VALIDATION AND VERIFICATION REPORT

VTRM RENEWABLE ENERGY 2

Document Prepared by Earthood Services Private Limited

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Summary:

Brief summary of the project activity

"VTRM Renewable Energy 2" 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 Piauí Complex, composed by seven wind power plants, with total installed capacity of 205.80 MW and estimated annual average GHG emission reductions of 439,950 tCO_2.

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

Scope of validation and verification

Ventos de Santo Vinicius Energias Renováveis S.A, Ventos de Santo Alberto Energias Renováveis S.A, Ventos de Santo Agostinho Energias Renováveis S.A, Ventos de Santa Albertina Energias Renováveis S.A, Ventos de São Casimiro Energias Renováveis S.A, Ventos de São Adeodato Energias Renováveis S.A e Ventos de Santo Afonso Energias Renováveis S.A have contracted ESPL to conduct the validation of the grouped project "VTRM Renewable Energy 2" and 1st verification of the period from 02/08/2017 to 28/02/2019 (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 2" and verification for the monitoring period from 02/08/2017 to 28/02/2019 (both days included).

During the present VCS validation and verification, 04 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 482,465 tCO_2e in the above-mentioned monitoring period.

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1 INTRODUCTION

1.1 Objective

Ventos de Santo Vinicius Energias Renováveis S.A, Ventos de Santo Alberto Energias Renováveis S.A, Ventos de Santo Agostinho Energias Renováveis S.A, Ventos de Santa Albertina Energias Renováveis S.A, Ventos de São Casimiro Energias Renováveis S.A, Ventos de São Adeodato Energias Renováveis S.A e Ventos de Santo Afonso Energias Renováveis S.A have contracted ESPL to conduct the validation of the grouped project "VTRM Renewable Energy 2" and 1st verification of the period from 02/08/2017 to 28/02/2019 (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 aim to achieve a reasonable level of assurance.

1.4 Summary Description of the Project

"VTRM Renewable Energy 2" 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 Piauí Complex, composed by seven wind power plants, with total installed capacity of 205.8 MW and estimated annual average GHG emission reductions of 439,950 tCO_2.

The project is listed at VCS and can be accessed by the following link: https://www.vcsprojectdatabase.org/#/pipeline_details/PL1903

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	24/06/2019	Project implementation	Sergio Cruz Ricardo Lopes
2.	Perucci	Flávia	WayCarbon	24/06/2019	VCS aspects Financial assessment	Sergio Cruz Ricardo Lopes
3.	Carepa de Sousa	Julio	WayCarbon	24/06/2019	VCS aspects Financial assessment	Sergio Cruz Ricardo Lopes

4.	Garcia	Janaína	Votorantim Energia	24/06/2019	Electricity generation	Sergio Cruz Ricardo Lopes
5.	Pedrosa	Guilherme	Votorantim Energia	24/06/2019	Electricity generation	Sergio Cruz Ricardo Lopes
6.	Nogueira	Thiago	Votorantim Energia	26/06/2019	Technical and environmental aspects	Sergio Cruz
7.	Silva	Ítalo	Votorantim Energia	26/06/2019	Operation and monitoring of the project activity	Sergio Cruz
8.	De Sena	Jackson	Votorantim Energia	26/06/2019	Operation and monitoring of the project activity	Sergio Cruz
9.	Soares	Cristiano	Votorantim Energia	26/06/2019	Maintenance of the project activity	Sergio Cruz

2.4 Site Inspections

Duration of on-site inspection: 24 and 26/06/2019				
#	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening Meeting at PP's office	São Paulo	24/06/2019	Sergio Cruz Ricardo Lopes
2.	Implementation of project	São Paulo	24/06/2019	Sergio Cruz Ricardo Lopes
3.	Technical aspects and VCS aspects	São Paulo	24/06/2019	Sergio Cruz Ricardo Lopes
4.	Local Stakeholder Consultation process and Environmental impacts	São Paulo	24/06/2019	Sergio Cruz Ricardo Lopes
5.	Monitoring plan	São Paulo	24/06/2019	Sergio Cruz Ricardo Lopes
6.	Additionality assessment	São Paulo	24/06/2019	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	24/06/2019	Sergio Cruz
8.	Review of monitored data and relevant document in accordance with registered	São Paulo	24/06/2019	Sergio Cruz

	monitoring plan and applied monitoring methodology.			
9.	Review of ER calculations in accordance with applied methodology and relevant tools.	São Paulo	24/06/2019	Sergio Cruz
10.	Physical inspection of the site	Curral Novo do Piauí	26/06/2019	Sergio Cruz
11.	Interview of monitoring personnel	Curral Novo do Piauí	26/06/2019	Sergio Cruz
12.	Assessment of evidences	Curral Novo do Piauí	26/06/2019	Sergio Cruz
13.	Compilation of audit findings	Curral Novo do Piauí	26/06/2019	Sergio Cruz
14.	Closing Meeting	Curral Novo do Piauí	26/06/2019	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, 04 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 an clear description of the grouped project and its first instance being included.

"VTRM Renewable Energy 2" 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 (CO_2) 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 given by ACM0002 – version 19.0, 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" – *to be evidenced by the document of validation of inclusion of the instance*;
  3. include just greenfield wind power plants connected to the grid – *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 face financial constraints and demonstrate additionality using investment analysis method – *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 (02/08/2017) – *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 Piauí Complex, composed by by seven wind power plants, with total installed capacity of 205.8 MW and estimated annual average GHG emission reductions of 439,950 tCO_2.

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 are 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 Piauí Complex to the eligibility criteria of the grouped project:

Criterion	Evidence	Assessment

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 Ventos do Piauí Complex with the applicability conditions of methodology ACM0002 is done in Section 4.5.1 below
2. are subject to the baseline scenario given by ACM0002 – version 19.0	Section 2.4 of the joint PD and MR	the baseline of Ventos do Piauí Complex is the one given by the applied methodology ACM0002
3. include just greenfield wind power plants connected to the grid	Environmental licenses	the EIA and environmental licenses of Ventos do Piauí Complex confirm that the project activity is composed for 7 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 municipality of Curral Novo do Piauí (State of Piauí) – Brazil. The coordinates of each plant are presented below at "Project Location of Ventos do Piauí Complex"
5. must face financial constraints and demonstrate additionality using investment analysis method	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 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	Section 4.3 of the joint PD and MR	the joint PD and MR sets a monitoring plan for the PA, 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 (02/08/2017)	ANEEL's dispatch for the start of commercial operation of first turbine of WPP São Vicente 14	the dispatch authorized the start of the operation of the first turbine of the first WPP of the complex on 02/08/2017

8. evidence the project ownership	Audited financial statement of São Vicente Participações Energias Renováveis S.A.	Ventos de Santo Vinicius Energias Renováveis S.A, Ventos de Santo Alberto Energias Renováveis S.A, Ventos de Santo Agostinho Energias Renováveis S.A, Ventos de Santa Albertina Energias Renováveis S.A, Ventos de São Casimiro Energias Renováveis S.A, Ventos de São Adeodato Energias Renováveis S.A e Ventos de Santo Afonso Energias Renováveis S.A are the project owners. All SPCs belong to São Vicente Holding S.A, which has VTRM Energia Participações S.A. as its only shareholder.

Some of the characteristics of the grouped project "VTRM Renewable Energy 2" and its instance Ventos do Piauí 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 tCO_2e/y);
- Start Date: 02/08/2017 – date of the start of commercial operation of the first turbine of Ventos do Piauí Complex;
- Crediting Period: from 02/08/2017 to 01/08/2027 – 10 years – renewable;
- Project Ownership of Ventos do Piauí Complex: Ventos de Santo Vinicius Energias Renováveis S.A, Ventos de Santo Alberto Energias Renováveis S.A, Ventos de Santo Agostinho Energias Renováveis S.A, Ventos de Santa Albertina Energias Renováveis S.A, Ventos de São Casimiro Energias Renováveis S.A, Ventos de São Adeodato Energias Renováveis S.A e Ventos de Santo Afonso Energias Renováveis S.A are the project owners. All SPCs belong to São Vicente Participações Energias Renováveis S.A., which has VTRM Energia Participações S.A. as its only shareholder. The information is demonstrated by the audited financial statement of the holding;
- Project Location of Ventos do Piauí Complex: municipality of Curral Novo do Piauí (State of Piauí) – Brazil. Coordinates of each plant of are presented as follows:
  - Ventos de São Vicente 08: LAT 8° 0' 50.73" / LONG 40° 38' 18.07";
  - Ventos de São Vicente 09: LAT 8° 0' 42.05" / LONG 40° 39' 4.54";
  - Ventos de São Vicente 10: LAT 8° 0' 23.50" / LONG 40° 38' 16.24";
  - Ventos de São Vicente 11: LAT 7° 59' 37.69" / LONG 40° 38' 3.84";
  - Ventos de São Vicente 12: LAT 8° 0' 22.70" / LONG 40° 36' 48.19";
  - Ventos de São Vicente 13: LAT 7° 59' 36.79" / LONG 40° 39' 9.67";
  - Ventos de São Vicente 14: LAT 7° 59' 44.50" / LONG 40° 35' 20.39";

- Technical Data of Ventos do Piauí Complex:

WPPs	Installed Capacity (MW)	Plant Load Factor (%)	Quantity of WPTs (Gamesa – 2.1 MW each)
Ventos de São Vicente 08	29.4	58.85	14
Ventos de São Vicente 09	29.4	59.01	14
Ventos de São Vicente 10	29.4	58.69	14
Ventos de São Vicente 11	29.4	57.97	14
Ventos de São Vicente 12	29.4	58.38	14
Ventos de São Vicente 13	29.4	59.56	14
Ventos de São Vicente 14	29.4	59.35	14

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 09.0.

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 Piauí 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 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.	The project complies with the condition (a) as it is constituted by new wind power plants.
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/m^2; 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/m^2, all of the following conditions shall apply:	Not applicable to the project as it is not composed of hydro power plants.

(i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m^2; (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: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
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 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.	Not applicable to the project as it is not composed of hydro power plants.
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:

a. P1: the project activity not implemented as a CDM project; and

b. 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 seven 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 project internal rate of return (IRR), which is in accordance with the "Methodological Tool Investment Analysis" – version 09.0 and the chosen benchmark is the estimate of the Weighted Average Capital Cost (WACC). Both are calculated in real terms and post taxes.

The PP's assumption is to use the directive of CDM PS for PoA – version 02.0, in which actual values are used for the financial assessment.

The assessment of financial parameters is presented below:

Financial parameter	Value	Assessment
Installed Power	205.8 MW	The value is the total installed capacity of all 7 wind power plants, which is evidenced by their operation licenses. The installed capacity of each plant is as follows: - Ventos de São Vicente 08: 29.7 MW; - Ventos de São Vicente 09: 29.7 MW; - Ventos de São Vicente 10: 29.7 MW;

<table>
<tr><td></td><td></td><td>- Ventos de São Vicente 11: 29.7 MW;
- Ventos de São Vicente 12: 29.7 MW;
- Ventos de São Vicente 13: 29.7 MW;
- Ventos de São Vicente 14: 29.7 MW.</td></tr>
<tr><td>Total Investment</td><td>R$ 1,545,605,925.13</td><td>Total investment cost for the Complex was obtained from contracts of each plant.
The investment cost of each plant is as follows:
- Ventos de São Vicente 08: R$ 221,001,385.50;
- Ventos de São Vicente 09: R$ 220,517,17277;
- Ventos de São Vicente 10: R$ 220,333,944.47;
- Ventos de São Vicente 11: R$ 220,294,182.93;
- Ventos de São Vicente 12: R$ 219,738,203.30;
- Ventos de São Vicente 13: R$ 219,978,303.55;
- Ventos de São Vicente 14: R$ 218,930,673.08.
The Complex has an investment cost around US$ 2,152 per installed kW (conversion rate on 21/08/2015 – date of investment decision: US$ 1.00 = R$ 3.4896).
When comparing this value with other wind farms investments per installed kW 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>
<tr><th>Title</th><th>MW</th><th>US$/kW</th></tr>
<tr><td>Osório Wind Power Plant[1]</td><td>50</td><td>6,584</td></tr>
<tr><td>Pedra do Sal Wind Farm[2]</td><td>18</td><td>3,565</td></tr>
<tr><td>Windfarm Complex Santana do Livramento[3]</td><td>90</td><td>1,998</td></tr>
<tr><td>Windfarm Complex Santa Vitória do Palmar and Chuí[4]</td><td>144</td><td>2,158</td></tr>
<tr><td>Windfarm Morro dos Ventos phase 2[5]</td><td>60</td><td>1,976</td></tr>
</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.</td></tr>
</table>

		• 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; - 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 São Vicente 08: 58.85% - Ventos de São Vicente 09: 59.01% - Ventos de São Vicente 10: 58.69% - Ventos de São Vicente 11: 57.97% - Ventos de São Vicente 12: 58.38% - Ventos de São Vicente 13: 59.36% - Ventos de São Vicente 14: 59.35%	The value certified by third party study as a guarantee percentage of energy that will be generated.
Energy Price	- Ventos de São Vicente 08: R$ 182.39/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

	- Ventos de São Vicente 09: R$ 182.41/MWh - Ventos de São Vicente 10: R$ 182.41/MWh - Ventos de São Vicente 11: R$ 182.42/MWh - Ventos de São Vicente 12: R$ 182.41/MWh - Ventos de São Vicente 13: R$ 182.42/MWh - Ventos de São Vicente 14: R$ 182.40/MWh	
Generated electricity for sale	1,060,590 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 São Vicente 08: 151,567 MWh/y; - Ventos de São Vicente 09: 151,979 MWh/y; - Ventos de São Vicente 10: 151,144 MWh/y; - Ventos de São Vicente 11: 149,298 MWh/y; - Ventos de São Vicente 12: 150,358 MWh/y; - Ventos de São Vicente 13: 153,397 MWh/y; - Ventos de São Vicente 14: 152,847 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)
COFINS	3%	
Income Tax	15%	
Additional Income Tax	10%	
CSLL	9%	

		- 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.
Operation and Maintenance – wind turbines	- R$ 102,275.00/y/WTG – for the 1st and 2nd years - R$ 130,400.00/y/WTG – from the 3rd year onwards	O&M costs per wind generator per period of years given by the Full Service Agreement between each Wind Power Plant and Supplier (Gamesa). The value is given per wind turbine per year and with different values for the periods of operation.
Operation and Maintenance	R$ 1,958,222.66	O&M costs for a period of 25 months given by the Full Service Agreement between each Wind Power Plant and Supplier (Cotesa).
Insurance	R$ 990,505.16/y	It is the value of the signed Insurance Policy.
ANEEL Inspection Fee (TFSEE)	- R$ 118,054.69/y – for 2017; - R$ 527,193.73/y – for 2018; - R$ 632,439.85/y – for 2019 onwards	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. It is an official fee charged regulated by ANEEL Dispatches 4402 and 44.
Transmission Use of System Charge (TUST)	R$ 5.291/kW installed/month	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 # 2259.
Land lease	R$ 2,901,910.34/y	It is the total value of the signed land lease contracts representing 1.5% of total revenues.
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.
Benchmark		The chosen benchmark is the Weighted average Capital Cost comprehending Cost of equity (Re) and Cost of debt (Rd). The formula applied is WACC = Re x We + Rd x Wd x (1 - Tc). Where: Re: Cost of equity; We: Percentage of financing that is equity; Rd: Cost of debt;

		Wd: Percentage of financing that is debt; Tc: Corporate tax rate. We and Wd (weight of equity and debt) are equal to 30% / 70% which is typical funding structure for these types of investment in Brazil. Tc is the corporate tax. As the WPPs are under presumed profit, the tax is equal to zero. Studies are provided that evidence that Tc is equal to zero, when presumed profit is chosen. Under this presumed profit regime, no tax deduction is considered. Thus, the parameter is equal to zero. For Re: Re= Rf + Beta x (US Premium + Country ERP): - Rf (risk free rate): determined based on rate of US Treasury Bond (T-bond) with a maturity of 10 years. The latest available data at the time of investment decision was taken (2014). Moreover, the 10 years maturity rate is reliable and in accordance with investment tool (it shall be based on local sovereign debt and shall have a maturity date close to the project lifetime (at least 10 years) and sufficient liquidity. The value is obtained in real terms by discounting the US inflation in the period; - Beta: beta was taken from source A. Damodaran using data from Brazilian Power companies and being levered for the proposed PA's capital structure; - US Premium (US Risk Premium): this value was taken from A. Damodaran and it is deemed correct and reliable; - Country ERP (Brazilian equity risk premium): this value was taken from A. Damodaran for the year 2014 (latest available at the investment decision) and is deemed correct and reliable. For Rd: Rd = Financing cost + Basic Spread + Credit spread risk: - Financing cost the average value of the long interest rate terms (TJLP) of BNDES for the year of the investment decision of the project activity (2015); - Basic spread and Credit spread risk: the values are the average values applied by BNDES on April 2015 (latest available at the investment decision). Therefore, the calculated values are presented below Re = 23.03%

		Rd = 3.83% WACC = Re x We + Rd x Wd x (1 - Tc) WACC = (23.03 x 30) + (3.83 x 70) x (1 - 0) Benchmark = WACC = **9.59%**

A benchmark analysis is the basis of additionality determination and Project IRR is the financial indicator chosen. It was verified in the financial analysis that the benchmark for this comparison is the calculated WACC, in real terms, which is in line with the CDM "Methodological Tool Investment Analysis", version 09.0. According to the Joint VCS-PD & MR, the IRR is below the benchmark, and hence not financially attractive.

The **Project IRR** has been calculated as **7.28%** and the chosen **benchmark** is calculated as **9.59%**. 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 15% 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 seven plants (205.8 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 67 plants with the installed capacity between 102.9 MW and 308.7 MW *(+/- 50% of the installed capacity of the project activity)* and have started before the starting date of the proposed project (02/08/2017) and not under CDM validation or already registered.

Therefore, there are 67 plants in operation in Brazil similar to the project activity. So, N_{all} = 67.

From those 67 plants, 17 are thermal biomass plants and 40 are hydro power plants.

Therefore, 57 plants apply technologies that are different to the technology applied in the proposed project activity. So, N_{diff} = 57.

Finally, as F = 0.149 (i.e. lower than 0.2) and $N_{all} - N_{diff}$ = 10 (i.e. greater 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*;

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: **8.8%**;
- *The total installed capacity of the technology* – the total installed capacity of the technology in the host country: **14,390,293 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 CO_2 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 agency of the state of Piauí.

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 a regional 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 21/06/2019, 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:
  - Main meter 1 – Schneider Electric – Model ION8650 – Serial # 1608A545-02;
  - Backup meter 2 – Schneider Electric – Model ION8650 – Serial # 1608A683-02;

Fixed parameters:

- *The percentage share of total installed capacity of the specific technology*: **8.8%** (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: **14,390,293 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*: **172,014 MWh/y** for 2017; **835,536 MWh/y** for 2018 and **91,346 MWh/y** for 2019;
- $EF_{grid,CM,y}$: Combined Margin CO_2 emission factor for grid connected power generation in year *y*: **0.4418 tCO_2e/MWh** for 2017, **0.4385 tCO_2e/MWh** for 2018 and **0.4385 tCO_2e/MWh** for 2019 (the value of 2018 is also being used for 2019, 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_{2017} **= 75,999 tCO_2e**; BE_{2018} **= 366,408 tCO_2e**; and BE_{2019} **= 40,058 tCO_2e**.

Thus, $BE_{2017-2019}$ **= 482,465 tCO_2e**.

Project emissions (PE_y)

No project emissions are considered for the project activity. Thus, PE_y **= 0 tCO_2e.**

Leakage emissions (LE_y)

No leakage is considered for this kind of project. Thus, LE_y **= 0 tCO_2e.**

Emission Reductions

Therefore, according to the applied methodology, as PE_y and LE_y = 0 tCO_2e, $ER_y = BE_y$.

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 **= 482,465 tCO_2e**.

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 was 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 Ventos de Santo Vinicius Energias Renováveis S.A, Ventos de Santo Alberto Energias Renováveis S.A, Ventos de Santo Agostinho Energias Renováveis S.A, Ventos de Santa Albertina Energias Renováveis S.A, Ventos de São Casimiro Energias Renováveis S.A, Ventos de São Adeodato Energias Renováveis S.A and Ventos de Santo Afonso Energias Renováveis S.A, has performed the independent validation of the grouped project "VTRM Renewable Energy 2" and 1st verification of the period from 02/08/2017 to 28/02/2019 (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 02/08/2017 to 28/02/2019 (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 2".

Verification period: From 02-August-2017 to 28-February-2019.

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

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
Year 2017	75,999	0	0	75,999
Year 2018	366,408	0	0	366,408

Year 2019	40,058	0	0	40,058
Total	**482,465**	**0**	**0**	**482,465**

Kaviraj Singh
Managing Director
Earthood Services Private Limited

29/07/2019
Gurugram, India

APPENDIX I: REFERENCES

No.	Title	References
1.	Methodology ACM0002 – Grid-connected electricity generation from renewable sources	 version 19.0
2.	Joint VCS-PD and MR – draft / revised	version 01 – 18/06/2019 version 02 – 16/07/2019 version 03 – 21/07/2019
3.	Joint VCS-PD and MR – final	version 04 – 24/07/2019
4.	ER Spreadsheet – draft / revised	version 1 version 2 version 3
5.	ER Spreadsheet – final	version 4
6.	Environmental impact assessments - EIA – São Vicente Windfarms Complex – Geoconsult - RIMA – São Vicente Windfarms Complex – Geoconsult - PBA – São Vicente Windfarms Complex – 3VOE0116 R00 – STCP	 Oct/2015 Oct/2015 Mar/2016
7.	Operation Licenses - Ventos de São Vicente 08: D000447/17 - Ventos de São Vicente 09: D000509/17 - Ventos de São Vicente 10: D000510/17 - Ventos de São Vicente 11: D000511/17 - Ventos de São Vicente 12: D000363/17 - Ventos de São Vicente 13: D000362/17 - Ventos de São Vicente 14: D000248/17	 29/08/2017 06/10/2017 06/10/2017 06/10/2017 19/07/2017 19/07/2017 31/05/2017
8.	Plant Load Factor Energy Production Reports for the Chapadinha Project – AWS TruePower	 08/01/2016
9.	Authorization for Operation - Ventos de São Vicente 08: o Dispatch # 3396 – ANEEL (WTG 1 to 7) o Dispatch # 3513 – ANEEL (WTG 8 to 14) - Ventos de São Vicente 09: o Dispatch # 4107 – ANEEL (WTG 1 to 14) - Ventos de São Vicente 10: o Dispatch # 3836 – ANEEL (WTG 1 to 5, 13 and 14) o Dispatch # 3927 – ANEEL (WTG 6 to 12) - Ventos de São Vicente 11: o Dispatch # 3764 – ANEEL (WTG 1 to 14) - Ventos de São Vicente 12: o Dispatch # 2670 – ANEEL (WTG 1 to 7) o Dispatch # 2974 – ANEEL (WTG 8 to 12) o Dispatch # 3401 – ANEEL (WTG 13 and 14) - Ventos de São Vicente 13:	 05/10/2017 18/10/2017 05/12/2017 16/11/2017 22/11/2017 08/11/2017 28/08/2017 15/09/2017 06/10/2017

	○ Dispatch # 3015 – ANEEL (WTG 1 to 14) - Ventos de São Vicente 14: ○ Dispatch # 2328 – ANEEL (WTG 1 to 7) ○ Dispatch # 2529 – ANEEL (WTG 8 to 14)	18/09/2017 01/08/2017 17/08/201
10.	Financial data - Results of the Auction A-3 – CCEE - Insurance # 059912016005107510000279000000 – Swiss Re - Insurance # 059912016005107671000047000000 – Swiss Re - Contract of purchase of capacitors bank – Construtora Sucesso - Contract of purchase of wind turbines and additives – Gamesa Energia and each SPC - Contract of Civil BOP – Cortez Engenharia and each SPC - Contract of Electric BOP – ABB and each SPC - Contract of Owner Engineering – Concremat Engenharia - O&M – Full Service Agreement – Gamesa Energia and each SPC - O&M – Full Service Agreement – Cotesa Engenharia and each SPC - Insurance Policy # 03.51.1.002009 – XL Seguros Brasil S.A. - Insurance Policy # 51961000444 – Swiss Re - TUST – ANEEL Technical Note # 2259 - Land Lease Agreements - TFSEE – ANEEL Dispatch # 4402 - TFSEE – ANEEL Dispatch # 44 - TFSEE – Law # 9427 - PIS and COFINS – Law # 10637; Law # 10833 and Normative Instruction # 247 - CSLL – Law # 9249 and Law # 9430 - IRPJ – Law # 9249 and Law # 9430 Benchmark: - Beta levered: https://web.bndes.gov.br/bib/jspui/bitstream/1408/10954/2/RB%2025%20Custo%20de%20Capital%20de%20Distribuição%20de%20Energia%20Elétrica%20-%20Revisão%20Tarifária%202007-2009_P_BD.pdf - Beta unlevered: http://stern.nyu.edu/~adamodar/pc/archives/emergcompfirm14.xls - US Premium and Country ERP rates: http://people.stern.nyu.edu/adamodar/New_Home_Page/dataarchived.html - Inflation target: Resolution BCB 4237 – http://www.bcb.gov.br/Pec/relinf/Normativos - Basic and risk spreads: https://www.bndes.gov.br/wps/portal/site/home/financiamento/produto/leiloes-infraestrutura/leiloes-geracao-energia-abril-2015/!ut/p/z1/xVPLcpswFP2WLljKEggIdEdtN8QhTWrHtWHjESBAGSMRIUzz9xWOM-60MZ1OF2UlHV3p3vMAJnALE04OrCSKCU72eh8n7m7hRdPQt1F0ba1cFDx8NXG4XFve2oGbYwG68AUIJuP3v8EEJhlXjapgnPKctjvGW8VUlx0nMFAlamqggnHCM0ZqypVoDbRnvCItaKQoJan1quh4fjygbC9oCxgvJKGtkp3qJDnjJZUkIwJQTmXJCCCpZHtgIdMZJmkylsO4oK7v5h4G2PYJs	21/08/2015 22/07/2016 08/08/2016 12/03/2018 16/12/2015 / 01/09/2016 / 21/11/2017 31/03/2016 31/03/2016 16/11/2015 22/07/2016 14/03/2017 19/12/2018 07/01/2019 27/06/2017 - 29/12/2017 08/01/2019 - - - - - - 28/06/2013 -

	HMXAY9mHiCWaWGcmsjG7on5CLVkXJjFn6TR2lvybnpX6rGIqgZGAm7f53fGR_jpB9nT83MSaMUFV_S7gtv_LPlmEP1nGdDnpaNleFziub3AaGWdCiL_dh7a9yi6v8FzFITTyLHnt-a1j08FI0rH2qmr8wveVIPBzLqKcPRoWTMbbg6M9nDNhax15ld_GYTwrcMlL033HzvoqJR7kb7-jwFPsaczIWlBJZWTTmq4UqppPxrIQH3fT46mTkpxmKRSI432qBFSDda2TNF3DdYlUuTdsLgUsd97V6LVGfq1JWzqde3hF5DEnvJvnpyy3s0-fQFJ-tJ_-AFiDe7e/dz/d5/L2dBISEvZ0FBIS9nQSEh/	
11.	Financial Assessment - Excel Financial Analysis Ventos do Piauí Complex	 version 1 version 5 version 6
12.	Common Practice Analysis - Excel demonstration – Common Practice Consolidation	 version 1
13.	Technical Data Technical Manual of WTG – Wind Power Turbines 1 & 2MW and 3MW Onshore – GE Power and Water	-
14.	Operation Procedures Standard Operational Procedures – Votorantim Energia	-
15.	Monitoring data - Monitoring report extracted from the meters - CCEE report of all plants (extracted directly CCEE website)	 2017 / 2018 / 2019 2017 / 2018 / 2019
16.	Calibration certificates - Main meter – Serial # MW-1608A545-02 – CAM Gym - Backup meter – Serial # MW-1608A683-02 – CAM Gym	 21/09/2016 23/09/2016
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_2e	Carbon dioxide equivalent
CL	Clarification Request
DOE	Designated Operational Entity
EIA / RIMA	Environmental Impact Assessment / Environmental Impact Report
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
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.**	3.3.5	**Date:** 28/06/2019
Description of CL				
No evidences were presented to support the value of the "Associative Contribution ANEEL"				
Project participant response				**Date:** 12/072019
The mentioned cost was disregarded from the financial analysis.				
Documentation provided by project participant				
FinancialAnalysis_VdPI complex_v5.xls				
DOE assessment				**Date:** 18/072019
The cost has been excluded from the financial analysis, but it is still part of the costs presented at the Joint Project & Description Monitoring Report. CL remains open.				
Project participant response #2				**Date:** 21/07/2019
The mentioned cost of 'Associative Contribution ANEEL' was excluded from the financial analysis presented at the Joint Project & Description Monitoring Report.				
Documentation provided by project participant				
Joint-Project-Description-Monitoring-VdPI-v7.doc				
DOE assessment #2				**Date:** 22/07/2019
The cost has been excluded from the Joint Project & Description Monitoring Report.				

CL ID	02	**Section no.**	3.3.8	**Date:** 28/06/2019
Description of CL				
At Section 4.1, the values presented as percentage share of total installed capacity of the specific technology is not in accordance with evidence presented.				
Project participant response				**Date:** 12/072019
The mentioned value was corrected and now is in accordance with the evidence previously presented.				
Documentation provided by project participant				
Joint-Project-Description-Monitoring-VdPI-v6.doc				
DOE assessment				**Date:** 18/072019
The value has not been revised. CL remains open.				
Project participant response #2				**Date:** 21/07/2019
The mentioned value was corrected and now is in accordance with the evidence previously presented.				
Documentation provided by project participant				
Joint-Project-Description-Monitoring-VdPI-v7.doc				
DOE assessment #2				**Date:** 22/07/2019
The value has been correctly revised.				

CL ID	03	**Section no.**	4.4	**Date:** 28/06/2019
Description of CL				
Section 5.4 have not been filled up as per the instruction for filling up the joint PD and MR.				
Project participant response				**Date:** 12/072019
The mentioned section was corrected and now is filled up according to the instruction for filling up the Joint Project & Description Monitoring Report.				
Documentation provided by project participant				
Joint-Project-Description-Monitoring-VdPI-v6.doc				

DOE assessment	**Date:** 18/072019
The Joint Project & Description Monitoring Report has been published as per VCS requirements and no comments have been received during the consultation period.	

CL ID	04	**Section no.**	5.1	**Date:** 28/06/2019
Description of CL				
During the site visit, it was verified that there are two pairs of meters – Serials #s MW-1608A545-02 and MW-1608A683-02 (main and backup) and MW-1608A513-02 and MW-1608A554-02 (main and backup) at the Substation Curral Novo do Piauí 2. Nevertheless, it was not clear which pair is responsible for the monitoring of the electricity delivered by the plants to the Brazilian grid. In addition, on Section 6.1, it is missing the information about type, model, class and accuracy of meters used and their calibrations and respective validities.				
Project participant response				**Date:** 12/072019
The pair MW-1608A545-02 and MW-1608A683-02 (main and rear, respectively) is responsible for the monitoring of the electricity delivered by the plants to the Brazilian grid. The correction has been made and this is now identified in Appendix 1 of the Joint Project & Description Monitoring Report.				
Documentation provided by project participant				
Joint-Project-Description-Monitoring-VdPI-v6.doc				
DOE assessment				**Date:** 18/072019
It is now clear that the pair of meters – Serials #s MW-1608A545-02 and MW-1608A683-02 (main and backup) is responsible for the monitoring of the electricity delivered by the plants to the Brazilian grid.				

Table 2. CAR from this joint validation and verification

CAR ID	01	**Section no.**	3.3.5	**Date:** 28/06/2019
Description of CAR				
In excel sheet Financial Analysis, tab “Assumptions”, values for BOP Civil, BOP Electric and Owners engineering did not consider the reduction in contract values due to obtaining the REIDI fiscal benefit after signature of original contracts.				
Project participant response				**Date:** 12/072019
The contract values were corrected to account for this change and the Financial Analysis Excel sheet has been updated accordingly.				
Documentation provided by project participant				
Joint-Project-Description-Monitoring-VdPI-v6.doc; FinancialAnalysis_VdPI complex_v5.xls				
DOE assessment				**Date:** 18/072019
All values have been revised and now consider REIDI reduction.				

CAR ID	02	**Section no.**	3.3.5	**Date:** 28/06/2019
Description of CAR				
In excel sheet Financial Analysis, tab “Assumptions”, cells B56 and B57, the values of insurances related to CAPEX are incorrect.				
Project participant response				**Date:** 12/072019
The values mentioned were corrected in the Financial Analysis excel sheet.				
Documentation provided by project participant				
Joint-Project-Description-Monitoring-VdPI-v6.doc; FinancialAnalysis_VdPI complex_v5.xls				
DOE assessment				**Date:** 18/072019
The values of insurances related to CAPEX have been revised and they are now in accordance with evidences presented to the validation team.				

CAR ID	03	**Section no.**	3.3.5	**Date:** 28/06/2019

Description of CAR	
In excel sheet Financial Analysis, tab “Assumptions”, cells B213 through B219, there is an error in the formula. In addition, in tab “Cash Flow”, in line 29, the calculation of additional income tax was not done considering the income additional to threshold of R$240.000/year per each power plant.	
Project participant response	**Date:** 12/072019
The wrongful calculation was not considered for cash flow results. Nevertheless, the correction was made to avoid any potentially misleading data being presented.	
Documentation provided by project participant	
Joint-Project-Description-Monitoring-VdPI-v6.doc; FinancialAnalysis_VdPI complex_v5.xls	
DOE assessment	**Date:** 18/072019
The formula of cells B211 through B217 (in the new version of the spreadsheet) has been correctly revised. In addition, in tab “Cash Flow”, the calculation of additional income tax has now been done considering the income additional to threshold of R$240.000/year per power plant.	

CAR ID	04	**Section no.**	3.3.5	**Date:** 28/06/2019
Description of CAR				
In excel sheet Financial Analysis, tab “Assumptions”, cells B177 and B178, the values are not in line with the respective insurance policies.				
Project participant response				**Date:** 12/072019
The values were corrected in the Financial Analysis excel sheet.				
Documentation provided by project participant				
Joint-Project-Description-Monitoring-VdPI-v6.doc; FinancialAnalysis_VdPI complex_v5.xls				
DOE assessment				**Date:** 18/072019
The values are now in line with the respective insurance policies presented to the validation team.				

CAR ID	05	**Section no.**	3.3.5	**Date:** 28/06/2019
Description of CAR				
In excel sheet Financial Analysis, tab “Cash Flow”, there is an error in the formulas of cells E37 through X37.				
Project participant response				**Date:** 12/072019
The formulas of cells E37 through X37 were corrected.				
Documentation provided by project participant				
FinancialAnalysis_VdPI complex_v5.xls				
DOE assessment				**Date:** 18/072019
The formulas of cells E37 through X37 have been correctly revised.				

CAR ID	06	**Section no.**	5.1	**Date:** 28/06/2019
Description of CAR				
The values of electricity generation presented by the COG as main source does not follow the same basis of the CCEE values used for crosschecking, thus not allowing a proper comparison. In addition, the values have not been presented per month and per plant in order to allow the verification of the conservativeness of the values used in the calculations.				
Project participant response				**Date:** 12/072019
Votorantim Energia Generation Operating Center (*Centro de Operação da Geração da Votorantim Energia – COG*, in Portuguese) provided electricity generation data with the same basis of CCEE. These values and also the ones provided by CCEE were presented per month and per plant. For conservativeness, the lower value was adopted in the calculations.				
Documentation provided by project participant				

Joint-Project-Description-Monitoring-VdPI-v6.doc; FinancialAnalysis_VdPI complex_v5.xls; 20190624Crosscheckgeraçãodeenergia.xls	
DOE assessment	**Date:** 18/072019
The electricity generation data have been revised. Nevertheless, the value for wind farm São Vicente 9 of November/2017 used for the calculations is still not the most conservative one. CAR remains open.	
Project participant response #2	**Date:** 21/072019
The value for wind farm São Vicente 9 of November/2017 used for the calculations is now the most conservative one.	
Documentation provided by project participant	
Joint-Project-Description-Monitoring-VdPI-v7.doc; 4. Emission Reduction Calculation_VdPI_v4	
DOE assessment #2	**Date:** 22/072019
All the electricity generation values used for the calculations are the most conservative ones.	

Table 3. FAR from this joint validation and verification

Not applicable