indicators/data to be monitored and reported
  - Responsibilities

- **Background investigation and follow up interviews**

- **Global Stakeholder consultation**
  - Publishing the PDD on TÜV Nord website /tuv/
  - Review of comments

- **Draft validation reporting with CARs & CRs, if any**

- **Final validation reporting.**

The information included in the PDD and the supporting documents were reviewed against the requirements and criteria mentioned above. The TÜV NORD JI/CDM CP has, based on the recommendations in the Validation and Verification Manual/VVM/, employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CER. The validation is based on the information made available to TÜV NORD JI/CDM CP and on the contract conditions.

The validation is not meant to provide any consulting to Rosa dos Ventos Ltda. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 GHG Project Description

1.3.1 Project Scope

The considered GHG project can be classified as a small-scale CDM project in the sector given in Table 1-1 (according to List of Sectoral Scopes of UNFCCC).

Table 1-1: Project Scope

No.	Project Scope
1	Energy Industries (renewable - / non-renewable sources)

1.3.2 Project Entities

The following parties are involved in the developing of the project:

Project Participant 1: **(Host country)**	Rosa dos Ventos Ltd. Avenida Senador Virgílio Távora, 1701 sala 1305 Fortaleza, Ceará – 60170-250 Brazil
Contact person:	Mr. Armando Almeida Ferreira +55 85 34527331 aferreira@hlcbrasil.com.br
Project Participant 2: **(ANNEX I)**	Carbon Capital Market Level 3,15 Berkeley Street London – W1J 8DY United Kingdom
Contact Person:	Mr. Reuben Maltby +44 207 317 6200 Reuben.maltby@carboncapitalmarkets.com
Project Consultant:	Ecológica Assessoria Rua Dr. Bacelar nº 231 conjunto 31 São Paulo - 04026-000 Brazil
Contact Person:	Mr. Alejandro Bango +55-11-50833252 alejandro@ecologica.ws

1.3.3 Project location

The project sites are located in Lagoa do Mato and Canoa Quebrada at the municipality of Aracati, State of Ceará. Both sites are located at 5 km distance from each other and 170 km from Fortaleza, the capital of the Ceará State. The total area of the sites is about 293 ha (196 ha Logoa do Mato and 97 ha Canoa Quebrada).

1.3.4 Technical project description

This bundled project activity involves two sites with altogether 17 Enercon wind turbines of 800 kW capacity with a total installed capacity of 13.60 MW, generating around 50.89 GWh per year. The Lagoa do Mato Wind Farm involves four wind turbines with an installed capacity of 3.20 MW (4 x 800 kW) and the Canoa Quebrada Wind Farm involves thirteen wind turbines with an installed capacity of 10.50 MW.

The project introduces medium power wind turbines from Enercon, type E-48 (3 blades model with a standard rotational speed of 17.3 rpm) with 48 meters of rotor diameter.

The wind turbines at both wind energy sites were constructed scheduled to start on 01 Mar '06 and the operation is planned to start on 01 Dec '06. As per information achieved during part of validation (in April 2006) the construction has not started yet.
The project activity meets the requirements of the Brazilian governmental program *Proinfa* created to promote the increase of alternative renewable sources in the Brazilian energy matrix and to boost projects in accordance with legal regime established by the Kyoto Protocol and the United Nations Framework Convention on Climate Change (UNFCCC), strengthening the Country's engagement in contributing to GHG emission reductions.
This project is intended to reduce CO_{2e} emissions to the extent of electricity displaced from the regional grid (Northeast geo-electric grid system). The estimated amount of emission reductions over the chosen 07-year "renewable crediting period" is **95,273 tCO_{2e}** between 1st March 2007 and 28th February 2014.

Table 1-2: Technical and operational data

Wind Turbine E-48	
Manufacturer	Enercon GmbH
Type	Enercon E-48, 17.3 rpm
Installed electrical output	800 kW
Rotor diameter	48 m
No. of rotor blade	3
Hub height	75 m
Rated wind speed	13 m/s
Generator type	Generator and converter Enercon
Type of gear box	Direct drive rotor/generator

2 VALIDATION TEAM

- The Validation Team was led by Mr. Rainer Winter. Mr. Winter works at TÜV NORD CERT GmbH as ISO 9001/ISO 14001 Auditor and environmental verifier for EMAS. He is also an approved emission verifier within the European Emission Trading Scheme. Mr. Winter is an authorized JI/CDM assessor and is in charge of the TÜV NORD JI/CDM Certification Program. For this validation he was assisted by:
- Maria Carolina Crisci Coelho, BRTÜV-Brazil (TÜV NORD-Brazil), Mrs. Coelho is ISO 14001 Auditor and Product Manager for CDM Services for BRTÜV. She is an appointed expert for the TÜV NORD JI/CDM certification program.
- Dr. Gilberto Andrade, BRTÜV-Brazil (TÜV NORD-Brazil), Dr. Andrade is Lead Auditor for 14001/9001 and Tutor for Lead Auditor 14001 and 9001 Training Courses. Currently he is the director of operations of BRTÜV. He is an appointed expert for the TÜV NORD JI/CDM certification program.

The validation report is verified by:

- Mr. Wolfgang Wielpütz. He is ISO 9001 and 14001 Auditor, environmental verifier for EMAS and DEHSt-appointed emission verifier in the framework of EU-ETS. He is appointed JI/CDM assessor. Mr. Wielpütz is the head of the department: “Integrated management systems, environmental and occupational safety” and the deputy chief of TÜV NORD CERT GmbH.

3 METHODOLOGY

The validation of the project was carried out from February to September '06. It was divided into 2 phases: The pre-validation and the final validation.

The pre-validation consisted of the following three sub-phases:

- A desk review of the PDD/PDD1/ (incl. annexes) and supporting documents with the use of a customised validation protocol/CPM/ according to the Validation and Verification Manual/VVM/;
- Background investigation and follow-up interviews with personnel of the project proponent, the consultant, legal authorities and other stakeholders;
- Reporting of validation findings taking into account the public comments received on TÜV NORD website.

The draft validation includes Corrective Action and Clarification Requests (CAR and CR) identified in the course of this validation.

A **Corrective Action Request** is established if

- mistakes have been made in assumptions or the project documentation which directly will influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered by the UNFCCC or that emission reductions cannot be verified and certified.

A **Clarification Request** is issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

The final validation started after issuance of proposed corrective action (CA) of these CAR and CR by the project proponent. The validator has assessed the proposed CA with a positive result and after the closure of these CAR and CR the project proponent has issued the final version of the PDD. On the basis of this the final validation report and opinion were issued.

3.1 Validation Protocol

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

- It organises, details and clarifies the requirements that a CDM project is expected to meet;
- It ensures a transparent validation process where the independent entity will document how a particular requirement has been validated and the result of the determination.

The validation protocol consists of three tables: Table 1 (Mandatory Requirements); Table 2 (Requirement Checklist); and Table 3 (Resolution of Corrective Action and Clarification Request) as described in Figure 1.

The completed validation protocol is enclosed in the annex to this report identifying 7 Corrective Action Requests and 13 Clarification Requests.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.*

Validation Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **Clarification** is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	***Ref. to checklist question in table 2***	***Summary of project owner response***	***Validation conclusion***
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.*	*The responses given by the Client or other project participants during the communications with the validation team should be summarised in this section.*	*This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1: Validation protocol tables

3.2 Review of Documents

The draft PDD[/PDDD1/] submitted by Rosa dos Ventos Ltda. in February 2006 and supporting background documents related to the project design and baseline were reviewed.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The documents that were considered during the (pre-) validation process are given in chapter 7 of this report. They are listed as follows:

- Documents provided by the project proponent (Table 7-1)
- Background investigation and assessment documents (Table 7-2)
- Websites used (Table 7-3).

In order to ensure the transparency of the decision making process, the reference codes listed in tables 7-1 to 7-3 are used in the validation protocol and – as far applicable – in the report itself.

3.3 Follow-up Interviews

From March to May 2006 the TÜV NORD JI/CDM CP performed interviews with the project proponent, project consultant and project stakeholders as well as with local authorities to confirm selected information and to resolve issues identified in the document review.

The main topics of the interviews are summarised in Table 3-1.

Table 3-1 Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives	- Environmental Policy - General aspects of the project - Technical details of the project realisation - Approval procedures and status - Quality and Environmental Management System - Involved personnel and responsibilities - Training of personnel - Monitoring and measurement equipment - Financial aspects - Management decision on CDM - Baseline study assumptions - Environmental impacts

Interviewed Persons / Entities	Interview topics
	- Socio economic impacts on the local population - Details of emission reduction calculation - Operational data - Energy Prices - Energy Purchase Agreement
Consultants	- Editorial aspects of PDD - Legal aspects of the project - Procedural aspects - Technical details of the project - Simplified Environmental reports - Financial aspects - Additionality of the project - Details of emission reduction calculation - Debundeling confirmation
Wind mill manufacturer	- Operation & Maintenance - Plant Load Factors - QA/QC procedures - Technology transfer
State authorities	- Stakeholder involvement process - Operating and build margin - Licensing procedures
Stakeholder	- Confirmation of stakeholder involvement process

A detailed list including the functions or designations of the interviewed persons is given in chapter 7 (cp. Table 7-4). This table also includes reference codes to be used in the validation protocol.

3.4 Resolution of Clarification and Corrective Action Requests

In order to remedy any mistakes, problems or any other outstanding issues, which needed to be clarified for positive conclusion on the project design, CAR and CR were raised.

In this validation report 7 CAR and 13 CR are raised.

The CAR / CR are documented in the annex and addressed in chapter 4.

3.5 Public Stakeholder Comments

The PDD was made publicly available through TÜV NORD JI/CDM CP website www.global-warming.de. Comments on the PDD were invited within 30 days, i.e. February 16th to March 18th 2006.

No comments were received. In case comments would have been received, they would have also been made publicly available on this website.

3.6 Finalising the report

The draft validation report was submitted to the client.

After resolving the CR & CAR raised, reviewing the revised and resubmitted project documentation/PDD2/ and outstanding concerns. TÜV NORD JI/CDM CP issues this final validation report and opinion.

4 VALIDATION FINDINGS

In the following paragraphs the findings from the desk review of the draft PDD, visits, interviews and supporting documents are summarised. This also includes the corresponding corrective action taken by the client and its final assessment.

This chapter also includes a brief discussion of important issues where considered necessary for the project assessment. For a more detailed assessment of single aspects within these categories please also refer to the validation checklist as presented in the annex.

The results are summarised in table 4-1:

Table 4-1: Summary of CAR and CR issued

Validation topic [1)]	No. of CAR	No. of CR
Project design (A1-A2)	2	5
Participation requirements (A3)	0	0
Baseline and additionality (B)	4	1
Crediting Period (C)	0	0
Monitoring plan (D)	0	3
Calculation of GHG emissions (E)	0	3
Environmental impacts (F)	0	0
Comments of local stakeholders (G)	1	1
SUM	**7**	**13**

[1)] The letters in brackets refer to the validation protocol

For an in depth evaluation of all validation items it should be referred to the validation protocol (Annex). The annex also includes all CAR and CR (Table 3).

4.1 Participation Requirements

Brazil as a non Annex-I party and United Kingdom as an Annex-I party meet all relevant participation requirements. At the time of the completion of the validation both LoAs are pending. Although the approval of the parties involved is required for

registration the validation has to be carried out without the approval of both, because for the Brazilian DNA a positive validation opinion is a prerequisite for the host government approval and thus the LoA could not be considered at the present validation stage.

Possible changes of the project documentation due to the approval process will be addressed in a revision of the final validation report.

4.2 Project design

Two wind energy farms are bundled in one small scale project activity with a total installed capacity of 13.60 MW. The two wind energy sites are located at Lagoa do Mato (3.20 MW) and Canoa Quebrada (10.40 MW) approx. 170 km east of Fortaleza, the capital of the Ceara state.

The purpose of the project activity is to generate energy from a renewable source by commissioning 17 Enercon wind turbines each with a capacity of 800 kW. The total annual generation is estimated to be around 50.89 GWh. The expected greenhouse gas (GHG) emission reductions during March 2007 and February 2014 are around 13,610 tCO_2equ per year.

The project activity will reduce the energy imports to the Northeast geo-electric region mainly from the southeast-central-western grid system. Furthermore it helps to reduce GHG generated by the increasing number of thermal power plants at the current regional energy mix.

Besides several other improvements, the project activity leads to positive local sustainable development like reducing local air pollution, transferring technical knowledge and generating specialized and non-specialized employment during the construction and operation phase.

In the PDD the amount of estimated emission reductions were calculated incorrect because in table A.4.3.1 the year 2013 was not considered within this calculation. A corresponding CAR was raised and successfully closed.

Corrective Action Request A1:	
CAR	In table A.4.3.1 the emission reductions of 2013 are missing. Thus the total estimated emission reductions have to be revised.
CA:	The emissions reductions of 2013 were included.
Conclusion:	The modified PDD addresses this issue in a correct manner. As the starting date of crediting period was changed to 2007, all years were considered in the emission reduction calculation. CAR is closed.

According to the guidelines for completing CDM-PDD the PDD has to be duly filled and no modifications of the template are allowed. These criteria were not completely met. Thus corresponding CAR and CR were raised.

Corrective Action Request A2:	
CAR	In annex 1 only project participants should be listed.
CA:	Only the project participants were included.
Conclusion:	CAR is closed.

Clarification Request A1:	
CR	The PDD was drafted before additional guidelines for bundling were issued by the EB. Therefore it should be made clear whether the project activity should be considered as a bundled project as defined by the EB. In case of bundling additional documentation has to be provided.
CA:	The Form for Submission of Bundled Small Scale Project Activities was provided.
Conclusion:	Additional documentation was provided. CR is closed.

Clarification Request A2:	
CR	In section A2 of the PDD the value for the total capacity of the project is given as 13.7 MW, while 17 units of 0.8 MW = 13.6 MW are installed. This deviation should be addressed.
CA:	The installed capacity of the project was corrected.
Conclusion:	The deviation referred to the value for the total capacity of the project was properly addressed. CR resolved.

Clarification Request A3:	
CR	The location description in table 5 does not match completely with Annex 3
CA:	The geographical coordinates were changed.
Conclusion:	The geographical coordinates were properly corrected. CR resolved.

The project boundaries were not clearly defined. Therefore a CR was raised and successfully resolved.

Clarification Request A4:	
CR	It should be clarified that the project boundary encompasses the physical geographical site of the renewable generation site. As far as the grid is considered the boundary is defined as the Northeast electric grid subsystem.
CA:	The project boundary and the grid subsystem were properly defined.
Conclusion:	It was made clear that the project boundary encompasses the physical geographical site of the renewable generation site. CR closed.

Version 7 of the chosen methodology AMS I.D. is not applicable, since the EB revised AMS I.D. Thus a corresponding CR was raised.

Clarification Request A5:	
CR	Version 7 of AMS I.D. is not valid. Corrections in the PDD are necessary.

CA:	The version of AMS I.D. changes from no. 7 to no. 9. The PDD was corrected accordingly.
Conclusion:	The PDD was corrected in an appropriate manner. Thus the CR is closed.

4.3 Baseline and Additionality

This project activity is applicable to the approved baseline methodology AMS I.D. 'Grid connected renewable electricity generation', Version 09 (July 2006/Scope 1), since the project activity consists of the installation of renewable energy technologies (wind turbine generators) with an installed capacity of 13.60 MW_{el} and thus under the threshold of 15 MW_{el}. Furthermore it supplies electricity to a grid.
The combined margin emission coefficient is chosen to calculate the baseline emissions as referenced under paragraph 9 (a) of AMS I.D. This combined margin is a combination of the operating margin (OM) and the built margin (BM), calculated as described in methodology ACM0002.

Grid characteristics

The northeast geo-electric system is defined as the spatial extent to calculate the combined margin emission coefficient. Although the grid imports electricity from the northern grid as well as from the southeast-central-western grid, the project participant decided not to consider the electricity imports as defined in ACM0002/ Version 06.

The northern grid only supplies electricity generated by hydropower, hence the CO_2 emission factor is considered as 0 tCO_2/MWh.

The imports from power plants of the southeast-central-western grid are not clearly to identify, because most of the imports are based on bilateral contracts, so the project participant determined the CO_2 emission factor of the net electricity imports as 0 tCO_2/MWh.

Operating Margin

The simple adjusted OM approach is applied to calculate the operating margin. The ex-ante data vintages are based on the years 2003, 2004 and 2005. The λ was calculated by interpolating daily dispatch data for thermal power plants and daily dispatch data for hydropower plants based on data provided by ONS for the years 2003 to 2005. The λ calculations were transparently presented in spreadsheets submitted to and assessed by TÜV NORD. The selected approach for calculating λ is in accordance with ACM0002.

The average between the calculated OM of each year constitutes the simple adjusted OM emission factor (0.198 tCO2/MWh).

Build Margin

The build margin is calculated ex-ante on the basis of the five power plants that have been built most recently till the year 2005. The plants comprise the larger annual generation of electricity than the most recently built 20 %. The built margin emission factor is 0.477 tCO_2/MWh.

Combined Margin

The combined margin emission factor (0.267 tCO_2/MWh) is the result of the weighted average of the operating margin and the build margin. According to the applied methodology the default weights for wind energy projects were chosen (75:25).

The calculation of the combined margin is sound and transparently given in the PDD as well as in the underlying spreadsheet. The validation team has checked the underlying input values as well as the spreadsheet programming. As a result of this check the validation team is convinced of the results of the emission coefficient calculation. It is deemed to be adequate and transparent.

Nevertheless a CAR regarding to the lack of reference of the approved baseline methodology was raised and successfully closed.

Corrective Action Request B1:	
CAR	The title and reference of the approved baseline methodology is not given in B.1
CA:	The title and reference of the approved methodology were incorporated.
Conclusion:	Corresponding corrections and clarifications have been included in the PDD.

Corrective Action Request B2:	
CAR	In section B.2 of the draft PDD a justification of the applied methodology choice is missing. Furthermore the key information and data should be presented in tabular form.
CA:	A table with the project category and its justification were described.
Conclusion:	The missing information was included in PDD and the justification of the applied methodology choice has been demonstrated. CAR is closed.

The application of the baseline methodology and the discussion and determination of the chosen baseline should be transparent and conservative. The calculations have to be documented in a complete and transparent manner. These criteria were not completely met. Thus corresponding CAR and CR were raised.

Corrective Action Request B4:	
CAR	There is no full evidence that the baseline is transparent and there is no evidence that it is conservative. No sensitivity analysis is presented.
CA:	The sensitivity analysis was presented.
Conclusion:	The PDD was modified with the addition of the sensitivity analysis. It was fully evidenced that the baseline is transparent and conservative. CAR is closed.

Clarification Request B1:	
CR	The calculation of the build margin as given in the draft PDD and the underlying spread sheet is not transparent and comprehensible. It shows some inconsistencies regarding the input data (i.e. installed power, operation start date, fuel consumption and generated energy). Furthermore the key data for the determination of the carbon emission factor (i.e fuel consumption performance) is not clearly justified and referenced.
CA:	The unreferenced data presented were excluded.
Conclusion:	OK, CR is resolved

Relevant national & sectoral policies have been considered such as provisions of the *Proinfa* program applied by the Brazilian government to promote the use of renewable energies.

In accordance with AMS-I.D. the additionality was demonstrated acc. to § 28 of the simplified modalities and procedures for small-scale CDM project activities in connection with attachment A of appendix B as a barrier analysis./SMP/ In particular the additionality is demonstrated by the existence of investment, technology and prevailing practice barriers.

The individual arguments presented in the PDD to justify the additionality were summarised in table 4-2. This table also includes the assessment of the validation team.

Table 4-2: Additionality assessment

Type of barrier[1)]	Argument	Assessment
(a)	The average power plant implementation costs of hydro and thermal power plants are lower than for wind power plants.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not a decisive barrier ☒ Argument justified / significant barrier
(a)	The generation costs per MWh for the wind energy projects are approx. 89 US$/MWh, thus higher than for other options like thermal power plants (57 US$/MWh).	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not a decisive barrier ☒ Argument justified / significant barrier
(a)	The uncertainty about the energy density for the project site is a barrier for commercial investments.	☐ Argument not justified ☒ Argument not convincing ☐ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier
(a), (c)	According to *Proinfa* program and the power purchase agreement model the electricity purchaser is obligated to pay only 70 % of the delivered electricity.	☐ Argument not justified ☐ Argument not convincing ☒ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier
(a), (d)	Due to the need of technology transfer and specialized services or currency instability risks, extra expenses are necessary compared to other options.	☐ Argument not justified ☐ Argument not convincing ☒ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier

Type of barrier[1)]	Argument	Assessment
(c)	The *Proinfa* program leads to disadvantages out of unequal conditions in the competition between Brazilian states with large and low capacity of wind energy.	☐ Argument not justified ☒ Argument not convincing ☐ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier
(b)	Fluctuating sources like wind power changes grid requirements and management. Thus several additional MWh might be a problem for local electricity networks.	☐ Argument not justified ☐ Argument not convincing ☒ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier
(b); (c)	The *Proinfa* program rules that 60 % of the employed equipment and services have to be purchased domestically. Since only a small number of suppliers exist, the quality of technology does not correspond to the best available.	☐ Argument not justified ☒ Argument not convincing ☐ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier
(b); (d)	Until 2004 the installed wind capacity accounts for 25 MW. Compared to the total energy generation of 349,593 GWh, wind turbines supplied 61 GWh to Brazilian grid system (0.017 %). Especially in the Northeast region thermal power plants are the first option for investments.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not a decisive barrier ☒ Argument justified / significant barrier
Assessment of the validation team		☒ Project is additional ☐ Project is not additional

1) Classification acc. to Attachment A to Appendix B of the simplified modalities and procedures a) investment barrier; b) technological barrier; c) barrier due to prevailing practice; d) other barriers

All included assumptions, incl. cost estimations, other financial parameters and calculation methods were assessed to be feasible and transparent.

The cost comparisons between conventional power plants and wind power plants are well justified and assessed as significant barriers.
Furthermore the barriers due to prevailing practice with respect to the small share of capacity compared with the total amount of installed capacity in Brazil are well justified and assessed as significant barrier as well.

Thus the validation team arrived at the opinion that the project activity can be assessed to be additional and is not a BAU case.

Nevertheless the impact of the CDM registration on overcoming the obstacles is not sufficiently demonstrated. So a CAR was raised.

Corrective Action Request B3:	
CAR	There is no clear evaluation about the impact of CDM registration on the barriers analysed.
CA:	The item “step 5” was excluded.
Conclusion:	The PDD was revised and the impact of the CDM registration on overcoming the obstacles has been sufficiently demonstrated. CAR is

	closed.

4.4 Crediting Period

This CDM project activity will use a renewable crediting period of 7 years, from 1st March 2007 to 28th February 2014.

4.5 Monitoring Plan

The project is applicable to the monitoring methodology

AMS-I.D.: "Grid Connected Renewable Electricity Generation".

Leakage is not to be considered since energy generating equipment is not transferred from another activity.
This methodology stipulates that monitoring shall consist of:

- Metering the net generation delivered to the grid by the *Lagoa do Mato* wind farm.
- Metering the net generation delivered to the grid by the *Canoa Quebrada* wind farm.

According to the monitoring plan of the PDD this requirement is fulfilled.

The procedures for calibration & maintenance of monitoring equipment are clearly mentioned as per QA/QC procedure of PDD.

Nevertheless some clarification needs referring to the monitoring plan were detected. Therefore the following CR were raised.

The authority and responsibility of project management should be clearly described.

Clarification Request D1:	
CR	The authorities and responsibilities are not clear as long as Rosa dos Ventos Ltda. as the owner of the wind energy power plant, is not addressed in A.3.
CA:	The owner was properly indicated.
Conclusion:	PDD was modified and is correct now. CR is resolved.

The application of the monitoring methodology should be transparent.

Clarification Request D2:	
CR	It should unequivocally be described, that the net energy generation measurement at the grid connection point will be considered for emissions reduction calculation.
CA:	It was evidenced that the power plant delivers energy to the grid.
Conclusion:	The changes are correct. CR is resolved.

The authority and responsibility of project management should be clearly described.

Clarification Request D3:	
CR	According to the PDD, the engineer Armando Ferreira is the authority for the registration, monitoring, measurement and reporting, but in interview, Armando Abreu has told that he is the authority.
CA:	Armando Abreu is the correct authority for the registration, monitoring, measurement and reporting of the project activity.
Conclusion:	CR is resolved.

4.6 Calculation of GHG Emissions

Methodologies for calculating emission reductions are documented. The project intends to reduce carbon dioxide (CO_2) emissions due to replacing electricity from the northeast geo-electric grid. The calculations of the baseline emissions are documented in section E. of the PDD. For assessment please refer to section 4.3 of this report.

The project activity leads to zero emissions and leakage is not to be considered, since it is a small scale renewable energy project and the energy generating equipment is not transferred.

All procedures for calculating emission reductions are well documented in section E as well as in annex 5 of the PDD and available supporting documents.

Acc. to the Final PDD[/PDD2/] the project is intended to reduce emissions of 95,273 tCO_2equ over the first 7 year crediting period.

Nevertheless some clarification needs referring to the monitoring plan were detected. Therefore the following CR were raised.

Clarification Request E1:	
CR	The tables A1 – A3 in section E.2 are not referenced in the PDD
CA:	The references were excluded.
Conclusion:	Tables were corrected. CR is resolved

Clarification Request E2:	
CR	Not all cited literature is clearly referenced (see e.g. page 20)
CA:	The cited literature reference was added.
Conclusion:	CR is resolved.

Clarification Request E3:	
CR	TEG in equation 3 is incorrect / not defined.
CA:	The correct term was properly defined.
Conclusion:	CR is resolved.

4.7 Environmental Impacts

The project activity will improve the environmental situation compared to the baseline scenario. No significant environmental impacts will be entailed by the project activity. An environmental impact assessment confirms this as well.

4.8 Comments by Local Stakeholders

According to the Resolution number 1 of the Brazilian Inter-Ministerial Commission on Climate Change[1], invitations for comments by local stakeholders are required by the Brazilian Designated National Authority (DNA) as part of the procedures for analyzing CDM projects and issuing letters of approval.

The DNA requests project participants to communicate with public through letters inviting for comments to: Brazilian national NGO's forum, local attorneys' and prosecutors' agency, municipality's chamber (mayor and assembly men), State's and municipal's environmental authorities and local communities' associations.

As defined by the Designated National Authority (DNA), the project developer sent information letters to the key institutions, describing the major aspects of the implementation and operation of the proposed project. Comments were invited within a period of 30 days open for comments. No comment was received.

Nevertheless some clarification needs were detected. Therefore the following CAR and CR were raised.

Corrective Action Request G1:	
CAR	The stakeholder involvement procedure was not concluded when the PDD was drafted. In the final version of the PDD the stakeholder comments must be addressed.
CA:	No comment was received.
Conclusion:	CAR is resolved

Clarification Request G1:	
CR	Brazilian DNA requires consultation with specific stakeholders by means of letters. According to section G.1 of the draft PDD emails were sent (despite evidence was provided to the validation team that letters were sent and received by local stakeholders). The PDD should be revised correspondingly.
CA:	The consultation was made by means of letters.
Conclusion:	CR is resolved

[1] Issued on December 2nd of the 2003, decree from July 7th 1999.

5 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the validation of CDM projects, TÜV NORD JI/CDM CP published the draft PDD on its website www.global-warming.de on 16 February 2006 and invited comments within 30 days, until 18 March 2006 by parties, stakeholders and UNFCCC accredited non-governmental organisations.

No comment was received.

6 VALIDATION OPINION

Rosa dos Ventos Ltda has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project: *"Rosa dos Ventos wind energy project"*, with regard to the relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords), the simplified modalities and procedures for small scale CDM project activities of annex II to decision 21/CP.8 and the relevant decisions by COP/MOP and CDM Executive Board.

The purpose of this project activity is to generate energy from a renewable source.

A risk based approach has been followed to perform this validation. In the course of the draft validation 7 Corrective Action Requests (CARs) and 13 Clarification Requests (CRs) were raised and successfully closed.

The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (Brazil) and all relevant UNFCCC requirements for CDM. Nevertheless the LoA´s of both parties are pending.
- The Brazilian DNA will only issue the host country approval on the basis of this positive validation opinion by the validator of the project. Thus the LoA could not be considered at the present validation stage.
- The project additionality is sufficiently justified in the PDD.
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 95,273 t CO_{2e} is most likely to be achieved within the first 7 y (renewable) crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation except the host county approval which will be issued on the basis of this report.

Essen, 2006-11-23

Rainer Winter

TÜV NORD JI/CDM Certification Program

7 REFERENCES

Table 7-1: Documents provided by the project proponent

Reference	Document
/ADA/	Prefeitura Municipal de Aracati: Atestado de Anuência (Approval)
/AIL/	Application for renewal of installation licenses for Lagoa do Mato
/ANEEL1/	ANEEL - Despacho No. 971, de 5 de agosto de 2005; for Canoa Quebrada
/ANEEL2/	ANEEL - Despacho No. 479, de 13 de abril de 2005 ; for Lagoa do Mato
/CSC/	Composition of social capital of Rosa dos Ventos
/IC/	Invitation Commentary to Local Stakeholders and Act of Receiving Voucher by Local Stakeholder
/IL-CQ/	Installation License Canoa Quebrada (valid until 2008-02-20)
/IL-LDM/	Installation License Lagoa do Mato (valid until 2003-03-21)
/MLLS/	Model letter to local stakeholders (Version 06-03-22)
/PDD/	1. Draft Project Design Document of “Rosa dos Ventos wind energy project” (hosted for public comments during 16 Feb’06 to 18 Mar’06). 2. Final Project Design Document of “Rosa dos Ventos wind energy project”
/SER-CQ/	Simplified Environmental Report (Canoa Quebrada) (SEMACE 02411711-0 – Version Feb´03)
/SER-LDM/	Simplified Environmental Report (Lagoa do Mato) (SEMACE 02411713-0 – Version Feb´03)
/TR-CQ/	Technical Report: Canoa Quebrada Wind Farm – Estimation of Annual Energy output Canoa Quebrada Wind Farm 10,4 MW
/TR-LDM/	Technical Report: Lagoa do Mato Wind Farm – Estimation of Annual Energy output Lagoa do Mato Wind Farm 3,2 MW
/XCS/	Calculation sheet of baseline study and emission reduction in excel

Table 7-2: Background investigation and assessment documents

Reference	Document
/AMS-I.D./	AMS-I.D.: "Renewable electricity generation for a grid" (Version 9, 2006-07-28)
/BWEA/	Brazilian Wind Energy Association: Brazilian Wind Energy Programme
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/CONAMA 279/	Resolution CONAMA 279 (2001) - Environmental National Board
/EMME/	Energy Ministry of Mines and Energy, decennial electric expansion plan, 2003-2012
/GCSCP/	UNFCCC: Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for submissions on methodologies for small-scale CDM project activities (F-CDM-SSC-Subm)
/IPCC-GP/	IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories, 2000
/IPCC-RM/	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual
/KP/	Kyoto Protocol (1997)
/MA/	Decision 17/CP. 7 (Marrakesh – Accords)
/PROINFA/	The Brazilian Alternative Energy Sources Program
/R#1/	Resolution #1 of Inter-Ministerial Commission of Global Change (2003) – Brazil
/SMP/	Simplified modalities and procedures for small–scale clean development mechanism project activities (Annex II to Decision 21/CP.18) Appendix B to this.
/VVM/	IETA, PCF Validation and Verification Manual (V.4)

Table 7-3: Websites used

Reference	Link	Organisation
/adne/	www.adne.gov.br	Agência de Desenvolvimento do Nordeste
/aneel/	http://www.aneel.gov.br	Electricity Brazilian Agency
/dna-br/	http://www.mct.gov.br/index.php/content/view/3881.html	Ministry of Science and Technology (Brazil)
/semace/	http://www.semace.ce.gov.br/	Environmental Supervision of Ceará State
/tuv/	http://www.global-warming.de	TÜV NORD JI/CDM CP
/unfccc/	http://cdm.unfccc.int	UNFCCC
/vsf/	http://www.valedosaofrancisco.com.br/Economia/PotencialEnergetico.asp	Vale de San Francisco
/ww/	http://www.wobben.com.br	Wobben Windpower Ltda.

Table 7-4: List of interviewed persons

Reference	MoI[1]		Name	Organisation / Function
/IM01/ /IM02/ /IM08/	V	☒ Mr. ☐ Ms.	Alejandro Bango	Ecológica Assessoria - Consultant
/IM02/	V	☒ Mr. ☐ Ms.	Thiago Chagas	Ecológica Assessoria - Consultant
/IM03/	T	☒ Mr. ☐ Ms.	Gustavo Rodrigues Silva	Braselco – Brasil Energias Solar e Eólica Ltda – Enginner.
/IM04/	T	☒ Mr. ☐ Ms.	Armando Abreu	Rosa dos Ventos Ltda - Director
/IM05/ /IM06/	T	☐ Mr. ☒ Ms.	Mara Lorena	DNA Brazil - Expert
/IM07/	T	☒ Mr. ☐ Ms.	Luiz Geraldo de Oliveira Moura	NEPA - President-Director

Reference	MoI[1]		Name	Organisation / Function
/IM08/	V	☒ Mr. ☐ Ms	Alejandro Bango	Ecológica Assessoria – Consultant
/IM09/	E	☒ Mr. ☐ Ms	Mauro Meirelles	Brazilian DNA / Expert

[1)] Means of Interview: (**T**elephone, **E**-Mail, **V**isit)

ANNEX

Validation Protocol

ANNEX: VALIDATION PROTOCOL

Table 1: Mandatory Requirements for Small Scale Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	The Annex I party is the UK The project participant from the UK is the company Carbon Credit Market.
2. The project shall assist non-Annex I Parties in achieving sustainable development and the project has obtained confirmation by the host country that the project assists in achieving sustainable development	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	LoA is pending	Table 2, Section A.3 The Brazilian DNA hasn't confirmed the sustainable development contribution yet, as a positive validation is a prerequisite for the Brazilian DNA to issue the LoA, in which the contribution to sustainable development will be addressed. Possible changes of the project documentation due to the approval process will be addressed in a revision of the final validation report.
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC?	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project has the written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	LoAs are pending	At the time of the completion of the validation both LoA´s are pending. For the Brazilian DNA a positive validation opinion is a prerequisite for the host government approval and thus the LoA could not be considered

Requirement	Reference	Conclusion	Cross Reference / Comment
			at the present validation stage. Possible changes of the project documentation due to the approval process will be addressed in a revision of the final validation report.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2 Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2 Section B.2.1.
7. Potential public funding for the project from Parties in Annex I is not a diversion of official development assistance	Marrakech Accords (Decision 17/CP.7)	OK	No public funding is involved.
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakesh Accords (CDM modalities§ 29)	OK	The Brazilian DNA assigned for CDM is the "Global Climate Change International Commission" and the UK DNA is the "Department for Environment, Food and Rural Affairs" (DEFRA).
9. The host country is a Party to the Kyoto Protocol	Marrakesh Accords (CDM modalities§ 30)	OK	Yes, Brazil, the host country, has ratified the Kyoto Protocol on 23 August 2002. The UK has ratified the Kyoto Protocol on 31 May 2002.

Requirement	Reference	Conclusion	Cross Reference / Comment
10. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
11. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	The simplified Project Design Document for Small-Scale Project Activities; version 2 from 8 July 2005 is used for submitting.
12. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3 and B.1 The project activity confirms to category I.D. "Grid-connected renewable electricity generation"
13. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F In the PDD, comments about a Simplified Environmental Report (SER) are included (see section F.1)
15. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM	OK	The PDD was made available for public commenting on the UNFCCC website with a linkage to TÜVNORD

Requirement	Reference	Conclusion	Cross Reference / Comment
	Project Activities §23b,c, d		website: www.global-warming.de from 2006-02-16 to 2006-03-18. No comments have been received.

Table 2: Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/PDD/ (A.2 and A.4.2)	DR	Yes, the project activity is a renewable energy project with an installed capacity of 13,6 MW_{el} which is lower than the threshold of 15 MW_{el}.	OK	
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/PDD/ (A.4.5) /IM01/	DR I	It has been verified that the criteria of Appendix C of the simplified modalities and procedures were satisfied. It is not a debundled project activity.	OK	
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/PDD/ (A.4.2)	DR	Yes, the proposed project activity confirms to project category I.D., renewable electricity generation for a grid.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/PDD/ (A.2, A.4 and Annex 3)	DR	The location description in table 5 does not match completely with Annex 3.	CR A3	OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/PDD/ (B.4)	DR	It should be clarified that the project boundary encompasses the physical geographical site of the renewable generation source. As far as the grid is considered the boundary is defined as the Northeast electric grid subsystem.	CR A4	OK
A.2.3. Does the project design engineering reflect current good practices?	/PDD/ (A.4.2) Validators Experience	DR	Yes, the power generation technology employs environmentally safe and sound technology.	OK	
A.2.4. Will the project result in technology transfer to the host country?	/PDD/ (A.4.2) /IM03/	DR I	The technology is available in Brazil and is supplied by a subsidiary of a German company.	OK	
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions	/PDD/ D.5 /IM04/	DR I	The authorized person for the registration, monitoring, measurement and reporting will be the Engineer Armando Ferreira, of the owner company Rosa dos Ventos, according	CR D3	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
for meeting training and maintenance needs?			to PDD. During interview, it was clarified that the responsible person is Mr. Armando Abreu. He is also responsible for the training of the monitoring and operation personnel.		
A.2.6. Has the PDD form been duly filled?	/PDD/	DR	It has been duly filled except the items addressed below: • The title and reference of the approved baseline methodology is not given in B.1 • In section B.2 of the PDD a justification of the applied methodology choice is missing. Furthermore the key information and data should be presented in tabular form. • In table A.4.3.1 the emission reductions of 2013 are missing. Thus the total estimated emission reductions have to be revised. • In annex 1 only project participants should be listed. • The PDD was drafted before additional guidelines for bundling were issued by the EB. Therefore it should be made clear whether the project activity should be considered as a bundled project as defined by the EB.	CAR B1 CAR B2 CAR A1 CAR A2 CR A1	OK OK OK OK OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			In case of bundling additional documentation has to be provided. • In section A2 of the draft PDD the value for the total capacity of the project is given as 13.7 MW, while 17 units à 0.8 MW = 13.6 MW are installed. This deviation should be addressed. • The location description in table 5 does not match completely with Annex 3 • Version 7 of AMS I.D. is not valid. Corrections in the PDD are necessary. • The tables A1 – A3 in section E.2 are not referenced in the PDD • Not all cited literature is clearly referenced (see e.g. page 20) • TEG in equation 3 is incorrect / not defined	CR A2 CR A3 CR A5 CR E1 CR E2 CR E3	OK OK OK OK OK OK
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/PDD/ (A.2)	DR	Yes, reducing local air pollution and generation specialized and non-specialized employment during the construction and operation phase.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3.2. Will the project create any adverse environmental or social effects?	/PDD/ (F.1)	DR	Identified adverse effects of an environmental impact assessment are negligible.	OK	
A.3.3. Is the project in line with sustainable development policies of the host country?	/PDD/ (A.2) /PROINFA/ /SER-CQ/ /SER-LDM/ /R#1/	DR	The National project for Renewable Energy Sources – PROINFA has identified both wind farms as appropriate sites. The Government has approved the Simplified Environmental Report – SER. In this report the consistency of the project with the sustainable development policies and practices of Brazil is analyzed. In Brazil the Letter of Approval is issued on the basis of the conclusion of the validation report. Thus the LOA is pending.	OK	
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/PDD/ (A.2 and F.1) /PROINFA/ /AIL/ /IL-CQ/ /IL-LDM/ /CONAMA 279/	DR	The National project for Renewable Energy Sources – PROINFA has identified both wind farms as appropriate sites. The installation license was granted for Lagoa do Mato. For Canoa Quebrada this license has been applied for. It is not foreseeable or likely that this license will not be granted.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/PDD/ (B.1) (B.2) /AMS-I.D./	DR	Yes, the approved methodology AMS I.D "Grid connected Renewable Electricity Generation" is applicable.	OK	
B.1.2. Is the baseline methodology applicable to the project being considered?	/PDD/ (B.2 and E.1.2.4) /AMS-I.D./		Yes, all application criteria are met.	OK	
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to	/PDD/ (B.3)	DR	According to attachment A of appendix B of the simplified modalities and procedures		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?			three different barriers are demonstrated. The additionality is demonstrated with several arguments according to investment and technology barriers as well as barriers due to prevailing practice. Nevertheless the impact of the CDM registration on overcoming the obstacles is not sufficiently demonstrated.	CAR B3	OK
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/PDD/ (B5) (Section E) /IM02/	DR I	There is no full evidence that the baseline methodology is transparent and there is no evidence that it is conservative. No sensitivy analysis is presented. The calculation of the build margin as given in the PDD and the underlying spread sheet is not transparent and comprehensible. It shows some inconsistencies regarding the input data (i.e. installed power, operation start date, fuel consumption and generated energy). Furthermore the key data for the determination of the carbon emission factor (i.e fuel consumption performance) is not clearly justified and referenced.	CAR B4 CR B1	OK OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/PDD/ (B.3) /PROINFA/	DR	Yes.	OK	
B.2.4. Is the baseline selection compatible with the available data?	/PDD/ (B.5, E.1	DR	Yes, the baseline selection is compatible with the data provided.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	and E.2) /EMME/ /aneel/				
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/PDD/ (B3)	DR	Yes.	OK	
C. Duration of the Project / Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/PDD/ (C.1) /IM04/	DR I	The starting date of the project operation is scheduled to be 2006-12-01. Though the beginning of the construction is delayed it can still be assumed that the construction will be completed before December. According to interview, Rosa dos Ventos Ltda intends to start the building on August/September´06 and start the operation on March´07. The expected operational lifetime is 30 years	OK	
C.1.2. Is the crediting period clearly defined (seven years with two possible renewals or 10 years with no renewal)?	/PDD/ (C.2)	DR	The chosen type of the crediting period is the Renewable Crediting Period with 7 years. The starting date is clearly defined. Nevertheless in Table A.4.3.1. it is not accounted for 2013.	CAR A1	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/PDD/ (B.5) (D.1)	DR	Yes.	OK	
D.1.2. Is the monitoring methodology applicable to the project being considered?	/PDD/ (D.2)	DR	Yes.	OK	
D.1.3. Is the application of the monitoring methodology transparent?	/PDD/ (D.3)	DR	It should unequivocally be described, that the net energy generation measurement at the grid connection point will be considered for emissions reduction calculation.	CR D2	OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/PDD/ (D.4)	DR	Yes, because the emission reductions are the measured electricity, which is generated during the crediting period.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Are the choices of project emission indicators reasonable?	/PDD/ (Section D)	DR	Since the project is based on renewable energy, there will be no project emissions.	OK	
D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. If applicable, are the choices of leakage indicators reasonable?	/PDD/ (Section D) /AMS-I.D./	DR	According to number 12, I.D., leakage is not to be considered since the energy generating equipment is not transferred from or to another activity.	OK	
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/PDD/	DR	The choice of the baseline indicators is adequate.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/PDD/ (A.3) (D.5) Annex 1) /IM01/	DR I	The authorities and responsibilities are not clear as long as Rosa dos Ventos Ltda. as the owner of the wind energy power plant, is not addressed in A.3.	CR D1	OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/PDD/ (D.5) /IM04/	DR, I	In the PDD, the Engineer Ferreira is the authority for the registration, monitoring, measurement and reporting, but in interview, Armando Abreu has told that he is the authority.	CR D3	OK
D.5.3. Are procedures identified for training of monitoring personnel?	/PDD/ /IM04/	DR I	The training issue is sufficiently addressed in the PDD and the responsibility for training of the personnel is already been allocated. Nevertheless additional training procedures should be elaborated in due time.	OK	
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/PDD/	DR	Generating electricity through wind turbines leads to zero emissions. So such emergencies are not expected.	OK	
D.5.5. Are procedures identified for calibration of monitoring equipment?	/IM04/	I	The calibration of the decisive meters will be done according to the INMETRO standards by the net operator and thus no specific procedures are provided by the operator.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/IM04/	I	See comment on D.5.5	OK	
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/IM04/	I	See comment on D.5.5.	OK	
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/IM04/	I	See comment on D.5.5.	OK	
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/IM04/	I	See comment on D.5.5.	OK	
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/IM04/	I	See comment on D.5.5.	OK	
D.5.11. Are procedures identified for project performance reviews?	/IM04/	I	See comment on D.5.5.	OK	
D.5.12. Are procedures identified for corrective actions?	/IM04/	I	See comment on D.5.5.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E. Calculation of GHG emission It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG Emissions The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/PDD/ (E.1)	DR	Since the project is renewable energy based, there will be no project emissions.	OK	
E.2. Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/PDD/ (E.1) /AMS-I.D./	DR	Leakage calculations are not applicable.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.3. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/PDD/ (E.1.2.4)	DR	Yes. The baseline emission boundary is the electricity grid of North East Brazil. All relevant sources of GHG are covered.	OK	
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/PDD/ /AMS-I.D./	DR	Yes, in accordance with AMS I.D. the applicable emission factor is determined by calculating the average of the operating margin and the build margin. Indirect emissions are not applicable.	OK	
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/PDD/ (Section E)	DR	Yes. E.2 gives sufficient reference data and overview of the GHG sources. E.1. details the calculation and the sources used.	OK	
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/PDD/ (Section B) /AMS-I.D./	DR	Yes, the baseline was calculated in correspondence of AMS I.D.	OK	
E.3.5. Are the calculations documented in a complete and transparent manner?	/PDD/ (Section E) (B.5) /IM02/	DR I	There is no full evidence that the baseline is transparent and there is no evidence that it is conservative. No sensitivity analysis is presented. The calculation of the build margin as given in the PDD and the underlying spread sheet is	CAR B4 CR B1	OK OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			not transparent and comprehensible. It shows some inconsistencies regarding the input data (i.e. installed power, operation start date, fuel consumption and generated energy). Furthermore the key data for the determination of the carbon emission factor (i.e fuel consumption performance) is not clearly justified and referenced		
E.3.6. Have conservative assumptions been used?	/PDD1/ (Section E) (B.5)	DR	See comment on E.3.5.	CAR B4 CR B1	OK OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/PDD1/ (Section E) (B.5)	DR	See comment on E.3.5.	CAR B4 CR B1	OK OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/PDD1/ (E.1)	DR	Yes, since the wind farm project is a zero emission project.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/PDD1/ (F.1) /SER-CQ/ /SER-LDM/ /CONAMA279/	DR	SER is referenced.	OK	
F.1.2. Does the project comply with environmental legislation in the host country?	/PDD1/ /SER-CQ/ /SER-LDM/ /AIL/ /IM05/	DR I	The installation license was granted for Lagoa do Mato. For Canoa Quebrada this license has been applied for. It is not foreseeable or likely that this license will not be granted.	OK	
F.1.3. Will the project create any adverse environmental effects?	/PDD1/ (F.1) /SER-CQ/ /SER-LDM/	DR	The environmental impacts have been identified in SER. The positive impacts have prevailed and the negative impacts have been controlled.	OK	
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/PDD1/ (F.1) Table 15	DR	Yes.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/PDD1/ (G.1) /IM04/ /IC/	DR I	Yes. NGO's forum, local attorneys and the prosecutors' agency, municipality chamber, state and local environmental authorities and local community associations were contacted. Nevertheless the stakeholder involvement procedure was not finalized when the PDD was drafted. Therefore the results of this procedure have to be addressed in the final version of the PDD.	CAR G1	OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/PDD1/ (G.1) /AM02/ /AM06/	DR I	Brazilian DNA requires consultation with specific stakeholders by means of letters. According to section G.1 of the draft PDD emails were sent (despite evidence was provided to the validation team that letters were sent and received by local stakeholders per DNA procedure). The PDD should be revised correspondingly.	CR G1	OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/PDD1/ (G1) /MLLS/	DR I	See comment on G.1.2.	CR G1	OK
G.1.4. Is a summary of the comments received provided?	/PDD1/ (G.2)	DR I	No, since no comments received.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
G.1.5. Has due account been taken of any comments received?	/PDD1/ (G.2)	DR I	No comments received.	OK	

Table 3: Resolution of Corrective Action and Clarification Requests

Draft report clarification requests and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR A1 In table A.4.3.1 the emission reductions of 2013 are missing. Thus the total estimated emission reductions have to be revised.	A.2.6	The emissions reductions of 2013 were included.	The modified PDD addresses this issue in a correct manner. As the starting date of crediting period was changed to 2007, all years were considered in the emission reduction calculation. CAR is closed.
CAR A2 In annex 1 only project participants should be listed.	A.2.6	Only the project participants were included.	Ok. CAR is closed.
CAR B1 The title and reference of the approved baseline methodology is not given in B.1	A.2.6	The title and reference of the approved methodology were incorporated.	Corresponding corrections and clarifications have been included in the PDD.
CAR B2 In section B.2 of the PDD a justification of the applied methodology choice is missing. Furthermore the key information and data should be presented in tabular form.	A.2.6	A table with the project category and its justification were described.	The missing information was included in PDD and the justification of the applied methodology choice has been demonstrated. CAR is closed.
CAR B3 There is no clear evaluation about the impact of CDM registration on	B.2.1.	The item “step 5” was excluded.	The PDD was revised and the impact of the CDM registration on overcoming the obstacles has been

Draft report clarification requests and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
the barriers analysed.			sufficiently demonstrated. CAR is closed.
CAR B4 There is no full evidence that the baseline is transparent and there is no evidence that it is conservative. No sensitivity analysis is presented.	B.2.2 E.3.5-7	The sensitivity analysis was presented.	The PDD was modified with the addition of the sensitivity analysis. It was fully evidenced that the baseline is transparent and conservative. CAR is closed.
CAR G1 The stakeholder involvement procedure was not concluded when the PDD was drafted. In the final version of the PDD the stakeholder comments must be addressed.	G.1.1 G.1.4 G.1.5	No comment was received.	OK. CR is resolved
CR A1 The PDD was drafted before additional guidelines for bundling were issued by the EB. Therefore it should be made clear whether the project activity should be considered as a bundled project as defined by the EB. In case of bundling additional documentation	A.2.6	The Form for Submission of Bundled Small Scale Project Activities was provided.	Additional documentation was provided. CAR is closed.

Draft report clarification requests and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
has to be provided.			
CR A2 In section A2 of the draft PDD the value for the total capacity of the project is given as 13.7 MW, while 17 units à 0.8 MW = 13.6 MW are installed. This deviation should be addressed.	D.4.1 A.2.6	The installed capacity of the project was corrected.	The deviation referred to the value for the total capacity of the project was properly addressed. CR resolved.
CR A3 The location description in table 5 does not match completely with Annex 3	A.2.1 A.2.6	The geographical coordinates were changed.	The geographical coordinates were properly corrected. CR resolved.
CR A4 It should be clarified that the project boundary encompasses the physical geographical site of the renewable generation site. As far as the grid is considered the boundary is defined as the Northeast electric grid subsystem.	A.2.2	The project boundary and the grid subsystem were properly defined.	It was made clear that the project boundary encompasses the physical geographical site of the renewable generation site. CR resolved.
CR A5 Version 7 of AMS I.D. is not valid. Corrections in the PDD are necessary.	A.2.6	The version of AMS I.D. changes from no. 7 to no. 9. The PDD was corrected accordingly.	The PDD was corrected in an appropriate manner. Thus the CR is closed.
CR B1 The calculation of the build margin	B.2.2, E.3.5 - E.3.7	The unreferenced data presented were excluded.	OK. CR is resolved.

Draft report clarification requests and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
as given in the PDD and the underlying spread sheet is not transparent and comprehensible. It shows some inconsistencies regarding the input data (i.e. installed power, operation start date, fuel consumption and generated energy). Furthermore the key data for the determination of the carbon emission factor (i.e fuel consumption performance) is not clearly justified and referenced.			
CR D1 The authorities and responsibilities are not clear as long as Rosa dos Ventos Ltda. as the owner of the wind energy power plant, is not addressed in A.3.	D.5.1	The owner was properly indicated.	PDD was modified and is correct now. CR is resolved.
CR D2 It should unequivocally be described, that the net energy generation measurement at the grid connection point will be considered for emissions reduction calculation.	D.1.3	It was evidenced that the power plant delivers energy to the grid.	The changes are correct. CR is resolved.
CR D3 According to the PDD, the engineer	A.2.5 D.5.2	Armando Abreu is the correct authority for the registration, monitoring, measurement and reporting of the	OK. CR is resolved.

Draft report clarification requests and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
Ferreira is the authority for the registration, monitoring, measurement and reporting, but in interview, Armando Abreu has told that he is the authority.		project activity.	
CR E1 The tables A1 – A3 in section E.2 are not referenced in the PDD	A.2.6	The references were excluded.	Tables were corrected. CR is resolved
CR E2 Not all cited literature is clearly referenced (see e.g. page 20)	A.2.6	The cited literature reference was added.	CR is resolved
CR E3 TEG in equation 3 is incorrect / not defined	A.2.6	The correct term was properly defined.	CR is resolved
CR G1 Brazilian DNA requires consultation with specific stakeholders by means of letters. According to section G.1 of the draft PDD emails were sent (despite evidence was provided to the validation team that letters were sent and received by local stakeholders). The PDD should be revised correspondingly.	G.1.2 G.1.3	The consultation was made by means of letters.	CR is resolved