

VALIDATION AND VERIFICATION REPORT

VTRM RENEWABLE ENERGY



Document Prepared by Earthhood Services Private Limited

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Summary:**Brief summary of the project activity**

“VTRM Renewable Energy” is a grouped project that consists in the implementation and operation of wind power plants in Brazil. All plants will supply clean electricity to the Brazilian National Interconnected System.

The instance to be included in the grouped project is a complex called Ventos do Araripe III Complex, composed by fourteen wind power plants, with total installed capacity of 358.8 MW and estimated annual average GHG emission reductions of 652,150 tCO₂.

The project applies the CDM approved methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0.

Scope of validation and verification

VTRM Energia Participações S.A. has contracted ESPL to conduct the validation of the grouped project “VTRM Renewable Energy” and 1st verification of the period from 09/12/2016 to 31/07/2018 (both days included).

The scope of the validation and verification is to establish/verify that:

- the latest available joint PD and MR template was used and correctly filled up;
- the project activity is in accordance with all relevant host country criteria (Brazil);
- the project activity is in accordance with all relevant VCS rules and requirements;
- the project activity is in accordance with conditions of the latest version of applied methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0;
- the project activity has been implemented and operated as per the PD and all physical features (technology, project equipment and monitoring and metering equipment) of the project are in place;
- the documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of VCUs, verifiable, and in accordance with applicable VCS Version 3.7 requirements;
- the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, the approved methodology including applicable tool(s);
- the data are recorded and stored as per the monitoring methodology including applicable tool(s).

Conclusion

ESPL has performed the validation of the VCS grouped project “VTRM Renewable Energy” and verification for the monitoring period from 09/12/2016 to 31/07/2018 (both days included).

During the present VCS validation and verification, 12 CLs and 06 CARs were raised and successfully closed.

The VVB has confirmed that:

- the grouped project is in accordance with all relevant host country criteria (Brazil) and VCS rules and requirements;
- the grouped project is in accordance with all conditions of the latest version of applied methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0;

- the first instance to be included along with this validation accomplishes with all eligibility criteria of the grouped project;
- the local stakeholders' consultation has been performed in accordance with host country and VCS requirements;
- the environmental assessment is appropriate and sufficient;
- the monitoring plan is transparent and adequate;
- all information has been consistently applied in the joint PD and MR;
- the implementation of the project has been done as per description in the joint PD and MR;
- the monitoring system is in place; and
- the emission reductions are calculated without material misstatements.

The verified emission reductions amount is 876,160 tCO₂e in the above-mentioned monitoring period.

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1 INTRODUCTION

1.1 Objective

VTRM Energia Participações S.A. has contracted ESPL to conduct the validation of the grouped project “VTRM Renewable Energy” and 1st verification of the period from 09/12/2016 to 31/07/2018 (both days included) according to the requirements of the Verified Carbon Standard Version 3.7.

1.2 Scope and Criteria

The scope of the validation and verification is to establish/verify that:

- the latest available joint PD and MR template was used and correctly filled up;
- the project activity is in accordance with all relevant host country criteria (Brazil);
- the project activity is in accordance with all relevant VCS rules and requirements;
- the project activity is in accordance with conditions of the latest version of applied methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0;
- the project activity has been implemented and operated as per the joint PD and MR and that all physical features (technology, project equipment and monitoring and metering equipment) of the project are in place;
- the documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of VCUs, verifiable and in accordance with applicable VCS Version 3.7 requirements;
- the actual monitoring system and procedures comply with the monitoring system and procedures described in the monitoring plan, the approved methodology including applicable tool(s);
- the data are recorded and stored as per the monitoring methodology including applicable tool(s).

1.3 Level of Assurance

The validation of grouped project and the verification of this monitoring period has achieved a reasonable level of assurance.

1.4 Summary Description of the Project

“VTRM Renewable Energy” is a grouped project that consists in the implementation and operation of wind power plants in Brazil. All plants will supply clean electricity to the Brazilian National Interconnected System.

The first instance to be included in the grouped project is a complex called Ventos do Araripe III Complex, composed by fourteen wind power plants, with total installed capacity of 358.8 MW and estimated annual average GHG emission reductions of 652,150 tCO₂.

The project is listed at VCS and can be accessed by the following link:
https://www.vcsprojectdatabase.org/#/pipeline_details/PL1812

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

The validation and verification process is conducted as per internal ESPL CDM Quality Manual and in accordance with criteria laid down by VCS. It includes the following steps:

- contract with PP for the scope and appointment of validation and verification team and technical review team;
- completeness check of joint PD and MR;
- desk review of joint PD and MR and corresponding ER sheet by validation and verification team and planning of on-site audit;
- physical on-site inspection by validation and verification team;
- follow up activities e.g., interviews;
- reporting and closure of findings (CARs/CLs/FARs) and preparation of draft validation and verification report;
- independent technical review of the draft validation and verification report and final/revised documentation (e.g., joint PD and MR, corresponding ER sheet and evidences);
- reporting and closure of TR comments/findings (CARs/CLs/FARs) and final approval for the decision made;
- issuance of final validation and verification report to contracted PP (or authorized representatives).

No sampling plan has been used as part of the validation or verification.

2.2 Document Review

A desk review was conducted by the validation and verification team that included:

- a review of the data and information presented to assess its completeness;
- a review of the PD, monitoring plan, the monitoring methodology including applicable tool(s), paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- an evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;
- supporting documents.

A complete list of documents/evidences reviewed is included as Appendix I.

2.3 Interviews

#	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Giglio	Tânia	Votorantim Energia	18/10/2018	Project implementation concept	Sergio Cruz Ricardo Lopes
2.	Amaro	Jarbas	Votorantim Energia	18/10/2018 24/10/2018	Project implementation concept Technical features	Sergio Cruz Ricardo Lopes
3.	Baltar	Eduardo	WayCarbon	18/10/2018 19/10/2018	VCS aspects	Sergio Cruz

					Financial assessment	Ricardo Lopes
4.	Perucci	Flávia	WayCarbon	18/10/2018 19/10/2018	VCS aspects Financial assessment	Sergio Cruz Ricardo Lopes
5.	Schwangart	Rafael	Votorantim Energia	18/10/2018	Project monitoring	Sergio Cruz Ricardo Lopes
6.	Morais	Caroline	Votorantim Energia	18/10/2018	Electricity generation	Sergio Cruz Ricardo Lopes
7.	Coelho	Lucas	Votorantim Energia	24/10/2018	Technical aspects Project implementation	Sergio Cruz
8.	Melo	Everton	Votorantim Energia	24/10/2018	Environmental programs	Sergio Cruz
9.	Americo	Higor	Votorantim Energia	24/10/2018	Metering equipment	Sergio Cruz
10.	Garcia	Janaína	Votorantim Energia	25/10/2018	Electricity generation	Sergio Cruz

2.4 Site Inspections

Duration of on-site inspection: 18, 19 and 24/10/2018				
#	Activity performed on-site	Site location	Date	Team member
1.	Opening Meeting at PP's office	São Paulo	18/10/2018	Sergio Cruz Ricardo Lopes
2.	Implementation of project	São Paulo	18/10/2018	Sergio Cruz Ricardo Lopes
3.	Technical aspects and VCS aspects	São Paulo	18/10/2018	Sergio Cruz Ricardo Lopes
4.	Local Stakeholder Consultation process and Environmental impacts	São Paulo	18/10/2018	Sergio Cruz Ricardo Lopes
5.	Monitoring plan	São Paulo	18/10/2018	Sergio Cruz Ricardo Lopes
6.	Additionality assessment	São Paulo	18/10/2018	Ricardo Lopes
7.	Management and operational system: documentation, allocation of responsibilities, qualification and training, data recording & archiving, internal audit and management review and emergency procedures.	São Paulo	18/10/2018	Sergio Cruz

8.	Review of monitored data and relevant document in accordance with registered monitoring plan and applied monitoring methodology.	São Paulo	18/10/2018	Sergio Cruz
9.	Review of ER calculations in accordance with applied methodology and relevant tools.	São Paulo	18/10/2018	Sergio Cruz
10.	Assessment of evidences	Video-conference	19/10/2018	Sergio Cruz
11.	Physical inspection of the site	Araripina, Simões and Curral Novo	24/10/2018	Sergio Cruz
12.	Interview of monitoring personnel	Simões	24/10/2018	Sergio Cruz
13.	Assessment of evidences	Simões	24/10/2018	Sergio Cruz
14.	Compilation of audit findings	Simões	24/10/2018	Sergio Cruz
15.	Closing Meeting	Simões	24/10/2018	Sergio Cruz

2.5 Resolution of Findings

The findings may be of following types: CAR – Corrective Action Request, CL – Clarification Request and FAR – Forward Action Request.

During the present validation and verification, 12 CLs and 06 CARs were raised and successfully closed.

The list of findings and their resolution are presented at Appendix III of this report.

2.5.1 Forward Action Requests

No FAR was raised.

3 VALIDATION FINDINGS

3.1 Project Details

The joint PD and MR provides an accurate and clear description of the grouped project and its first instance being included.

“VTRM Renewable Energy” is a grouped project that consists in the implementation and operation of wind power plants in Brazil. All plants will supply clean electricity to the Brazilian National Interconnected System.

- Sustainable development contribution:

- reduces greenhouse gas emissions (CO₂) from the Brazilian Interconnected System;
- generates extra income for the landowners, while they can continue using the area for other activities, thus it increases and diversifies the lands productivity;
- stimulates the regional economy by increasing tax revenues for the local government and direct and indirect job opportunities for local workers and service suppliers;
- general improvement of the local infrastructure such as road, electricity transmission system and stimulus for education;

- use equipment with domestic content, inducing the development of national technology and improvement of domestic know-how;
- stimulates the development of a proficient tertiary sector in the region, thus creating opportunities for education, professionalization and employment;
- diversifies the run-of-river hydroelectric generation in the host country.
- Eligibility criteria: for new instances to be included in the grouped project:
 1. meet the applicability conditions of methodology ACM0002 – *to be evidenced by the document of validation of inclusion of the instance*;
 2. are subject to the baseline scenario of the applied methodology ACM0002 – version 19.0 that sets that the baseline scenario of a greenfield project activity is the electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in “TOOL07: Tool to calculate the emission factor for an electricity system” – *to be evidenced by the document of validation of inclusion of the instance*;
 3. include just greenfield grid connected wind power plants – *to be evidenced by environmental licenses*;
 4. must be located in Brazil (geographic area of the project) – *to be evidenced by environmental licenses*;
 5. must demonstrate the additionality performing an investment analysis, in accordance with TOOL07, TOOL24 and TOOL27 – *to be evidenced by the document of validation of inclusion of the instance*;
 6. detail its own monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body – *to be evidenced by the document of validation of inclusion of the instance*;
 7. have a start date that is the same as or later than the grouped project start date (09/12/2016) – *to be evidenced by legal documents, such as Operation License, ANEEL Dispatch, etc.*;
 8. evidence the project ownership – *to be evidenced by legal documents with proof of ownership*.
- Commercially sensitive information: the commercial information has not been excluded from the documents made public by the PP.

One instance is being included in the grouped project along with its validation process: Ventos do Araripe III Complex, composed by by fourteen wind power plants, with total installed capacity of 358.8 MW and estimated annual average GHG emission reductions of 652,150 tCO₂.

As per the on-site assessment, observations, interviews and collected evidences, it was possible to assess that, in general, the first instance has been implemented as described in the joint PD and MR.

There is no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology.

All plants are greenfield projects and the project complies with all applicable laws, statutes and other regulatory frameworks

Assessment of the accomplishment of the instance Ventos do Araripe III Complex to the eligibility criteria of the grouped project:

Criterion	Evidence	Assessment
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1. meet the applicability conditions of methodology ACM0002	Section 2.2 of the joint PD and MR and ACM0002 – version 19.0	the full assessment of the accomplishment of <u>Ventos do Araripe III Complex</u> with the applicability conditions of methodology ACM0002 is done in Section 4.5.1 below
2. are subject to the baseline scenario of the applied methodology ACM0002 – version 19.0 that sets that the baseline scenario of a greenfield project activity is the electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in “TOOL07: Tool to calculate the emission factor for an electricity system”	Section 2.4 of the joint PD and MR	the baseline of <u>Ventos do Araripe III Complex</u> is the one given by the applied methodology ACM0002
3. include just greenfield grid connected wind power plants	environmental licenses	the EIA and environmental licenses of <u>Ventos do Araripe III Complex</u> confirm that the project activity is composed for 14 greenfield grid connected wind power plants
4. must be located in Brazil (geographic area of the project)	environmental licenses	the operating licenses evidences that all plants are located in the municipalities of municipalities of Araripina State of Pernambuco), Simões and Curral Novo (State of Piauí) – Brazil. The coordinates of each plant are presented below at “Project Location of Ventos do Araripe III Complex”
5. must demonstrate the additionality performing an investment analysis, in accordance with TOOL07, TOOL24 and TOOL27	Section 2.5 of the joint PD and MR and “Tool for the demonstration and assessment of additionality” – version 07.0.0	the full assessment of the demonstration of the additionality of the PA is done in Section 3.3.5 of this report
6. detail its own monitoring report with sufficient	Section 4.3 of the joint PD and MR	the joint PD and MR sets a monitoring plan for the PA,

technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body		which is feasible and in accordance with the applied methodology and tools. The management structure, roles, and responsibilities are set. There are established procedures for crosschecking the monitored data.
7. have a start date that is the same as or later than the grouped project start date (09/12/2016)	ANEEL's dispatch for the start of commercial operation of first turbine of WPP São Estevão III	the dispatch authorized the start of the operation of the first turbine of the first WPP of the complex on 09/12/2016
8. evidence the project ownership	audited financial statement of the holding Ventos de São Estevão Holding S.A.	VTRM Energia Participações S.A. is the project owner. Each plant belongs to a special purpose company. All fourteen companies belongs to Ventos de São Estevão Holding S.A., which has as its only shareholder the VTRM Energia Participações S.A.

Some of the characteristics of the grouped project "VTRM Renewable Energy" and its instance Ventos do Araripe III Complex are described below:

- Project Proponents: VTRM Energia Participações S.A. and WayCarbon Soluções Ambientais e Projetos de Carbono LTDA;
- Project Category: Large project (> 300,000 tCO₂e/y);
- Start Date: 09/12/2016 – date of the start of commercial operation of the first turbine of Ventos do Araripe III Complex;
- Crediting Period: from 09/12/2016 to 08/12/2026 – 10 years – renewable;
- Project Ownership of Ventos do Araripe III Complex: VTRM Energia Participações S.A. is the project owner. Each plant belongs to a special purpose company. All fourteen companies belongs to Ventos de São Estevão Holding S.A., which has as its only shareholder the VTRM Energia Participações S.A. All information is demonstrated by the audited financial statement of the holding;
- Project Location of Ventos do Araripe III Complex: municipalities of Araripina State of Pernambuco), Simões and Curral Novo (State of Piauí) – Brazil. Coordinates of each plant of are presented as follows:
 - Ventos de Santo Estevão I: LAT 315.569 / LONG 9.143.661 (UTM);
 - Ventos de Santo Estevão II: LAT 316.754 / LONG 9.144.168 (UTM);
 - Ventos de Santo Estevão III: LAT 318.340 / LONG 9.143.710 (UTM);

- Ventos de Santo Estevão IV: LAT 319.391 / LONG 9.140.103 (UTM);
- Ventos de Santo Estevão V: LAT 322.191/ LONG 9.140.116 (UTM);
- Ventos de São Virgílio I: LAT 310.771 / LONG 9.1386.47 (UTM);
- Ventos de São Virgílio II: LAT 316.605 / LONG 9.139.075 (UTM);
- Ventos de São Virgílio III: LAT 310.200 / LONG 9.142.579 (UTM);
- Ventos de Santo Onofre IV: LAT 310.245 / LONG 9.142.098 (UTM);
- Ventos de Santo Augusto I: LAT 315.154 / LONG 9.144.770 (UTM);
- Ventos de Santo Augusto II: LAT 314.649 / LONG 9.139.381 (UTM);
- Ventos de Santo Augusto VI: LAT 315.149 / LONG 9.147.550 (UTM);
- Ventos de Santo Augusto VII: LAT 314.976 / LONG 9.146.227 (UTM);
- Ventos de Santo Augusto VIII: LAT 308.651 / LONG 9.158.924 (UTM);

- Technical Data of Ventos do Ararape III Complex:

WPPs	Installed Capacity (MW)	Plant Load Factor (%)	Quantity of WPTs (GE – 2.3 MW each)
Ventos de Santo Estevão I	25.3	47.3	11
Ventos de Santo Estevão II	25.3	46.6	11
Ventos de Santo Estevão III	29.9	46.1	13
Ventos de Santo Estevão IV	29.9	48.0	13
Ventos de Santo Estevão V	27.6	49.4	12
Ventos de São Virgílio I	29.9	47.7	13
Ventos de São Virgílio II	29.9	50.7	13
Ventos de São Virgílio III	20.7	49.9	9
Ventos de Santo Onofre IV	27.6	51.3	12
Ventos de Santo Augusto I	18.4	47.5	8
Ventos de Santo Augusto II	27.6	48.4	12
Ventos de Santo Augusto VI	29.9	49.7	13
Ventos de Santo Augusto VII	18.4	49.9	8
Ventos de Santo Augusto VIII	18.4	48.8	8

The expected lifetime of wind turbines is 20 years.

3.2 Participation under Other GHG Programs

The grouped project has no participation under any other GHG program.

In addition, the GHG emission reductions generated by the project have not been included in any emissions trading program or any other mechanism that includes GHG allowance trading. Moreover, the project has not received nor sought any other form of environmental credit, and neither has become eligible to do so since validation or previous verification. Finally, the project has not participated nor been rejected under any other GHG programs.

3.3 Application of Methodology

3.3.1 Title and Reference

The grouped project applies CDM methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0.

In addition, the project applies:

- TOOL01: Tool for the demonstration and assessment of additionality – version 07.0.0;
- TOOL07: Tool to calculate the emission factor for an electricity system – version 07.0;
- TOOL24: Methodological Tool Common Practice – version 03.1; and
- TOOL27: Methodological Tool Investment Analysis – version 08.0.

The applied methodology and tools and their specific versions are valid at the time of validation.

3.3.2 Applicability

All applicability conditions of the applied methodology are met by the instance Ventos do Araripe III Complex:

Applicability Criteria – ACM0002 – v. 19.0	Assessment
This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).	The project complies with the condition (a) as it is constituted by new wind power plants.
The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the	The project complies with the condition (a) as it is constituted by new wind power plants.

calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	
In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (3), is greater than 4 W/m²; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be: - Lower than or equal to 15 MW; and - Less than 10 per cent of the total installed capacity of integrated hydro power project.	Not applicable to the project as it is not composed of hydro power plants.
In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in	Not applicable to the project as it is not composed of hydro power plants.

different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	
The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	Not applicable to the project as it does not involve switching from fossil fuels to renewable energy sources and it is not composed of biomass fired power plants.
In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.	Not applicable to the project as it does not consist in retrofits, rehabilitations, replacements, or capacity additions.

3.3.3 Project Boundary

GHG gases and GHG sources are correctly described at the joint PD and MR, in accordance with applied methodology.

A flow diagram physically delineating the PA is included at the Section 2.3 of the joint PD and MR.

3.3.4 Baseline Scenario

The baseline scenario is the one given by the applied methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0 for the installation of a greenfield power plant, which is: “the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in “TOOL07: Tool to calculate the emission factor for an electricity system”.

3.3.5 Additionality

The demonstration of additionality was done according to the “Tool for the demonstration and assessment of additionality” – version 07.0.0.

Identification if the project activity is the first-of-its-kind Step 0:

Not applicable to the project activity.

Identification of alternatives Step 1:

As the baseline is directly given by the methodology ACM0002, the selection of alternatives is not required. Nevertheless, the PP has identified the two realistic alternatives to the PA, which are:

- P1: the project activity not implemented as a CDM project; and
- P2: the continuation of the current situation.

Both alternatives are consistent with mandatory laws and regulations of the host country (Brazil);

Investment analysis Step 2:

It is worth noting that the investment analysis was done for all fourteen plants together as this approach is more conservative as revealed during the interviews with PP's representatives. A benchmark analysis is being performed to assess the additionality of the project activity.

The chosen financial indicator is the equity internal rate of return (IRR), which is in accordance with the "Methodological Tool Investment Analysis" – version 08.0.

In addition, the chosen benchmark is the default value presented at the tool of expected return on equity for electricity generation projects developed in Brazil, in real terms. The value is **11.87%**.

The PP's assumption is to use the directive of CDM PS for PoA – version 01.0, in which actual values are used for the financial assessment.

The assessment of financial parameters is presented below:

Financial parameter	Value	Assessment
Installed Power	358.8 MW	The value is the total installed capacity of all 14 wind power plants, which is evidenced by their operation licenses. The installed capacity of each plant is as follows: - Ventos de Santo Estevão I: 25.3 MW - Ventos de Santo Estevão II: 25.3 MW - Ventos de Santo Estevão III: 29.9 MW - Ventos de Santo Estevão IV: 29.9 MW - Ventos de Santo Estevão V: 27.6 MW - Ventos de São Virgílio I: 29.9 MW - Ventos de São Virgílio II: 29.9 MW - Ventos de São Virgílio III: 20.7 MW - Ventos de Santo Onofre IV: 27.6 MW - Ventos de Santo Augusto I: 18.4 MW - Ventos de Santo Augusto II: 27.6 MW - Ventos de Santo Augusto VI: 29.9 MW - Ventos de Santo Augusto VII: 18.4 MW - Ventos de Santo Augusto VIII: 18.4 MW
Total Investment	R\$ 1,609,389,871	Total investment cost for the Complex was obtained from contracts of each plant. The investment cost of each plant is as follows: - Ventos de Santo Estevão I: R\$ 114,478,257 - Ventos de Santo Estevão II: R\$ 113,548,729 - Ventos de Santo Estevão III: R\$ 135,065,198 - Ventos de Santo Estevão IV: R\$ 134,397,188 - Ventos de Santo Estevão V: R\$ 120,806,735 - Ventos de São Virgílio I: R\$ 132,145,938

		- Ventos de São Virgílio II: R\$ 133,169,563 - Ventos de São Virgílio III: R\$ 93,647,052 - Ventos de Santo Onofre IV: R\$ 123,664,194 - Ventos de Santo Augusto I: R\$ 83,532,588 - Ventos de Santo Augusto II: R\$ 123,473,302 - Ventos de Santo Augusto VI: R\$ 132,839,071 - Ventos de Santo Augusto VII: R\$ 85,681,624 - Ventos de Santo Augusto VIII: R\$ 82,940,426 The Complex has an investment cost around US\$ 1,325 per installed kW (<i>conversion rate on 09/12/2016: US\$ 1.00 = R\$ 3.385</i>). When comparing this value with other <u>wind farms investments per installed kW</u> it is possible to conclude that the project activity has an investment comparable to the market value as can be cross checked with public and official sources, as can be verified below: • Examples of wind projects in Brazil: <table border="1"> <thead> <tr> <th>Title</th><th>MW</th><th>US\$/kW</th></tr> </thead> <tbody> <tr> <td>Osório Wind Power Plant¹</td><td>50</td><td>6,584</td></tr> <tr> <td>Pedra do Sal Wind Farm²</td><td>18</td><td>3,565</td></tr> <tr> <td>Windfarm Complex Santana do Livramento³</td><td>90</td><td>1,998</td></tr> <tr> <td>Windfarm Complex Santa Vitória do Palmar and Chuí⁴</td><td>144</td><td>2,158</td></tr> <tr> <td>Windfarm Morro dos Ventos phase 2⁵</td><td>60</td><td>1,976</td></tr> </tbody> </table> ¹ CDM registered project Ref. # 0603; ² CDM registered project Ref. # 0693; ³ CDM registered project Ref. # 7964; ⁴ CDM registered project Ref. # 8012; ⁵ CDM registered project Ref. # 8253. • Specialized literature: - Financing Renewable Energy in the European Energy Market – Final Report by Ecofys, Fraunhofer ISI, TU Vienna EEG and Ernst & Young (2011): price in Europe: from US\$ 1,504/kW to US\$ 2,039/kW;	Title	MW	US\$/kW	Osório Wind Power Plant ¹	50	6,584	Pedra do Sal Wind Farm ²	18	3,565	Windfarm Complex Santana do Livramento ³	90	1,998	Windfarm Complex Santa Vitória do Palmar and Chuí ⁴	144	2,158	Windfarm Morro dos Ventos phase 2 ⁵	60	1,976
Title	MW	US\$/kW																		
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Windfarm Complex Santa Vitória do Palmar and Chuí ⁴	144	2,158																		
Windfarm Morro dos Ventos phase 2 ⁵	60	1,976																		

		- IEA Wind Task 26 Final Report – National Renewable Energy Laboratory (NREL) – (2011) – Price of Reference Case taking into account the values of Denmark, Germany, Netherlands, Spain, Sweden, Switzerland and United States: US\$ 2,014/kW. By this comparison, the weighted average value of total investment in wind farms in Brazil is above the presented value of the project activity. Therefore, the total investment presented is assessed as adequate by the validation team. Therefore, the total investment has been evidenced and it has been considered reasonable and consistent by the validation team. All calculations have been demonstrated in the Financial Analysis and the evidences of actual values have been presented to the validation team.
PLF	- Ventos de Santo Estevão I: 47.3% - Ventos de Santo Estevão II: 46.6% - Ventos de Santo Estevão III: 46.1% - Ventos de Santo Estevão IV: 48.0% - Ventos de Santo Estevão V: 49.4% - Ventos de São Virgílio I: 47.7% - Ventos de São Virgílio II: 50.7% - Ventos de São Virgílio III: 49.9% - Ventos de Santo Onofre IV: 51.3% - Ventos de Santo Augusto I: 47.5% - Ventos de Santo Augusto II: 48.4% - Ventos de Santo Augusto VI: 49.7% - Ventos de Santo Augusto VII: 49.9% - Ventos de Santo Augusto VIII: 48.8%	The value certified by third party study as a guarantee percentage of energy that will be generated.

Energy Price	- Ventos de Santo Estevão I: R\$ 120.48/MWh - Ventos de Santo Estevão II: R\$ 121.49/MWh - Ventos de Santo Estevão III: R\$ 120.48/MWh - Ventos de Santo Estevão IV: R\$ 142.99/MWh - Ventos de Santo Estevão V: R\$ 120.47/MWh - Ventos de São Virgílio I: R\$ 142.99/MWh - Ventos de São Virgílio II: R\$ 136.99/MWh - Ventos de São Virgílio III: R\$ 142.99/MWh - Ventos de Santo Onofre IV: R\$ 142.99/MWh - Ventos de Santo Augusto I: R\$ 120.47/MWh - Ventos de Santo Augusto II: R\$ 120.48/MWh - Ventos de Santo Augusto VI: R\$ 120.47/MWh - Ventos de Santo Augusto VII: R\$ 120.48/MWh - Ventos de Santo Augusto VIII: R\$ 120.47/MWh	All plants have participated in a public auction for authorization. The energy price is value of sale of MWh of each plant in the respective auction
Generated electricity for sale	1,529,112 MWh/y	The value is the total energy that will be generated by the wind power plants in the year. The value is obtained by the electricity sold at respective auction by each plant, in accordance with the plant

		load factor of each plant certified by the third party report. The electricity generation of each plant is as follows: - Ventos de Santo Estevão I: 104,830 MWh/y - Ventos de Santo Estevão II: 103,278 MWh/y - Ventos de Santo Estevão III: 120,746 MWh/y - Ventos de Santo Estevão IV: 125,723 MWh/y - Ventos de Santo Estevão V: 119,437 MWh/y - Ventos de São Virgílio I: 124,937 MWh/y - Ventos de São Virgílio II: 132,795 MWh/y - Ventos de São Virgílio III: 90,484 MWh/y - Ventos de Santo Onofre IV: 124,031 MWh/y - Ventos de Santo Augusto I: 76,562 MWh/y - Ventos de Santo Augusto II: 117,019 MWh/y - Ventos de Santo Augusto VI: 130,176 MWh/y - Ventos de Santo Augusto VII: 80,430 MWh/y - Ventos de Santo Augusto VIII: 78,657 MWh/y
PIS	0.65%	Brazilian tributes are charged over the company's assumed profit (companies with gross revenue below R\$ 48 million can apply the modality of tax call "Assumed tax profit regime"). The assumed profit and the taxes are calculated as follows: - PIS (Social Integration Program): 0.65% of the gross profit; - COFINS (Contribution for Financing Social Security): 3% of the gross profit; - CSSL (Social Contribution): 9% of 12% of the gross profit; (assumed profit) - Income tax: 15% of 8% of the gross profit (assumed profit) - Additional Income tax: 10% of the presumed profit (8%) which exceeds R\$ 240 thousand/year.
COFINS	3%	
Income Tax	15%	
Additional Income Tax	10%	
CSLL	9%	
Operation and Maintenance – wind turbines	- R\$ 58,700.00 – for the 1st year - R\$ 103,600.00 – for the 2nd year - R\$ 123,700.00 – for the 3rd year	O&M costs per wind generator per period of years given by the Full Service Agreement between each Wind Power Plant and Supplier (GE Power and Water). The value is given per wind turbine per year and with different values for the periods of operation.

	- R\$ 159,000.00 – for the 4th year - R\$ 179,600.00 – for the 5th year - R\$ 182,300.00 – for the 6th year - R\$ 159,000.00 – for the 7th year - R\$ 177,000.00 – for the 8th, 9th and 10th years - R\$ 180,100.00 – for the 11th, 12th and 13th years - R\$ 180,000.00 – from the 14th year onwards	
Insurance	R\$ 953,552/y	It is the value of the signed Insurance Policy.
ANEEL Inspection Fee (TFSEE)	R\$ 1,146,473.64/y	It is a fee paid over the annual income resulted from the generation service. It is charged in Brazil by the ANEEL. It is 0.5% over the actual economic benefits received by the plant owner due to the performed activities (R\$ 639.06/kW installed). It is an official fee charged regulated by Decree 2,410 and ANEEL Dispatch 88.
Transmission Use of System Charge (TUST)	- Ventos de Santo Estevão I: R\$ 1,418,722.80/y - Ventos de Santo Estevão II: R\$ 1,418,722.80/y - Ventos de Santo Estevão III: R\$ 1,676,672.40/y - Ventos de Santo Estevão IV: R\$ 1,676,672.40/y - Ventos de Santo Estevão V: R\$ 1,547,697.60/y - Ventos de São Virgílio I: R\$ 1,891,593.60/y - Ventos de São Virgílio II: R\$ 1,918,862.40/y	It is a fee charged monthly by ANEEL over the use of transmission line. The value is calculated based on the installed kW for each plant. It is an official fee charged regulated ANEEL's Technical Note # 162/2015. The values are: - Ventos de Santo Estevão I: R\$ 4.6730 /kW installed - Ventos de Santo Estevão II: R\$ 4.6730 /kW installed - Ventos de Santo Estevão III: R\$ 4.673/kW installed - Ventos de Santo Estevão IV: R\$ 4.673/kW installed - Ventos de Santo Estevão V: R\$ 4.673/kW installed - Ventos de São Virgílio I: R\$ 5.272/kW installed - Ventos de São Virgílio II: R\$ 5.348/kW installed

	- Ventos de São Virgílio III: R\$ 1,309,068.00/y - Ventos de Santo Onofre IV: R\$ 1,746,086.40/y - Ventos de Santo Augusto I: R\$ 1,031,577.60/y - Ventos de Santo Augusto II: R\$ 1,547,697.60/y - Ventos de Santo Augusto VI: R\$ 1,676,672.40/y - Ventos de Santo Augusto VII: R\$ 1,031,577.60/y - Ventos de Santo Augusto VIII: R\$ 1,031,577.60/y	- Ventos de São Virgílio III: R\$ 5.270/kW installed - Ventos de Santo Onofre IV: R\$ 5.272/kW installed - Ventos de Santo Augusto I: R\$ 4.672/kW installed - Ventos de Santo Augusto II: R\$ 4.673/kW installed - Ventos de Santo Augusto VI: R\$ 4.673/kW installed - Ventos de Santo Augusto VII: R\$ 4.672/kW installed - Ventos de Santo Augusto VIII: R\$ 4.672/kW installed
Land lease	R\$ 2,954,869/y	It is the total value of the signed land lease contracts.
Contingencies	0.1% over CAPEX	Among these expenses are included taxes to be paid to Brazilian regulatory agencies. The value is estimated based on company's experience in the electric market.
Nominal interest rates for the direct loan	(2.45% + 6.5%)/y	Interest rates established in BNDES Direct Loan contract. BNDES loan is subdivided in sub-loans with different interest rates. Conservatively, the lowest interest rate was applied to simplify financial model. The total is 2.45% + TJLP (official Interest Rate of Long Term)
Nominal interest rates for the indirect loan	(5.55% + 6.5%)/y	Interest rates established in BNDES Indirect Loan contract. The credit is subdivided in sub-loans with different interest rates. Conservatively, the lowest interest rate was applied to simplify financial model. The total is 2.45% + TJLP (official Interest Rate of Long Term)
Amortization period	16 years	According to BNDES Direct Loan contract. BNDES Indirect Loan has a lower amortization period. Conservatively, the shortest period was applied to simplify financial model.

Leverage of the project	64.8%	According to loan contracts signed with BNDES and banks Bradesco and Santander.
Inflation rate	4.5%	Estimate based on Brazilian Central Bank inflation index.

A benchmark analysis is the basis of additionality determination and Equity IRR is the financial indicator chosen. It was verified in the financial analysis that the benchmark for this comparison is the expected return on equity, in real terms, which is in line with the CDM “Methodological Tool Investment Analysis”, version 08.0. According to the Joint VCS-PD & MR, the IRR is below the benchmark, and hence not financially attractive.

The **Equity IRR** has been calculated as **3.72%** and the chosen **benchmark** is the default value of **11.87%**. Both values are in real terms.

In addition, a sensitivity analysis has been performed with the variation from -10% to +10% of Revenues, CAPEX and Operational and Maintenance Costs was done and continues to give a lower IRR than the benchmark rate.

Moreover, a breakeven analysis was also performed and shows that the variation of all items has to be over 22% to reach the breakeven point, which is not reasonable in any case.

Barrier analysis Step 3:

Not applicable to the project activity.

Common Practice analysis Step 4:

The analysis has been performed in accordance with the Methodological Tool Common Practice – version 03.1. It is as follows:

The geographical region that was considered for the analysis is the national (Brazil) scenario, which is reasonable as the energy sector rules are the same for the whole country.

As the financial analysis has been done with the installed capacity of all fourteen plants (538.8 MW), the same value has been used for the Common Practice analysis.

From all electricity plants with renewable fuel in operation in Brazil, there are 57 plants with the installed capacity between 179.4 MW and 538.2 MW (+/- 50% of the installed capacity of the project activity) and have started before the starting date of the proposed project (09/12/2016) and not under CDM validation or already registered.

Therefore, there are 57 plants in operation in Brazil similar to the project activity. So, $N_{all} = 57$.

From those 57 plants, 6 are thermal biomass plants and 46 are hydro power plants (some of those are also under PROINFA – Brazilian government incentive).

Therefore, 52 plants apply technologies that are different to the technology applied in the proposed project activity. So, $N_{diff} = 52$.

Finally, as $F = 0.087719$ (i.e. lower than 0.2) and $N_{all} - N_{diff} = 5$ (i.e. not lower than 3), the proposed project activity is not a common practice within the sector in the applicable geographical area.

This demonstrates that project activity is not the common or prevailing practice.

Conclusion about the additionality of the project activity: it was demonstrated and evidenced that the project activity is additional.

3.3.6 Quantification of GHG Emission Reductions and Removals

All the equations to calculate the ERs are in accordance with the applied methodology and joint VCS-PD and MR.

The baseline emissions (BE_y) are calculated as follows:

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

Where:

BE_y	Baseline emissions during the year y ;
$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y ;
$EF_{grid,CM,y}$	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system”.

As the project is the implementation of greenfield plants, $EG_{PJ,y} = EG_{facility,y}$ (quantity of net electricity generation supplied by the project plant/unit to the grid in year y).

In addition, $EF_{grid,CM,y}$ is calculated as follows:

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

Where:

$EF_{grid,OM,y}$	Build margin CO ₂ emission factor in year y ;
$EF_{grid,BM,y}$	Amount of product produced in year y ;
w_{OM}	Weighting of operating margin emissions factor;
w_{BM}	Weighting of build margin emissions factor

As per the “Tool to calculate the emission factor for an electricity system” – version 07.0, $w_{OM} = 0.75$ and $w_{BM} = 0.25$, for wind power generation project activities.

The project emissions (PE_y):

As per the CDM methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0, for this type of project, no project emissions are considered. Thus, $PE_y = 0$ (zero).

The leakage emissions (LE_y):

No leakage is considered for this kind of project, as per the CDM methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0. Thus, $LE_y = 0$ (zero).

Therefore, according to the applied methodology the **Emission Reductions** are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y	Emission reductions in year y ;
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BE_y	Baseline reductions in year y ;
PE_y	Project reductions in year y ;
LE_y	Leakage reductions in year y .

Thus, $ER_y = BE_y$

Therefore, it can be concluded that:

- all relevant assumptions and data are listed in the project description, including their references and sources;
- all data and parameter values used in the project description are considered reasonable in the context of the project;
- all estimates of the baseline emissions can be replicated using the data and parameter values provided in the project description;
- the quantification of GHG emission reductions were determined in accordance with applied methodology.

3.3.7 Methodology Deviations

No deviation from methodology and tools was requested during the validation process.

3.3.8 Monitoring Plan

The joint VCS-PD and MR sets a monitoring plan, which is feasible and in accordance with the applied methodology and tools.

The management structure, roles, and responsibilities are established for data collection, calibration frequency of plant meters, data report and data archiving.

Moreover, there are procedures set for crosschecking the monitored data.

No sampling plan is set to monitor any parameter.

The parameters available at the validation are:

- *The percentage share of total installed capacity of the specific technology* – the percentage share of total installed capacity of the specific technology in the total installed grid connected power generation capacity in the host country: **10.4%**;
- *The total installed capacity of the technology* – the total installed capacity of the technology in the host country: **12,537,943 MW**.

All parameters to be monitored necessary for the PA are listed at the joint VCS-PD and MR, in accordance with the applied methodology and tools.

The parameters required for monitoring are contained in the monitoring plan. They are:

- $EG_{facility,y}$: Quantity of net electricity generation supplied by the project plant/unit to the grid in year y ;
- $EF_{grid,CM,y}$: Combined Margin CO₂ emission factor for grid connected power generation in year y .

3.4 Non-Permanence Risk Analysis

No non-permanence risk has been identified.

4 SAFEGUARDS

4.1 No Net Harm

For this type of project, an environmental impact assessment is required, which was prepared by a third party and submitted to the state environmental authorities to start the licensing process.

There are no significant environmental and socio-economic impacts envisaged for this project as per the environmental assessments.

The project complies with host party requirements.

4.2 Environmental Impact

The environmental studies were properly carried out and approved by environmental agencies of the states of Pernambuco and Piauí and federal agency, IBAMA.

No significant adverse impacts are envisaged for this project activity and the mitigatory measures, as stated at the joint VCS-PD and MR, are being performed in accordance with the activities asked at the final operation license.

In addition, previous licenses, installation and operation licenses were issued by local environmental agencies.

The environmental impact assessments were correctly performed in accordance with national and local environmental regulations.

4.3 Local Stakeholder Consultation

A public hearing has been performed as part of the environmental impact assessment and one of the main channels of community participation at a local level before project construction of the complex.

A note in Union's Official Journal and in regional and/or local large circulation newspaper, radios and banners has invited the stakeholders.

No negative comments from local stakeholders have been received.

Several channels of communication with stakeholders are in place in order to allow complaints and suggestions of local community.

4.4 Public Comments

The joint VCS-PD and MR of the grouped project has been listed on the VCS pipeline on 16/10/2018, thus before the start of the validation process.

No comments have been received during the public comment period.

5 VERIFICATION FINDINGS

5.1 Accuracy of GHG Emission Reduction and Removal Calculations

- the approved CDM methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0 is applied to the project activity. GHG emission reduction is calculated as baseline emissions;
- no project emissions are considered for the project activity, in accordance with the applied methodology;
- no leakage is considered for this kind of project, in accordance with the applied methodology;
- all methods and formulas used in the calculations of emission reductions have been followed in accordance to the applied methodology and monitoring plan of the joint VCS-PD and MR;
- all monitored data are traceable;

- all monitored equipment that require calibration have been calibrated for the entire monitoring period. They are:
 - o Main meter 1 – Schneider Electric – Model ION8650 – Serial # MW-1410A004-01
 - o Main meter 2 – Schneider Electric – Model ION8650 – Serial # MW-1410A005-01
 - o Backup meter 1 – Schneider Electric – Model ION8650 – Serial # MW-1401A151-01
 - o Backup meter 2 – Schneider Electric – Model ION8650 – Serial # MW-1401A427-01

Fixed parameters:

- *The percentage share of total installed capacity of the specific technology: **10.4%*** (as per Section 4.1 of joint VCS-PD and MR);
- *The total installed capacity of the technology – the total installed capacity of the technology in the host country: **12,537,943 MW*** (as per Section 4.1 of joint VCS-PD and MR).

Monitored parameters:

- $EG_{facility,y}$: Quantity of net electricity generation supplied by the project plant/unit to the grid in year y: **14,028 MWh/y** for 2016; **1,196,308 MWh/y** for 2017 and **770,684 MWh/y** for 2018;
- $EF_{grid,CM,y}$: Combined Margin CO₂ emission factor for grid connected power generation in year y: **0.5066 tCO₂e/MWh** for 2016; **0.4418 tCO₂e/MWh** for 2017 and **0.4418 tCO₂e/MWh** for 2018 (the value of 2017 is also being used for 2018, as those are the latest set of data of $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ available at the Brazilian DNA website).

The emission reduction spreadsheet is transparent, traceable and correct, with no manual transposition errors.

Baseline emissions (BE_y)

The baseline emissions are calculated as follows:

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

Where:

BE_y	Baseline emissions during the year y;
$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y;
$EF_{grid,CM,y}$	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system”.

As the project is the implementation of greenfield plants, $EG_{PJ,y} = EG_{facility,y}$ (quantity of net electricity generation supplied by the project plant/unit to the grid in year y).

In addition, $EF_{grid,CM,y}$ is calculated as follows:

$$EF_{grid,CM,y} = W_{OM} * EF_{grid,OM,y} + W_{BM} * EF_{grid,BM,y}$$

Where:

$EF_{grid,OM,y}$	Build margin CO ₂ emission factor in year y;
$EF_{grid,BM,y}$	Amount of product produced in year y;
W_{OM}	Weighting of operating margin emissions factor;

W_{BM} Weighting of build margin emissions factor

So, $BE_{2016} = 7,107 \text{ tCO}_2\text{e}$; $BE_{2017} = 528,551 \text{ tCO}_2\text{e}$; and $BE_{2018} = 340,502 \text{ tCO}_2\text{e}$.

Thus, $BE_{2016-2018} = 876,160 \text{ tCO}_2\text{e}$.

Project emissions (PE_y)

No project emissions are considered for the project activity. Thus, $PE_y = 0 \text{ tCO}_2\text{e}$.

Leakage emissions (LE_y)

No leakage is considered for this kind of project. Thus, $LE_y = 0 \text{ tCO}_2\text{e}$.

Emission Reductions

Therefore, according to the applied methodology, as PE_y and $LE_y = 0 \text{ tCO}_2\text{e}$, $ER_y = BE_y$.

Where:

ER_y :	Emissions reductions during the year y ;
BE_y :	Baseline emissions during the year y ;
PE_y :	Project reductions in year y ;
LE_y :	Leakage reductions in year y .

Thus, $ER_y = BE_y$. So, $ER_y = 876,160 \text{ tCO}_2\text{e}$.

5.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

- records were submitted by the project proponent as evidences to determine emission reduction;
- the records, data and information provided were found valid for the current verification period. The documents were verified during site visit and when possible, were checked directly from its source;
- interviews were performed during site visit with involved personnel and PP's representatives;
- the GHG emission reduction calculations were check step by step with PP's representatives;
- the quality of evidences were found of adequate level by the verification team to ensure an accurate quantification of the emission reductions.

6 VALIDATION AND VERIFICATION CONCLUSION

ESPL, contracted by VTRM Energia Participações S.A., has performed the independent validation of the grouped project "VTRM Renewable Energy" and 1st verification of the period from 09/12/2016 to 31/07/2018 (both days included).

The PPs are responsible for the information about the implementation of the grouped project and for the collection of data, in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

ESPL commenced the validation and verification based on the baseline and monitoring methodology ACM0002 – version 19.0 and draft joint VCS-PD and MR.

ESPL's validation approach is based on the understanding of the risks associated with reporting the project activity, estimates of GHG emission data and the controls to be implemented to mitigate these. ESPL planned and performed the validation by obtaining evidence, other information and explanations that ESPL considered necessary to give reasonable assurance that the estimated GHG emission reductions are fairly to be achieved.

In addition, ESPL's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

The validation and verification team confirms that:

- the grouped project is in accordance with all relevant host country criteria (Brazil) and CDM rules and requirements;
- the grouped project is in accordance with all conditions of the latest version of applied methodology ACM0002 – Grid-connected electricity generation from renewable sources – version 19.0;
- the first instance to be included along with this validation accomplishes with all eligibility criteria of the grouped project;
- the local stakeholders' consultation has been performed in accordance with host country and VCS requirements;
- the environmental assessment is appropriate and sufficient;
- the monitoring plan is transparent and adequate;
- all information has been consistently applied in the joint PD and MR;
- the implementation of the project has been done as per description in the joint PD and MR;
- the monitoring system is in place; and
- the emission reductions are calculated without material misstatements.

Thus, the GHG emissions reductions reported for the project activity for the period 09/12/2016 to 31/07/2018 (including both days) are fairly stated in the final version of the joint VCS-PD and MR. The GHG emission reductions were calculated correctly based on the approved baseline and monitoring methodology ACM0002 – version 19.0 and the monitoring plan contained in the joint VCS-PD and MR.

Therefore, ESPL is able to certify that the emission reductions from the VCS grouped project "VTRM Renewable Energy".

Verification period: From 09-December-2016 to 31-July-2018.

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2016	7,107	0	0	7,107
Year 2017	528,551	0	0	528,551

Year 2018	340,502	0	0	340,502
Total	876,160	0	0	876,160

Approved by



Kaviraj Singh
Managing Director

14/03/2019

APPENDIX I: REFERENCES

No.	Title	References
1.	<u>Methodology</u> ACM0002 – Grid-connected electricity generation from renewable sources	version 19.0
2.	Joint VCS-PD and MR – draft / revised	version 01 – 16/04/2018 version 02 – 19/11/2018 version 03 – 21/11/2018 version 04 – 27/11/2018
3.	Joint VCS-PD and MR – final	version 05 – 12/05/2019
4.	ER Spreadsheet – draft / revised	version 1 version 2
5.	ER Spreadsheet – final	version 3
6.	<u>Environmental impact assessments</u> - PBA – Santo Estevão I Wind Farm Complex – Diversa - PBA – Santo Estevão II Wind Farm Complex – Diversa - PBA – Santo Estevão III Wind Farm Complex – Diversa - PBA – Santo Estevão IV Wind Farm Complex – Diversa - PBA – Santo Estevão II Wind Farm Complex – Diversa - EIA – Chapada do Piauí Wind Farm Complex – Geoconsult	Mar/2015 Mar/2015 Mar/2015 Mar/2015 Mar/2015 May/2015
7.	<u>Operation Licenses</u> - Ventos de Santo Estevão I: # 03.17.04.001303-8 – CPRH – valid until 16/04/2021 - Ventos de Santo Estevão II: # 03.17.04.001300-7 – CPRH – valid until 16/04/2021 - Ventos de Santo Estevão III: # 03.16.11.005145-1 – CPRH – valid until 24/11/2020 - Ventos de Santo Estevão IV: # 03.17.07.002272-7 – CPRH – valid until 17/07/2021 - Ventos de Santo Estevão V: # 03.16.11.005144-4 – CPRH – valid until 24/11/2020 - Ventos de São Virgílio I: # D000246/17 – 002001/17 – SEMAR – valid until 31/05/2021 - Ventos de São Virgílio II: # D000677/16 – 008516/16 – SEMAR – valid until 18/11/2020 - Ventos de São Virgílio III: # D000247/17 – 002000/17 – SEMAR – valid until 31/05/2021 - Ventos de Santo Onofre IV: # D000075/17 – 000945/17 – SEMAR – valid until 14/02/2021 - Ventos de Santo Augusto I: # D000068/17 – 000923/17 – SEMAR – valid until 10/02/2021 - Ventos de Santo Augusto II: # D000678/16 – 008514/16 – SEMAR – valid until 18/11/2020	17/04/2017 17/04/2017 25/11/2016 18/17/2017 25/11/2016 31/05/2017 18/11/2016 31/05/2017 14/02/2017 10/02/2017 18/11/2016 14/02/2017 14/02/2017

	- Ventos de Santo Augusto VI: # D000076/17 – 000944/17 – SEMAR – valid until 14/02/2021 - Ventos de Santo Augusto VII: # D000077/17 – 000924/17 – SEMAR – valid until 14/02/2021 - Ventos de Santo Augusto VIII: # D000679/16 – 008512/16 – SEMAR – valid until 18/11/2020	18/11/2016
8.	<u>Plant Load Factor</u> Energy Production Reports for the Ventos do Araripe III Wind Complex – AWS TruePower	23/10/2017
9.	<u>Authorization for Operation</u> - Ventos de Santo Estevão I: - o Dispatch # 1810 – ANEEL (WTG 1 to 11) - Ventos de Santo Estevão II: - o Dispatch # 1243 – ANEEL (WTG 7 to 11) - o Dispatch # 1368 – ANEEL (WTG 1, 2, 4 and 6) - o Dispatch # 1615 – ANEEL (WTG 3 and 5) - Ventos de Santo Estevão III: - o Dispatch # 3216 – ANEEL (WTG 1 to 13) - Ventos de Santo Estevão IV: - o Dispatch # 3358 – ANEEL (WTG 1 to 13) - Ventos de Santo Estevão V: - o Dispatch # 3239 – ANEEL (WTG 1 to 10) - o Dispatch # 277 – ANEEL (WTG 11 and 12) - Ventos de São Virgílio I: - o Dispatch # 2714 – ANEEL (WTG 1 to 13) - Ventos de São Virgílio II: - o Dispatch # 395 – ANEEL (WTG 1 to 5) - o Dispatch # 509 – ANEEL (WTG 6 to 8) - o Dispatch # 562 – ANEEL (WTG 7 and 9 to 13) - Ventos de São Virgílio III: - o Dispatch # 3329 – ANEEL (WTG 1 to 9) - Ventos de Santo Onofre IV: - o Dispatch # 1684 – ANEEL (WTG 1 to 12) - Ventos de Santo Augusto I: - o Dispatch # 508 – ANEEL (WTG 1 to 8) - Ventos de Santo Augusto II: - o Dispatch # 3404 – ANEEL (WTG 1 to 12) - Ventos de Santo Augusto VI: - o Dispatch # 827 – ANEEL (WTG 1 to 4) - o Dispatch # 836 – ANEEL (WTG 5 to 13) - Ventos de Santo Augusto VII: - o Dispatch # 600 – ANEEL (WTG 1 to 4) - o Dispatch # 729 – ANEEL (WTG 5 to 8) - Ventos de Santo Augusto VIII: - o Dispatch # 3382 – ANEEL (WTG 1 to 8)	22/06/2017 05/05/2017 17/05/2017 06/06/2017 08/12/2016 02/10/2017 12/12/2016 31/01/2017 29/08/2017 09/02/2017 17/02/2017 23/02/2017 28/09/2017 13/06/2017 17/02/2017 28/12/2016 23/03/2017 24/03/2017 03/03/2017 15/03/2017 23/12/2016
10.	<u>Financial data</u> - Results of the 18th Auction	Oct/2013

- Information of the 6 th Auction of Energy for Reserve – CCEE	31/10/2014
- Result of the 20 th Auction	Nov/2014
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Estevão I – ID #1031804	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Estevão II – ID #1031803	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Estevão III – ID #1031802	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Estevão IV – ID #1031814	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Estevão V – ID #1031800	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Virgílio I – ID #1031811	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Virgílio II – ID #1031810	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Virgílio III – ID #1031813	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Onofre IV – ID #1031812	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Augusto I – ID #1031798	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Augusto II – ID #1031801	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Augusto VI – ID #1031795	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Augusto VII – ID #1031796	27/07/2015
- Contract of purchase of wind turbines – GE Energy do Brasil and Ventos de Santo Augusto VIII – ID #1031799	27/07/2015
- Contract Civil BOP – Cortez Engenharia and each SPC	14/09/2015
- RMT Contract – Construtora Sucesso S.A. and each SPC	30/10/2015
- Contract between Siemens and each SPC	30/09/2015
- Contract of Purchase of Transformers – Siemens Ltda. and Ventos do Araripe 3 Complex	30/09/2015
- Contract of Purchase of Capacitors bank – Siemens Ltda. and each SPC	18/04/2017
- Contract of Transmission line – SadeSul and each SPC	25/11/2015
- Contract of Reclosers – Siemens and each SPC	30/09/2015
- BNDES Contract of Direct Loan – BNDES and Ventos do Araripe 3 Complex	24/02/2017
- BNDES Contract Indirect Loan – Bradesco, Santander and Ventos do Araripe 3 Complex	08/02/2017
- Full Service Agreement – GE POWER and Water and each SPC	26/06/2017
- Insurance Policy 03.51.1.001591	06/06/2018
- TUST – ANEEL Technical Note # 162/2015-SGT/ANEEL	19/06/2015
- TFSEE – ANEEL Dispatch # 88	13/01/2017
- TFSEE – Law # 9427	1996
- Land Lease Agreements	-
- PIS and COFINS – Law # 10637; Law # 10833 and Normative Instruction # 247	-

	- CSLL – Law #9249 and Law # 9431 - IRPJ – Law # 9249 and Law # 9430 - Inflation http://www.bcb.gov.br/Pec/metase/TabelaMetaseResultados.pdf	- - -
11.	<u>Financial Assessment</u> - Excel Financial Analysis Ventos do Araripe III Complex	version 1 version 2
12.	<u>Common Practice Analysis</u> - Excel demonstration – Common Practice Consolidation	version 1 version 2 version 3
13.	<u>Technical Data</u> Technical Manual of WTG – Wind Power Turbines 1 & 2MW and 3MW Onshore – GE Power and Water	-
14.	<u>Operation Procedures</u> Standard Operational Procedures – Votorantim Energia	-
15.	<u>Monitoring data</u> - Monitoring report extracted from the meters - CCEE report of all plants (extracted directly CCEE website)	2016 / 2017 / 2018 2016 / 2017 / 2018
16.	<u>Calibration certificates</u> - Main meter 1 – Serial # MW-1410A004-01 – CAM Gym - Main meter 2 – Serial # MW-1410A005-01 – CAM Gym - Backup meter 1 – Serial # MW-1401A151-01 – CAM Gym - Backup meter 2 – Serial # MW-1401A427-01 – CAM Gym	13/12/2014 13/12/2014 17/07/2014 17/07/2014
17.	IPCC publications	www.ipcc-nggip.iges.or.jp
18.	UNFCCC	http://cdm.unfccc.int
19.	VCS	https://verra.org/

APPENDIX II: ABBREVIATIONS

Abbreviations	Full texts
BE	Baseline Emission
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CPRH	Environmental Agency of the State of Pernambuco
CL	Clarification Request
DOE	Designated Operational Entity
EIA	Environmental Impact Assessment
ER	Emission Reduction
ESPL	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IBAMA	Brazilian Institute of the Environment and Natural Renewable Resources
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PBA	Environmental Basic Project
PE	Project Emission
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
RAS	Simplified Environmental Report
SEMAR	Secretary of the Environment of the State of Piauí
SPC	Special Purpose Company
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCS-PD	VCS – Project Description
VCU	Verified Carbon Unit
XLS	Emission Reduction Calculation Spread Sheet
WPP	Wind Power Plant
WPT	Wind Power Turbine

APPENDIX III: FINDINGS

Table 1. CL from this joint validation and verification

CL ID	01	Section no.	3.1	Date: 25/10/2018
Description of CL				
In Section 1.2, it is not clear how the eligibility criteria for inclusion of instances are going to be evidenced. In addition, criterion 7 is not clear what has to be evidenced.				
Project participant response				Date: 19/11/2018
In the version 02 of VCS Project Description & Monitoring Report, it was added information about how each eligibility criteria for inclusion of instances can be evidenced. Criterion 07 was reviewed.				
DOE assessment				Date: 21/11/2018
It is now clear how the eligibility criteria for inclusion of instances are going to be evidenced. Criterion 8 (former criterion 7) is now clear.				

CL ID	02	Section no.	3.1	Date: 25/10/2018
Description of CL				
In Section 1.12.1, it is not clear, nor evidenced by proof of title, the project ownership by VTRM.				
Project participant response				Date: 19/11/2018
For each plant, it was created a Special Purpose Company (SPC) due to tax reasons. A Holding called Ventos de São Estevão Holding S.A is the owner of all SPCs. VTRM Energia Participações S.A (VTRM) is the only shareholder of this holding. The Financial Statement of Ventos de São Estevão Holding S.A shows that VTRM owns Ventos de São Estevão Holding S.A (Pages 08 and 09). It also shows that Ventos de São Estevão Holding S.A owns each Special Purpose Company that owns each plant (page 10). This financial statement is audited by PwC and it was issued at August 15, 2018.				
DOE assessment				Date: 21/11/2018
It was evidenced that VTRM Energia Participações S.A is the owner of the project as it is the only shareholder of the Ventos de São Estevão Holding S.A, which owns the 14 special purpose companies (each wind farm).				

CL ID	03	Section no.	3.3.1	Date: 25/10/2018
Description of CL				
In Section 2.1, the list of tools is not in accordance with the applied ones.				
Project participant response				Date: 19/11/2018
List of tools was updated in the version 02 of VCS Project Description & Monitoring Report.				
DOE assessment				Date: 21/11/2018
The list of tools is now complete with all the tools applied to the project activity.				

CL ID	04	Section no.	3.3.5	Date: 25/10/2018
Description of CL				
In Section 2.6 – Sub-step 1b, it is not clear if both alternatives P1 and P2 are consistent with mandatory laws and regulations.				
Project participant response				Date: 19/11/2018
Section 2.6 – Sub-Step 1b was modified in the version 02 of VCS Project Description & Monitoring Report.				
DOE assessment				Date: 21/11/2018

At Sub-step 1b in Section 2.6, it is now clear that both alternatives P1 and P2 are totally consistent with all Brazilian mandatory laws and regulations.

CL ID	05	Section no.	3.3.6	Date: 25/10/2018
Description of CL				
It is not clear the application of a factor of 97.5% in the calculation of the estimates of electricity generation.				
Project participant response				Date: 19/11/2018
In the version 02 of VCS Project Description & Monitoring Report, electricity generation estimation was reviewed and the application of 97.5% factor was not considered.				
DOE assessment				Date: 21/11/2018
The 97.5% factor used in the calculation of the estimates of electricity generation has been disregarded.				

CL ID	06	Section no.	4.3	Date: 25/10/2018
Description of CL				
In Section 5.3, it is not clear if comments have been made during the local stakeholder consultation and what kind of actions have been taken by the PPs.				
Project participant response				Date: 19/11/2018
In the VCS Project Description & Monitoring Report, Version 02, Section 5.3 was modified. The minute of the stakeholder consultation is provided to DOE. This minute register local stakeholder comments and project representatives' answer.				
DOE assessment				Date: 21/11/2018
Section 5.3 has been revised. During the stakeholder consultation process, just questions about the implementation and operation of the plants have been registered, which have been totally clarified by project representatives. No actions have been made necessary.				

CL ID	07	Section no.	4.4	Date: 25/10/2018
Description of CL				
In Section 5.4, it is not clear if public comments have been received.				
Project participant response				Date: 19/11/2018
No public comments were received.				
DOE assessment				Date: 21/11/2018
During the public consultation period, no comments have been received.				

CL ID	08	Section no.	3.3.5	Date: 25/10/2018
Description of CL				
At the financial analysis spreadsheet – tab “Cash Flow”, it is considered that all plants started operation in the same year. Nevertheless, in reality operation dates were different and it is not justified in VCS-PD whether this is a conservative simplification.				
Project participant response				Date: 19/11/2018
VCS Project Description & Monitoring Report, Version 02 justifies this option. This is a conservative approach once it considers that revenues related to the full amount of electricity generated by all plants happen since the first operational month. This assumption contributes for a higher IRR.				
DOE assessment				Date: 21/11/2018
At the financial analysis, it was included a clarification that the consideration that all plants started operation at the same time simplifies the financial model and it is conservative, as the revenues related				

to the full amount of electricity generated by all plants since the first month of the cash flow increases the IRR, which is correct as per the validation team's understanding.

CL ID	09	Section no.	3.3.5	Date: 25/10/2018
Description of CL				
The percentages of Equity/Debt considered in the financial analysis do not reflect the standard in the sector in the host country.				
Project participant response				Date: 19/11/2018
The percentages of Equity/Debt considered in the financial analysis were reviewed according to actual values of the loan contracts of the project.				
DOE assessment				Date: 21/11/2018
As the PP revised the financial analysis based on the guidelines of CDM project standard for programmes of activities – version 01.0, using the actual values of the parameters, the percentages of Equity/Debt according to this approach have been revised to the actual values of the loan contracts of the project (35.2/64.8).				

CL ID	10	Section no.	3.3.5	Date: 25/10/2018
Description of CL				
The O&M contracts of São Augusto I and São August VIII have not been provided.				
Project participant response				Date: 19/11/2018
O&M contracts of São Augusto I and São August VIII were presented to DOE after validation site visit.				
DOE assessment				Date: 21/11/2018
The O&M contracts of São Augusto I and São August VIII have been presented to and checked by the validation team.				

CL ID	11	Section no.		Date: 25/10/2018
Description of CL				
The calibration certificates of the electricity meters have not been provided.				
Project participant response				Date: 19/11/2018
The calibration certificates of the electricity meters were presented to DOE after validation site visit.				
DOE assessment				Date: 21/11/2018
All calibration certificates of the electricity meters have been presented to the verification team. The meters have been calibrated during all the present monitoring period.				

CL ID	12	Section no.	5.1	Date: 25/10/2018
Description of CL				
The readings of the meters located at Curral Novo do Piauí II Substation have not been presented do the verification team.				
Project participant response				Date: 19/11/2018
Readings of the meters located at Curral Novo do Piauí II Substation were supplied after site visit validation.				
DOE assessment				Date: 21/11/2018
The readings of the meters located at Curral Novo do Piauí II Substation have been presented do the verification team.				
Nevertheless, it is necessary to clarify why the losses that appear at the CCEE reports have not been considered and the reason why there are months that the difference between the values of the meters at Curral Novo do Piauí II Substation are so different from the ones of CCEE reports.				

Project participant response #2	Date: 22/11/2018
From the period of December/2016 to September/2017, differences from values of the meters and CCEE reports are significant. From October/2017 to July/2018, the differences are acceptable and similar levels of Brazilian Electric Sector. VTRM team contacted the outsourced agent to review the values and to explain what happened from the period of December/2016 to September/2017. Outsourced agents reviewed the values of the meters and of the system WAY2. The same values previously obtained were found. As VTRM was not responsible for the plants from December/2016 to September/2017, once the acquisition of the project just happened in 2018, it was not possible to identify reasons for these differences. Hypotheses were formulated by operation team of VTRM. But Operation Team of VTRM cannot state with certainty the real reason for what happened. From the time, VTRM manages the project, differences between CCEE Report and values of the meters are similar to the standard of Brazilian Electric Sector. Regarding the losses that appear at the CCEE reports, these losses were presented in the report because these values are used for commercial team estimate losses for future months. The column that shows net electricity already considered these losses. Therefore, it should not be accounted. This could be showed when commercial team present public reports of CCEE where the values of net electricity are the same of those presented by PPs in CCEE report.	
DOE assessment #2	Date: 23/11/2018
As revealed by PP's representative, the column with the values of losses in the CCEE reports are just for internal purposes, as the column of net generation already takes into account those losses. In addition, based on PP's representatives' opinion, the differences in the values of the meters at Curral Novo do Piauí II Substation are so different from the ones of CCEE reports in the beginning of the operation of the plants might be due to necessary adjustments that could be made just during the operation itself. As the PP was not the owner of the plants at the time, the cause cannot be defined. Nevertheless, the values used in the ER calculations are all the lowest values of each month, therefore, the calculations use the most conservative data.	

Table 2. CAR from this joint validation and verification

CAR ID	13	Section no.	3.3.5	Date: 25/10/2018
Description of CAR				
Some of the input data in financial analysis are not valid and applicable at the time of investment decision.				
Project participant response				Date: 19/11/2018
The financial analysis was reviewed. As recommended by <i>CDM project standard for programmes of activities</i> , version 01.0, paragraph "g", item "iv", the additionality of the initial project instances of this grouped project is assessed by using the actual values, applicable at the time of this Joint Project Description & Monitoring Report elaboration. Therefore, VCS Project Description & Monitoring Report, Version 02 and Financial analysis spreadsheet Version 02 present financial analysis using actual values.				
DOE assessment				Date: 21/11/2018
As the PP revised the financial analysis based on the guidelines of CDM project standard for programmes of activities – version 01.0, using the actual values of the parameters, all input data are now actual values.				
CAR ID	14	Section no.	3.3.5	Date: 25/10/2018
Description of CAR				
The values of TUST presented at the financial analysis are not in accordance with presented evidences.				
Project participant response				Date: 19/11/2018
Values of TUST were reviewed. Financial analysis spreadsheet Version 02 and VCS Project Description & Monitoring Report, Version 02, present updated values.				

DOE assessment	Date: 21/11/2018
The values of TUST presented at the financial analysis are now in accordance with presented evidences.	

CAR ID	15	Section no.	3.3.5	Date: 25/10/2018
Description of CAR				
The values of RMT contracts used in the financial analysis for Santo Estevão I, Santo Estevão III, Santo Estevão IV and Santo Augusto VIII are not in accordance with respective contracts presented to the validation team.				
Project participant response				Date: 19/11/2018
Values of RMT contracts used in the financial analysis for Santo Estevão I, Santo Estevão III, Santo Estevão IV and Santo Augusto VIII were corrected at the financial analysis presented in VCS Project Description & Monitoring Report, Version 02.				
DOE assessment				Date: 21/11/2018
The values of RMT contracts used in the financial analysis for Santo Estevão I, Santo Estevão III, Santo Estevão IV and Santo Augusto VIII are now in accordance with respective contracts.				

CAR ID	16	Section no.	3.3.5	Date: 25/10/2018
Description of CAR				
The common practice analysis has not been performed in accordance with the Methodological Tool Common Practice, version 03.1.				
Project participant response				Date: 19/11/2018
VCS Project Description & Monitoring Report, Version 02 presents a reviewed version of common practice analysis in accordance with the Methodological Tool Common Practice, version 03.1.				
DOE assessment				Date: 21/11/2018
The Common Practice analysis has been revised, but still presents some inconsistencies: a. Step 2: it is not clear if all considered thermal plants have biomass as fuel; b. Step 2: the New Model of the Brazilian Electric Sector cannot be considered at this moment of the analysis; c. Step 2: the wind complex “União dos Ventos” has not been considered although within the range and with operation started before 09/12/2016. CAR remains open.				
Project participant response #2				Date: 22/11/2018
VCS Project Description & Monitoring Report, Version 03 presents reviewed version of common practice analysis considering DOE Assessment.				
DOE assessment #2				Date: 23/11/2018
The Common Practice analysis has been revised and it is now in accordance with the requirements. The analysis is as follows: The geographical region that was considered for the analysis is the national (Brazil) scenario, which is reasonable as the energy sector rules are the same for the whole country. As the financial analysis has been done with the installed capacity of all fourteen plants (538.8 MW), the same value has been used for the Common Practice analysis. From all electricity plants with renewable fuel in operation in Brazil, there are 57 plants with the installed capacity between 179.4 MW and 538.2 MW (+/- 50% of the installed capacity of the project activity) and have started before the starting date of the proposed project (09/12/2016) and not under CDM validation or already registered. Therefore, there are 57 plants in operation in Brazil similar to the project activity. So, $N_{all} = 57$.				

From those 57 plants, 6 are thermal biomass plants and 46 are hydro power plants (some of those are also under PROINFA – Brazilian government incentive).

Therefore, 52 plants apply technologies that are different to the technology applied in the proposed project activity. So, $N_{diff} = 52$.

Finally, as $F = 0.087719$ (i.e. lower than 0.2) and $N_{all} - N_{diff} = 5$ (i.e. not lower than 3), the proposed project activity is not a common practice within the sector in the applicable geographical area.

This demonstrates that project activity is not the common or prevailing practice.

CAR ID	17	Section no.	1.4; 3.1; 3.3.5; 3.3.6	Date: 25/10/2018
Description of CAR				
The presented installed capacity of WPP São Virgílio 3 is not in consistent with actual scenario. In addition, the total installed capacity of the entire complex is not correct.				
Project participant response				Date: 19/11/2018
Installed capacity of WPP São Virgílio III and the total installed capacity of the entire complex were corrected.				
DOE assessment				Date: 21/11/2018
The installed capacity of WPP São Virgílio III is now in consistent with actual scenario, where there is an installed capacity of 20.7 MW, resulting in a total installed capacity of the entire complex in 358.8 MW.				

CAR ID	18	Section no.	1.4; 3.1	Date: 25/10/2018
Description of CAR				
The estimated ERs for 2026 have not been calculated for the correct period.				
Project participant response				Date: 19/11/2018
In the version 02 of VCS Project Description & Monitoring Report, emission reduction (ER) calculation was reviewed and ER for 2016 corrected.				
DOE assessment				Date: 21/11/2018
The estimated ERs for 2026 have been revised and calculated for the correct period, from 01/01/2026 to 08/12/2026.				

Table 3. FAR from this joint validation and verification

Not applicable