VALIDATION REPORT

"RONDINHA SMALL HYDROELECTRIC POWER PLANT" IN BRAZIL

REPORT NO. 2012-0546

REVISION NO. 03A

DET NORSKE VERITAS

VALIDATION REPORT

Date of first issue: 17 August 2012	ConCert Project No.: PRJC-364087-2012-CCS-BRA
Approved by: Michael Lehmann	Organisational unit: Accredited Climate Change Services
Client: Rondinha Energética S.A.	Client ref.: Marcelo Marder

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Summary:
Project Name: Rondinha Small Hydroelectric Power Plant
Country: Brazil
Methodology: ACM0002 **Version:** 14.0
GHG reducing Measure/Technology: Grid connected renewable electricity generation
Sectoral scope(s): 1
ER estimate: 10 238 tCO_2e per year (average)
Size
☒ Large Scale ☐ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested ☐ Clarifications Requested
☒ Submission for registration ☐ Rejected

This validation summarizes the findings of the validation. The only changes made to this version of the validation report compared to the validation report rev. 03 dated 14 November 2014 referred to in the letter of approval of the DNA of Brazil are linked to the status of issuance of the letter of approval by the DNA of Brazil. In summary, it is DNV's opinion that the project activity "Rondinha Small Hydroelectric Power Plant" in Brazil, as described in the PDD, version 8 of 22 October 2014, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 14.0. Hence DNV requests the registration of the project as a CDM project activity.

Report No.: 2012-0546	Subject Group: Environment
Report title: "Rondinha Small Hydroelectric Power Plant" in Brazil	
Work carried out by: Felipe Lacerda Antunes, Robin Weldy, Frederico Rosas	
Work verified by: Andrea Leiroz	
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Indexing terms

Key words
Climate Change
Kyoto Protocol
Validation
Clean Development Mechanism

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Abbreviations

ANEEL	Brazilian National Electric Energy Agency
BNDES	Brazilian National Development Bank
CAPM	Capital Asset Pricing Model
CAR	Corrective Action Request
CCEE	Electric Power Commercialization Chamber
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CONAMA	Brazilian National Environmental Council
DNV	Det Norske Veritas
DNA	Designated National Authority
EIA	Environmental Impact Assessment
FAR	Forward Action Request
FATMA	Foundation for the Environment
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IGP-M	Market General Prices Index
INEE	Energy Efficiency National Institute
INMETRO	Brazilian Metrology National Institute
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of approval
MoC	Modalities of communication
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PROINFRA	Program of Encouraging Alternative Sources of Electrical Energy
PS	Clean Development Mechanism Project Standard
SIN	National Interconnected Grid of Brazil
tCO_2e	Tonnes of CO_2 equivalents
TFSEE	ANEEL's electrical energy services inspection tax
TUSD	ANEEL's distribution system use tariff
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard

1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed a validation of the project activity "Rondinha Small Hydroelectric Power Plant" in Brazil. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host Party is Brazil which fulfils the participation criteria and has approved the project and authorized the project participant Rondinha Energética S.A.. The DNA from Brazil confirmed that the project assists in achieving sustainable development. No participating Annex I Party is yet identified.

The project correctly applies the baseline and monitoring methodology ACM0002, version 14.0 "Grid-connected electricity generation from renewable sources".

The project activity is a hydroelectric power plant which involves the installation and operation of 2 turbines and associated reservoir with a total of 9.6 MW of installed capacity. By generating electricity from hydro power and displacing electricity from the grid that is partly generated from fossil fuels, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 10 238 tCO_2e per year over the selected 7 year renewable crediting period. The emission reduction forecast has been checked, and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design, and it is DNV's opinion that the project participants are able to implement the monitoring plan.

In summary, it is DNV's opinion that the project activity "Rondinha Small Hydroelectric Power Plant" in Brazil, as described in the PDD, version 8 dated 22 October 2014 meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 14.0.

Rio de Janeiro and Oslo, 16 December 2014

Felipe Lacerda Antunes
Validator

Michael Lehmann
Director of Services and Technologies
DNV Climate Change Services AS

2 INTRODUCTION

Rondinha Energética S.A. has commissioned DNV Climate Change Services AS (DNV) to perform a validation of the proposed CDM project activity "Rondinha Small Hydroelectric Power Plant" in Brazil (hereafter called "project"). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

2.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0002 (version 14.0) /31/. The validation was carried out in accordance with the principles and the requirements for validation contained in the Validation and Verification Standard /28/.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

3 METHODOLOGY

The validation consisted of the following three phases:

I document review

II follow-up actions (e.g. on-site visit and telephone or email interviews)

III the closing out of validation findings and the issuance of the final validation report and opinion

The following sections outline each step in more detail.

3.1 Document review

The following tables list the documentation that was reviewed during the validation.

3.1.1 Documentation provided by the project participants

/1/ Carbon Management Consulting Ltd.: *CDM-PDD for project activity "Rondinha Small Hydroelectric Power* Plant*" in Brazil*, Version 1 dated 25 January 2012 and Version 8 dated 22 October 2014.

/2/ Carbon Management Consulting Ltd.: *Investment Analysis spreadsheet for Rondinha: "InvestmentAnalysis-Rondinha Aug2013.xls".*

/3/ Carbon Management Consulting Ltd.: *Emission Reduction calculation spreadsheet: "CERs Rondinha for DOEOct_2014.xls"* dated 14 November 2014.

/4/ RTK: *Feasibility Study*. Dated 15 October 2007.

/5/ WEG Equipamentos Elétricos: *Turbine and Generator supply contract for PCH Rondinha*, Dated 15 June 2011.

/6/ RTK: *Environmental Impact Assessment for PCH Rondinha*. Dated 27 June 2008.

/7/ FATMA: *Previous License No. 121/09 for PCH Rondinha*. Dated 22 May 2009.

/8/ FATMA: *Installation License No. 22/2009*. Dated 2 October 2009.

/9/ Carbon Management Consulting Ltd.: *Stakeholders Post Office Delivery Receipt* Dated 18 October 2011.

/10/ UNFCCC: *Prior consideration confirmation email for Rondinha small hydro plant.* Dated 29 July 2009.

/11/ Interministerial Commission on Global Climate Change (DNA of Brazil): *Prior consideration confirmation email for PCH Rondinha.* Dated 24 July 2009.

/12/ Rondinha Energética S.A.: PCH Rondinha Report submitted to bank BNDES to apply for a loan, dated 27 April 2011.

/13/ Interministerial Commission on Global Climate Change (DNA of Brazil): *Email between DNA and consultant, subject:"ENC: Rondinha; Eurus/Renascenca – FBOMS"* dated 14 August 2012.

/14/ Rondinha Energética S.A.: PPA signed with Tramontina group, dated 19 May 2010.

/15/ Rondinha Energética S.A.: Civil works contract with PSO Engineering, dated 15 June 2012.

/16/ ENGEPESA: Civil works proposal, dated 11 April 2010

/17/ MECAMIDI: Turbines and generators proposal dated 22 February 2010

/18/ Gerdau: Steel supply proposal dated 10 February 2010

/19/ Votorantin: Cement supply proposal dated 10 February 2010
/20/ EletroWatt: Transmission system proposal dated 5 May 2010
/21/ Infra Soluções: Land expropriation analysis dated 31 October 2008
/22/ Techne: Engineering studies proposal dated 10 June 2009
/23/ MS Engineer: Management and administration proposal dated 16 April 2010
/24/ Impacto: Environmental studies proposal dated 14 January 2010
/25/ RTK Consulting: Acquisition authorization proposal dated 6 February 2009
/26/ Grameyer: Installation and mounting proposal dated 21 February 2010

3.1.2 Letters of approval

/27/ Interministerial Commission on Global Climate Change (DNA of Brazil): *Letter of approval*: Letter of approval dated 4 December 2014, received by e-mail message from the DNA dated 15 December 2014.

3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

/28/ CDM Executive Board: *Clean Development Mechanism Validation and Verification Standard,* version 05.0.
/29/ CDM Executive Board: *Clean Development Mechanism Project Standard,* version 05.0.
/30/ CDM Executive Board: *Clean Development Mechanism Project Cycle Procedure,* version 05.0.
/31/ CDM Executive Board: *Baseline and monitoring methodology ACM0002 – "Grid-connected electricity generation from renewable sources"*, version 14.0.
/32/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, Version 7.0.0.
/33/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, Version 4.0.
/34/ CDM Executive Board: *Guidelines on the demonstration and assessment of prior consideration of the CDM*, Version 4.
/35/ CDM Executive Board: *"Guidelines on the Reporting and Validation of Plant Load Factors"*, version 1.
/36/ CDM Executive Board: *"Guidelines on common practice"*, version 2.

3.1.4 Documents used by DNV to validate / cross-check the information provided by the project participants

/37/ Brazilian Ministry of Science and Technology: *2011 Build and Operating Margins for the National Grid.* http://www.mct.gov.br/index.php/content/view/333605.html#ancora. Resolution nº 7, dated 5 March 2008, about stakeholders consultation process.
/38/ ANEEL: Database of Energy Generation (used for the common practice analysis). Available at: http://www.aneel.gov.br/area.cfm?idArea=37. Date last accessed: 21 March 2013.
/39/ Scania: Diesel generator specifications. http://www.scania.com/images/Energy_CarbonDioxide_2011_ENG_110330_tcm40-

301879.pdf
http://mandieselturbo.com/files/news/filesof16119/tech_paper_low_speed.pdf
Date last accessed: 25 March 2013.

/40/ UNFCCC: Registered project activities that use diesel generators.
http://www.cdmloanscheme.org/sites/default/files/bugoye_13.0_mw_run-of-river_hydropower_project.pdf
http://cdm.unfccc.int/Projects/DB/DNV-CUK1179471118.63/view
Date last accessed: 25 March 2013.

/41/ Aswath Damodaran: *Calculation of equity risk premium*, registry of the USA Treasury Yields, from 1927 to 2012.
Available at: http://pages.stern.nyu.edu/~adamodar/.
Last accessed on 23 August 2012.

/42/ United States of America Treasury: *Inflation Rate USA*, for the year of 2008 to 2010.
Available at: http://www.federalreserve.gov/releases/h15/data.htm.
Last accessed on 23 August 2012.

/43/ JP Morgan: *EMBI+, index of the bonds from emerging markets, historical data*. Dated 2010. Available at:
http://www.jpmorgan.com/pages/jpmorgan/investbk/solutions/research/EMBI.
Last accessed on 23 August 2012.

/44/ Frederico Rosas, independent financial expert for DNV: *Financial Expert Assessment*, approving benchmark and investment analysis presented for the project.
Dated 27 February 2013.

/45/ Aswath Damodaran: *Calculation of equity risk premium*, registry of the USA Treasury Yields, from 1927 to 2010.
Available at: http://pages.stern.nyu.edu/~adamodar/. Last accessed on 23 August 2012.

/46/ Brazilian National Treasury, *Normative Instruction nº 247*, dated 21 November 2002. About PIS/PASEP and Cofins taxes, available at:
http://www.receita.fazenda.gov.br/legislacao/ins/2002/in2472002.htm. Last accessed on 23 August 2012.

/47/ Brazilian National Treasury, *Law 11 051 about presumed profit companies*, dated 2004. Available at:
http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2005/PergResp2005/pr517a555.htm. Last accessed on 23 August 2012.

/48/ Ministry of Environment: *Renewable Sources of Energy in Brazil* dated 2003.

/49/ Brazilian Mining and Energy Ministry: Hydroelectric inventory manual, dated December 2007.

/50/ Evidence for raw material prices increase: London Metal Exchange website – www.lme.com

/51/ ANEEL Decrees, Dispatches and Notes on Tariffs:

- *Normative Resolution nº 77 about discount in tariff for alternative sources*, dated 18 August 2004;
- *Decree nº 2410, creating the TSFEE tariff*, dated 28 November 1997;
- *Dispatch nº 4774, about the values of the TSFEE tariff*, dated 22 December 2009;

- *Normative Resolution nº 320 about charges of center of gravity (nodes) for alternative sources,* dated 10 June 2008*;*
- *Dispatch nº 3731, regulates the Supervision Tax on Electricity Power Services* dated 27 December 2007. Available at: http://www.aneel.gov.br/cedoc/dsp20073731.pdf. Last accessed on 23 August 2012.
- *Portaria (Ordinance) no 815, dated 30 November 1994, of the Secretariat for Energy of the Ministry of Mines and Energy of Brazil.INMETRO Portaria (Ordinance) no 431, dated 4 December 2007*

/52/ Porto University presentation about renewable energy generation projects in Brazil, dated 11 February 2010

/53/ ANEEL: *Brazilian Auction data* Available at: http://www.aneel.gov.br/area.cfm?idArea=53 Last accessed on 26 March 2013.

/54/ ANEEL: *Resolution No. 2568* Dated 5 October 2010.

/55/ Ministry of Mines and Energy: *Proinfa Projects,* dated August 2009. Available at: http://www.mme.gov.br/programas/proinfa/galerias/arquivos/apresentacao/Situaxo_usinas_PROINFA_AGO-2009.pdf. Last accessed on 23 August 2012.

/56/ INEE: *Evaluation of PROINFA Parameters,* dated July 2003. Available at: http://www.inee.org.br/down_loads/forum/Parecer%20INEE%20Proinfra.pdf. Last accessed on 23 August 2012.

/57/ Eletrobras: Guidelines for Small Hydroelectric Power Plants, dated 2000

/58/ UNFCCC: CDM registered run-of-river small hydroelectric power plants in Brazil: http://cdm.unfccc.int/Projects/projsearch.html, last accessed on 6 September 2013.

/59/ FGV: Historical IGP-M data, available at http://www.portalbrasil.net/igp.htm. Last accessed on 23 August 2012.

/60/ Santa Catarina State Hall: regulations related to tax on goods and services (ICMS), available at: http://www.portalicms.com.br/, last accessed on 1 October 2013

/61/ OCDE paper: "Regulation of the electricity sector, 2005"

/62/ FATMA: *Operating License No. 10246/2013*. Dated 2 December 2013.

3.2 Follow-up actions

On 26 March 2012 Robin Weldy and Felipe Antunes from DNV visited the office of Atlantic Energias Renováveis and performed interviews with project stakeholders.

	Date / Type of interview	Name / Organization	Topic
/63/	26 March 2012 ☐ On-site ☒ Face-to-face at office ☐ Telephone ☐ E-mail	Eduardo Barrionuevo Director – Carbon Management Consulting Ltd.	• Status of the project implementation • Technical issues • Methodology applicability • Project additionality
/64/	26 March 2012 ☐ On-site	Thiago Corrêa Marder Atlantic Energias Renováis	

	☒ Face-to-face at office ☐ Telephone ☐ E-mail	S.A.	
/65/	26 March 2012 ☐ On-site ☒ Face-to-face at office ☐ Telephone ☐ E-mail	Henrique Theodorovicz Atlantic Energias Renováis S.A.	• CDM consideration and real action to secure the implementation of the CDM project • GHG emission calculation • Monitoring plan • Environment impact assessment • Consulting process on the stakeholder's comments
/66/	26 March 2012 ☐ On-site ☒ Face-to-face at office ☐ Telephone ☐ E-mail	Marcos Tulio Schmidt Director General - MS Engenharia S/C Ltda	

3.3 Closing out of validation findings

The objective of this phase of the validation was to resolve any issues which needed be clarified prior to DNV's conclusion on the project's compliance with applicable CDM requirements. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity "Rondinha Small Hydroelectric Power Plant" in Brazil is enclosed in Appendix A to this report.

Table 2 of the validation protocol documents the findings of the desk review of the project design documentation and follow-up interviews with project stakeholders. Any findings raised in Table 2 are listed in Table 3 of the protocol, and changes to the description of the project design as a result of these findings will be addressed in Table 3. Table 2 thus may not reflect all aspects of the project as described in the final PDD submitted for registration.

A corrective action request (CAR) is raised if one of the following occurs:

(a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

(b) The applicable CDM requirements have not been met;

(c) There is a risk that emission reductions cannot be monitored or calculated.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

The validation identified six CARs, eight CLs and zero FARs. The CARs and CLs were satisfactorily addressed by the project participants by among other revising the PDD (please refer to Table 3 in Appendix A for further details). In addition to the changes made to the PDD as a result of the validation findings, the following changes to the PDD (version 8 dated 22 October 2014) were made compared to the version of the PDD published for stakeholder comments (version 1 dated 25 January 2012):

- PDD changed from VVM to VVS template format;
- The project proponent decided to update the methodology ACM0002 to the latest version 14.0, and the "*Tool to calculate the emission factor for an electricity system*" to the latest version 4.0;
- Update on the starting date of the crediting period.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities		
Requirement	***Reference***	***Conclusion***
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)** if a requirement is not met.*

Validation Protocol Table 2: Requirement Checklist				
Checklist question	***Reference***	***Means of verification (MoV)***	***Assessment by DNV***	***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 different sections, following the logic of the CDM-PDD	*Gives reference to documents where the answer to the checklist question or item is found.*	*Means of verification (MoV) are **document review (DR)**, **interview (I)** or any other follow-up actions (e.g., on site visit and telephone or email interviews) and **cross-checking (CC)** with available information relating to projects or technologies similar to the proposed CDM project activity under validation.*	*The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.*	*OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A **corrective action request (CAR)** is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A **clarification request (CL)** is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A **forward action request (FAR)** during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Corrective action and/ or clarification requests	***Ref. to checklist question in table 2***	***Response by project participants***	***Validation conclusion***
*The **CARs** and/ or **CLs** raised in Table 2 are repeated here.*	*Reference to the checklist question number in Table 2 where the CAR or CL is explained.*	*The responses given by the project participants to address the CARs and/or CLs.*	*The validation team's assessment and final conclusions of the CARs and/or CLs.*

Validation Protocol Table 4: Forward Action Requests		
Forward action request	***Ref. to checklist question in table 2***	***Response by project participants***
The FARs raised in Table 2 are repeated here.	*Reference to the checklist question number in Table 2 where the FAR is explained.*	*Response by project participants on how forward action request will be addressed prior to first verification.*

Figure 1: Validation protocol tables

3.4 Internal quality control

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation team

				Type of involvement						
Role	***Last Name***	***First Name***	***Country***	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.2 competence	Financial expertise
Team leader (Validator)	Antunes	Felipe	Brazil	✓	✓	✓	✓		✓	
Assessor under training	Weldy	Robin	USA	✓	✓	✓				
Expert	Rosas	Frederico	Brazil	✓		✓				✓
Technical reviewer	Leiroz	Andrea	Brazil					✓	✓	

The qualification of each individual validation team member is detailed in Appendix B to this report.

4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the PDD, version 8 dated 22 October 2014 /1/.

The only changes made to this version of the validation report compared to the validation report rev. 03 dated 14 November 2014 referred to in the letter of approval of the DNA of Brazil are linked to the status of issuance of the letter of approval by the DNA of Brazil.

4.1 Comments by Parties, stakeholders and NGOs

The PDD, version 1 dated 25 January 2012, was made publicly available on the CDM website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 8 February 2012 to 8 March 2012.

One comment was received for the proposed project, and is given (in unedited form) in the below text box.

Comment by: Krystopher

☐ Accredited NGO ☐ Party ☒ Stakeholder

Comment:

1) DOE to ensure that the PDD values are consistent and ensure that the CDM project is a genuine project.
2) DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also.
3) Careful study must be done so that the DPR/FR is not in different versions made and submitted with different purposes to different agencies, which is totally unacceptable, illegal and unethical.
4) Project owner should show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE at face value, but must be checked independently. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE.
5) DPR/FR values must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts.
6) DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by PP/Consultant.
7) DOE must not entertain this project any more if found the DPR/FR is tamprered with at any point in time. PP can not give different DPR's and FR's. They must submit only the one given to Banks and other agencies while obtaining loans and decision making time.

8) Has the PP considered the CDM revenues while envisaging the project? Without CDM the project was not viable, is it right? This project is having a debt component? Then how bankers or lenders gave the loan? Have the bankers or lenders considered the CDM revenues while agreeing to give loan to this projects? If not this project should be rejected right away by DOE by terminating the contract forthwith. If yes, where is the proof? What is the date of the evidence document from bank? Is

this document printed now a days or earlier. DOE to independently check the same. If the document is available from Bank it must be checked from all angles so that it is genuine and not forged and date changed by putting back dated. This is normally done, DOE to be aware of this please. Please check the communication the PP had during that time with banks, emails and postal receipts and the weights and dates mentioned on the receipts. Do not believe in courier bills and receipts since these can be cooked up easily. Insist on government owned postal service receipts only. If the project is fully equity project then on what basis the PP has invested full equity in to the project while considering the CDM revenue? DOE to check the same in detail and bring out the facts. Is there any past record of this PP to invest or not to invest at returns what he is talking about in this project? Proper evidences must be reviewed and digged out by the DOE and take decision on the project based on established facts. Do not ask documents from PP, DOE to collect the same from different sources to do independent evaluation.

9) Is the project equipment purchased second hand equipment or sourced from cheap foreign sources? If yes, the issue must be probed by DOE since invoices will invariably be inflated and forged. Total project costs mentioned by PP will not be the same as originals. Hence no additionality. These facts must be probed in full by DOE by checking all documents and money transactions along with bank statements and certified accounts by a legally acceptable financial analyst.

10) From DOE side which auditor has done marketing and business development for acquiring this business of validating this project? With whom he or she was co-ordinating at PP or CER buyer? The same person who has done the marketing and business development to acquire the business do validation or participate in any manner what so ever in the validation process? One cannot do like that. It is against the accreditation rules and norms followed since ages. DOE should send auditors from different offices or countries to do this validation audit. DOE must take care of impartiality and accreditation rules. Due to the targets set by the DOE managements auditors are doing marketing and meeting clients and giving promises that the project will be taken care. Is it acceptable and fair? This must be stopped. No auditor should do marketing. Only non-auditing staff should do marketing. DOE to ensure the same please.

11) If applicable only: Is these machines, equipment was a part of any bundle of CDM activity envisaged and developed earlier. DOE to check the same through independent sources also. Once some bundles are non-additional and getting negative validation from a DOE, PP is rolling out the same project as an individual project which is not a CDM project at all. DOE to verify the same from independent sources and also take undertaking in the form of an affidavit from the PP's that any misrepresentation or false statement with respect this would attract strict legal action from UNFCCC and DOE. Furthermore the registered project must be de-registered in case of any future findings contradicting the submissions made by the project owner.

12) DOE to be more careful so that this is a genuine CDM project. What is the exact project cost? The project cost is covering what? Each value considered must be validated with proof. The machinery is second hand purchased or fresh and new from an OEM? In either case DOE to check all the quotations, proposals, purchase orders, invoices, way bills, transport bills, proof of payments like bank statements. DOE to check with banks by way of written confirmation the amount transacted, to whom the money is paid, when the money is paid, is the party paid is the correct party as shown in the purchase orders. It may so happen that the values, party names, dates are fabricated and misrepresented in this project. DOE should terminate their contract for this project immediately. This is the only way out to protect the value of CDM process. If the PP is purchasing second hand or second quality equipment and inflating the purchase order values and invoices, this must be probed thoroughly and real values to taken for additionality calculation. Then I'm sure the additionality is not there at all in such a situation.

13) How is the base line defined in this project? Is Base line hypothetically defined with no proper evidences and proper justification? In such case, DOE cannot take the base line as suggested by the PDD. Please check that there are real emission reductions beyond the real and factual base line. It may so happen that this project qualifies for no CER's. DOE cannot assume values and things

as giving by this PP. Whatever values are considered throughout the project in all documents including the real DPR (not the one prepared for CDM, the one given to the banks and others), they must be validated, verified and double checked. Do not ask PP for DPR. Ask the parties who have been given DPR by the PP. Get directly from the bank and others by each page of the DPR and Feasibility report signed. Such document can be considered as a real DPR or FR. UNFCCC CDM process cannot be degraded by fabricating and misinterpreting the project base line and additionality.

DNV has verified that the same comment has been posted for many proposed CDM projects and finds that the comment is not related specifically to the project in question, but represents general issues which shall be validated for proposed CDM projects.

For example, issue 13 "How is the baseline defined in this project? Is Base line hypothetically defined with no proper evidences and proper justification? In such case, DOE cannot take the baseline as suggested by the PDD." is addressed in section B.4 of the webhosted PDD and validated as described in section 4.5 of this report.

Hence, it is DNV's opinion that all issues raised have been sufficiently covered in the validation process, as illustrated by the example above, and were addressed during the validation process as reflected in this validation report and validation protocol.

4.2 Approval, authorization and contribution to sustainable development

The project participant is Rondinha Energética S.A. of Brazil. The host Party (Brazil) meets all relevant participation requirements. No Annex I Party is identified yet.

A letter of approval (LoA) /27/ was issued by DNA of Brazil on 4 December 2014, authorizing Rondinha Energética S.A. as a project participant and confirming that the project assists in achieving sustainable development.

The letter of approval was received from the project participants. DNV could confirm the authenticity of the letter of approval by an e-mail received from the DNA on 15 December 2014 /27/. DNV considers the letters are in accordance with paragraphs 39-42 of the VVS /28/.

The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards Brazil.

4.3 Modalities of communications

DNV has performed due diligence on the Modalities of Communications (MoC) statement submitted by the project participants in accordance with applicable requirements in the VVS as documented in section A.4 of Table 2 in the validation protocol in Appendix A to this report. DNV was able to confirm the information contained in the MoC and that the MoC complies with all relevant forms and requirements.

4.4 Project design

The "Rondinha Small Hydroelectric Power Plant" project is located in the municipality of Passos Maia, state of Santa Catarina.

The geographical coordinates of the proposed project activity are: 26° 40' 57" S and 52° 02' 44" W. The project is a newly built grid-connected run-of-river hydro power plant which involves installation and operation of two sets of generators and turbines. The installed capacity of each generator is 5.33 MVA and a power factor of 90%, thus constituting a total installed capacity of 9.6 MW. The project design engineering reflects current good practice.

The annual electricity delivered to the National Interconnected System (SIN) is expected to be 51 500 MWh corresponding to an average plant load factor of 61.24% sourced from the report submitted to BNDES to apply for a loan /12/. The "*Guidelines on the Reporting and Validation of Plant Load Factors"* /35/ gives instruction for validation of plant load factor for renewable energy. One option is to use plant load factor provided by a third party contracted by the project participants or to use plant load factor provided to banks and/or equity financiers applying the project activity for project financing, or to the government while applying the project activity for implementation approval. The plant load factor was estimated by the report submitted to BNDES to apply for a loan /12/, therefore in line with the Guidelines.The electricity generated by the project will be ultimately delivered to the SIN - which has part of its electricity generated by fossil fuel power plants.

Being a renewable electricity project, the project activity will generate greenhouse gas (GHG) emission reductions by avoiding the CO_2 emissions from the electricity generation by fossil fuel power projects.

The starting date of the project activity is 19 May 2010, which corresponds to the date of the signing of four PPAs with the Tramontina group /14/. DNV confirms that this corresponds to the project's first commitment on expenditures, as described in section 4.9. A renewable 7 year crediting period has been chosen and the expected starting date is on 1 January 2015.

The expected operational lifetime of the project activity is 30 years /54/.

The emission reductions are estimated to be 10 238 tCO_2e per year, which corresponds to 71 666 tCO_2e over the first seven years of crediting period.

DNV considers the project description of the project contained in the PDD to be complete and accurate. The PDD complies with the relevant forms and guidance for completing the PDD.

4.5 Application of selected baseline and monitoring methodology

The project correctly applies the approved baseline and monitoring methodology ACM0002 version 14.0 /31/.

The applied baseline methodology is justified as it has been demonstrated that the project activity ensures that:

- The project activity is the installation of a grid-connected and greenfield run-of-river hydroelectric power plant /4/.
- The project activity produces a reservoir of 0.76 km^2, which corresponds to a power density of 12.63 W/m^2, therefore higher than 4 W/m^2 /4/.
- It does not involve any switching from fossil fuel to renewable energy at the project site, which was verified by DNV through the follow-up interview /43//44//45//46/.
- It is not a biomass fired power plant, which was verified by DNV through the follow-up interview /43//44//45//46/.
- The project is connected to the National Interconnected System (SIN), the electricity grid of Brazil, for which the geographical and system boundaries are clearly identified /4/.

The assessment of the project's compliance with the applicability criteria of ACM0002 (version 14.0) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

4.6 Project boundary

The spatial extent of the project boundary is correctly defined as the site of project activity and the system boundary for the grid electricity system is also correctly defined as all power plants connected physically to the National Interconnected System (SIN), the electricity grid of Brazil, to which the project will be connected /4/. It is DNV's opinion that the project boundary of "Rondinha Small Hydroelectric Power Plant" is clearly defined in accordance with applicable guidelines of both ACM0002 (version 14.0) /31/ and the *Tool to calculate the emission factor for an electricity system* (version 4.0) /33/.

Emission sources and gases included in the project boundary are:

	GHGs involved	*Description*
Baseline emissions	CO_2	The baseline emission factor for the project is determined *ex-post* as a combined margin (CM), consisting of combination of the operating margin (OM) and build margin (BM) of the National Interconnected System (SIN), the electricity grid of Brazil.
Project emissions	N/A	Project emission is regarded as zero as the project is an hydroelectric power plant with a power density of 12.63 W/m^2 /4/.
Leakage	N/A	There are no leakages that need to be considered in applying this methodology.

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by ACM0002 (version 14.0).

4.7 Baseline scenario identification and description

The baseline is in accordance with ACM0002 (version 14.0) /31/ that electricity delivered to the grid by project activity would otherwise have been generated by the operation of grid-connected power plants in SIN and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the *Tool to calculate the emission factor for an electricity system* /33/.

According to ACM0002 (version 14.0) baseline emissions are equal to power generated by the project delivered to the SIN, multiplied by the baseline emission factor. The grid emission factor will be determined *ex-post* as a combined margin, consisting of combination of the operating margin (OM) and build margin (BM) emission coefficient for the project. The Brazilian grid emission factor is published by the DNA of Brazil /37/. The calculations are based on electricity generation data provided by the National Operator System (ONS) for the electricity generated in the grid. The weighting of the OM and BM is set to be 50% and 50% respectively, which are the default values stipulated for hydropower projects by *Tool to calculate the emission factor for an electricity system*.

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumption and data used by the project participants are listed in the PDD and/or supporting documents. All documentation 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.

4.8 Algorithms and/or formulae used to determine emission reductions

The project involves hydroelectric power generation, which partly displaces fossil fuel based power generation from the SIN grid in Brazil.

In accordance with the consolidated baseline methodology ACM0002 version 14.0 /31/, no leakage effects have been considered.

There are no emissions from the project activity, since the project is a hydroelectric power plant with a power density of 12.63 W/m^2 /4/.

Baseline emissions are calculated as the electricity delivered to the grid multiplied by an emission factor for the SIN grid. For the *ex-ante* estimation of emissions reduction, the electricity generated is estimated to be 51 500 MWh, according to the report submitted to BNDES to apply for a loan /12/.

The grid emission factor for the project will be determined *ex-post* as a combined margin (CM), consisting of combination of the operating margin (OM) and build margin (BM) according to *Tool to calculate the emission factor for an electricity system* /33/ for the 7-years crediting period.

The Brazilian grid emission factor is published by the Brazilian DNA. The system boundary for the grid electricity system affected by the project is defined as the system of the Brazilian grid (SIN).

The calculations are based on the latest electricity generation data published by the National Operator System (ONS) for the electricity generated in the grid available at the validation /37/. Therefore the project used 2011 Operating Margin (0.2919 tCO_2/MWh) and 2011 Build Margin (0.1056 tCO_2/MWh) for the purpose of calculating expected emission reductions. It has been calculated as the weighted average (w_{OM} = 0.5; w_{BM} = 0.5) of the operating margin and the build margin emission factors. The resulted combined margin emission factor of 0.1988 tCO_2e/MWh.

DNV confirms that the database is an official publication of the Brazilian Government for the purpose of CDM baselines and as stated in the Brazilian DNA website it is in line with the *Tool to calculate the emission factor for an electricity system*.

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average *ex-ante* estimation of emission reduction calculated to be 10 238 tCO_2e per year for the selected crediting period.

All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the 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, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.

4.9 Additionality

The additionality of the project has been demonstrated using the *Tool for the demonstration and assessment of additionality* version 7.0.0 /32/.

4.9.1 Prior consideration of CDM

Project start date

The starting date of the project activity is 19 May 2010, which corresponds to the date of the signing of four PPAs with the Tramontina group /14/. DNV confirms that this corresponds to the project's first commitment on expenditures, since the turbine and generator supply contract was signed on 15 June 2011 /5/, and the civil works contract was signed on 15 June 2012 /15/.

Evidence for prior consideration

Before the project activity starting date of 19 May 2010, the project participant notified the UNFCCC on 29 July 2009 and the Brazilian DNA on 24 July 2009 in writing of the intention to seek CDM status. The email evidence was provided /10//11/.

It is DNV's opinion that the proposed CDM project activity complies with the requirements for prior consideration of the CDM contained in the CDM Project Standard /29/ and the CDM Project Cycle Procedure /30/.

4.9.2 Identification of alternatives to the project activity

The possible scenarios identified are i) the proposed project activity not undertaken as a CDM project activity; ii) continuation of the situation before the start of the project activity where additional energy is produced in SIN grid.

DNV considers the listed alternatives to be credible and complete.

4.9.3 Investment analysis

Choice of approach

As the project generates financial and economic benefits other than CDM related income through the sales of electricity and the alternative to the project does not involve an investment for the project participants, a benchmark analysis was selected for conducting the investment analysis.

Benchmark selection

The selected benchmark is an equity benchmark calculated based in the Capital Asset Pricing Model, or CAPM. The benchmark was calculated to be 21.03% as follows:

$$K_e = R_f + ß\ (R_m - R_f)$$

Where:

- R_f (risk free rate), represents the sum of standard investment rate available for all investors and the Brazilian risk. Internationally accepted standard for the first

component are USA Treasury Bonds. It is based on the average of one year of quotes for the 30 year (1980 to 2010) bonds the USA Treasury Bonds, researched from the renowned registry of Damodaran /41/ **4.45%**, which is the nominal risk free rate. Since this value is nominal it must be converted to real by calculating the expected inflation forecast, by using the USA Treasury securities at 20-year and the USA Treasury securities at 20-year inflation-indexed /42/, correspondent to 2.30%. R_{fUSA} is then calculated as ((1+4.45%)/(1+2.30%)) – 1 = 2.10%.

- The country risk is then added to the risk free rate to reflect the difference of risk between the economies of Brazil and the USA. The Brazilian External Debt bond (C-bonds) – the most liquid bonds from Brazil – are compared to the USA Treasury Bonds, the most liquid bonds in the world, through and index called EMBI+ (Emerging Markets Bond Index), from JP Morgan /43/. Bonds returns are post-tax. And the C-bonds are used and a five year average, which is appropriate, and value is **2.67%** per year. DNV cross-checked the values presented with JP Morgan home page /43/ and confirmed that this value is appropriate for the time of the investment decision 19 May 2010 with support of an independent financial expert /44/ and it is thus correct.
- With the addition of the country risk, the risk free rate for 2010 is **4.77%** per year (2.10% + 2.67%).
- $R_m – R_f$ (average annual return of shares minus the return of the American T bonds) is calculated as **6.03%.** It is based on the difference of the average return of a stock market, and the average return of the government securities in the long term (USA Treasury Bond Yield, calculated by Damodaran /45/), from 1928 to 2010. DNV cross-checked the values presented with Damodaran's home page /45/ and confirmed that this value is appropriate for the time of the investment decision 19 May 2010 with support of an independent financial expert /44/ and it is thus correct.
- β (adjusted industry beta) is considered to be **2.47** for the year of 2010, based on the covariance of the daily return of bonds of companies from the USA Electrical Energy Sector. Beta is first found for companies in the USA (which is the unlevered beta), and then relevered, using the tax conditions of presumed profit regime of the project /46//47/. This tax rate is zero when relevering beta. DNV cross-checked the values presented with Damodaran's home page /45/ and confirmed that this value is appropriate for the time of the investment decision 19 May 2010 with support of an independent financial expert /44/ and it is thus correct.
- Thus, with these data, it is possible to calculate K_e:

Ke = 4.77% + 2.47 * 6.03% = **19.70%**

This benchmark is not specific to the project activity, since it was calculated based on public data considering the risks faced by any renewable power plant in Brazil.

DNV confirmed this approach is correct with independent financial expert Frederico Rosas /44/. The calculation of the benchmark is based on official sources, specific literature and legislation /41/ - /47/.

Hence, DNV concludes that the benchmark calculated for the proposed project is reasonable.

Input parameters

Total Investment:

The total investment is estimated to be BRL 57 907 824. . From this amount:

- BRL 21 830 921 (37.7% of the total investment) corresponds to civil work costs, as per the civil works proposal dated 11 April 2010/16/. According to INEE's publication "*Evaluation of PROINFA Parameters"* /56/, an average of 40% of the total investment is the usual expenses with civil structures in a small hydroelectric power plant. Therefore DNV considers the values to be reasonable.
- BRL 9 615 000 corresponds to the investment in national equipment and BRL 3 761 763 corresponds to national materials, according to the correspondent proposals dated 22 February 2010 and 9 February 2010 (totalizing 23.1% of the total investment) /17//18//19/. According to INEE's publication "*Evaluation of PROINFA Parameters"* /56/, an average of 30% of the total investment is the usual expenses with equipment in a small hydroelectric power plant. Therefore DNV considers the values to be reasonable.
- BRL 4 836 324 (8.35% of the total investment) corresponds to transmission system, as per the supplier proposal dated 5 May 2010 /20/; According to INEE's publication "*Evaluation of PROINFA Parameters"* /56/, an average of 10% of the total investment is the usual expenses with transmission in a small hydroelectric power plant. Therefore DNV considers the values to be reasonable.
- BRL 579 059 (1.0% of the total investment) corresponds to land, as per the expropriation analysis dated 31 October 2008 /21/. According to INEE's publication "*Evaluation of PROINFA Parameters"* /56/, an average of 5% of the total investment is the usual expenses with land in a small hydroelectric power plant. Therefore DNV considers the values to be reasonable.
- BRL 2 100 000 corresponds to engineering studies, and BRL 1 909 023 corresponds to management and administration (totalizing 6.92% of the total investment), as per the respective proposals dated 10 June 2009 and 16 April 2010 /22//23/; According to INEE's publication "*Evaluation of PROINFA Parameters"* /56/, an average of 5% of the total investment is the usual expenses with engineering and management in a small hydroelectric power plant. Therefore DNV considers the values to be reasonable.
- BRL 2 060 000 corresponds to investment in environment, as per the environmental programs proposal dated 14 January 2010 /24/;
- BRL 4 800 000 corresponds to acquisition authorization, as per the proposal dated 6 February 2009 /25/;
- BRL 1 990 234 corresponds to installations and mounting, as per the supplier proposal dated 21 February 2010 /26/;
- BRL 4 425 500 corresponds to interest during construction; this value was estimated as 9.2% over the bankable items costs, as defined in the Guideline from Eletrobras dated 2000 /57/.

These values correspond to an estimate specific cost of BRL 6 032/kW and were compared by DNV with registered Brazilian small hydroelectric power plant projects below:

Table 1: Rate costs for Brazilian run-of-river small hydroelectric power plant registered CDM projects since March 2009 /58/

UNFCCC Ref. N°	Name of Project	Date of Registration	Capacity (MW)	Total Investment (BRL/kW)
1526	Saldanha Small Hydroelectric Project	16 March 2009	5.00	5 668.04
2500	CDM Project of Moinho and Barracão Small Hydropower Plant (Moinho Plant)	11 January 2010	7.30	9 594.52
2500	CDM Project of Moinho and Barracão Small Hydropower Plant (Barracão Plant)	11 January 2010	6.00	10 200.00
2793	Santana I SHP CDM Project	11 January 2010	14.76	2 825.37
3002	São Domingos II Hydroelectric Project	20 April 2010	24.30	5 119.88
3669	Rodeio Bonito Small Hydro Power Project	20 May 2011	14.64	3 924.67

It is possible to conclude that the total investment values used in the estimates presented by the project participant are within the range of 2 825.37 and 10 200.00 BRL/kW found in recent registered CDM Brazilian run-of-river small hydroelectric power plant projects listed in Table 1.

DNV concludes that the total investments for the proposed project are reasonable for a small hydroelectric power plant.

Loan costs:

The debt/equity ratio for each project was estimated as 80%, as confirmed in a presentation from Porto University dated 11 February 2010 /52/. The loan parameters 8.92% interest rate and 16 years of term period were confirmed against a presentation from Porto University /52/.

O&M costs:

The operation and maintenance yearly costs were estimated as BRL 46.0/kW which corresponds to BRL 441 320, based on the hydroelectric inventory manual from the Brazilian Mining and Energy Ministry /49/. This value corresponds to 0.8% of total investment.

Comparing with SHHP projects presented in the book from the Brazilian Ministry of Environment "*Renewable Sources of Energy in Brazil*" /48/, which considered values of O&M ranging from 1% to 4%, DNV considers that the O&M cost for the proposed project are reasonable.

Electricity charges and taxes applied during operation are:

- TFSEE tax is for regulation of electric energy services and was applied following regulatory decrees /51/ and will cost 0.5% of BRL 363.60/kW, totalling BRL 17 453/year /2/. DNV confirmed that these values are in accordance with the Brazilian national regulation.
- TUSD tax is for the use of the distribution system and was applied following regulatory decrees /51/ and varies on the production of energy, BRL 1.16/kW per month, totalling BRL 5 568/year /2/. DNV confirmed that these values are in accordance with the Brazilian national regulation.

Taxes and depreciation:

DNV also confirmed that the company is eligible for the presumed (or assumed) profit regime, in accordance to the Brazilian national fiscal legislation /47/ with the support of an independent financial expert /44/. Tax values of 0.65% for the PIS tax /46/ and 3% for the COFINS tax /46/ were applied in the calculations.

Income tax values were applied as 9% CSLL, 15% income tax and 10% additional income tax (for profits over BRL 240 000/year). DNV confirmed that these values are in accordance with the Brazilian national regulation /51/.

The investment analysis was carried out for 20 years. A fair value of BRL 31 270 225 was returned back as income at the end of the period of assessment /51/.

DNV cross-checked the used values with government sources /46//47//51/ and confirmed that the regulations and values of taxes used in the project are the latest available in the time of the investment decision and are correct. In the presumed profit regime, depreciation has no impact in the IRR. In this case, income tax rates are calculated over revenues and not over gross profits.

Plant Load Factor:

The project power plant has 9.6 MW of installed capacity. At the time of the investment decision date, it was expected that the plant would annually provide 53 611 MWh of electricity to the grid, which corresponds to a plant load factor of 63.75%, based on the project feasibility report /4/ elaborated by a third party.

Energy Price:

The energy price was established as BRL 150.00/MWh in the four PPAs signed with the Tramontina group on 19 May 2010 /14/. According to the PPA, the value of BRL 150.00/MWh is based on 01 September 2009 /14/, and this value should be adjusted according to the IGP-M index. Therefore, the energy price adjusted for May 2010 corresponds to BRL 157.00. DNV could confirm that the adjustment was made according to the IGP-M official values /59/.

Calculation and conclusion

The equity IRR calculations were provided in a spreadsheet /2/ and verified by DNV. The assumptions and calculations were verified and found to be correct by DNV with the support of an independent financial expert /44/. The equity IRR in the assessment period of 20 years

without CDM revenues is 16.64%. This confirms that the project in the absence of CDM benefits and compared to the benchmark of 21.03% is not financially attractive.

Sensitivity analysis

A sensitivity analysis was carried to check the robustness of the investment analysis. Parameters contributing more than 20% to the revenues or costs were considered to be the investment, electricity generation, electricity tariff and O&M costs. The sensitivity analysis demonstrates the following:

Investment: If the capital expenditures decrease by 11.92%, the equity-IRR will reach the benchmark. However, DNV confirmed that all commodities and raw materials required for construction of the project have increased their prices since September 2008 /50/. Besides, on 27 April 2011 Rondinha Energética S.A. submitted a report to BNDES to apply for a loan /12/; in this report, the investment value required was considered to be BRL 68 211 203, therefore 17.79% higher than the value estimated in May 2010. Hence, a 11.92% decrease is not likely.

Electricity generation: If Rondinha generates 7.24% more than estimated the equity IRR will reach the benchmark. However, on 27 April 2011 Rondinha Energética S.A. submitted a report to BNDES to apply for a loan /12/; in this report, the electricity generation was considered to be 51 500 MWh/year, therefore 4% lower than the value estimated in May 2010. Therefore, such an increase is not likely.

Electricity tariff: If the electricity tariff increases by 7.24% the equity IRR will reach the benchmark, which would correspond to BRL 168.4/MWh. However, the electricity tariff in ANEEL's auctions have been reducing: BRL 148.39/MWh in the auction of 26 August 2010, BRL 104.75/MWh in the auction of 17 August 2011, BRL 107.98/MWh in the auction of 20 December 2011, and BRL 95.31/MWh in the auction of 14 December 2012 /53/. In this sense, such an increase in the electricity tariff is not likely.

O&M costs: Even if the operational expenditures decrease to zero, the IRR would not reach the benchmark. DNV acknowledges that this is not possible to happen.

4.9.4 Barrier analysis

The project activity does not apply barrier analysis to demonstrate additionality.

4.9.5 Common practice analysis

According to the *Guidelines on common practice* version 2 /36/ the common practice analysis is carried out on similar projects which are considered to be in the same region, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.

Following the steps of the *Guidelines on common practice* version 2:

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

Project participant analysed power plants with an installed capacity from 4.8 MW and 14.4 MW, which was correctly calculated as +/- 50% of the installed capacity for Rondinha Small Hydroelectric Power Plant.

Step 2: Identify similar projects (both CDM and non-CDM) which fulfill all of the following conditions:

a) The projects are located in the applicable geographical area:

The geographical scope for common practice analysis was determined by the project proponents to be Southern Brazil, where the project is located, due to differences throughout the country in the climate (climate in Southern Brazil is subtropical humid) and hydrology. The Brazilian territorial extension is of 8 459 417 square kilometres, with over 4 000 km distance in the north-south as well as in the east-west axis and 6 distinct climate regions: humid tropical, semi-arid, equatorial, tropical, highland-tropical and finally sub-tropical, in the region of the project to be implemented. Also due to the wide extension, there are differences in topography, availability of transmissions lines, and taxation on electrical energy (which is different in each state /60/). Therefore, DNV considers the choice of Southern Brazil acceptable, since there are great variations in the environment for each region.

b) *The projects apply the same measure as the proposed project activity:*
The project activity is a "switch of technology with or without change of energy source".

c) *The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity:*
Only hydro power plants are considered in the common practice analysis.

d) *The plants in which the projects are implemented produce goods or services with comparable quality, properties and application areas as the proposed project plant:*
All plants considered produce electrical energy.

e) *The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1:*
Hydro power plants with an installed capacity from 4.8 MW and 14.4 MW are considered.

f) *The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier:*
The earliest date is 19 May 2010, starting date of the project activity. Only project activities that started commercial operation before that date are considered in the analysis.

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

N_{all} was calculated considering the total hydro power plants in Southern Brazil in May 2010, before the project activity starting date, according to ANEEL database /38/. 12 hydro power plants were identified considering the range between 4.8 MW and 14.4 MW. Therefore, N_{all} was calculated to be 12. DNV cross-checked the results against the ANEEL database and found this information to be accurate /38/, and also confirmed that CDM project activities were excluded.

Step 4: *Within plants identified in Step 3, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.*

Projects developed under PROINFA (national program started in 2002 to foster the share of alternative energy in the Brazilian matrix) /55/ were considered as plants that were under different promotional policies than the one applied in the project activity. Besides, a new electric market model was implemented in Brazil in March 2004 /61/. DNV confirms that

such legislation and promotional policies comply with the aspects of "different technologies" determined by the *Guidelines on common practice*. N_{diff} was hence calculated as 10.

Step 5: Calculate factor F=1- N_{diff} /N_{all} representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

"Factor F" was calculated as: $F=1-N_{diff}/N_{all}$ =1-10/12 = 0.17 and $N_{all}-N_{diff}$ = 12-10 = 2

Outcome: The proposed project activity would be a common practice within a sector in the applicable geographical area if the factor F is greater than 0.2 and N_{all} - N_{diff} is greater than 3.

According to the *Guidelines on common practice* version 2, the proposed project activity is a common practice within a sector in the applicable geographical area if both the conditions are fulfilled, factor F is greater than 0.2 and N_{all} - N_{diff} is greater than 3. As demonstrated and verified above factor F is lower than 0.2, and $N_{all}-N_{diff}$ is lower than 3. Hence, the project does not represent a common practice project in Southern Brazil.

DNV confirmed this information consulting ANEEL's Bank of Information of Generation /38/.

4.9.6 Additionality - Conclusion

In conclusion, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions resulting from the project are additional.

4.10 Monitoring plan

The project applies the approved monitoring methodology ACM0002 version 14.0 /31/. The selected monitoring methodology is applicable for the project activity as it involves grid-connected renewable power generation using hydro energy.

Monitoring of sustainable development indicators is not required by the DNA of Brazil. The monitoring plan will give opportunity for real measurements of achieved emission reductions.

The project monitoring plan is in compliance with the monitoring methodology ACM0002 (version 14.0).

It is DNV's opinion, that the project participants are able to implement the monitoring plan.

4.10.1 Parameters determined ex-ante

The parameters determined *ex-ante* are:

- EF_{RES} - default emission factor for emissions from reservoirs;
- Cap_{BL} - installed capacity of the hydro power plant before the implementation of the project activity;
- A_{BL} - area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2).

For new hydro power plants, Cap_{BL} and A_{BL} are zero.

DNV confirmed that the estimates for the data and parameters fixed *ex-ante* are reasonable.

4.10.2 Parameters monitored ex-post

The monitoring plan allows for collection and archiving of the following key parameters related to the determination of emission reductions resulting from the project activity:

- $EG_{project,y}$: Net quantity of electricity generated by the project plant measured continuously with a bi-directional electricity meter. The meter will have an accuracy class of 0.2 and will be calibrated at a frequency in line with relevant standards /51/. Data measured will be stored by the government agency responsible for generation and transmission of electricity and will be archived electronically for at least 2 years after the end of the last crediting period. The measurements will be cross-checked against records of sold electricity.
- $EF_{grid,CM,y}$: The grid emission factor, OM and BM are calculated and published by the Brazilian DNA /37/. The value will be monitored annually. DNV confirms that the database in an official publication of the Brazilian Government for the purpose of CDM baselines and as stated in the Brazilian DNA webside, it is in line with the *Tool to calculate the emission factor for an electricity system* /33/.
- Cap_{PJ} - installed capacity of the hydro power plant after the implementation of the project activity, measured annually;
- A_{PJ} - area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2), measured annually.

4.10.3 Management system and quality assurance

Detailed procedures have been elaborated in the PDD section B.7.3 and Appendix 5. The responsibility of monitoring parameters is clearly described, as well as frequency of reporting, calibration and data control.

These will be maintained and implemented to enable subsequent verification of emission reductions. The application of the monitoring methodology is transparent and DNV considers that the project participants are able to implement the monitoring plan.

4.11 Environmental impacts

According to the rules of the Brazilian National Environmental Council (CONAMA), the project developer is required to obtain three licenses in order to receive the environmental permit and develop the hydroelectric plant. These are the preliminary license where an environmental impact assessment is performed, a construction license where requirements for the construction are established, and the operating license where a test is performed before operation of the plant to ensure that it fulfils all environmental requirements. The project proponent has performed a third-party environmental impact assessment on the project /6/, and received the preliminary, installation and operating licenses from the State of Santa Catarina /7//8//62/. Before the project can proceed to the operation phase, they will need to acquire the operation license. There is not expected to be any significant environmental impacts.

DNV could determine that no significant environmental impacts are expected from the project activity and that possible impacts were adequately mitigated.

4.12 Local stakeholder consultation

Stakeholder involvement is organized through the process of the environmental licensing and the Brazilian DNA in order to provide the letter of approval, according to the Resolution nº 7 from the DNA /37/. A translated version of the PDD was sent to local officials and stakeholders on 18 October 2011. Receipts of those mailings were provided to DNV /9/ and

one comment was received that was positive in nature. The project participant confirmed with the Brazilian DNA that additional notifications are not necessary for the granting of the Letter of Approval /13/.

DNV considers the local stakeholder consultation carried out adequately.

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory requirements for Clean Development Mechanism (CDM) project activities

Requirement	Reference	Conclusion
About Parties		
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	NA
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	A letter of approval (LoA) was issued by DNA of Brazil on 4 December 2014, authorizing Rondinha Energética S.A. as a project participant and confirming that the project assists in achieving sustainable development.
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	A letter of approval (LoA) was issued by DNA of Brazil on 4 December 2014, authorizing Rondinha Energética S.A. as a project participant and confirming that the project assists in achieving sustainable development.
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK

Requirement	Reference	Conclusion
assistance and is separate from and is not counted towards the financial obligations of these Parties.		
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	NA
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	NA
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK

Requirement	Reference	Conclusion
About stakeholder involvement		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	~~CAR 2~~ OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements checklist

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity						
A.1	**Title of the project activity (PS § 31, VVS § 62-63)**					
A.1.1	Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	☒ Clearly identifiable title of the project activity ☒ Version number of the PDD is included ☒ Date of the PDD is included.		OK
A.1.2	Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	☒ Yes *If no, list where the PDD is not in accordance:*		OK
A.2	**Description of the project activity (VVS § 64-69)**					
A.2.1	How was the design of the project assessed?	/1/ /4/ /5/ /12/	DR	*What type is the project?* ☐ Project in existing facility or utilizing existing equipment(s) ☐ Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO_2e per year. In this case, a site visit must be performed. ☐ Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO_2e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical analysis. ☐ The project is an individual small scale project activity with emission reductions		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				not exceeding 15 000 tCO_2e per year. In this case, DOE may not conduct a physical site visit as appropriate. ☒ Greenfield project *How was the design of the project assessed?* ☐ Physical site inspection ☒ Reviewing available designs and feasibility studies *If a physical site inspection is not undertaken, justify why no site visit was undertaken:* Construction of this greenfield project had not started on the date of the follow-up interviews.		
A.2.2	If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR	Construction of the project was not expected to begin until 1 March 2012 but as of the site visit interview on 26 March 2012, the project construction had not begun. The project participant is requested to clarify the expected project construction starting date.	~~CL 1~~	OK
A.2.3	If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO_2e per year), justify the sampling through a statistical analysis:	/1/	DR	Not applicable		OK
A.2.4	Is 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?	/1/	DR I	The project activity is composed of a run-of-river hydroelectric plant creating a total of 9.6 MW capacity. The plant will be connected to the Brazilian National Grid. DNV requests that the project participant revises the project activity description in the PDD to reflect the current design and specifications of the project, including the energy generation (MWh), capacity factors, and turbine and generator type.	~~CAR 1~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A.2.5	If the project activity is implemented in existing facilities or is utilizing existing equipments, is there a clear description of the facilities/equipments that are affected by project activity? Is there a clear list of the pre-project scenario equipment and the post project scenario equipment?	/1/	DR	No, the proposed project activity does not involve alteration of existing installations.		OK
A.2.6	Does the project design engineering reflect current good practices?	/1/	DR	DNV requests that the project participant revises the project activity description in the PDD to reflect the current design and specifications of the project, including the energy generation (MWh), capacity factors, and turbine and generator type.	~~CAR 1~~	OK
A.2.7	Would the technology result in a significantly better performance than any commonly used technologies in the host country? Is any transfer of technology from any Annex-I Party involved?	/1/	DR	The proposed project activity will reduce greenhouse gas emissions by displacing part of the electricity generated in the National Grid, which is partly generated by fossil fuels.		OK
A.3	**Participation and authorization (VVS § 38-52)**					
A.3.1	Do all participating Parties fulfil the participation requirements as follows:	/1/	DR			OK
		Brazil (host)				
	a) Party has ratified the Kyoto Protocol	☒ Yes ☐ No				
	b) Party has designated a Designated National Authority	☒ Yes ☐ No				
	c) The assigned amount has been determined	NA				
A.3.2	Do the letters of approval meet the following requirements?	/1/ /27/	DR	A letter of approval (LoA) was issued by DNA of Brazil on 4 December 2014, authorizing Rondinha Energética S.A. as a project participant and confirming that the project assists in achieving sustainable development.		OK
		Brazil (host)				
	a) LoA confirms that Party has ratified the Kyoto Protocol	☒ Yes ☐ No				
	b) LoA confirms that participation is voluntary	☒ Yes ☐ No				
	c) The LoA confirms that the project contributes to the	☒ Yes ☐ No				

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	sustainable development of the host country?					
	d) The LoA refers to the precise project activity title in the PDD			☒ Yes ☐ No		
	e) The LoA is unconditional with respect to (a) to (d) above			☒ Yes ☐ No		
	f) The LoA is issued by the respective Party's DNA			☒ Yes ☐ No		
	g) The LoA was received directly by the DNA or the PP			☐ DNA ☒ PP		
	h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic			DNV could confirm the authenticity of the letter of approval by an e-mail received from the DNA on 15 December 2014		
A.3.3	Have all private/public project participants been authorized by an involved Party?	/1/	DR	A letter of approval (LoA) was issued by DNA of Brazil on 4 December 2014, authorizing Rondinha Energética S.A. as a project participant and confirming that the project assists in achieving sustainable development.		OK
A.4	**Modalities of communications (VVS § 53-61)**					
A.4.1	How has the corporate identity of all project participants and focal points included in the MoC, as well as the personal identities, including specimen signatures and employment status, of their authorized signatories, been validated?	/1/	DR	☒ Directly checking evidence for corporate, personal identity and other relevant documentation; ☐ Notarized documentation; ☐ Written confirmation from the project participant or the coordinating/managing entity that submits to it the MoC statement that all corporate and personal details, including specimen signatures, are valid and accurate. If this case was selected, DNV has confirmed that: ☐ the MoC statement was received		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			from a project participant with whom DNV has a contractual relationship. ☐ the official who submits the MoC statement to the DOE and the official who signed the written confirmation (if a different person) is/are duly authorized to do so on behalf of the respective project participant		
A.4.2 Has the MoC statement been correctly completed and duly authorized? Check that all three requirements listed in the next column are complied with.	/1/	DR	☒ The latest version of the form F-CDM-MOC has been used; ☒ The information required as per the F-CDM-MOC, including its annex 1, is correctly completed; ☒ The project participantís authorized signatories signing the F-CDM-MOC correspond to the project participantís authorized signatories included in F-CDM-MOC, annex 1.		OK
A.5 Technical description of the project activity (PS § 31, VVS § 64-69)					
A.5.1 Is the project's location clearly defined?	/1/ /3/ /11/	DR	The proposed project activity is located on the Chapecó River in Santa Catarina State at 26° 40' 57" S and 52° 02' 44" W.		OK
A.6 Public funding of the project activity (CDM Modalities and Procedures Appendix B § 2)					
A.6.1 In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of	/1/ /11/	DR	The project does not involve any public funding from an Annex I Party and the validation did not reveal any information that indicated that the		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	official development assistance and is separate from and is not counted towards the financial obligations of these Parties?			project can be seen as a diversion of official development assistance (ODA) funding towards Brazil.		
B Application of a baseline and monitoring methodology						
B.1	**Methodology applied (VVS para 70-133)**					
B.1.1	Does the project apply an approved methodology and the correct and valid version thereof?	/1/	DR	The proposed project activity applies the approved consolidated baseline methodology ACM0002 version 13.0.0 "Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources" in combination with the "Tool to calculate the emission factor for an electricity system" version 3.3.0 for the grid emission factor calculations.		OK
B.1.2	If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/	DR	Not applicable.		OK
B.2	**Applicability of methodology (and tools) (VVS § 73-77)**					
B.2.1	How was it validated that project complies with the following applicability criteria: "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 (with 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"?	/1/ /4/	DR	It is confirmed that the project activity consists of the new installation of a run-of-river hydroelectric power plant that displaces electricity from the national grid.		OK
B.2.2	How was it validated that project complies with the following applicability criteria: "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 EGPJ,y): the	/1/	DR	The project activity is a greenfield power plant.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	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"?					
B.2.3	How was it validated that project complies with the following applicability criteria: "The methodology is not applicable to the following: • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • Biomass fired power plants; • A hydro power plant that results in the creation of a new single reservoir where the power density of the power plant is less than 4 W/m^2""?	/1/	DR	There are no fossil fuel energy sources at the project site. The project activity is a hydroelectric power plant. The project participant is requested to revise the table of applicability criteria in Section B.2 such that conditions that are not applicable to the methodology are considered "requirements".	~~CL 2~~	OK
B.2.4	How was it validated that project complies with the following applicability criteria: "In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is 'the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance'"?	/1/	DR	The project activity is a greenfield power plant.		OK
B.2.5	Is the selected baseline one of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/	DR	Yes, the selected baseline is the correspondent generation of electricity from Brazilian Interconnected Grid (SIN).		OK
B.3	**Project boundary (VVS § 82-87)**					
B.3.1	What are the project's system boundaries (components and	/1/	DR	Yes, the project system boundary is delineated		OK

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	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/31/		and in line with the approved consolidated CDM methodology ACM0002 version 13.0.0. The project boundary is the project power plant and all power plants connected physically to the SIN grid.		
B.3.2	Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/	DR	Baseline emissions: CO_2 emissions from fossil fuel based electricity generation of the SIN grid. No project emissions were identified, as per the applied methodology. No leakage sources were identified, as per the applied methodology. DNV requests the project participant to update the table of emission sources to reflect the actual emission sources of the project activity.	~~CL 3~~	OK
B.3.3	Do the system boundaries for the project as described in the PDD fully comply with the system boundaries stipulated by the applied baseline methodology?	/1/	DR	Yes, the system boundaries were defined based on the ACM0002 requirements.		OK
B.3.4	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/	DR	All project emission sources are foreseen by the methodology. The project participant is requested to provide evidence that the onsite backup generator does not contribute more than 1% of the estimated emission reductions of the project.	~~CL 4~~	OK
B.4	**Baseline scenario determination and description (VVS § 88-95 / Identification of alternatives to the project activity (VVS § 113-116)**					
B.4.1	Which baseline scenarios have been identified? Is the list of baseline scenarios complete? Does the list include as one of the options that the project activity is undertaken without being registered as a proposed project activity? Does the list contain all plausible alternatives which are viable means of supplying the comparable outputs or services that are to be	/1/ /31/	DR	The baseline scenarios identified are i) electricity generated by the SIN grid (current practice) and ii) the project activity implemented without CDM benefits. These baseline scenarios are in line with ACM0002 version 13.0.0.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	supplied by the proposed project activity?					
B.4.2	Could the project activity in absence of the CDM or other baseline alternatives also be implemented by other entities than the CDM project participants? If so, has this also been included in the list of baseline scenarios?	/1/	DR	Yes, but this does not affect the baseline scenario determination.		OK
B.4.3	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/	DR	The project activity implemented without CDM benefits scenario was eliminated by applying investment analysis.		OK
B.4.4	What is the baseline scenario?	/1/	DR	The baseline scenario for the proposed project activity is that "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) calculation described in the 'Tool to calculate the mission factor for an electricity system".		OK
B.4.5	Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/ /31/	DR	Yes, the baseline scenario is in line with ACM0002 requirements.		OK
B.4.6	Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /31/	DR	Yes, the baseline scenario corresponds to ACM0002 prescriptions.		OK
B.4.7	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies? Does the baseline scenario comply with all applicable and enforced legislation?	/1/ /31/	DR	Yes, the baseline scenario is directly determined by ACM0002.		OK
B.4.8	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Yes, the baseline scenario is compatible with all available data and all literature and sources are clearly referenced.		OK
B.4.9	Is the baseline determination adequately documented in the PDD? • All assumptions and data used by the project participants are listed in the PDD and related document to be	/1/ /31/	DR	The baseline determination is adequately documented in the PDD and in line with ACM0002 requirements.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	submitted for registration. The data are properly referenced. • All documentation is relevant as well as correctly quoted and interpreted. • Assumptions and data can be deemed reasonable • Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. • The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity					
B.5	**Additionality determination (VVS § 101-129)**					
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/ /32/	DR	The project proponent applies the *Tool for the demonstration and assessment of additionality*.		OK
B.5.2	Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/	DR	The project activity and the alternatives comply with the mandatory laws and regulations.		OK
B.5.3	Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	Pending from the resolution of the following CAR/CL.	~~CAR 3~~ ~~CAR 4~~ ~~CL 5~~	OK
B.5.4	What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR	To demonstrate the project additionality, the project participants applied investment analysis.		OK
	Prior consideration of CDM (VVS § 105-112)					
B.5.5	Is the project start date before 2 August 2008 or on/after 2 August 2008?	/1/	DR	☒ On or after 2 August 2008; ☐ Before 2 August 2008; *Refer to C.1.1 for the validation of project start date.*		OK
B.5.6	If the starting date is on or after 2 August 2008 and before the global stakeholder consultation (or a new methodology proposed or request for revision of an approved methodology is requested), has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's	/1/ /34/	DR	In accordance with the *Guidelines on the demonstration and assessment of prior consideration of the CDM*, the project participants have notified the host party DNA and the UNFCCC before the project starting date.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	intention to seek CDM status within 180 days of the project acidity start date?			This is considered adequate since the project starting date is after 2 August 2008.		
B.5.7	If in addition to the above, the PDD was not published for global stakeholder consultation (or a new methodology proposed or request for revision of an approved methodology is requested) within two years of the initial notification, have project participants every subsequent two years after the initial notification informed the UNFCCC secretariat of the progress of the project activity?	/1/ /10/ /11/	DR	Yes, the DNA and the UNFCCC have confirmed the receipt of the project's intention to seek CDM status.		OK
	Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)					
B.5.8	What initiatives where taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/	DR	Not applicable.		OK
B.5.9	When did the construction of the project activity start?	/1/	DR	Not applicable.		OK
B.5.10	When was the project commissioned?	/1/	DR	Not applicable.		OK
B.5.11	Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/	DR	Not applicable.		OK
	Investment analysis (VVS § 117-123)					
B.5.12	Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/	DR	Yes, the project generates revenues apart from CDM related income through the sales of electricity. A benchmark analysis was selected for conducting the investment analysis.		OK
B.5.13	Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR	No, the alternative to the project activity does not involve investment and this is reflected in the PDD.		OK
B.5.14	If the project activity is implemented in existing facilities or is utilizing existing equipments, does the investment analysis also consider the overall impact on the operations of the	/1/	DR	Not applicable.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	project owner, including any impacts on operational costs and revenues that the project may have (also outside of the project boundaries)?					
B.5.15	Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR	The choice of benchmark analysis is correct.		OK
B.5.16	Is the benchmark/discount rate the latest available at the time of decision?	/1/	DR	The project participant is requested to provide evidence for the benchmark that is relevant at the time of the investment decision. Regarding the benchmark calculation, the values used for the parameter "Market yield on U.S. Treasury securities at 30-year constant maturity, quoted on investment basis" are not correct. Besides, the "Beta 1" value used for Rondinha is not consistent with 2010 data.	~~CAR 3~~ ~~CAR 6~~	OK
B.5.17	What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?	/1/	DR	The financial indicator is IRR on a project bases, after tax.		OK
B.5.18	Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/	DR	The project participant is requested to provide evidence for all investment analysis inputs used at the time of the investment decision.	~~CAR 3~~	OK
B.5.19	Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/	DR	The project participant is requested to begin plant equipment depreciation only after construction is expected to be finished.	~~CAR 3~~	OK
B.5.20	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of operation?	/1/	DR	The project participant is requested to provide evidence for all investment analysis inputs used at the time of the investment decision.	~~CAR 3~~	OK
B.5.21	When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully	/1/	DR	The project participant is requested to provide evidence for all investment analysis inputs used at the time of the investment decision.	~~CAR 3~~	OK

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	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?					
B.5.22	How was the amount of output (e.g. sales of electricity) assessed?	/1/	DR	☐ The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval ☒ The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company) ☐ Other approach. *Provide details on how the load factor was validated::* The project participant is requested to provide evidence for all investment analysis inputs used at the time of the investment decision.	~~CAR 3~~	OK
B.5.23	How was the output price (e.g. electricity price) assessed?	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Provide details on how the output price was validated:* The project participant is requested to provide evidence for all investment analysis inputs used at the time of the investment decision.	~~CAR 3~~	OK
B.5.24	How were the investment costs assessed? Were the data available and valid at the time of decision?	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project	~~CAR 3~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				participants *Provide details on how the investment costs were validated:* The project participant is requested to provide evidence for all investment analysis inputs used at the time of the investment decision.		
B.5.25	How were the O&M costs assessed? Were the data available and valid at the time of decision?	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Provide details on how the O&M costs were validated:* The project participant is requested to provide evidence for all investment analysis inputs used at the time of the investment decision.	~~CAR 3~~	OK
B.5.26	Describe the assessment of the other input parameters. Were the data available and valid at the time of decision?	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Provide details on how other input parameters were validated:* The project participant is requested to provide evidence for all investment analysis inputs used at the time of the investment decision.	~~CAR 3~~	OK
B.5.27	Was the financial calculation spreadsheet verified and found to be correct?	/1/	DR	The project participant is requested to: a. Provide third-party evidence for all investment analysis input values. b. Use investment analysis inputs that are relevant at the time of the investment	~~CAR 3~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				decision. c. Begin plant equipment depreciation only after construction is expected to be finished. d. Only use English words in the calculation spreadsheet. e. Include taxes, such as PIS and COFINS, or provide evidence that these taxes are not required. f. Interest costs should not be included in the calculations. g. Provide calculation spreadsheets that do not contain cell errors.		
B.5.28	Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/	DR	Yes. A sensitivity analysis was carried out for parameters contributing more than 20% to revenues or costs in order to check the robustness of the financial analysis. Reasonable variations of power generation, electricity prices, capital investment, and operational and maintenance expenditures were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen.		OK
B.5.29	Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/	DR	Yes. A range of +/- 10% was defined, which is reasonable.		OK
B.5.30	Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/	DR	The project participant is requested to confirm by providing evidence that the parameters discussed in the sensitivity analysis will not cause the IRR to reach the benchmark.	~~CL 5~~	OK
	Barrier analysis (VVS § 124-127)					
B.5.31	Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on	/1/	DR	Not applicable.		OK

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	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.					
B.5.32	How were the investment barriers assessed to be real? Are the investment barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable.		OK
B.5.33	How does CDM alleviate the investment barriers?	/1/	DR	Not applicable.		OK
B.5.34	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
B.5.35	How were the technological barriers assessed to be real? Are the technological barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable.		OK
B.5.36	How does CDM alleviate the technological barriers?	/1/	DR	Not applicable.		OK
B.5.37	Is the project activity prevented by the technological barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
B.5.38	How were the barriers due to prevailing practise assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants? For projects having to apply the "Guidelines on additionality of first-of-its-kind project activities", (a) is the project the first in the applicable geographical area that applies a technology that is different from technologies that are implemented by any other project, which are able to deliver the same output and have started commercial operation in the applicable geographical area before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of the proposed project activity, whichever is earlier? (b) has the project participants selected a crediting period for the project activity that is "a maximum of 10 years with no option of renewal"?	/1/	DR	Not applicable.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.39	How does CDM alleviate the barriers due to prevailing practise?	/1/	DR	Not applicable.		OK
B.5.40	Is the project activity prevented by the barriers due to prevailing practise and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
B.5.41	How were the other barriers assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable.		OK
B.5.42	How does CDM alleviate the other barriers?	/1/	DR	Not applicable.		OK
B.5.43	Is the project activity prevented by the other barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
	Common practice analysis (VVS § 128-130)					
B.5.44	Does the project apply the latest version of the "Guidelines on common practice" (applicable to projects *Tool for the demonstration and assessment of additionality* / *Combined tool to identify the baseline scenario and demonstrate additionality* or any other methodology requiring the use of the "Guidelines on common practice"?	/1/	DR	☒ Project apply measure(s) for which "Guidelines on common practice" shall be applied and thus applies the steps of the guidelines ☐ Project does not apply measure(s) for which "Guidelines on common practice" shall be applied ☐ Methodology applied by project does not require use of "Guidelines on common practice" ☐ Project is demonstrated to be first-of-its kind and not common practise analysis is required		OK
B.5.45	What is the geographical scope of the common practice analysis? Is this justified?	/1/	DR	The geographic scope is the entire country of Brazil, the area connected to the SIN grid.		OK
B.5.46	What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has	/1/	DR	The scope of the common practice analysis is hydroelectric power plants with installed		OK

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	this been justified? For projects applying the "Guidelines on common practice", has the PDD considered similar projects (both CDM and non-CDM) with a capacity or output range as +/-50% of the total design capacity or output of the proposed project activity capacity?			capacities between 4.8 and 14.4 MW.		
B.5.47	What is the data source(s) used for the common practice analysis?	/1/	DR	The data source is the database of ANEEL, the national electrical energy agency of Brazil. The project participant is requested to provide DNV the third-party evidence to support the common practice analysis.	~~CAR 4~~	OK
B.5.48	How many similar non-CDM-projects exist in the region within the scope? For projects applying the "Guidelines on common practice", has the PDD identified all those projects that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation and note their number N_{all}?	/1/	DR	The project participant is requested to avoid eliminating projects from the common practice analysis that use subsidies that the project itself utilizes.	~~CAR 4~~	OK
B.5.49	How were possible essential distinctions between the project activity and similar activities assessed? For projects applying the "Guidelines on common practice", has the PDD identified those projects that apply technologies that are different to the technology applied in the proposed project activity and note their number N_{diff}?	/1/	DR	The project participant is requested to provide DNV the third-party evidence to support the common practice analysis.	~~CAR 4~~	OK
B.5.50	What is the conclusion of the common practice analysis? For projects applying the "Guidelines on common practice", has the PDD demonstrated that the proposed project activity is <u>not</u> a "common practice" within a sector in the applicable geographical area given that neither the factor F is greater than 0.2 nor N_{all}-N_{diff} is greater than 3.	/1/	DR	The project participant is requested to: a. Provide DNV the third-party evidence to support the common practice analysis. b. Not eliminate projects from the common practice analysis that use subsidies that the project itself utilizes. c. Follow the steps outlined for common practice analysis and do not present redundant categorizations of power	~~CAR 4~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				plants.		
	Conclusion					
B.5.51	What is the conclusion with regard to the additionality of the project activity?	/1/	DR	Pending with regards to the closing of the previous CAR and CLs	~~CAR 3~~ ~~CAR 4~~ ~~CL 5~~	OK
B.6 Algorithms and/or formulae used to determine emission reductions (VVS § 96-100)						
	Data and parameters that are available at validation and that are not monitored					
B.6.1	How was the installed capacity of the hydro power plant verified?	/1/	DR	DNV requests that the project participant revises the project activity description in the PDD to reflect the current design and specifications of the project, including the energy generation (MWh), capacity factors, and turbine and generator type.	~~CAR 1~~	OK
B.6.2	How was the area of the reservoir verified?	/1/	DR I	During the site visit interview, DNV was informed that the area of the reservoir will be different than the value presented in the PDD. DNV requests that the project participant revises the project activity description in the PDD to reflect the current design and specifications of the project, including the energy generation (MWh), capacity factors, and turbine and generator type.	~~CAR 1~~	OK
	Baseline emissions					
B.6.3	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /33/ /37/	DR	The baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor ($EF_{grid,CM,y}$ in tCO_2/MWh) times the electricity supplied by the project activity to the grid ($EG_{facility,y}$ in MWh). Emissions from electricity generation in fossil-fuel power plants belonging to the SIN are displaced due to the project activity.	~~CL 6~~	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				The participants have used the dispatch data analysis method for determining the operating margin and data is provided by the Brazil DNA and published online. The project participant is requested to follow the guidelines and steps presented in the *Tool to calculate the emission factor for an electricity system*, version 3.0.0.		
B.6.4	Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	Yes, refer to Section B.6.3.		OK
B.6.5	Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Yes, refer to Section B.6.3.		OK
	Project emissions					
B.6.6	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /31/	DR	The project participants have shown that the proposed project activity has a power density greater than 10 MW/m^2. According to ACM0002, since the power density is greater than 10 MW/m^2, the project emissions are considered to be zero.		OK
B.6.7	Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Yes, see Section B.6.6.		OK
B.6.8	Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Yes, see Section B.6.6.		OK
	Leakage					
B.6.9	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	No leakage has to be considered for the proposed project activity.		OK
B.6.10	Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	No leakage has to be considered for the proposed project activity.		OK
B.6.11	Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	No leakage has to be considered for the proposed project activity.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	Emission Reductions					
B.6.12	Algorithms and/or formulae used to determine emission reductions: • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.	/1/	DR	The methods and calculations are correct but DNV requests that the project participant revises the project activity description in the PDD to reflect the current design and specifications of the project, including the energy generation (MWh) and capacity factors.	~~CAR 1~~	OK
B.7	**Monitoring plan (VVS § 131-133)**					
	Data and parameters monitored					
B.7.1	Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/	DR	Yes. The proposed project activity applies the approved consolidated monitoring methodology ACM0002 Version 13.0.0 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources". The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions.		OK
B.7.2	Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR	The electricity generated by the project activity will be monitored, along with the combined margin grid emission factor which is calculated using data from the Brazilian DNA.		OK
B.7.3	In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/	DR	Yes. Electricity meters will be used.		OK
B.7.4	In case parameters are measured, is the measurement	/1/	DR	The project participant should present a	CL	OK

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	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	accuracy addressed and deemed appropriate? Describe each relevant parameter.			consistent value for the electricity meter accuracy.	7~~CL 7~~	
B.7.5	In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/	DR	The PDD does not clearly specify the calibration frequency of the electricity meter.	~~CL 7~~	OK
B.7.6	Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	Yes. Electricity generation data will be monitored hourly and sent daily to the Electric Power Commercialization Chamber (CCEE). Weekly and monthly reports will be available.		OK
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	Yes. Electricity generation data will be monitored hourly and sent daily to the Electric Power Commercialization Chamber (CCEE). Weekly and monthly reports will be available.		OK
	Ability of project participants to implement monitoring plan					
B.7.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR	Electricity generation data will be monitored hourly and sent daily to the Electric Power Commercialization Chamber (CCEE). Weekly and monthly reports will be available and all values will be stored until 2 years after the end of the project.		OK
B.7.9	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR	Monitoring data will be stored until 2 years after the end of the project on the servers of CCEE and Bioenergy.		OK
B.7.10	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/	DR	Yes. Electricity generation data will be monitored hourly and sent daily to the Electric Power Commercialization Chamber (CCEE). Weekly and monthly reports will be available.		OK
B.7.11	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or	/1/	DR	Monitored data will be stored until 2 years after the end of the project on the servers of CCEE and		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	the last issuance of CERs, for this project activity, whichever occurs later?			at Atlantic.		
	Monitoring of sustainable development indicators/ environmental impacts					
B.7.12	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	Neither the approved methodology, ACM0002, nor the Brazilian DNA require monitoring sustainable development indicators.		OK
B.7.13	Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Not applicable.		OK
B.7.14	Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	Not applicable.		OK
C	**Duration of the project activity / crediting period**					
C.1.1	**Start date of project activity (VVS § 106 & 112, PS § 57-62)**					
C.1.2	How has the starting date of the project activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/1/ /5/	DR	The starting date of the project activity is 15 June 2011, which was determined by the equipment purchase agreement with WEG. The PDD refers to this agreement as an EPC. The project participant is requested to update the evidence for the project starting date to reflect the type of contract signed.	~~CAR 5~~	OK
C.1.3	Is the stated expected operational lifetime of the project activity reasonable?	/1/ /54/	DR	Yes, the expected operational lifetime of the project activity is 30 years. The project is a Build, Operate, Transfer type project and authorities of Brazil will claim ownership of the project in 30 years.		OK
C.1.4	Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	Yes, the crediting period is clearly defined and can be considered reasonable. A renewable 7 year		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				crediting period has been chosen and the starting date is on 1 December 2013.		
D Environmental impacts (VVS § 134-137)						
D.1.1	Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions that need monitoring?	/1/ /6/ /7/ /8/	DR	The project activity requires 3 environmental licenses from the host country; a preliminary license which includes an environmental impact assessment, a construction license and an operating license. The project participants have obtained a preliminary license, performed an EIA, and obtained a construction license. This is considered to address any potential environmental impacts.		OK
D.1.2	Does the project comply with environmental legislation in the host country?	/1/ /6/ /7/ /8/	DR	Yes, refer to Section D.1.1.		OK
D.1.3	Will the project create any adverse environmental effects?	/1/ /6/ /7/ /8/	DR	The project participant is requested to describe the social and relocation impacts of the project activity.	~~CL 8~~	OK
D.1.4	Have identified environmental impacts been addressed in the project design?	/1/ /6/ /7/ /8/	DR	Yes, refer to Section D.1.1.		OK
D.1.5	Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /6/ /7/ /8/	DR	Yes, refer to Section D.1.1.		OK
D.1.6	Are transboundary environmental impacts considered in the	/1/	DR	Yes, refer to Section D.1.1.		OK

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	analysis?	/6/ /7/ /8/				
E	**Local stakeholder consultation (VVS § 138-140)**					
E.1.1	Have relevant stakeholders been consulted?	/1/ /9/	DR	A translated copy of the PDD was sent to various local stakeholders on 18 October 2011. The Brazilian DNA requires the additional notification to a local community association and the Fórum Brasileiro de ONG's. The project participant is requested to distribute a translated copy of the PDD to the group of NGOs and to the relevant community associations associated with the project area.	~~CAR 2~~	OK
E.1.2	Have appropriate media been used to invite comments by local stakeholders?	/1/ /9/	DR	Yes, refer to Section E.1.1.		OK
E.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?	/1/ /9/	DR	Refer to Section E.1.1.	~~CAR 2~~	OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/	DR	The project participant is requested to provide evidence of the comment received during the stakeholder engagement process.	~~CAR 2~~	OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/	DR	The project participant is requested to provide evidence of the comment received during the stakeholder engagement process.	~~CAR 2~~	OK

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 1 DNV requests that the project participant revises the project activity description in the PDD to reflect the current design and specifications of the project, including the energy generation (MWh), capacity factors, and turbine and generator type.	A.2.4 A.2.6 B.6.1 B.6.2 B.6.12	The project includes the requested info, based on the latest documents received from the PP. The design is based on the report submitted to BNDES and the WEG contract from June 2011	DNV confirms that the revised PDD /1/ presents a design that reflects the project technical description and expected generation /4//5//12/. Therefore this CAR is closed.
CAR 2 Stakeholder process: a. The project participant is requested to distribute a translated copy of the PDD to the group of NGOs and to the relevant community association associated with the project area. b. The project participant is requested to provide evidence of the comment received during the stakeholder engagement process.	E.1.1 E.1.3 E.1.4 E.1.5	Both the points have been considered and corrected in the PDD. One comment was received from the City Council Chamber of Passos Maia and was duly stated in point E.2 Attached comes a series of emails, including the AR sent to the FOMBS, all which remain unanswered. In retrospective, the steps taken were: a) The address was wrong, since we sent a letter (with "AR") in October 2011 and it returned; b) We discovered recently the new web address; c) We sent an email to FBOMS formalizing this situation, and asking the new address; d) We had no response. The DNA confirmed that the fact that FBOMS is not available will not be impeditive for the LoA issuance.	According to an e-mail message from the Brazilian DNA /13/, the Letter of Approval may be issued without consulting the group of NGOs, since that group was not available. Therefore this CAR is closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 3 Investment analysis. The project participant is requested to: a. Provide third-party evidence for all investment analysis input values. b. Use investment analysis inputs that are relevant at the time of the investment decision, including related to the benchmark calculation. c. Begin plant equipment depreciation only after construction is expected to be finished. d. Only use English words in the calculation spreadsheet. e. Include taxes, such as PIS and COFINS, or provide evidence that these taxes are not required. f. Interest costs should not be included in the calculations. g. Provide calculation spreadsheets that do not contain cell errors.	B.5.3 B.5.16 B.5.18 B.5.19 B.5.20 B.5.21 B.5.22 B.5.23 B.5.24 B.5.25 B.5.26 B.5.27 B.5.51	a) Included in the "Notes" spreadsheet. Most values come from the report that was submitted to BNDES, which is selected as the "Investment Decision Date" b) The inputs used are from the investment decision date. c) The depreciation starts on 2013, the year when the project is supposed to start and the construction was supposed to be finished by the Investment decision time assumptions be finished. d) Translations performed when necessary e) PIS and COFINS are included, other taxes like ANEEL tax (TFSEE) and distribution (TUSD) also included. f) Not included g) Revised and corrected	a) The project proponent provided evidences for all input values, as described in the investment analysis spreadsheet /2/ as described in this report section 4.9.3. b) All input values used were available at the time of the project investment decision, as described in this report section 4.9.3. c) The equipment depreciation is correctly starting only when the construction ends in the revised investment analysis spreadsheet /2/; d) The revised spreadsheet /2/ are totally in English; e) The applicable taxes are being correctly considered in the revised spreadsheet /2/; f) Interest costs are now included in the investment analysis /2/, since the project proponent changed to equity IRR; g) The revised spreadsheet /2/ does not contain cell errors anymore. Therefore this CAR is closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 4 Common Practice Analysis. The project participant is requested to: a. Provide DNV the third-party evidence to support the common practice analysis. b. Not eliminate projects from the common practice analysis that use subsidies that the project itself utilizes. c. Follow the steps outlined for common practice analysis and do not present redundant categorizations of power plants.	B.5.3 B.5.47 B.5.48 B.5.49 B.5.50 B.5.51	Overall, the Common practice analysis has been improved and corrected.	The revised PDD /1/ presents an updated common practice analysis, and DNV confirmed the information consulting ANEEL's Bank of Information of Generation /38/. Therefore this CAR is closed.
CAR 5 The PDD refers to the equipment purchase agreement as an EPC. The project participant is requested to update the evidence for the project starting date to reflect the type of contract signed.	C.1.2	The contract signed is the starting date of the project, the fact that is not an EPC is not relevant. The reference to an EPC was deleted in order to clarify. However, there was a previous financial commitment, which was the PPA that was signed with Tramontina group on 19 May 2010. Therefore, the PDD and the investment analysis were revised accordingly.	Since the original contract just refers to equipment supply, the revised PDD /1/ was corrected accordingly. However, DNV could confirm that the contract signed date does not correspond to the first financial commitment: four PPAs were signed with Tramontina group on 19 May 2010. In this sense, the PDD was revised considering this project starting date, and a new investment analysis based on evidence that was available prior to that date. The common practice analysis was also revised considering the scenario valid at the time of the project starting

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			date. DNV could confirm the validity of the revised investment analysis and common practice analysis, as described in section 4.9 of this report. Therefore this CAR is closed.
CAR 6 Regarding the benchmark calculation, the values used for the parameter "Market yield on U.S. Treasury securities at 30-year constant maturity, quoted on investment basis" are not correct. Besides, the "Beta 1" value used for Rondinha is not consistent with 2010 data.	B.5.16	The benchmark calculation was corrected in the revised PDD.	The revised benchmark calculation correctly considers the USA Treasury securities at 20-year and the USA Treasury securities at 20-year inflation-indexed /42/, correspondent to 2.30%. Besides, the beta value is now considered to be **2.47** for the year of 2010, based on the covariance of the daily return of bonds of companies from the USA Electrical Energy Sector. Beta is first found for companies in the USA (which is the unlevered beta), and then relevered, using the tax conditions of presumed profit regime of the project /46//47/. This tax rate is zero when relevering beta. DNV cross-checked the values presented with Damodaran's home page /45/ and confirmed that this value is appropriate for the time of the investment decision 19 May 2010 with support of an independent financial expert /44/ and it is thus correct. Therefore this CAR is closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CL 1 The project participant is requested to clarify the expected project construction starting date.	A.2.2	Since the Installation license is not granted yet, although it was already requested, there is no assured date for starting the construction. The latest projected dates, given that uncertainty, are Start Construction: 01.July.12; Start Operation: 01.December.13.	The revised PDD /1/ presents the expected construction and operation starting dates. Therefore this CL is closed.
CL 2 The project participant is requested to revise the table of applicability criteria in Section B.2 such that conditions that are not applicable to the methodology are considered "requirements".	B.2.3	Corrected, "Requirements" was changed for "Other Conditions"	The revised PDD /1/ clearly describes the applicability criteria and relevant requirements in line with ACM0002. Therefore this CL is closed.
CL 3 DNV requests the project participant to update the table of emission sources to reflect the actual emission sources of the project activity.	B.3.2	Corrected.	The revised PDD /1/ clearly describes the emission sources applicable to the project activity. Therefore this CL is closed.
CL 4 The project participant is requested to provide evidence that the onsite backup generator does not contribute more than 1% of the estimated emission reductions of the project.	B.3.4	The backup diesel generator is rated at 95 kVA. If it operates 100% of the total time of power plant operation, without shutdowns for maintenance, supplies, etc. it would produce a total of 600 MWh/year. That is 1.17% of the total energy. The projected need for the backup generator, yearly, is about 7.7 MWh (Including scheduled and forced stops, maintenance etc.) therefore, roughly 0.015% of the yearly generation would be generated by the backup	According to the diesel generator specifications /39/ and data from similar project activities /40/, the diesel generator emission reductions contribution corresponds to 0.042% of the emission reductions. Therefore, the validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		generator. In terms of emissions, the diesel combustion produces 0.28 tonne of CO_2 per MWh. Assuming the engine can have a efficiency factor of 50% , we can assume 0,56 ton of CO_2 per MWh, this is 7.7 x 0.56 MWh = 4.312 tCO_2, around a 0.042% of the avoided emissions, less than 1%. This can be proved by using the calculations for similar projects, with similar backup generators, like: Bugoye 13.0 MW Run-of-River Hydropower Project and CDM project Gansu Zhouqu Shimenping 15 MW Hydropower Station Project.	contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by ACM0002 (version 13.0.0). Therefore this CL is closed.
CL 5 The project participant is requested to confirm by providing evidence that the parameters discussed in the sensitivity analysis will not cause the IRR to reach the benchmark.	B.5.3 B.5.30 B.5.51	Noted and Included.	The revised investment analysis /1//2/ describes a complete sensitivity analysis accordingly. Therefore this CL is closed.
CL 6 The project participant is requested to follow the guidelines and steps presented in the *Tool to calculate the emission factor for an electricity system*.	B.6.3	Item B.6 corrected to 6 steps instead of 7.	The revised PDD correctly considers all steps from the *Tool to calculate the emission factor for an electricity system*, version 3.0.0. Therefore this CL is closed.
CL 7 a. The PDD does not clearly specify the calibration frequency of the electricity	B.7.4 B.7.5	a) The monitoring equipment is not purchased yet, but it was confirmed by the PP that it will	The revised PDD clearly specifies the calibration frequency and the accuracy

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
meter. b. The project participant should present a consistent value for the electricity meter accuracy.		comply on the ONS rule and maintain a yearly calibration. b) The accuracy will also meet the industry standards with a two decimal points accuracy.	of the electricity meter. Therefore this CL is closed.
CL 8 The project participant is requested to describe the social and relocation impacts of the project activity.	D.1.3	Impacts of the project incorporated, including the relocation actions implemented.	The revised PDD includes a description of the social and relocation impacts of the project activity. Therefore this CL is closed.

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
Not applicable.		

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Felipe Lacerda Antunes

Felipe Lacerda Antunes holds a Master's Degree in Production Engineering (Quality) and a Post Graduate Diploma in Environmental Management and Industrial Waste Management and Treatment. Possesses an International experience of more than 10 years in the field of quality and environmental auditing, working two years as the responsible of the QMS of Rede Metrológica RS and since 1999 as a QMS and EMS auditor in DNV.

He has experience of more than 3 years in validation and verification of numerous CDM projects in DNV, both in South America & abroad. He has also been actively involved in Management System Audits such as ISO 9001, ISO 140001 and OHSAS 18001 standards in various industrial sectors for more than 10 years in DNV.

His qualification and experience in CDM demonstrate him sufficient sectoral competence in energy generation from renewable energy sources, waste handling and disposal, and animal waste management.

Robin Weldy

Mr. Weldy holds a Master's degree in Sustainable Cities and a Bachelor's degree in Environmental Geology. Prior to joining DNV, he performed geotechnical consulting and construction monitoring for large residential and commercial developments. While employed by DNV, Mr. Weldy brings three years of experience in the wind energy industry, including quality checking meteorological data, generating wind resource assessment summaries, and managing projects. Beginning in December 2011, Mr. Weldy joined the Climate Change and Environmental Services unit within DNV as a GHG Assessor where he is currently involved in the CDM validation and verification process.

Frederico Rosas

Frederico holds a Bachelor Degree in Management and a specialization in Business Administration.
He is a professor at Fundação Getúlio Vargas, where he teaches financing, costs management, price management, investment analysis and controllership.

He presents a working experience of more than 15 years in companies of areas such as of finances, mining and cosmetics.

Andrea Leiroz

Andrea Leiroz holds a Bachelor's Degree in Chemical Engineering, Master Degree in Material Science and Doctor Degree in Mechanical Engineering. She has an overall experience of around thirteen years.

She has experience of around 6 years in validation and verification of numerous CDM projects in DNV, both in Brazil & abroad.

Her qualification, experience in CDM demonstrates her sufficient sectorial competence in Energy Generation from renewable energy sources, Waste handling and disposal and Animal waste management.

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