

# VIÑALES BIOMASS POWER PLAN VERIFICATION REPORT

*2<sup>ND</sup> MP (01/01/2015 to 31/12/2016)*



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**Summary:**

Viñales Biomass Power Plant is a grid-connected renewable energy project activity consisting on displacement of grid electricity with electricity which is generated by renewable biomass residues which are derived from industrial wood and forestry operations.

The plant is located in the Km. 5 of the M-50 road to Chanco, commune of Constitucion in the Maule Region (Chilean Region VII, Chile).

The project activity is based on a 41MW condensing-extracting turbo generator machine and a biomass fluidized-bed boiler of 210 ton/hr of high pressure steam capacity and a turbo generator unit.

The project activity's purpose is to provide heat and electricity in order to meet Viñales site electrical requirements. In addition, the generated surplus is provided to the Central Interconnected Electricity System of Chile (SIC).

The electricity generation (MW levels) from biomass is based on the steam-Rankine cycle which involves heating pressurized water. The resulting steam is expanded to drive a turbine, and then condensing back to water for partial or full recycling to the boiler. In addition, a heat exchanger is used in some cases to recover heat from the flue gases to preheat combustion air, where an aerator must be used to remove dissolved oxygen from water before it enters the boiler.

The project activity encourages Chile's sustainable development by providing electricity through biomass power generation, regarded as a clean and renewable energy source. In addition, the rational use of by-product of the forestry industry is assured, serving as a potential reference for other regional forest-related industries, sectors which are economically crucial within the Maule Region.

The verification scope is defined as an independent and objective review and ex-post determination of the monitored reductions in GHG emissions according to VCS Standard, version 3.5. Based on the key project information, the verification addresses the implementation and operation of the project activity, and assesses the registered Project Design document criteria, being supported by any additional documentation and reported emissions reduction calculations, tools and methodologies.

Our assessment is based on the submitted monitoring report/1.1/, 1.2/ for the monitoring period during 01-January-2015 to 31-December-2016, the validated and registered PD/1.3/ as well as its validation report/1.4/, and the applied monitoring methodology and tools (ACM0006 Version 12.1.1). In addition, all VCS relevant decisions, clarifications and guidance, such as the VCS Validation and Verification Manual v3.1/2.1/, VCS Program Guide v3.5/2.2/ and VCS Project Standard v3.5/2.3/ have been taken into account.

The principles of accuracy, completeness, relevance, reliability and credibility were combined with a conservative approach to establishing a traceable and transparent verification opinion. For this reason, the verification scope considers both quantitative and qualitative information on emission reductions. Last but not least, verification is not aimed to provide any consultancy services towards the client. However, stated requests for clarifications, corrective and/or forward actions may provide input for improvement of the monitoring activities.

A risk based approach has been followed to perform this verification activity. In the course of verification, 02 Corrective Action requests (CARs) and 01 Clarification Requests (CLs) were raised and successfully closed. The review of the Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews

and PP have provided APPLUS with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

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## 1 INTRODUCTION

### 1.1 Objective

**LGAI Technological Center, S.A.** (hereinafter referred as **Applus+ LGAI**) has been appointed by **Celulosa Arauco y Constitución S.A.** (hereinafter referred as **Arauco**) to perform the second periodical verification of **Viñales Biomass Power Plant** in Chile (**VCS Ref. No. 1186**). In concrete terms, monitoring period dates is defined within 01-January-2015 to 31-December-2016. For this purpose, it has been applied the methodology **ACM0006 Version 12.1.1** with its relevant and applicable tools. The management of **Arauco Bioenergía S.A.** was the responsible for the elaboration of the Monitoring Report data and the GHG emission reductions calculations.

Applus+ LGAI's verification approach consists on a two-stage process.

In the 1<sup>st</sup> stage, Applus+ LGAI completed a strategic review in order to assure a full understanding of:

- Activities which are associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols which are used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying the reported data; and
- Compilation of the monitoring report.

Applus+ LGAI applied a periodical Verification Checklist which is based on the risk-based assessment of the parameters, data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

In the 2<sup>nd</sup> stage, by using the Verification Checklist, Applus+ LGAI verified the implementation of the monitoring plan with a desk review and an on-site visit performance. Applus+ LGAI confirms that the following documentation was reviewed:

- (a) The registered PDD, including the monitoring plan and the corresponding validation report;
- (a) Monitoring report of previous monitoring period as well as corresponding verification report (if applicable);
- (b) Monitoring report of this monitoring period (MR);
- (c) The applied monitoring methodology and relevant tools;
- (d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;

- (e) The projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7; sustainability criteria along with VCS guideline and standard version 3.7.<sup>1</sup>
- (f) CDM Validation and Verification Standard version 09
- (g) CDM Project Standard version 09
- (h) CDM Project Cycle Procedure version 09
- (i) VCS standard v3.7<sup>2</sup>
- (j) VCS guideline v3.7
- (k) All information and references relevant to the project activity resulting in emission reductions;
- (l) The project's baseline and monitoring plan are assessed against **ACM0006 Version 12.1.1**;

## 1.2 Scope and Criteria

The verification is an independent and objective review and ex-post determination of the monitored reductions in GHG emissions. Based on key project information, the verification scope addresses the implementation and operation of the project activity which has been set out in the Project Design Document/1.3/ as well as the information and reported emissions reductions that are set out in the monitoring report/1.1/1.2/ for this monitoring period.

The MR is reviewed against the relevant criteria (see 1.1) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM Validation and Verification Standard version 09, review against registered PD and Final Validation report, CDM Project Standard version 09, CDM Project Cycle Procedure version 09 and VCS guideline and standard version 3.7.

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<sup>1</sup>

<http://www.v-c-s.org/project/vcs-program/rules-and-requirements/>

The Verification team checks:

- If the current monitoring systems and procedures are in line with the monitoring systems, the physical and temporary boundaries and the procedures described in the monitoring plan;
- If the GHG emission reduction data states a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;
- The reported GHG emission data is sufficiently supported by evidence and consistent with the temporal boundaries determined by the length of the monitoring period

The assessment team has employed a risk based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of VERs. The verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring report combined.

The only purpose of the verification is its usage during the issuance process as part of the VCS project cycle. Therefore, LGAI Technological Center S.A. can't be held liable by any party for decisions made or not made based on the verification opinion, which will go beyond that purpose.

### 1.3 Level of Assurance

In order to assure a reasonable level of assurance, Applus+ LGAI's verification approach is developed in a two-stage process.

In the 1<sup>st</sup> stage, Applus+ LGAI conducted a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:

- Activities which are associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols which are used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;

- Means of verifying reported data; and
- Compilation of the monitoring report.

Applus+ LGAI applied a periodical Verification Checklist which is based on the risk-based assessment of the parameters, data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

In the 2<sup>nd</sup> stage, using the Verification Checklist, Applus+ LGAI verified the implementation of the monitoring plan and the data parameters and information which is submitted described in the Monitoring Report for the period in question. This analysis involved a site visit and a desk review of the Monitoring Report.

#### **The assessment team**

In order to meet the technical demands of the project activity, Applus+ LGAI has designated its assessment team in terms of applicable technical area/sectoral scope qualification and professional experience of succeeding candidates.

The assessment team members qualification and experience is described in the below table:

**Table 1. Team members short competence description**

<b>Work Team</b>	<b>Role</b>	<b>Short Competence Description</b>
Natalia Rodrigo Vega	Lead Auditor	<p>Ms. Natalia Rodrigo Vega has a Bachelor's Degree on Environmental Engineering and Master's Degree on Environmental and Quality Management System (under ISO 9001 and 14001). She Works in Applus Environmental and Quality Management Systems Department since March 2012, being specially involved on technical support tasks related to CDM-VCS and GS Standards, among others (i.e. GHG verification and Proyecto Clima).</p> <p>She is a qualified lead auditor and technical reviewer. In addition, she was appointed CDM Project Activity Manager in January 2015.</p>
Simon Shen	Auditor	<p>Simon Shen has a Master Degree in Thermal Energy Engineering and a Bachelor Degree in Environmental Engineering. Simon is a qualified Lead Auditor and Technical Reviewer appointed by Applus+ LGAI for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ LGAI, he had been worked for TÜV SÜD as a GHG Validator/Verification team and ISO 9001/14001 Lead Auditor for 3.5 years. Simon has been working for Applus since 2010.</p>
Denny Xue	Technical Reviewer	<p>Mr. Hanshen (Denny) Xue (Master Degree in Environmental Engineering, Bachelor Degree in Thermal Engineering) is a lead auditor appointed by Applus+ LGAI for the GHG project assessment. He is based on Shanghai. He has 1.5 years of work experiences in CDM project development. Before he joined Applus+ LGAI in 2012, he has been worked for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.</p>

## 1.4 Summary Description of the Project

Viñales Biomass Power Plant is a grid-connected renewable energy project activity, consisting on displacement of grid electricity with electricity which is generated by renewable biomass residues which derive from the industrial wood operations (sawdust, bark and fine dust from sawmills) and forestry operations. The site is located at the Km. 5 of the M-50 road to Chanco, commune of Constitucion in the Maule Region (Chilean Region VII).

The Verification team confirmed that the implementation status of the project activity consists on the operation of 210 ton/hr fluidized bed biomass power boiler and a 41 MW condensing/extracting turbo generator unit. The boiler and turbine meet the heat and electricity demand levels of Viñales' industrial facilities as well as the power surplus to the Central Interconnected System (SIC). The high-pressure steam line provides the superheated steam for power generation in the turbine. The medium and low backpressure lines provide steam for current industrial operations.

The project activity counts with efficient technical equipment, qualified personnel as well as necessary logistic infrastructure in order to assure a reliable control and proper biomass management. This management implies not only its reception and storage, but also its homogenization to mixed products for power generation under the cogeneration process. The boiler is also able to burn diesel fuel and propane gas during the shutdowns, stoppages or the energy operation compensation.

In addition, it has been proved that the project activity encourages Chile's sustainable development by providing electricity through biomass power generation, regarded as a clean and renewable energy source. The rational use of by-product of the forestry industry is assured, serving as a potential reference for other regional forest-related industries, sectors which are economically crucial within the Maule Region.

Relevant dates for the project activity are defined as follows:

Date (DD/MM/YY)	Key events
January, 2010	Construction start date
July, 2012	Commissioning date
01/07/2014 to 31/12/2014	The 1 <sup>st</sup> monitoring period <sup>3</sup>

<sup>3</sup> During the first monitoring period, Project Participant presented a deviation to the starting date of the period due to a delay in the implementation of the Viñales on-site laboratory to monitor the moisture content of the different biomass types, which started to be measured from July 2014.

01/01/2015 to 31/12/2016	The 2 <sup>nd</sup> monitoring period
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The electricity generated from the fthe project activity will be used to meet the facility sites and the surplus will be integrated within the Central Interconnected System (SIC). The project achieved greenhouse gases (GHG's) emission reductions are estimated to be 506,775 tCO<sub>2</sub>e for the monitoring period, thereon displacing electricity from the generation-mix of power plants connected to the NEWNE regional grid, which is mainly dominated by thermal/fossil fuel based power plant.

The Project Participant, has implemented monitoring procedures according to the monitoring methodology chosen for this project activity. This monitoring methodology accounts for emission reductions in an accurate and conservative manner. The following diagram includes data collection procedure as: Data Parameters as  $HC_{BL,y}$ ,  $EL_{PJ,gross,y}$ ,  $EL_{PJ,imp,y}$ ,  $EL_{PJ,aux,y}$ ,  $D_{f,m}$ ,  $FC_{i,j,y}$ ,  $BR_{PJ,n,y}$ ,  $BR_{B4,n,y}$ ,  $BR_{B1/B3,n,y}$  and  $BR_{B5/B8,n,y}$  are aggregated in excel files to obtain a monthly value that is reported in the emission reductions calculation file. All data is recorded in electronic tapes and archived two years following the end of the crediting period as is specified in the defined monitoring plan.

## 2 VERIFICATION PROCESS

The project verification process is based on VCS standards version 3.3. The same is conducted by applying already standardized auditing techniques in order to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the project activity are appointed. The following process has been carried out to validate the project activity:

- I. A desk review of the project design documentation;
- II. Follow-up interviews with project stakeholders;
- III. Resolution of outstanding issues and the issuance of the final verification report and opinion.

The resulting verification report and other supporting documents will under an internal quality control and technical review before being submitted to the client.

Criteria conducted to designate the working team, both verification team and technical reviewer is defined under section 1.3.

## 2.1 Method and Criteria

**Verification Scope:** The scope is defined as an independent and objective review of the Monitoring report (MR) prepared as per the registered PD and registered approved methodology ACM 0006 version 12.1.1. The MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard and guideline version 3.7, including the approved baseline and monitoring methodology ACM0006 version 12.1.1. The verification was based on the requirements in the Validation and Verification Standard (VVS version 09), project standard version 09, project cycle procedure version 09 and VCS guideline and standard version 3.7

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

**Verification Process:** The project assessment is based on the “Clean Development Mechanism Validation and Verification Standard version 09.0 and VCS standard and guideline version 3.7 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

Once the project is received by the assessment team, the members of the assessment team carried out:

1. A desk review of the Monitoring report against the registered PD and final validation report;
2. Follow-up interviews with project participant;
3. The resolution of outstanding issues and the issuance of the final verification report and opinion.

The prepared verification report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the VCS executive board.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. Applus+ LGAI has developed a specific checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating the identified criteria.

The verification checklist consists of three tables. The different columns in these tables are described in the tables below

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

Verification Checklist Table 2: Requirement checklist				
Checklist Question	Reference	Comment	Draft Conclusion	Final Conclusion
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organized in several different sections. Each section is then further subdivided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	Conclusions are presented based on the assessment of the first MR version. This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). Clarification is used when the assessment team has identified a need for further clarification. Forward action request to highlight issues related to project implementation that requires review during the further verifications.	Conclusions are presented in the same manner based on the assessment of the final MR version and further documents including assumptions presented in the documentation.

Verification Checklist Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 1&2	Summary of project owner response	Validation/Verification conclusion
If the conclusions from the draft verification are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 1&2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the assessment team should be summarized in this section.	This section should summarize the assessment team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

### **Appointment of the assessment team**

According to the sectoral scopes / technical area and experiences in the sectoral or national business environment, Applus+ LGAI has composed a project assessment team in accordance with the appointment rules in Applus+ LGAI. The composition of assessment team has to be approved by the Applus+ LGAI ensuring that the required skills are covered by the team. The four qualification levels for team members that are assigned by formal appointment rules as below:

- Leader Auditor (LA)
- Auditor (A)
- Auditor Trainee (T)
- Technical Experts (E)
- Technical Review (TR)

It is required that the sectoral scope / technical area related to the methodology has to be covered by the assessment team.

The detail regarding the assessment team is provided below in this report as Appendix 3

### **Document review**

The Monitoring report submitted by the Client was reviewed against the approved methodology, registered PD, final validation report and other relevant criteria to verify the correctness, credibility, and interpretation

of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report (see table 2).

### **Follow-up interviews**

A site visit is conducted by Applus+ LGAI performed interviews, telephone conferences, and physical site inspection with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report

### **Resolution of Clarification and Corrective Action Request**

The objective of this phase of the Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ LGAI's positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ LGAI were resolved during communications between the Client and Applus+ LGAI to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR Version 02 submitted by PP on 15-06-2017 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

### **Internal quality control**

As final step of a verification of the final documentation including the verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the PP the positive verification opinion and relevant documents are submitted to the VCS board through the VCS web-platform.

## **2.2 Document Review**

A detailed document review was undertaken during all verification process. The following the documents were reviewed (see table 2):

**Table 2. List of Document Review**

No.	Author	Title	Date
1	Basic Documents		
1.1	Arauco	Monitoring Report of the Viñales biomass power plant Version 1	10/05/2017
1.2	Arauco	Viñales biomass power plant Emission Reduction Calculation Spreadsheet. Version 1	05/11/2015
1.3	Arauco	Project Description Version 2 of the Viñales biomass power plant.	10/05/2013
1.4	DNV	Viñales Biomass Power Plant Validation Opinion Report Nº 2013-0437	17/06/2013
1.5	Arauco	Personnel responsible for Monitoring Plan in Viñales Power Plant.	
1.6	Arauco	Calculation sheet version 1 Calculation sheet version 2	10/05/2017 03/08/2017
2	References and requirements at VCS and applicable UNFCCC/IPCC/etc.		
2.1	VCS	Validation and Verification Manual, Version 3.7	21/06/2017
2.2	VCS	Program Guide Version, Version 3.7	21/06/2017
2.3	VCS	VCS Standard Version 3.7	21/06/2017
2.4	CDM UNFCCC	ACM0006 "Consolidated methodology for electricity generation from biomass waste --- Version 12.1.1	13/09/2012
2.5	CDM UNFCCC	Tool to calculate the emission factor for an electricity system ---Version 2.	29/09/2011
2.6	CDM UNFCCC	Tool to determine the baseline efficiency of thermal or electric energy generation systems – Version 2.	27/11/2015
2.7	CDM UNFCCC	Tool to calculate project or leakage CO2 emissions from fossil fuel combustion ---Version 2.	02/08/2008
2.8	CDM UNFCCC	Tool to calculate baseline, project and/or leakage emissions from electricity consumption – Version 2.	27/11/2015
2.9	CDM UNFCCC	Tool for project and leakage emissions from transportation of freight (Version 1.1).	23/11/2012
2.10	FCCC-COP	Decision 4/CMP.7 Greenhouse gases, sectors and source categories, common metrics to calculate the carbon dioxide equivalence..."	15/03/2012
2.11	CDM UNFCCC	EB69 Annex 3 Standard for Application of the GWP to CDM project activities.	13/09/2012
3	Project implementation information		
3.1	Arauco.	Power Generation availability report Version 2.	Submitted to APPLUS on 16/05/2017
3.2	Arauco	Electricity Invoices for Electricity Supply to the Grid.	Submitted to APPLUS on 16/05/2017
3.3	Arauco Bioenergia	Electricity Invoices for Electricity Supply from the grid	Submitted to APPLUS on 16/05/2017

3.4	Arauco	Energy Balance and QA/QC procedures.	Submitted to APPLUS on 15/05/2017
3.5	CESMEC	Net Calorific Values Characterization of Biomass products.	Submitted to APPLUS on 23 June 2016
3.6	CDEC-SIC	Electricity Generation Data of the Central.	Submitted to APPLUS on 15/05/2017
3.7	CDEC-SIC	Fuel consumption for electricity generation in the thermal power generation units of Chile.	Submitted to APPLUS on 15/05/2017
3.8	Micropyretics Heaters International	Steam Calculator website: <a href="http://www.mhi-inc.com/superheated_steam/steam-calculator-superheated-tables.html">http://www.mhi-inc.com/superheated_steam/steam-calculator-superheated-tables.html</a>	Submitted to APPLUS on 15/05/2017
3.9	CESMEC	Historical NCVi biomass characterization.	Submitted to APPLUS on 15/05/2017
3.10	INN	CESMEC Laboratory Official Accreditation Valid until 20/08/2018.	Submitted to APPLUS on 15/05/2017
3.11	Arauco	Fossil Fuels Invoices Purchases for the project activity.	Submitted to APPLUS on 15/05/2017
4	Plant Records and monitoring system data		
4.1	Arauco.	Plant Records Biomass Consumption in the Power Plant.	Submitted to APPLUS on 15/05/2017
4.2	Arauco	Plant Record of Boiler and Power Plan Operation Heat generation & consumption.	Submitted to APPLUS on 15/05/2017
4.3	Arauco.	Plant Records of daily data moisture content by industrial residues.	Submitted to APPLUS on 15/05/2017
4.4	Arauco	Freight Transportation monitoring data Version 2: a. Suppliers freight transportation data b. Map area of influence c. Truck performance data	Submitted to APPLUS on 15/05/2017
4.5	Arauco	Electricity Systems Emission Factor Calculation SIC	Submitted to APPLUS on 15/05/2017
4.6	Arauco	Monthly Monitoring Parameters Records RPG Viñales CP1 ver1 170411	Submitted to APPLUS on 15/05/2017
4.7	Arauco	Quality Management Manual.	Submitted to APPLUS on 15/05/2017
4.8	Arauco	Viñales Training Records.	Submitted to APPLUS on 15/05/2017

4.9	Arauco	Plant Records Pressure and Temperature conditions (20145-2016 Set point lines control).	Submitted to APPLUS on 15/05/2017
4.10	Arauco	Plant Records Saw Timber Production Viñales.	Submitted to APPLUS on 15/05/2017
4.11	Arauco	Plant Records Remanufacturing Product in Viñales Complex.	Submitted to APPLUS on 15/05/2017
4.12	Arauco	Electricity consumption and generation in Viñales Complex records.	Submitted to APPLUS on 15/05/2017
4.13	Various	Arauco's Fuel Specification.	Submitted to APPLUS on 15/05/2017
4.14	Arauco	Freight transportation monitoring data.	Submitted to APPLUS on 15/05/2017
5	Calibration issues		
5.1	Various	Steam Flow Meters Calibration Certifications Endress and Hauser Cerabar PMP75 Rosemount 2051CD.	Submitted to APPLUS on 15/05/2017
5.2	Endress and Hauser	Manufacturer and Technical Specifications for Cerabar S PMC71, PMP71, PMP75 pressure measurement. Process pressure measurement. Pressure transmitter.	Submitted to APPLUS on 15/05/2017
5.3	Endress and Hauser	Endress_Hauser Flow Meter Calibration Manufacturer Recommendation.	Submitted to APPLUS on 15/05/2017
5.4	Emerson	Manufacture and Technical Specifications for Rosemount 2051 Pressure Transmitter.	September 2014
5.5	Emerson	Manufacture and Technical Specifications for Rosemount 485 Annubar®.	May 2006
5.6	Various	Pressure Gauge and Pressure Transmitter Calibration Certification. Endress and Hauser Cerabar PMP75. Rosemount 2051TG.	Submitted to APPLUS on 15/05/2017
5.7	Various	Temperature Sensor Calibration Certification Rosemount 644HANA.	Submitted to APPLUS on 15/05/2017
5.8	Various	Manufacture and Technical Specification for the Viñales Quality Laboratory equipment: <ul style="list-style-type: none"> <li>a. Electronic moisture analyser Sartorius MA150C.</li> <li>b. Laboratory Oven Memmert UFE 600.</li> <li>c. Laboratory Digital scale Sartorius TE1502S.</li> </ul>	Submitted to APPLUS on 15/05/2017
5.9	Various	Manufacture and Technical Specification for Electricity	Submitted to

		Meters: a. Schneider PowerLogic® ION8600. b. Schneider PowerLogic® ION 7550.	APPLUS on 04/12/2015
5.10	GSE Scale System	Manufacture and Technical Specification for Controller GSE Series 460 (Weighbridge).	Submitted to APPLUS on 15/05/2017
5.11	Various	Accreditation Evidences for calibration entities of: - Ineco. - Molinstec. - Cientec. - Salfamontajes.	Submitted to APPLUS on 15/05/2017
5.12	Various	Evidences of Calibration frequency of electricity meters, flow meters, laboratory equipment, pressure gauge, thermocouples and weighbridge.	Submitted to APPLUS on 15/05/2017
5.13	Various	Evidences of Equipment Accuracy electricity meters, flow meters, laboratory equipment, pressure gauge, thermocouples and weighbridge.	Submitted to APPLUS on 15/05/2017
5.14	Schneider Electric	Electricity meters Project Activity Calibration Certifications.	Submitted to APPLUS on 15/05/2017
5.15	Cientec	Laboratory Equipment Calibration Certification: a. Electronic moisture analyser Sartorius MA150C. b. Laboratory Oven Memmert UFE 600. c. Laboratory Digital scale Sartorius TE1502S.	Submitted to APPLUS on 15/05/2017
5.16	Other	Fossil Fuel Meter Calibration Certification.	Submitted to APPLUS on 15/05/2017
6	Other		
6.1	Electricity System Public data		
6.1	SIC	Central Interconnected Electrical System of Chile Map: <a href="http://www.cdec-sic.cl/wp-content/uploads/2013/06/Mapa_SIC_May2014.jpg">http://www.cdec-sic.cl/wp-content/uploads/2013/06/Mapa_SIC_May2014.jpg</a>	Last access 17/05/2017
6.2	CDEC-SIC	Annual Report of Central Interconnected Electrical System Chile: <a href="http://www.cdec-sic.cl/anuarios/anuario2015/index.html#">http://www.cdec-sic.cl/anuarios/anuario2015/index.html#</a>	Last access 17/05/2017
6.3	CDEC-SIC	Statistical Monthly Report 2014: <a href="http://www.cdec-sic.cl/informes-y-documentos/fichas/informe-operacion/">http://www.cdec-sic.cl/informes-y-documentos/fichas/informe-operacion/</a>	Last access 17/05/2017
6.4	Energy Ministry Energy Policy Division	National Energy Balance	
6.5	IPCC	2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2: <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a>	Last access 17/05/2017
7	Publications		
7.1	UNFCCC	CDM Registration Process - Rejected	Last access

		<a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1287571838.72/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1287571838.72/view</a>	17/05/2017
7.2	Chilean Ministry of Public Works (MOP)	MOP "REGLAMENTO DEL INCISO 5° DEL ARTICULO 54° DEL DECRETO N° 294, DE 1984, MODIFICADO POR LA LEY N° 19.171".	23/01/1995
7.3	Universidad de Chile y otros	CARMONA, R and Urzua A, Caracterización de Biomasa Leñosa con fines energéticos disponible en Chile: <a href="http://www.libros.uchile.cl/files/presses/1/monographs/398/submission/proof/files/assets/basic-html/index.html#1">http://www.libros.uchile.cl/files/presses/1/monographs/398/submission/proof/files/assets/basic-html/index.html#1</a>	2013
7.4	Arauco	Arauco Web Page – Sustainable Wood: <a href="http://www.msdc.cl/informacion2.asp?Submenu=2181&amp;cat=0&amp;fin=0&amp;idioma=82">http://www.msdc.cl/informacion2.asp?Submenu=2181&amp;cat=0&amp;fin=0&amp;idioma=82</a>	Webpage Last access July 7, 2016
<b>8. Other sources</b>			
8.1	Arauco	Arauco's Sustainability Report (2015&2016).	2015 & 2016
8.2	Arauco	Project Site EIA report, noise declaration, 2008. (Issued by Third Party, Pares&Alvarez)	2008
8.3	Arauco	Acoustic Report, 2008. (Issued by Third Party, Acus)	2008
8.4	Arauco	Air pollutant reports (yearly basis isokinetic reports and monthly basis records), 2015-2016. (Issued by Third Party, JHG).	2015 & 2016
8.5	Arauco	Disposal certificate issued by Ecobío Landfill, Chillán, 2015&2016	2015 & 2016
8.6	Arauco	Arauco's Collective Contracts and Agreements	Submitted by PP on 20/06/2017
8.7	Arauco	H&S Report on Arauco's web page, last access on 21/06/2017.  <a href="http://www.arauco.cl/informacion.asp?idq=1066&amp;parent=1054&amp;ca_submenu=1054&amp;idioma=22">http://www.arauco.cl/informacion.asp?idq=1066&amp;parent=1054&amp;ca_submenu=1054&amp;idioma=22</a>	Last access on 21/06/2017.
8.8	Arauco	Arauco's staff H&S Training certificates and records, 2015&2016.	2015 & 2016
8.9	Arauco	Other websites: Santiago Climate Exchange; Forest Footprint Disclosure; Center for Business Sustainability	Last access on

		(CBS); UN Global Compact; Prohumana; AccionRSE; Shared value Initiative. Last access on 21/06/2017.	21/06/2017
		<ul style="list-style-type: none"> <li>✓ <a href="http://www.scx.cl/scx-quienes/">http://www.scx.cl/scx-quienes/</a></li> <li>✓ <a href="http://www.uai.cl/noticias/escuela-de-negocios-lanza-el-centre-for-business-sustainability-cbs">http://www.uai.cl/noticias/escuela-de-negocios-lanza-el-centre-for-business-sustainability-cbs</a></li> <li>✓ <a href="http://prohumana.cl/prohumanared/quienes-forman-parte/">http://prohumana.cl/prohumanared/quienes-forman-parte/</a></li> <li>✓ <a href="http://www.accionempresas.cl/index.php?op=empresas-socias">http://www.accionempresas.cl/index.php?op=empresas-socias</a></li> </ul>	

## 2.3 Interviews

An on-site assessment was undertaken within 15-17/05/2017 at project site and Arauco's Head Quarters in Santiago. The aim of this visit was to evaluate the implementation and operation of the project activity as well as to review all applicable supportive evidence. In addition, interviews with key personnel were conducted in order to confirm the associated evidence with the data generation, aggregation, calculation and reporting of the monitoring parameters.

The interviews with relevant staff helped to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan /1.1/.

The list of all personnel which was interviewed is the following:

**Table 3. List of Interviews**

No.	Interviewee			Date	Subject	Team Member
	Last name	First name	Affiliation			
1.	Seguel	Carla A.	Development Engineer - ABSA	15-16-17/05/2017	Monitoring Report ER Calculations Monitoring System	Ms. Natalia Rodrigo Vega.

					Grid emission factor Biomass Index Surplus	
2.	Rodriguez	Christian	CDM Project Manager- ABSA	15/05/2017	Project implementation	Ms. Natalia Rodrigo Vega.
3.	Fuster	Sergio	VCUs responsible Viñales Power Plant	15- 16/05/2017	Monitoring System Monitoring Equipment Monitoring Data Flow Power Plant Process	Ms. Natalia Rodrigo Vega.
4.	Saglietto	Vicente	Facility manager	15- 16/05/2017	Power Plant Process	Ms. Natalia Rodrigo Vega.
5.	Foundes	Carlos Esteban	Operator Weighbridge Control	16/05/2017	Biomass operations Plant records Weight Control Trucks Data	Ms. Natalia Rodrigo Vega.
6.	Urrutia	Ricardo	Biomass Operations Manager	15- 16/05/2017	Biomass operations Plant records Weight Control Trucks Data	Ms. Natalia Rodrigo Vega.
7.	Veli Castro	Mari	Laboratory Analyst	16/05/2017	Moisture Content Data Flow Cross-checking	Ms. Natalia Rodrigo Vega.
8.	Valdebenito	Claudio	Daily Control Centre Room Operator	16/05/2017	Historical records Data Flow Registers	Ms. Natalia Rodrigo Vega.
9.	Arriagada	Carlos	Instrumentation Supervisor	16/05/2017	Monitoring Equipment (Meters, transmitter, thermocouple)	Ms. Natalia Rodrigo Vega.
10.	Bordones	José	Electrical Operator Operations	16/05/2017	Power Generation Electricity Meters	Ms. Natalia Rodrigo Vega.
11.	Borma	Washington	Maintenance manager	16/05/2017	Project Activity	Ms. Natalia Rodrigo Vega.
12.	Yañez	Paulina	Manager of B&B Local Hotel	16/05/2017	Local Villager	Ms. Natalia Rodrigo Vega.

The verification team conducted the on-site verification performance in accordance with the following description:

- Within the days 15-17/05/2017 in Celulosa Arauco y Constitución, Central Site, El Golf 150, Las Condes, Santiago de Chile,
- Within the days 15-16/05/2017 in Viñales Plant, M-50 Road to Chanco, Km 5, Constitución (Chile). The interviewed personnel is listed in the table in section 2.3 of this report.

## 2.4 Site Inspections

Duration of on-site inspection: 15/05/2017 to 16/05/2017				
No.	Activity performed on-site	Site location	Date	Team member
1.	<p>Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring.</p> <p>Assessment team also checked that whether the monitoring plan as described in the PD is actually practised onsite. Also assessment team checked any change in host country criteria which may affect the baseline of the project activity.</p>	The project activity is located at Viñales Plant, M-50 Road to Chanco, Km 5, Constitución (Chile).	15-16/05/2017	Ms. Natalia Rodrigo Vega

## 2.5 Resolution of Findings

The objective of this phase of the Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues from validation which need to be clarified for Applus+ LGAI's positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ LGAI were resolved during communications between the Client and Applus+ LGAI to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR Version 03 (03/08/2017) submitted by PP on 03/08/2017 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

As an outcome of the verification process, the verification team can raise different types of findings. Where a non-conformance arises the verification team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- a) It has identified a material discrepancy or non-conformance that the project proponent must address;
- b) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;

- c) Modifications to the implementation, operation, and monitoring of the project activity has not been sufficiently documented by the project participants;
- d) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

Issues identified in a Forward Action Request (FAR) during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

The assessment team shall raise a Clarification Request (CL) if project reporting lacks transparency and further information is needed to determine if a material discrepancy is presubmitted. All CARs and CLs raised during verification shall be resolved before submit a request for issuance.

As a result of the assessment conduction, 1 CLs and 2 CARs were raised for this verification period. Its analysis and resolution is found in Section 5 of Appendix 1. The appendix included the responses provided by the project participant, in terms of resulted conclusions, modification and updates of applicable project documents (if applied).

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	00	00
Description of project activity	00	01	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	00	00
- Deviation from methodology	00	00	00
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
- Project boundary	00	00	00
- Establishment and description of baseline scenario	00	00	00
- Demonstration of additionality	00	00	00
- Emission reductions	00	01	00
- Calibration details	01	00	
- Monitoring plan	00	00	00
Others (please specify)-Matter related to breakdown details	00	00	00
PP declaration – Related to participation in other GHG program for the monitoring period			
<b>Total</b>	01	02	00

The list of findings and there resolution is presented in Appendix 2 of this report.

### 2.5.1 Forward Action Requests

This is 2<sup>nd</sup> periodic verification of the project activity and no FAR raised from previous verification and validation stage.

## 2.6 Eligibility for Validation Activities

Not applicable. The auditor team does not have undertaken validation activities as part of the verification.

## 3 VALIDATION FINDINGS

### 3.1 Participation under Other GHG Programs

This section is not applicable for present verification.

Verification team has checked by means of desk review and on-site interviews, that the emission reductions associated to the Viñales project have not been used for compliance in any other emission trading program or to meet any kind of binding limits on GHG emissions during the current verification process.

In addition, this project activity is not involved to any other form of GHG-related environmental credit for GHG emission reductions or removals other than the VCS Program.

Last but not least, this project activity participated in the ERNC market, created under the Law N°20.257, April, 2008 and therefore generated non-conventional energy certificates. This mechanism, however, is a non-GHG related environmental mechanism, so there are no double-counting issues involved with the VCS program in this case.

### 3.2 Methodology Deviations

This section is not applicable for present verification.

### 3.3 Project Description Deviations

During first monitoring period, the following deviations were opened regarding the following issues:

- Crediting period starting date:

	From	To
Start date 1 <sup>st</sup> crediting period	01/01/2014	01/07/2014
Finish date 1 <sup>st</sup> crediting period	31/12/2023	30/06/2024

- QA/QC procedures (parameters  $EL_{PJ,gross,y}$ ,  $EL_{PJ,imp,y}$  and  $EL_{PJ,aux,y}$ );
- Critical equipment

By means of desk review and on-site interviews, verification team confirms the following:

- Changes on crediting period starting date do not affect the defined project initial conditions as per follows

Project Participant present a deviation to current PD and proposed a change in the starting date from 01/01/2014 to 01/07/2014. The reasons to delay the star date are:

- 1) The impossibility to measure directly all monitoring parameters would have compromised seriously the possibility of the project activity to generate CERs since this constitutes a direct non-compliance of the monitoring plan.
- 2) The impossibility to check the consistency of direct measurement of all monitored parameters as per procedure would have compromised the possibility of the project and generate a direct non-compliance of the standards of the monitoring plan.

VVB confirms that:

- Viñales power plant still is a Greenfield project, only biomass residues are used in the project plant, fossil fuels co-fired in the power boiler does not exceed the 80% of the total fuel, the implementation of the project does not result in an increase of the processing capacity, biomass residues used as fuel came from forestry or industrial operations and no chemical process is involved and biomass residues are not stored for more than one year. In conclusion, the applicability of the methodology ACM0006 Version 12.1.1 has not been modified.
- As was described in current PD Viñales biomass power plant project activity is not considered to be part of the common practice in the relevant and comparable industry (ies) in Chile and therefore, considered additional from a common practice analysis perspective. Additionality was not impacted by starting date change.
- Viñales project has not modified their project boundaries, then the definition of the baseline scenarios is the same defined in current PD. Appropriateness of the baseline scenario has not been impacted.

- Modifications on QA/QC procedures regarding the parameters  $EL_{PJ,gross,y}$ ,  $EL_{PJ,imp,y}$  and  $EL_{PJ,aux,y}$  do not affect the defined project initial conditions, such as applicability of the methodology, additionality and appropriateness of the baseline scenario. By means of desk review and interviews with project participants, VVB confirms that the same does not impact on prior consideration, common practices, barriers and project boundaries.
- Differences on critical equipment between already registered PD and the installed instruments do not affect monitoring plan continuity and, therefore, the emission reduction calculations.
- In addition, it can be confirmed that all the parameters defined in the already registered PD as part of the monitoring plan are equally measured, controlled and registered. No changes were identified

in the requirements to the applicability of the methodology, additionality and appropriateness of the baseline scenario given that there were no instruments replaced during the presented monitoring period until the date of this monitoring report.

Resulted from this section, the Verification team confirms:

- The parameter  $HC_{BL,y}$  description was improved under the 1<sup>st</sup> monitoring period report, project deviation section are according to the superheated steam distribution. Also, 2<sup>nd</sup> Monitoring Period report counts with this description. This correction is now clearer and consistent with conclusions resulted from site inspection and desk review.
- In terms of electricity meters, project participants clarified the meters localization and monitoring procedures of gross power generation ( $EL_{PJ,gross,y}$ ); electricity consumption from the grid ( $EL_{PJ,imp,y}$ ) with respective monitoring equipment.
- The assumptions stated under project deviation section of monitoring report contain the applicable monitoring procedures according to the power plant monitoring procedures of fossil fuels consumption

### 3.4 Grouped Project

This is not a grouped project, as a result, this section is not applicable.

## 4 VERIFICATION FINDINGS

### 4.1 Project Implementation Status

The verification team verified if the project activity was correctly implemented as well as if the project boundary and the current monitoring system is consistent with the registered Project Description/1.3/ and the applicable monitoring methodology ACM0006 "Consolidated methodology for electricity generation from biomass waste --- Version 12.1.1/2.4/. Furthermore, it was assessed if the monitoring methodology was correctly applied and the documents are complete and consistent with the monitoring period.

The verification team confirmed that the project activity consists on the operation of 210 ton/hr fluidized bed biomass power boiler and a 41 MW condensing/extracting turbo generator unit. The heat is used in the Viñales sawmill for wood-drying while a fraction of the electric power is also used in the Viñales sawmill. The electric power surplus is injected in the SIC grid. The project activity has all equipment, personnel, logistic and infrastructure to guarantee a reliable control and proper biomass management from the reception, storage, homogenization to the feeding the biomass in mixed products for power generation in the cogeneration process. The power boiler and

condensing/extracting turbo generator provide the heats to the Viñales Complex through two medium and low-pressure lines.

The verification team checked the parameters of the installed equipments and confirmed that the technical information of the equipments are consistent with the design in the registered PD. As confirmed, the project activity started construction dated in Jan. 2010 and started commissioning dated in July 2012.

The verification team evaluated if the monitoring system included the relevant management system organizational structure, roles and responsibilities, data collection, monitoring frequency, transfer and aggregation procedures as well as data recording, which are applied for this monitoring period were consistent with the scope of site-visit inspections and personnel who was interviewed.

The information data and parameters which were provided in the monitoring report are the same as the ones which are already stated in the monitoring plan of the registered PDD /1.2/. In addition, the verification team evaluated the operational timeline during the monitoring period /3.1/ and confirmed that there were not critical operation events.

All meters and control system of the monitoring system are described in the Table below.

**Table 4. Metering System of Monitoring Plan**

NAME	Parameter	Equipment Manufacturer	TAG	Serial
Power Boiler pressure gauge transmitter Line 85 bar	HC <sub>BL,y</sub>	ENDRESS + HAUSER	663-PT-0155	D500C90109 C
Power boiler Flow transmitter Line 85 bar	HC <sub>BL,y</sub>	ENDRESS + HAUSER	663-FT-0156	D501F50109D
Power boiler Temperature sensor Line 85 bar	HC <sub>BL,y</sub>	ENDRESS + HAUSER	663-TT-0157	266161
Pressure gauge transmitter High Pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-PT-9040-A-B	32601(A)-32602(B)
Flow transmitter High-Pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-FT-9030	33712
Temperature transmitter High-Pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-TT-9043-A-B	0271902(A)-0219846(B)
Pressure gauge transmitter Medium pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-PT-9001-A-B	32561(A)-32562(B)
Flow transmitter Medium pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-FT-9025	33711
Flow transmitter Medium pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-FT-9051	107763
Temperature transmitter Medium pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-TT-9026	0271897

Pressure gauge transmitter Low pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-PT-9002-A-B-C	32598(A)-32599(B)-32600(C)
Steam flow transmitter Low-pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-FT-9019	33709
Deaerator steam flow transmitter	HC <sub>BL,y</sub>	ROSEMOUNT	665-FT-9023	33710
Temperature transmitter Low pressure line	HC <sub>BL,y</sub>	ROSEMOUNT	665-TT-9024	0271896
Feed water pressure gauge transmitter	HC <sub>BL,y</sub>	ENDRESS + HAUSER	663-PT-0106	D501E40109D
Feed water temperature transmitter	HC <sub>BL,y</sub>	ROSEMOUNT	663-TT-0111	265913
Energy meter Gross power generation	EL <sub>PJ,gross,y</sub>	SCHNEIDER ELECTRIC	SE-EI-0003/0004 (52-B1)	PT-1012A934-01
Energy meter Import power generation	EL <sub>PJ,imp,y</sub>	SCHNEIDER ELECTRIC	SE-EI-0006/0007 (52-B1)	PT-1012A934-01
Energy meter (1-6)	EL <sub>PJ,aux,y</sub>	SCHNEIDER ELECTRIC	669-EI-1603/1604 (1-6)	LI-1010A261-02
Energy meter (1-7)	EL <sub>PJ,aux,y</sub>	SCHNEIDER ELECTRIC	669-EI-1703/1704 (1-7)	LI-1010A263-02
Energy meter (1-8)	EL <sub>PJ,aux,y</sub>	SCHNEIDER ELECTRIC	669-EI-1803/1804 (1-8)	LI-1010A264-02
Energy meter (1-9)	EL <sub>PJ,aux,y</sub>	SCHNEIDER ELECTRIC	669-EI-1903/1904 (1-9)	LI-1010A262-02
Energy meter (1-11)	EL <sub>PJ,aux,y</sub>	SCHNEIDER ELECTRIC	669-EI-1703/1804 (1-11)	LI-1010A265-02
Weighbridge gate 1	BR <sub>PJ,n,y</sub>	PESAMATIC (GSE)	611-49-001	v4.0.0 (162069)
Digital weight meter	Moisture content	Sartorius	-	27402265
Oven	Moisture content	MEMMERT	-	G611.0831
Electronic moisture analyser	Moisture content	Sartorius	-	27008246
Flow transmitter	FC <sub>i,j,y</sub>	ENDRESS + HAUSER	663-FT-508	D606EA16000
Flow transmitter	FC <sub>i,j,y</sub>	ENDRESS + HAUSER	663-FT-522	D606E916000

The verification team confirmed that the emission reductions associated with the project does not request for compliance under any other emission trading program. Furthermore, the project is not involved in another form of GHG-related environmental credit for GHG emission reductions or removals other than the VCS Program.

On the other hand, the verification team checked that the project activity was requested for registration under UNFCCC and the same was rejected by the CDM Executive Board /7.1/. However, it is confirmed that as per Validation process/1.4/ the project is eligible under VCS consideration.

## 4.2 Accuracy of GHG Emission Reduction and Removal Calculations

As a result of verification of the ER calculation process, the assessment team confirmed that all the parameters required for the determination of the emission reductions have been included in the MR Report and ER Calculation Spreadsheet, which are consistent with the applied methodology ACM0006 version 12.1.1 and the monitoring plan contained in the registered PD. The parameters are complete in this monitoring period.

After verifying the reported figures with the raw data sources, it's confirmed that the values of the parameters from the raw data sources are consistent with those quoted in the ER Calculation Spreadsheet and the MR Report. The verification process for the same is clearly described above in section 4.3 of the report.

The calculation tool, i.e. the ER Calculation Spreadsheet clearly and transparently describes the calculation of emission reductions. The ER Calculation Spreadsheet is indicated with the issuing date and revision number. The assessment team re-produced the calculation process and confirmed that the methods and formulae used to obtain the baseline, project and leakage emissions are appropriate. The calculation has been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology. Meanwhile, the baseline emissions have been rounded down and the project emissions have been rounded up in the MR which is conservative.

The reported data have been cross-checked against other sources available as explained in section 4.3 of the report.

The assessment team confirms that all the assumptions, emission factors and default values (ex-ante values) from registered PD have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report.

As a result the quantity of GHG emission reductions in tCO<sub>2</sub>e achieved by the project activity during the monitoring period is 506,775 tCO<sub>2</sub>e (241,788 tCO<sub>2</sub>e in year 2015 and 264,988 tCO<sub>2</sub>e in year 2016).

The emission reductions for the present monitoring period were 506,775 tCO<sub>2</sub>e. This amount is 2% lower than the double of the emission reductions estimated in registered PD (258,093 VCU's for both years 2015 and 2016. 516,186 VCU's estimated from January, 2015 to December, 2016). This last difference could be explained by the following reasons: 1) Lower baseline electricity generation during the current monitoring period due to constraint in the transmission line. 2) Difference between the estimated supplying distance in PD and the measured average distance during the present monitoring period result in decreasing emission related to biomass transportation. 3) The update of GWP of CH<sub>4</sub> from 21 to 25. The assessment team checked the reported data for calculating baseline emissions and project emissions, and confirmed that explanation on the difference reflects the real practice.

### 4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

Sufficient evidences covering the full monitoring period in the required frequency are available to verify the figures stated in the final monitoring report. The source of the evidences has been discussed below. Specific cross-checks have been done in cases that further sources were available. The monitoring report's figures were checked by the assessment team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

The assessment team confirmed the completeness, accuracy and reliability of the evidences available during the monitoring period, thereby the determination of GHG emission reductions or removals are appropriate.

The monitoring is consistent with the Monitoring Plan contained in the PD /1.3/. All parameters were monitored and determined as per the monitoring plan. See below

#### 4.3.1 Data and parameters fixed ex-ante

The following data and parameters have been checked against the PD/1.3/, the applied Methodology/2.4/ and applicable tools/2.5/2.6/2.7/2.8/2.9/.

**Table 5. Data and parameters fixed ex-ante**

Parameter	Source	Value	DOE opinion
Biomass residues categories and quantities used for the selection of the baseline scenario and assessment of additionality.	On-site assessment of biomass residues categories and quantities	See MR.	The data is consistent with PD.
P <sub>x</sub>	On-site measurements	352,686 m <sup>3</sup> /yr of sawn timber from the sawmill; 88,203 m <sup>3</sup> /yr of processed wood products from the remanufacture plant.	The data is consistent with PD.
CAP <sub>HG,h</sub>	Reference plant design parameters	210 (GJ/h)	The data is consistent with PD.
LFC <sub>HG,h</sub>	Reference plant design parameters.	90%	The data is consistent with PD.
GWP <sub>CH4</sub>	IPCC	25 tCO <sub>2</sub> e/tCH <sub>4</sub>	Consistent with the 4/CMP.7 Decision/2.10/ and EB69Annex3 guide/2.11/  For the second commitment period
EF <sub>burning,CH4,k,y</sub>	The third party Lab U.S. Forest Service of Missoula,	Industrial 874.2 Kg CH <sub>4</sub> /TJ Forestry 101.46 Kg CH <sub>4</sub> /TJ	Values accepted and validated from the Validation process/1.4/

	Montana		
$EF_{CH_4, BR}$	Default Values ACM0006 V 12	41.1 kg CH <sub>4</sub> /TJ	Consistent with the most conservative value /2.4/
$\eta_{BL, HG, BR, boiler}$	Current Practice of Energy Industry	85%	Consistent with the Tool/2.6/ definition for baseline efficiency
$EF_{CO_2, f}$	Default CO <sub>2</sub> emission factor	Light vehicle 245 g CO <sub>2</sub> /t Km Heavy vehicle 129 g CO <sub>2</sub> /t Km	Consistent with default values defined in the Tool/2.9/

As a result, Applus+ LGAI confirms that the data and parameters fixed ex-ante have been correctly listed. Parameters fixed ex-ante for required scope have been verified by checking the information flow and in compliance with the monitoring plan of the PD/1.3/ and hence, the requirement of VCS project Standard/2.3/.

#### 4.3.2 Data and Parameters Monitored

Applus+ LGAI evaluated whether the monitoring parameters were accordingly monitored as required in the monitoring plan. During the Verification process, several issues were found (please, refer to Section 5 of the Appendix 1).

In response of all clarification and correction response as well as updated version of Monitoring Report/1.1/, ER Calculation/1.2/ and Project Design Document/1.3/, the verification team confirms:

- The GHG emission reductions were calculated by project participants under reliable and monitored data support (i.e. plant records, operation conditions for flow mass and energy balances) as well as conservative assumptions in the case of emission factors, net calorific values and local fossil fuels data.
- Most of the data is recorded and captured electronically by the Data Control System (DCS) of the Power Plant and recorded by the responsible, in line with the Monitoring System/1.3/ and Quality Management Manual/4.7/ All data generation and aggregation were available for the verification team during the assessment,
- All monitoring equipment counts with proper manufacturing specification or relevant evidence that specifies calibration frequency, accuracy and calibration certification.

In the section 2 of the Appendix 1, a detailed assessment of each of applicable parameters is possible to be checked according to the following specifications:

**Table 6. Parameters measured (A, B, C)**

<b>A. Parameters measured directly with instruments</b>
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<b>Parameter Description</b>	<b>Localization Appendix 1</b>	<b>Section 2</b>
Biomass waste categories (k) and quantities used in the project activity	Section 2.2 Table 1	
Quantity of biomass waste of category n used in the project activity in year y.	Section 2.2 Table 2	
Quantity of biomass waste of category n used in the project activity in year y for which the baseline scenario is B4 $BR_{B4,n,y}$	Section 2.2 Table 3	
Quantity of biomass waste of category n used in the VCS project activity in year y for which the baseline scenario is B1 or B3 (tonnes on dry-basis)	Section 2.2 Table 4	
Baseline process heat generation in year y $HC_{BL,y}$	Section 2.2 Table 5	
Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y. $EL_{PJ,gross,y}$	Section 2.2 Table 6	
Project electricity imports from the grid in year y. $EL_{PJ,imp,y}$	Section 2.2 Table 7	
Total auxiliary electricity consumption required for the operation of the power plants at the project site in year y (MWh) $EL_{PJ,aux,y}$	Section 2.2 Table 8	
Moisture content of the biomass waste	Section 2.2 Table 9	
Quantity of fuel type i combusted in process j during the year y $FC_{i,j,y}$	Section 2.2 Table 10	

<b>B. Parameters measured through laboratory test</b>		
<b>Parameter Description</b>	<b>Localization Appendix 1</b>	<b>Section 2</b>
Net calorific value of biomass waste of	Section 2.3 Table 1	

<b>B. Parameters measured through laboratory test</b>	
<b>Parameter Description</b>	<b>Localization Section 2 Appendix 1</b>
category n in year y $NCV_{BR,n,y}$	

<b>C. Parameters obtained from external sources and accounting data</b>	
<b>Parameter Description</b>	<b>Localization Section 2 Appendix 1</b>
For biomass waste categories for which scenarios B1:, B2: or B3: is deemed a plausible baseline alternative, project participants shall demonstrate that is a realistic and credible alternative scenario	Section 2.4 Table 1
CO <sub>2</sub> emission factor for fossil fuel type f in year y $EF_{ff,y,f}$	Section 2.4 Table 2
CH <sub>4</sub> emission factor for the combustion of biomass waste in the project plant $EF_{CH_4,BR}$	Section 2.4 Table 3
CO <sub>2</sub> emission factor of the most carbon intensive fossil fuel used in the country $EF_{CO_2,LE}$	Section 2.4 Table 4
Length of the operational campaign in year y $LOC_y$	Section 2.4 Table 5
Quantity of the main product of the production process produced in year y from plants operated at the project site $P_y$	Section 2.4 Table 6
Weighted average net calorific value of fuel type i in year y. $NCV_{i,y}$	Section 2.4 Table 7
Weighted average CO <sub>2</sub> emission factor of fuel type l in year y. $EF_{CO_2,i}$	Section 2.4 Table 8
Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m $D_{f,m}$	Section 2.4 Table 9
Total mass of freight transported in	Section 2.4 Table 10

<b>C. Parameters obtained from external sources and accounting data</b>	
<b>Parameter Description</b>	<b>Localization Section 2 Appendix 1</b>
freight transportation activity f in monitoring period m $FR_{f,m}$	
Amount of fossil fuel type i consumed by power plant/unit m, k or n $FC_{i,m,i,y}, FC_{i,k,y}$	Section 2.4 Table 11
Net calorific value (energy content) of fossil fuel type i in year y $NCV_{i,y}$	Section 2.4 Table 12
CO <sub>2</sub> emission factor of fossil fuel type i used in power unit m in year y. $EF_{CO_2,i,y}, EF_{CO_2,m,i,y}$	Section 2.4 Table 13
Net electricity generated by power plant/unit m, k in year y $EG_{m,y}, EG_{k,y}$	Section 2.4 Table 14

#### 4.4 Non-Permanence Risk Analysis

<b>No.</b>	<b>Risk that could lead to material errors, omissions or misstatements</b>	<b>Assessment of the risk</b>		<b>Response to the risk in the verification plan and/or sampling plan</b>
		<b>Risk level</b>	<b>Justification</b>	
1	Human errors: Readings from Meters (if not automatic)	LOW	Human error is likely to occur if the monitoring personnel are not trained well or inexperienced in data recording procedures and monitoring processes.	All the personal are well trained to monitor and collect data and thus risk associated with Human error is minimized. Assessment team checked the training records to confirm the statement. All the monitoring practices onsite are followed as per the registered VCS PD.
2	Human error: Quantification of emission reduction	LOW	Use of spreadsheets without adequate data control, changes/updates, version tracking, traceability	All the JMR sheets and the invoices for the complete monitoring period are checked and thus the assessment team confirms that the ER value is

			and security	conservative and correct.
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In line with Guidelines for Application of materiality in verifications, the verification team has conducted a complete verification of all the information presented in the monitoring report and data monitored as presented in the emission reduction calculation spread sheet. It invoices follows the paper trail back to the raw data such as meter reading records and invoices. There are no material errors, omission or misstatement

## 5 SAFEGUARDS

### 5.1 No Net Harm

PP has deeply describe within MR Version 03, the scope of the sustainability, social and environmental approach in terms of human rights insurance, labor conditions, work equality, sustainable development and code of ethics.

PP has considered all the indicators mentioned in Appendix B of MR Version 03 and all the suitable indicators required in case of project activity. All criterion have been indicated as low impact as the positive impact of these parameters can be monitored effectively on a yearly basis. The project also does not have any negative score against any of the indicator/parameter selected.

By means of desk review based on documentary information as well as conduction of interviews made across project site's staff and local villagers, Applus LGAI can confirm that PP has implemented a global no net harm policy, whose main achievements are summarized as per below table:

CRITERIA	SCOPE	DOE'S OPINION AND CROSSCHECKING APPROACH
Human rights insurance	Support and respect the protection of internationally proclaimed human rights	Chile has ratified United Nations Human Right Commitment, which is implemented across National law.  Arauco, as a Chilean company, undertakes and insures the commitment imposed by the National Labour Directorate and Work Code which is focused on equality in terms of gender, race, color, sex, age and religion, marital state among others criterion.  Furthermore, Arauco counts with Collective Contracts, Labor Agreements and Sustainability Reports updated on a yearly
	Ensure they are not complicit in human rights abuses	
	Uphold the freedom of association and the effective recognition of the right to collective bargaining	
Labor conditions and	Eliminate all forms of forced and	

work equality	compulsory labour	<p>basis, whose main scope is defined as the protection and insurance of work equality condition across all its employees.</p> <p>Additionally, Arauco has implemented a Health and Safety Policy, integrating the main principles of OHSAS Standard, also being accredited by a Third Party for this purpose.</p> <p>Verification team has been able to crosscheck all of these assumptions by deeply evaluating Arauco's policies in terms of work equality and by the conduction of interviews to project site staff in line with this scope.</p> <p>Verification team can confirm that this criterion is fully ensured and implemented by PP.</p> <p>Source:</p> <p>Arauco's Sustainability Report, 2015&amp;2016.</p> <p>Arauco's Collective Contracts and Agreements</p> <p>Arauco's H&amp;S Reports, 2015&amp;2016</p> <p>H&amp;S Policy on Arauco's web page, last access on 21/06/2017.</p>
	Abolish child labour	
	Eliminate discrimination in respect of employment and occupation	
Environmental protection and sustainable development	Support a precautionary approach to environmental challenges	<p>Arauco as a Chilean company, ensures commitment with National law in terms of Environmental protection.</p> <p>Environmental protection criteria is defined as per the following scope:</p> <ul style="list-style-type: none"> <li>✓ <b>Air pollutants</b> (i.e MP-10,MP-2.5, NO<sub>2</sub>, SO<sub>2</sub> and CO), which are monitored on a monthly basis and its value under authorized threshold limits are certified by a third party laboratory within a yearly basis isokinetic report.</li> <li>✓ <b>Solid waste</b> (ash, sand, tree branches and sludge) treatment and disposal in authorized landfills, as per Chilean law for this purpose. Arauco counts with</li> </ul>

		<p>disposal certificate issued by this authorized landfills (Ecobío, Chillán).</p> <ul style="list-style-type: none"> <li>✓ <b>Liquid waste</b> treatment and disposal. Liquid waste is defined by the parameters of pH, temperature, oil and grease, aluminium, chloride, mercury, nickel, lead, total suspended solids, sulfates, zinc and flow. All of these parameters are measured on a monthly basis and certified by a third party laboratory.</li> <li>✓ <b>Noise.</b> Project Site EIA report, as per the scope of noise impact, has determined that there is no any violation under this criterion. Noise map and expected values while implementation and operation of project site facilities under the worst circumstances demonstrate that achieved levels are found within permissible threshold limits. In addition, it is determined that there is no any affection on local communities and fauna impact.</li> </ul> <p>Within the period 2015-2016, no violation of the aforementioned criteria has been found.</p> <p>As a remarkable strength for this purpose, Arauco is planning to conduct 2 isokinetic evaluation per year instead of one.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report, 2015&amp;2016.</p> <p>Air pollutant reports (yearly basis isokinetic reports and monthly basis records), 2015-2016. (Issued by Third Party, JHG).</p> <p>Solid Waste Disposal certificate issued by Ecobío Landfill, Chillán, 2015&amp;2016. Project Site EIA report, noise declaration, 2008. (Issued by Third Party, Pares&amp;Alvarez).</p>
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		<p>Liquid waste records and certificates, 2015&amp;2016.</p> <p>Acoustic Report, 2008. (Issued by Third Party, Acus).</p>
	<p>Undertake initiatives to promote greater environmental responsibility</p>	<p>When it comes to environmental protection, investment of new ecofriendly technologies and sustainable development implementation, Arauco as a global company has joined different international and national programmes whose main purpose is related to the fact of being aware about the most recent available green techniques. This point is Illustrated by its partnership with Center for Business Sustainability (CBS) of Universidad Adolfo Ibañez and its participation across different programmes such as Santiago Climate Exchange, Forest Footprint Disclosure (of the Global Canopy Project), and UN Global Compact among others.</p> <p>When it comes to our specific project site, <i>Viñales Biomass Project</i> has joined the VCS Programme, for which PP shows great interest on ensuring its monitoring evaluation on a yearly basis.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report (2015&amp;2016).</p> <p>VCS Data Base.</p>
	<p>Encourage the development and diffusion of environmentally friendly technologies</p>	
<p>Code of ethics</p>	<p>Work against corruption in all its forms, including extortion and bribery</p>	<p>Chile has ratified a commitment to ensure that companies implement policies and effective instruments to fight against corruption and bribery activities.</p> <p>Arauco, as a Chilean company defines and implement at an international level a complete policy in terms of code of ethics. The same describes and ensures, for each of the activities of Arauco's work scope, the approach and instruments needed to deal with any risk on corruption, bribery or threats to impartiality.</p> <p>In addition, the same is also defined at an</p>

		<p>individual level, by promoting social values such equality, respect and team force.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report (2015&amp;2016).</p> <p>Arauco's web page, last access on 21/06/2017.</p> <p>Arauco's code of ethics, 2016.</p>
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## 5.2 Local Stakeholder Consultation

PP has deeply describe within Appendix B of MR Version 03, the way in which local stakeholder consultation (LSC) is implemented and the criteria and parameters the same is focused on.

By means of desk review based on documentary information as well as conduction of interviews made across project site's staff and local villagers, Applus LGAI can confirm that PP has implemented a LSC complete. Verification team asked project site's staff and local villagers during the validation site visit and concludes that stakeholders are overall satisfied with the implementation of the project activity.

LSC's main achievements are summarized as per below table:

CRITERIA	SCOPE	DOE'S OPNION AND CROSSCHECKING APPROACH
Sustainable development (I). Social criteria.	Education and Training	<p>PP considers education and training as the sole force of ensuring the social and technical development of a region.</p> <p>Arauco conducts yearly trainings for company's staff memebers. In addition, with the sole objective of extension of social criteria scope, Arauco invests management and financial support for regional schools (i.e Arauco, Constitución and Cholguan). In addition, the company supports Fundación</p>

		<p>Belén Educa, an organization providing subsidized education for more than 8,000 students in their seven schools. Arauco also make a significant contribution through Arauco Educational Foundation, which for over 20 years has helped provide quality education to 94,700 students in public schools.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report (2015&amp;2016).</p> <p>Arauco's web page, last access on 21/06/2017.</p>
<p>Sustainable development (II). Economic criteria.</p>	<p>Infrastructure and Improving the quality of life</p>	<p>Arauco promotes housing infrastructure access for its employees, collaborators within the regional area of influence. This objective is ensured by public subsidies, financial support, locating and technically evaluating land for housing purposes, and cooperation and partnerships with diverse public and private bodies.</p> <p>By site inspection and interviews, it can be concluded that regional daily quality of social life is improved.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report (2015&amp;2016).</p> <p>Arauco's web page, last access on 21/06/2017.</p>
<p>Sustainable development (III). Transparency.</p>	<p>Participation and dialogue</p>	<p>Arauco has conducted LSC within Evaluation Impact Assessment process as well as within Viñales</p>

		<p>project construction and implementation period.</p> <p>In addition, Arauco is regarded as an active social media entity, which promotes feedback from any stakeholder by being present on online network channels such as <i>Facebook</i>, <i>YouTube</i>, <i>Flickr</i> and <i>Twitter</i>. Within these channels, Arauco promotes and informs about their working scope and impacts on regional community, national economy and environment.</p> <p>By site inspection and interviews, it can be concluded that regional participation and transparency is ensured.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report (2015&amp;2016).</p> <p>Arauco's web page, last access on 21/06/2017.</p> <p>Different social media networks, YouTube and Facebook, last access on 21/06/2017.</p>
<p>Sustainable development (IV). Local Action and Ancient Heritage Maintenance.</p>	<p>Corporate Policy on Mapuche Community Relations</p>	<p>Arauco is committed to learn about and respect the Mapuche culture, an ancient community of the region. For this purpose, Arauco establishes a complete program of training, recognition, dialogue and collaboration between these two parties.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report</p>

		<p>(2015&amp;2016).</p> <p>Arauco's web page, last access on 21/06/2017.</p> <p>Different social media networks, YouTube and Facebook, last access on 21/06/2017.</p>
<p>Sustainable development (V).</p> <p>Global action</p>	<p>Global Commitments</p>	<p>Arauco as a global company has joined different international and national programmes whose main purpose is related to the fact of being aware about the most recent available green techniques. This point is illustrated by its partnership with Center for Business Sustainability (CBS) of Universidad Adolfo Ibañez and its participation across different programmes such as Santiago Climate Exchange, Forest Footprint Disclosure (of the Global Canopy Project), and UN Global Compact among others.</p> <p>When it comes to our specific project site, <i>Viñales Biomass Project</i> has joined the VCS Programme, for which PP shows great interest on ensuring its monitoring evaluation on a yearly basis.</p> <p>All of these platforms are made publicly available to stakeholders and ensure their feedback.</p> <p>It can be concluded that positive feedback is resulted from Arauco's approach.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report (2015&amp;2016).</p> <p>VCS Data Base.</p> <p>Other websites: Santiago Climate Exchange; Forest Footprint Disclosure; Center for Business</p>

		<p>Sustainability (CBS); UN Global Compact; Prohumana; AccionRSE; Shared value Initiative. Last access on 21/06/2017.</p>
<p>Health and Safety (H&amp;S) approach.</p>	<p>Work Conditions</p>	<p>ARAUCO ensures its workers a safe workplace environment, as well as all the tools, equipment and training necessary to perform their activities in a healthy and safe manner.</p> <p>H&amp;S policies are based on a risk minimization approach by establishing the requirements and procedures to act before the damage is done as well as to effectively respond to already produced damages.</p> <p>Project site staff are deeply trained for this purpose as well as motivated to provide feedback in order to enrich H&amp;S policies.</p> <p><b>Source:</b></p> <p>Arauco's Sustainability Report, 2015&amp;2016.</p> <p>Arauco's Collective Contracts and Agreements</p> <p>Arauco's H&amp;S Reports, 2015&amp;2016</p> <p>H&amp;S Policy on Arauco's web page, last access on 21/06/2017.</p> <p>Arauco's staff H&amp;S Training certificates and records, 2015&amp;2016.</p>

## 6 VERIFICATION CONCLUSION

Applus+ LGAI has been engaged by Arauco to perform the 2<sup>nd</sup> periodical verification of Viñales Biomass Power Plant

By means of desk review and on-site assessments, Applus+ LGAI confirms that Viñales Biomass Power Plant complies with the verification criteria for project activities and their GHG emission reductions defined under VCS Version 3.7, including any qualifications or limitations. In addition, the project has been implemented in accordance with the project description.

Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the monitoring process in Monitoring Report is as per the PD
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.

During the verification process, some changes and updates have been included by project participants as project deviation under applicable monitoring report. The verification team verified that these changes and modifications meet the scope corrective actions and clarification requests which were raised during the assessment. Furthermore, possible implication on additionality criteria, baseline scenario definition or emission reduction calculation has been evaluated as per these aforementioned updates.

Therefore, the verification team concludes that criteria for project activities which is set out in VCS Version 3.7, has been fully accomplished and fulfilled.

The quantity of GHG emission reductions in tCO<sub>2</sub> achieved by the project activity during the monitoring period 01/01/2015 to 31/12/2016 is 506,775 tCO<sub>2</sub>e. The same is summarized in the following table:

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

Table 7. Verified GHG emission reductions and removals in the above verification period.

Year	Baseline emissions or removals (tCO <sub>2</sub> e)*	Project emissions or removals (tCO <sub>2</sub> e)**	Leakage emissions (tCO <sub>2</sub> e)	Net GHG emission reductions or removals (tCO <sub>2</sub> e)
2015 (01/01/2015-31/12/2015)	247,642	5,854	0	241,788
2016 (01/01/2016-31/12/2016)	271,504	6,515	0	264,988
<b>Total</b>	519,145	12,370	0	506,775

Estimated emission reductions are provided separately for each site in the ER sheet and estimated emission reductions for this monitoring period has been calculated considering number of days each site was operating. The estimated emission reduction works out to be 506,775 tCO<sub>2</sub>e and emission reductions achieved during this monitoring period are 2% lower than the estimated emission reduction as per registered VCS-PD. Details are listed below:

<b>Estimated amount GHG emissions reduction in this monitoring period (Registered PD version)</b>	<b>Actual GHG emission reductions monitoring period</b>	<b>Difference %</b>
516,186	506,775	2%

## APPENDIX 1 VERIFICATION CHECKLIST

**VERIFICATION CHECKLIST**

<b>PROJECT TITLE:</b>	<b>Viñales Biomass Power Plant</b> MP dates: 01/01/2015 to 31/12/2016
<b>REFERENCE NO:</b>	<b>VCS 1186</b>
<b>VERSION NO.</b>	<b>01</b>
<b>CLIENT NAME:</b>	<b>Celulosa Arauco y Constitución S.A. (hereafter referred to as Arauco)</b>
<b>ASSESSMENT TEAM:</b>	
<b>Lead Auditor:</b>	<b>Natalia Rodrigo</b>
<b>Auditor</b>	<b>Simon Shen</b>
<b>Technical Expert:</b>	<b>Natalia Rodrigo/ Simon Shen</b>
<b>Technical Reviewers:</b>	<b>Denny Xue</b>

This document contains a generic Verification Checklist for CDM and Verified Carbon Standard VCS projects, which must be jointly evaluated with the Validation and Verification Guidelines and the Verification Report Template.

This verification checklist serves the following purposes:

- It organizes, details and clarifies the requirements a CDM/ VCS project is expected to meet straight before starting its operation; and
- It ensures a transparent verification process by inducing the assessment team to document how a particular requirement has been verified and which conclusions have been reached.

This checklist contains a table with generic aspects for verification of a CDM or VCS project. Project specific aspects set by the approved PD have to be amended as a result of the review of the monitoring plan and the validation report. The use of all the checklist questions may not be applicable for all investors, and should not be viewed as mandatory for all projects. Where a finding is issued as a consequence of the verification, a corrective action request, a forward action request or clarification request should be stated.

Before this generic checklist can be applied for the verification of a specific project, the assessment team must review and adjust/amend the checklist to make it applicable to individual project characteristics and circumstances as well as individual investor criteria. The application of the assessment team's professional judgment and technical expertise should ensure that checklist amendments cover all necessary specific project requirements that have an impact on project performance. Given the above, the checklist is neither exhaustive nor prescriptive.

## 1. Compliance of Project Activity Implementation

### 1.1. Basic information

Location				
	Real situation	Consistency of PD	Consistency of MR	Conclusion and IRL
Address:	Km. 5 of the M-50 road to Chanco, commune of Constitucion in the Maule Region (Chilean Region VII)	Yes	Yes	OK
GPS coordinates:	LatitudeLongitude -35.371°      -72.412°	Yes	Yes	OK
Technical specification of main Equipment				
	Real situation	Consistency of PD	Consistency of MR	Conclusion and IRL
Description	The project activity consists on the installation and operation of the 210 ton/hr fluidized bed biomass power boiler and a 41 MW condensing/extracting turbo generator unit. The heat generated in the project activity is used for power generation and wood-drying and mechanical system in the sawmill equipment in Viñales facilities. While a fraction of the electric power is used in the Viñales sawmill to cover all industrial complex, the remaining electric power is injected in the SIC grid for	Yes	Yes	OK

	<p>sale.</p> <p>The superheated steam generated by the biomass boiler is supply throughout three lines:</p> <ol style="list-style-type: none"> <li>1. High pressure 85 Bar @ 485°C. Inject to turbo generator.</li> <li>2. Medium pressure 6.5 Bar @ 200°C</li> <li>3. Low pressure 5 Bar @ 157°C</li> </ol> <p>The Verification team also can confirm that the project activity has a feed-water line to the boiler, product of the water return, pump and pre-heated system, which allow for the project activity inject steam at 90 Bar @ 244°C</p>			
Operation Status during verification				
	Real situation	Consistency of PD	Consistency of MR	Conclusion and IRL
Actual Operation Status	<p>During the on-site inspection, the Verification team found that Project Activity has a 210 ton/hr fluidized bed biomass power boiler and a 41 MW condensing/extracting turbo generator unit. The recover superheat steam is used to meet the technical demands of the project activity's sawmill and the electric power system. The electricity is supplied to the project activity facilities according to responding to the process demands; the power surplus is injected in the SIC grid. The project activity counts with all equipment, technology, personnel, logistic and infrastructure to assure a reliable control and proper biomass</p>	Yes	Yes	OK

	<p>management regarding the reception, storage and homogenization to of biomass in mixed products for power generation in the cogeneration process. The Verification team was able to confirm that the project activity and saw mill facility is operating according to the project description of PD/1.3/</p>			
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### 1.2. Organization

Project Participant (s)		
	Verified Situation	Conclusion and IRL
Entity / Responsible person:	<p>Celulosa Arauco y Constitución S.A / Viñales Power Plant / Sergio Fuster</p> <p>Arauco Bioenergia / Carla Seguel</p>	OK
VCS Project management:	<p>Viñales Power Plant is the responsible to the Monitoring Plan enforcing and GHG data collection and data reporting/1.5/</p> <p>Arauco Bioenergia is the responsible for Monitoring Report development, Emission Reduction</p>	OK

	Calculation and request for issuance/1.1/	
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### 1.3. Quality Management System

General aspects of the Quality Management System		
	Verified Situation	Conclusion and IRL
Quality Management Manual:	<p>The verification team evaluated the management system procedures regarding the implementation of the monitoring criteria of the project activity. During the assessment it was checked that the monitoring system included the relevant management system organizational structure, roles and responsibilities, data collection, monitoring frequency, transfer and aggregation procedures, data recording, applied for this monitoring period, which is consistent with the field inspection and personnel interview.</p> <p>In addition, emergency procedures for the monitoring system were provided at on-site inspection.</p>	OK
Responsibilities:	<p>According to the site inspection and personnel interviews, the Verification team confirm that there are designated on-site personnel in charge of gathering and registering all the required information, supervising by the Power Plant Engineer, which is also the responsible to enforce monitoring plan on the site /1.5/.</p> <p>All monitoring data and relevant evidence shall be submitted to the Arauco Bioenergia, which is</p>	OK

	the responsible for the Monitoring Report development, Emission Reduction Calculation and requesting for issuance/1.1/	
Qualification and Training:	Training reports of qualification were provided at on-site inspection.	OK
Implementation of QM-system	During the site inspection, the Verification teams confirmed that all operators and responsible are clear of monitoring equipment, collection, and data management. Supportive evidence was provided at on-site inspection.	OK

**1.4. Remaining FARs from previous Verifications (or forwarded issues of validation report)**

Remaining Requests from Previous Verifications	Summary of project owner response	Assessment team Conclusion and IRL
<b><u>Forward action request No. 1:</u></b> None	No applicable. It is not applicable for the first monitoring period.	N/A

## 2. Monitoring Plan Implementation

### 2.1. Parameters

Parameters					
Meth/tool	PD	MR	Included in below table	Compliance	Conclusion and IRL
Biomass categories and quantities used in the CDM project activity	Biomass waste categories and quantities used in the project activity.	Biomass waste categories and quantities used in the project activity	Yes, at monitoring report	Yes	OK
For biomass waste categories for which scenarios B1:, B2: or B3: is deemed as a plausible baseline alternative, project participants shall demonstrate that this is a realistic and credible alternative scenario	For biomass waste categories for which scenarios B1:, B2: or B3: is deemed as a plausible baseline alternative, project participants shall demonstrate that is a realistic and credible alternative scenario	For biomass waste categories for which scenarios B1:, B2: or B3: is deemed as a plausible baseline alternative, project participants shall demonstrate that is a realistic and credible alternative scenario	Yes, at monitoring report	Yes	OK
Quantity of biomass waste of category n used in the VCS project activity in year y (tonnes on dry-basis) BRPJ,n,y	Quantity of biomass waste of category n used in the project activity in year y (tonnes on dry-basis)	Quantity of biomass waste of category n used in the project activity in year y.	Yes, at monitoring report & ER Sheets	Yes	OK
Quantity of biomass waste of category n used in the project activity in year y for which the	Quantity of biomass waste of category n used in the project activity in year y for which the	Quantity of biomass waste of category n used in the project activity in year y for which the	Yes, at monitoring report & ER Sheets	Yes	OK

Parameters					
Meth/tool	PD	MR	Included in below table	Compliance	Conclusion and IRL
baseline scenario is B4 (tonne on dry-basis) $BR_{B4,n,y}$	baseline scenario is B4 $BR_{B4,n,y}$	baseline scenario is B4 $BR_{B4,n,y}$			
Quantity of biomass waste of category n used in the VCS project activity in year y for which the baseline scenario is B1or B3 (tonnes on dry-basis) $BR_{B1/B3,n,y}$	Quantity of biomass waste of category n used in the VCS project activity in year y for which the baseline scenario is B1or B3 (tonnes on dry-basis)	Quantity of biomass waste of category n used in the VCS project activity in year y for which the baseline scenario is B1or B3 (tonnes on dry-basis)	Yes, at monitoring report & ER Sheets	Yes	OK
CO <sub>2</sub> emission factor for fossil fuel type f in year y $EF_{ff,y,f}$	CO <sub>2</sub> emission factor for fossil fuel type f in year y $EF_{ff,y,f}$	CO <sub>2</sub> emission factor for fossil fuel type f in year y $EF_{ff,y,f}$	Yes, at monitoring report & ER Sheets	Yes	OK
CH <sub>4</sub> emission factor for the combustion of biomass waste in the project plant $EF_{CH4,BR}$	CH <sub>4</sub> emission factor for the combustion of biomass waste in the project plant $EF_{CH4,BR}$	CH <sub>4</sub> emission factor for the combustion of biomass waste in the project plant $EF_{CH4,BR}$	Yes, at monitoring report & ER Sheets	Yes	OK
CO <sub>2</sub> emission factor of the most carbon intensive fossil fuel used in the country. $EF_{CO2,LE}$	<i>CO<sub>2</sub> emission factor of the most carbon intensive fossil fuel used in the country.</i> $EF_{CO2,LE}$	<i>CO<sub>2</sub> emission factor of the most carbon intensive fossil fuel used in the country.</i> $EF_{CO2,LE}$	Yes, at monitoring report & ER Sheets	Yes	OK
Baseline process heat generation in year y $HC_{BL,y}$	Baseline process heat generation in year y $HC_{BL,y}$	Baseline process heat generation in year y $HC_{BL,y}$	Yes, at monitoring report & ER Sheets	Yes	OK

Parameters					
Meth/tool	PD	MR	Included in below table	Compliance	Conclusion and IRL
Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y $EL_{PJ,gross,y}$	Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y. $EL_{PJ,gross,y}$	Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y. $EL_{PJ,gross,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
Project electricity imports from the grid in year y. $EL_{PJ,imp,y}$	Project electricity imports from the grid in year y. $EL_{PJ,imp,y}$	Project electricity imports from the grid in year y. $EL_{PJ,imp,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
Total auxiliary electricity consumption required for the operation of the power plants at the project site in year y (MWh) $EL_{PJ,aux,y}$	Total auxiliary electricity consumption required for the operation of the power plants at the project site in year y (MWh) $EL_{PJ,aux,y}$	Total auxiliary electricity consumption required for the operation of the power plants at the project site in year y (MWh) $EL_{PJ,aux,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
Net calorific value of biomass waste of category n in year y $NCV_{BR,n,y}$	Net calorific value of biomass waste of category n in year y $NCV_{BR,n,y}$	Net calorific value of biomass waste of category n in year y $NCV_{BR,n,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
Moisture content of the biomass waste	Moisture content of the biomass waste	Moisture content of the biomass waste	Yes, at monitoring report & ER Sheets	Yes	OK

Parameters					
Meth/tool	PD	MR	Included in below table	Compliance	Conclusion and IRL
Length of the operational campaign in year y $LOC_y$	Length of the operational campaign in year y $LOC_y$	Length of the operational campaign in year y $LOC_y$	Yes, at monitoring report & ER Sheets	Yes	OK
Quantity of the main product of the production process (e.g. sugar cane, rice) produced in year y from plants operated at the project site. $P_y$	Quantity of the main product of the production process (e.g. sugar cane, rice) produced in year y from plants operated at the project site. $P_y$	Quantity of the main product of the production process produced in year y from plants operated at the project site $P_y$	Yes, at monitoring report & ER Sheets	Yes	OK
Quantity of fuel type i combusted in process j during the year y $FC_{ij,y}$	Quantity of fuel type i combusted in process j during the year y $FC_{ij,y}$	Quantity of fuel type i combusted in process j during the year y $FC_{ij,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
Weighted average net calorific value of fuel type i in year y. $NCV_{i,y}$	Weighted average net calorific value of fuel type i in year y. $NCV_{i,y}$	Weighted average net calorific value of fuel type i in year y. $NCV_{i,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
CO <sub>2</sub> emission factor for fossil fuel type f in year y $EF_{CO_2,i}$	Weighted average CO <sub>2</sub> emission factor of fuel type I in year y. $EF_{CO_2,i}$	Weighted average CO <sub>2</sub> emission factor of fuel type I in year y. $EF_{CO_2,i}$	Yes, at monitoring report & ER Sheets	Yes	OK
Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m	Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m	Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m	Yes, at monitoring report & ER Sheets	Yes	OK

Parameters					
Meth/tool	PD	MR	Included in below table	Compliance	Conclusion and IRL
$D_{f,m}$	$D_{f,m}$	$D_{f,m}$			
Total mass of freight transported in freight transportation activity f in monitoring period m $FR_{f,m}$	Total mass of freight transported in freight transportation activity f in monitoring period m $FR_{f,m}$	Total mass of freight transported in freight transportation activity f in monitoring period m $FR_{f,m}$	Yes, at monitoring report & ER Sheets	Yes	OK
Amount of fossil fuel type i consumed by power plant/unit m, k or n (or in the project electricity system) in year y $FC_{i,m,i,y}, FC_{i,k,y}$	Amount of fossil fuel type i consumed by power plant/unit m, k or n $FC_{i,m,i,y}, FC_{i,k,y}$	Amount of fossil fuel type i consumed by power plant/unit m, k or n $FC_{i,m,i,y}, FC_{i,k,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
Net calorific value (energy content) of fossil fuel type i in year y $NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type i in year y $NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type i in year y $NCV_{i,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
CO <sub>2</sub> emission factor of fossil fuel type i used in power unit m in year y. $EF_{CO_2,i,y}, EF_{CO_2,m,i,y}$	CO <sub>2</sub> emission factor of fossil fuel type i used in power unit m in year y. $EF_{CO_2,i,y}, EF_{CO_2,m,i,y}$	CO <sub>2</sub> emission factor of fossil fuel type i used in power unit m in year y. $EF_{CO_2,i,y}, EF_{CO_2,m,i,y}$	Yes, at monitoring report & ER Sheets	Yes	OK
Net electricity generated by power plant/unit m, k in year y $EG_{m,y}, EG_{k,y}$	Net electricity generated by power plant/unit m, k in year y $EG_{m,y}, EG_{k,y}$	Net electricity generated by power plant/unit m, k in year y $EG_{m,y}, EG_{k,y}$	Yes, at monitoring report & ER Sheets	Yes	OK

## 2.2. Parameters measured directly with instruments

**Table 1**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Biomass waste categories and quantities used in the project activity.	Biomass categories (k) and quantities used in the CDM project activity	Biomass waste categories (k) and quantities used in the project activity	Consistent	OK
Parameter ID (if available)	Explain and document transparently in the PD which quantities of which biomass categories are used in which installation(s) under the VCS project activity and what is their baseline scenario. The quantities should be updated every year of the crediting period as part of the monitoring plan so as to reflect the actual use of biomass in the project scenario New categories of biomass can be used in	K1 Sawdust and bark from industrial operations on-site. B4 K2 Sawdust and bark from industrial operations on-site. B1/B3 K3 Sawdust and bark from industrial operations off-site B1/B3 K4 Biomass from forestry operations B1/B3	K1 Sawdust and bark from industrial operations on-site. B4 K2 Sawdust and bark from industrial operations on-site. B1/B3 K3 Sawdust and bark from industrial operations off-site B1/B3 K4 Biomass from forestry operations B1/B3	Verification team confirmed during the site inspection, no new biomass categories. The biomass waste are consistent with the K1, K2, K3 defined categories. No forestry waste or direct plantation were used.  The biomass allocation was explained and justified in the MR and the ER calculation by the Project Participants. The MR, PD and ER are consistent between	OK

	the project activity.			them.	
Data Unit	<ul style="list-style-type: none"> <li>- Type</li> <li>- Source</li> <li>- Fate in the absence of the project activity (Scenario B)</li> <li>- Use in the project scenario (Scenarios P and H)</li> <li>- Quantity (tonne dry basis)</li> </ul>	<ul style="list-style-type: none"> <li>- Type</li> <li>- Source</li> <li>- Fate in the absence of the project activity</li> <li>- Use in the project scenario</li> <li>- Quantity (tonne dry basis)</li> </ul>	<ul style="list-style-type: none"> <li>- Type</li> <li>- Source</li> <li>- Fate in the absence of the project activity</li> <li>- Use in the project scenario</li> <li>- Quantity (tonne dry basis)</li> </ul>		
Monitoring frequency - Reading / Recording	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Consistent	OK
Calibration requirements	No requirements for weight meters	No requirements for the Weighbridge 1 GSE460	Biannual for the Weighbridge 1 GSE460	Project Participants provide relevant evidence of calibration frequency.	OK
Uncertainty level	No requirements for weight meters	Class III (+/- 30 kg) the Weighbridge 1 GSE460	Class III (+/- 30 kg) the Weighbridge 1 GSE460	Project Participants provided relevant evidence of accuracy frequency.	OK
Measurement Principle (if applicable)	Use weight meters. Adjust for the moisture content in order to determine the quantity of	Most of the internal biomass waste will be measured at the entrance of the biomass	Weighbridge 1 GSE460 and the theoretical approach for biomass waste from Brushing,	The Verification team confirmed that the dedicated weight meter is used in the Power	OK

	dry biomass	power plant, using dedicated weight bridges. The rest of the internal biomass waste that are transported via the pneumatic transportation system will be estimated using calculations (see the Annex at the end of this document). The external biomass waste will be all measured using dedicated weight-bridges.	Logging, finger, band-sawing, squaring and sawmill	Plant. Project Participants provided relevant justification of the approach rationality and confirmed that Viñales complex reports the waste from remanufacturing process according to the theoretical approach.	
	Technical aspects				Conclusion and IRL
Instrument Type:	Weighbridge 1 GSE 460				OK
Serial Number:	152069				OK
Manufacturer Model Nr.:	PESAMATIC (GSE)				OK
Specific Location:	Entrance to Power Plant TAG 611-49-001				OK
Measurement Range:	0-30.000 Kgs				OK
Gaps in operating time of instrument:	Period: According to the Plant Records there were not operation gaps for in Weighbridges operation.				OK
	Default value used: No required				
	Justification: No required				
	QA/QC aspects				Conclusion and IRL
Source of data	Source: On-site measurement and calculations				
	Procedures: The verification team confirmed that all biomass which is transported to the power plant is				OK

	<p>checked in the entrance and registered in the SAP Arauco Commercial System. The weighbridge operators digitalized into the system all relevant data of every truck, such as the truck and driver authentication (i.e. origin, supplier, types of truck, etc.) and the biomass type and its characteristics like gross weight, volume, and other relevant data.</p> <p>Project Participant crosschecked the measurement with an annual energy balance based on purchased quantities and stock changes.</p> <p>Verification team Verification team checked the Energy Balance provided by the project participants/3.4/, but this is consistent with the monitored data.</p> <p>Verification team confirmed that the biomass waste are automatically recorded and supported by the order of work per truck and invoice system, which is the basis of supplier's payment. The Sunder dust from the remanufacturing process is estimated by the project facilities based on the theoretical approach according to the magnitude of wood materials productions. All plant records /4.1/4.2/4.11/</p> <p>Furthermore, the Energy balance and boiler efficiency were clarified. The Verification team confirmed that the energy balance comparison is based on the data records of the waste biomass waste and fuel consumption/4.1/4.2/.</p>	
	<p><b>Implementation of procedure:</b></p> <p>According to the visual inspections and the interviews with the power plant operators, the Verification team confirmed that all biomass transported to the power plant is checked and registered. Taking into account that there are manual collection data procedures, the verification teams selected randomly 40 different orders of services from the monitoring period and checked the data against the SAP System. All data found consistent and no major inconsistencies found. Therefore, the plan records/4.1/ are credible and reliable</p> <p>The ER Calculation and the MR are consistent with the data records of the waste biomass waste and fuel consumption/4.1/4.2/ and real operative conditions.</p>	<p>OK</p>

	<b>Responsibility:</b> The Verification team confirmed that the primary responsibility is for Weighbridge Operators and the Power Plant Engineer in charge. The data is gathering and registered in the system and send to the Arauco Headquarters for final processing.	OK																									
Archiving of raw data and protection measures	All recorded monitored data is archived in electronic into the SAP Commercial System and the Data Control System (DCS)/4.1/. The verification teams confirmed on the site that anyone could not modify the original data, which belongs to the commercial system to support the biomass supplier's payment system. Finally, the data report is storage into the virtual Arauco FTP site (FileZilla) designated to the Viñales project activity, which has restricted access protected with passport and username.	OK																									
Data transfer and protection of input data for calculations	The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergia S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/. Verification team confirmed on the site that the data records/4.1/ are consistent with the DCS and SAP databases.	OK																									
	<b>Quality of evidence</b>	<b>Conclusion and IRL</b>																									
Completeness of data	The Verification team confirmed the biomass waste data in this monitoring period is: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Type</th> <th>Desp</th> <th>Source</th> <th>DTon/yr 2015</th> <th>DTon/yr 2016</th> </tr> </thead> <tbody> <tr> <td>BR<sub>B4,1,y</sub> Heat and power generation (B4) on site</td> <td>Sawdust and bark industrial operations</td> <td>On-site</td> <td>35,430</td> <td>30,678</td> </tr> <tr> <td>BR<sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)</td> <td>Sawdust and bark industrial operations</td> <td>Off-site</td> <td>133,229</td> <td>161,404</td> </tr> <tr> <td>BR<sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)</td> <td>Sawdust and bark industrial operations</td> <td>On-site</td> <td>67,042</td> <td>72,326</td> </tr> <tr> <td>BR<sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1</td> <td>Sawdust and bark industrial operations</td> <td>Off-site</td> <td>133,229</td> <td>161,404</td> </tr> </tbody> </table>	Type	Desp	Source	DTon/yr 2015	DTon/yr 2016	BR <sub>B4,1,y</sub> Heat and power generation (B4) on site	Sawdust and bark industrial operations	On-site	35,430	30,678	BR <sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404	BR <sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	On-site	67,042	72,326	BR <sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1	Sawdust and bark industrial operations	Off-site	133,229	161,404	OK
Type	Desp	Source	DTon/yr 2015	DTon/yr 2016																							
BR <sub>B4,1,y</sub> Heat and power generation (B4) on site	Sawdust and bark industrial operations	On-site	35,430	30,678																							
BR <sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404																							
BR <sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	On-site	67,042	72,326																							
BR <sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1	Sawdust and bark industrial operations	Off-site	133,229	161,404																							

	and or B3					
Data verification	The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.					OK
	Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/					OK
Crosscheck (if available)	The Verification team confirmed that the biomass consumption was compared with the Energy Balance which is calculated according to the fossil fuel and biomass waste consumption and energy generated. The average efficiency of the monitoring period is 69% which is reasonably taking into consideration the low-efficiency process during stopping or general maintenance process in November and December.					

**Table 2**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Quantity of biomass waste of category n used in the VCS project activity in year y (tonnes on dry-basis)	Quantity of biomass waste of category n used in the VCS project activity in year y (tonnes on dry-basis)	Quantity of biomass waste of category n used in the VCS project activity in year y (tonnes on dry-basis)	The team found that the Project developer used the same classification for Biomass wastewaste categories and quantities used in the project activity. K1, K2, K3 categories are consistent with the "n" category. No forestry wastewaste were used during the monitoring period.	OK
Parameter ID (if available)	BRPJ,n,y	BRPJ,n,y K1 Sawdust and bark from industrial operations on-site. B4 K2 Sawdust and bark from industrial operations on-site. B1/B3 K3 Sawdust and bark	BRPJ,n,y K1 Sawdust and bark from industrial operations on-site. B4 K2 Sawdust and bark from industrial operations on-site. B1/B3 K3 Sawdust and bark		OK

		from industrial operations off-site B1/B3 K4 Biomass from forestry operations B1/B3	from industrial operations off-site B1/B3 K4 Biomass from forestry operations B1/B3	The biomass allocation was explained and justified in the MR and the ER calculation by the Project Participants.	
Data Unit	tonnes	BRPJ,n,y tonnes	BRPJ,n,y Tonnes dry basis		OK
Monitoring frequency - Reading / Recording	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Consistent	OK
Calibration requirements	No requirements for weight meters	No requirements for the Weighbridge 1 GSE460	Biannual for the Weighbridge 1 GSE460	Project Participants provided relevant evidence of calibration frequency.	OK
Uncertainty level	No requirements for weight meters	Class III (+/- 30 kg) the Weighbridge 1 GSE460	Class III (+/- 30 kg) the Weighbridge 1 GSE460	The team confirmed that the Weighbridge 1 GSE460 is installed in the project plant. Project Participants provided relevant evidences of accuracy frequency.	OK
Measurement Principle (if applicable)	Use weight meters. Adjust for the moisture content in order to	Dedicated weighbridges. A theoretical approach for biomass waste	Weighbridge 1 GSE460 And theoretical approach for biomass waste from	Confirmed that Weighbridge 1 GSE460 is installed. All biomass	OK

	determine the quantity of dry biomass The biomass waste quantities used should be monitored separately for (a) each type of biomass waste and each source (e.g. produced on-site, obtained from biomass waste suppliers, obtained from a biomass waste market, obtained from an identified biomass waste producer, etc.).	transported via the pneumatic	Brushing, Logging, finger, band-sawing, squaring and sawmill	waste transported to the project activity are registered electronic way Project Participants provided relevant justification of the approach rationality and confirmed that Viñales complex report the waste from remanufacturing process according to the theoretical approach.	
	Technical aspects				Conclusion and IRL
Instrument Type:	Weighbridge 1 GSE 460				OK
Serial Number:	152069				OK
Manufacturer Model Nr.:	PESAMATIC (GSE)				OK
Specific Location:	Entrance to Power Plant TAG 611-49-001				OK
Measurement Range:	0-30.000 Kgs				OK
Gaps in operating time of instrument:	Period: According to the Plant Records there were not operation gaps for in Weighbridges operation.				Ok
	Default value used: No required				-
	Justification: No required				-
	QA/QC aspects				Conclusion and IRL
Source of data	Source: On-site measurement and calculations				OK

	<p><b>Procedures:</b> The team confirmed that all biomass which is transported to the power plant is checked in the entrance and registered in the SAP Arauco Commercial System. The weighbridge operators digitalized into the system all relevant data of every truck, such as the truck and driver authentication (i.e origin, supplier, types of truck, etc) and the biomass type and its characteristics like gross weight, volume, and other relevant data.</p> <p>Project Participant crosschecked the measurement with an annual energy balance that is based on purchased quantities and stock changes.</p> <p>The Verification team checked the Energy Balance which was provided by the project participants/3.4/, and the same is consistent with the monitored data.</p> <p>The Verification team confirmed that the biomass waste are automatically recorded and supported by the order of work per truck and invoice system, which is the base of supplier's payment. The Sunder dust from the remanufacturing process is estimated based on the theoretical approach according to the magnitude of wood materials productions. All plant records /4.1/4.2/4.11/</p> <p>The Verification team confirmed that the energy balance comparison is based on the data records of the waste biomass waste and fuel consumption/4.1/4.2/.</p>	OK
	<p><b>Implementation of procedure:</b> According to the visual inspections and the interviews with the power plant operators, the Verification team confirmed that all biomass which is transported to the power plant is checked and registered. Taking into account that there are manual collection data procedures, the verification team selected randomly 40 different service orders which applied for the succeeding monitoring period and checked the data against the SAP System. All data was found consistent and no major inconsistencies have been found. Therefore, the plan records/4.1/ are credible and reliable.</p> <p>The ER Calculation and the MR are consistent with the data records of the waste biomass waste and fuel consumption/4.1/4.2/ and real operative conditions.</p>	OK
	<p><b>Responsibility:</b></p>	OK

	The Verification team confirmed that the primary responsibility comes from Weighbridge operators and the Power Plant Engineer in charge. The data is gathering and registered in the system and send to the Arauco Headquarters for final processing.																										
Archiving of raw data and protection measures	All recorded monitored data is recorded electronically into the SAP commercial System and the Data Control System (DCS)/4.1/. The verification team confirmed by means of site inspection that no one is able to modify the original data, which belongs to the commercial system to support the biomass supplier's payment system. Finally, the data report is recorded in the virtual Arauco FTP site (FileZilla), which has restricted access protected with passport and username.	OK																									
Data transfer and protection of input data for calculations	The monitoring data information is on-site consulted, processed and recorded by the Power Plant Engineer in Charge. These records are monthly submitted to Arauco Bioenergía S.A. for further processing regarding Emission calculation/1.2/ and Monitoring Report/1.1/ data parameters. Verification team confirmed on the site that the data records/4.1/ are consistent with the DCS and SAP databases.	OK																									
Quality of evidence		Conclusion and IRL																									
Completeness of data	<p>The Verification team confirmed the biomass residues data records for this monitoring period is:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Desp</th> <th>Source</th> <th>DTon/yr 2015</th> <th>DTon/yr 2016</th> </tr> </thead> <tbody> <tr> <td>BR<sub>B4,1,y</sub> Heat and power generation (B4) on site</td> <td>Sawdust and bark industrial operations</td> <td>On-site</td> <td>35,430</td> <td>30,678</td> </tr> <tr> <td>BR<sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)</td> <td>Sawdust and bark industrial operations</td> <td>Off-site</td> <td>133,229</td> <td>161,404</td> </tr> <tr> <td>BR<sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)</td> <td>Sawdust and bark industrial operations</td> <td>On-site</td> <td>67,042</td> <td>72,326</td> </tr> <tr> <td>BR<sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1 and or B3)</td> <td>Sawdust and bark industrial operations</td> <td>Off-site</td> <td>133,229</td> <td>161,404</td> </tr> </tbody> </table>	Type	Desp	Source	DTon/yr 2015	DTon/yr 2016	BR <sub>B4,1,y</sub> Heat and power generation (B4) on site	Sawdust and bark industrial operations	On-site	35,430	30,678	BR <sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404	BR <sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	On-site	67,042	72,326	BR <sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404	OK
Type	Desp	Source	DTon/yr 2015	DTon/yr 2016																							
BR <sub>B4,1,y</sub> Heat and power generation (B4) on site	Sawdust and bark industrial operations	On-site	35,430	30,678																							
BR <sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404																							
BR <sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	On-site	67,042	72,326																							
BR <sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404																							

Data verification	The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.	OK
	Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/	OK
Crosscheck (if available)	The Verification team confirmed that the biomass consumption was compared with the Energy Balance calculated according to the fossil fuel and biomass waste consumption and energy generated. The average efficiency of the monitoring period is 69% which is reasonable taking into consideration the low-efficiency process during programmed stoppages or general maintenance process within the period November-December.	OK

**Table 3**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Quantity of biomass waste of category n used in the project activity in year y for which the baseline scenario is B4	Quantity of biomass waste of category n used in the project activity in year y for which the baseline scenario is B4	Quantity of biomass waste of category n used in the project activity in year y for which the baseline scenario is B4	Project Participants clarified the biomass waste allocation. Now is clear how many of biomass waste belong to the scenario B4.	OK
Parameter ID (if available)	BR <sub>B4,n,y</sub>	BR <sub>B4,n,y</sub>	BR <sub>B4,n,y</sub> K1 Sawdust and bark from industrial operations on-site. B4 K2 Sawdust and bark from industrial operations on-site. B1/B3 K3 Sawdust and bark from industrial		

			operations off-site B1/B3 K4 Biomass from forestry operations B1/B3		
Data Unit	tonnes	tonnes	Tonnes dry basis		
Monitoring frequency - Reading / Recording	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Consistent	
Calibration requirements	No requirements for weight meters	No requirements for the Weighbridge	Biannual for the Weighbridge 1 GSE460	Relevant evidence was provided.	OK
Uncertainty level	No requirements for weight meters	Class III (+/- 30 kg) the Weighbridge 1 GSE460	Class III (+/- 30 kg) the Weighbridge 1 GSE460	Relevant evidence was provided.	
Measurement Principle (if applicable)	Use weight meters. Adjust for the moisture content in order to determine the quantity of dry biomass The procedures in Step 1.4 of the Methodology ACM0006 v 12.1.1 /2.1/ should also be followed	Dedicated weighbridges. A theoretical approach for biomass waste transported via the pneumatic	Weighbridge 1 GSE460 And theoretical approach for biomass waste from Brushing, Logging, finger, band-sawing, squaring and sawmill	Confirmed that Weighbridge 1 GSE460 is installed. All biomass waste which are transported to the project activity are recorded in electronic form. The MR is clear what biomass waste products applied to scenario B4. See below.	
	Technical aspects				Conclusion and IRL

Instrument Type:	Weighbridge 1 GSE 460	OK
Serial Number:	152069	OK
Manufacturer Model Nr.:	PESAMATIC (GSE)	OK
Specific Location:	Entrance to Power Plant TAG 611-49-001	OK
Measurement Range:	0-30.000 Kgs	OK
Gaps in operating time of instrument:	Period: According to the Plant Records there were not operation gaps for in Weighbridges operation.	OK
	Default value used: No required	-
	Justification: No required	-
	QA/QC aspects	Conclusion and IRL
Source of data	Source: On-site measurement and calculations	
	<p>Procedures: The weighbridge operators digitalized into the system all relevant data of every truck, such as the truck and driver authentication (i.e origin, supplier, types of truck, etc) and the biomass type regarding its characteristics like gross weight, volume, and other relevant data. Project Participant crosschecked the measurement with an annual energy balance that is based on purchased quantities and stock changes. The Verification team checked the Energy Balance provided by the project participants/3.4/, and this is consistent with the monitored data.</p> <p>The Verification team confirmed that the biomass waste are automatically recorded and supported by the service order, per truck and invoicing system, which is the base of supplier's payment. The Sunder dust from the remanufacturing process is estimated by the Viñales complex based on the theoretical approach according to the magnitude of wood materials productions. All plant records /4.1/4.2/4.11/</p> <p>Furthermore, the Energy balance and boiler efficiency was clarified. The Verification team confirmed that the energy balance comparison is based on the data records of the waste biomass waste and fuel consumption/4.1/4.2/.</p>	OK
	Implementation of procedure:	OK

	The ER Calculation and the MR are consistent with the data records of the waste biomass waste and fuel consumption/4.1/4.2/ and real operative conditions.											
	<p>Responsibility:</p> <p>The Verification team confirmed that the primary responsibility comes from Weighbridge operators and the Power Plant Engineer in charge. The data recorded in the system and submitted to the Arauco Headquarters for final processing.</p>	OK										
Archiving of raw data and protection measures	All recorded monitored data is recorded digitally into the SAP commercial System and the Data Control System (DCS)/4.1/. The verification team confirmed by means of site inspection that no one is able to modify the original data, which belongs to the commercial system to support the biomass supplier's payment system. Finally, the data report is recorded into the virtual Arauco FTP site (FileZilla) i which has restricted access protected with passport and username.	OK										
Data transfer and protection of input data for calculations	The monitoring data information is on-site consulted, processed and recorded by the Power Plant Engineer in Charge. In addition it is monthly submitted to Arauco Bioenergia S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/ . Verification team confirmed on the site that the data records/4.1/ are consistent with the DCS and SAP databases.	OK										
	Quality of evidence	Conclusion and IRL										
Completeness of data	<p>The Verification team confirmed the monitored data in this monitoring period is:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Desp</th> <th>Source</th> <th>DTon/yr 2015</th> <th>DTon/yr 2016</th> </tr> </thead> <tbody> <tr> <td>BR<sub>B4,1,y</sub> Heat and power generation (B4) on site</td> <td>Sawdust and bark industrial operations</td> <td>On-site</td> <td>35,430</td> <td>30,678</td> </tr> </tbody> </table>	Type	Desp	Source	DTon/yr 2015	DTon/yr 2016	BR <sub>B4,1,y</sub> Heat and power generation (B4) on site	Sawdust and bark industrial operations	On-site	35,430	30,678	OK
Type	Desp	Source	DTon/yr 2015	DTon/yr 2016								
BR <sub>B4,1,y</sub> Heat and power generation (B4) on site	Sawdust and bark industrial operations	On-site	35,430	30,678								
Data verification	The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.	OK										
	Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/	OK										
Crosscheck (if available)	The Verification team confirmed that the biomass consumption was compared with the Energy Balance calculated according to the fossil fuel and biomass waste consumption as well as generated energy. The average efficiency of the monitoring period is 69% which is reasonable taking into consideration the low-											

	efficiency process during programmed stoppage or general maintenance process in November and December	
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**Table 4**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Quantity of biomass waste of category n used in the VCS project activity in year y for which the baseline scenario is B1 or B3 (tonnes on dry-basis)	Quantity of biomass waste of category n used in the VCS project activity in year y for which the baseline scenario is B1 or B3 (tonnes on dry-basis)	Quantity of biomass waste of category n used in the VCS project activity in year y for which the baseline scenario is B1 or B3 (tonnes on dry-basis)	The biomass allocation is clarified in MR  Consistent	OK
Parameter ID (if available)	BR <sub>B1/B3,n,y</sub>	BR <sub>B1/B3,n,y</sub>	BR <sub>B1/B3,n,y</sub> K2 Sawdust and bark from industrial operations on-site. B1/B3 K3 Sawdust and bark from industrial operations off-site B1/B3 K4 Biomass from forestry operations B1/B3		OK
Data Unit	tonnes	tonnes	tonnes		OK
Monitoring frequency - Reading / Recording	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions	Consistent	OK

Calibration requirements	No requirements for weight meters	No requirements for the Weighbridge 1 GSE460	Biannual for the Weighbridge 1 GSE460	Relevant evidence was provided. Consistent	OK
Uncertainty level	No requirements for weight meters	Class III (+/- 30 kg) the Weighbridge 1 GSE460	Class III (+/- 30 kg) the Weighbridge 1 GSE460	The biomass allocation is clarified in MR  Consistent	Ok
Measurement Principle (if applicable)	Use weight meters. Adjust for the moisture content to determine the quantity of dry biomass	Dedicated weighbridges. A theoretical approach for biomass waste transported via the pneumatic	Weighbridge 1 GSE460 And theoretical approach for biomass waste from Brushing, Logging, finger, band-sawing, squaring and sawmill	Confirmed the installation of the Weighbridge 1 GSE460. All biomass waste transported to the project activity are registered electronically. The biomass calculated and the plant records/4.1/ are consistent with the theoretical approach for Sunder dust.	OK
Technical aspects					Conclusion and IRL
Instrument Type:	Weighbridge 1 GSE 460				OK
Serial Number:	152069				OK
Manufacturer Model Nr.:	PESAMATIC (GSE)				OK
Specific Location:	Entrance to Power Plant TAG 611-49-001				OK
Measurement Range:	0-30.000 Kgs				OK
Gaps in operating time of instrument:	Period: According to the Plant Records there were not operation gaps for in Weighbridges operation.				OK
	Default value used: No required				-

	Justification: No required	-
	QA/QC aspects	Conclusion and IRL
Source of data	Source: On-site measurement and calculations	
	<p>Procedures: The weighbridge operators digitalized into the system all relevant data of every truck, such as the truck and driver authentication (i.e., origin, supplier, types of truck, etc) and the biomass type and its characteristics like gross weight, volume, and other relevant data. Project Participant crosschecked the measurement with an annual energy balance based on purchased quantities and stock changes. The Verification team checked the Energy Balance provided by the project participants/3.4/, and the same is consistent with the monitored data.</p> <p>The Verification team confirmed that the biomass waste is automatically recorded and supported by the service order per truck and invoice system, which is the base of supplier's payment. The Sunder dust from the remanufacturing process is based on the theoretical approach according to the magnitude of wood materials productions. All plant records /4.1/4.2/4.11/</p> <p>The Verification team confirmed that the energy balance comparison based on the data records of the waste biomass waste and fuel consumption/4.1/4.2/.</p> <p>7</p>	OK
	<p><b>Implementation of procedure:</b></p> <p>The cross-checking procedures are consistent with the Monitoring Plan</p> <p>The ER Calculation and the MR are consistent with the data records of the waste biomass waste and fuel consumption/4.1/4.2/ and real operative conditions.</p>	OK

	<p><b>Responsibility:</b> The Verification team confirmed that the primary responsibility is for Weighbridge Operators and the Power Plant Engineer in charge. The data is gathering and registered in the system and send to the Arauco Headquarters for final processing.</p>	OK																									
Archiving of raw data and protection measures	All recorded monitored data is recorded digitally into the SAP commercial System and the Data Control System (DCS)/4.1/. The verification team confirmed by means of site inspection that no one is able to modify the original data, which belongs to the commercial system to support the biomass supplier's payment system. Finally, the data report is recorded into the virtual Arauco FTP site (FileZilla) which has restricted access protected with passport and username. recorded	OK																									
Data transfer and protection of input data for calculations	The monitoring data information is on-site consulted, processed and recorded by the Power Plant Engineer in Charge. These records are monthly submitted to Arauco Bioenergia S.A. for further processing regarding Emission calculation/1.2/ and Monitoring Report/1.1/ data parameters. Verification team confirmed on the site that the data records/4.1/ are consistent with the DCS and SAP databases.	OK																									
	<b>Quality of evidence</b>	<b>Conclusion and IRL</b>																									
Completeness of data	<p>The Verification team confirmed the biomass waste data in this monitoring period is:</p> <table border="1" data-bbox="645 944 1603 1396"> <thead> <tr> <th>Type</th> <th>Desp</th> <th>Source</th> <th>DTon/yr 2015</th> <th>DTon/yr 2016</th> </tr> </thead> <tbody> <tr> <td>BR<sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)</td> <td>Sawdust and bark industrial operations</td> <td>Off-site</td> <td>133,229</td> <td>161,404</td> </tr> <tr> <td>BR<sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)</td> <td>Sawdust and bark industrial operations</td> <td>On-site</td> <td>67,042</td> <td>72,326</td> </tr> <tr> <td>BR<sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1 and or B3)</td> <td>Sawdust and bark industrial operations</td> <td>Off-site</td> <td>133,229</td> <td>161,404</td> </tr> <tr> <td>BR<sub>B1/B3,4,y</sub> Dumped and/or burned in</td> <td>Biomass from forestry operations</td> <td>Off-site</td> <td>17,360</td> <td>0</td> </tr> </tbody> </table>	Type	Desp	Source	DTon/yr 2015	DTon/yr 2016	BR <sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404	BR <sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	On-site	67,042	72,326	BR <sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404	BR <sub>B1/B3,4,y</sub> Dumped and/or burned in	Biomass from forestry operations	Off-site	17,360	0	
Type	Desp	Source	DTon/yr 2015	DTon/yr 2016																							
BR <sub>B1/B3,4,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404																							
BR <sub>B1/B3,2,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	On-site	67,042	72,326																							
BR <sub>B1/B3,3,y</sub> Dumped and/or burned in the open air (B1 and or B3)	Sawdust and bark industrial operations	Off-site	133,229	161,404																							
BR <sub>B1/B3,4,y</sub> Dumped and/or burned in	Biomass from forestry operations	Off-site	17,360	0																							

	the open air (B1 and or B3) Heat and power generation on-site (biomass only boiler)						
Data verification	The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.						OK
	Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/						OK
Crosscheck (if available)	The Verification team confirmed that the biomass consumption was compared with the Energy Balance calculated according to the fossil fuel and biomass waste consumption and generated energy. The average efficiency of the monitoring period is 69% which is reasonable taking into consideration the low-efficiency process during programmed stoppage or general maintenance process in November and December						OK

**Table 5**

Parameter and instrumentation Information						
	Meth/Tool	PD	MR	Verified	Conclusion and IRL	
Parameter title	Baseline process heat generation in year y	Baseline process heat generation in year y	Baseline process heat generation in year y	Consistent	OK	
Parameter ID (if available)	HC <sub>BL,y</sub>	HC <sub>BL,y</sub>	HC <sub>BL,y</sub>	Consistent	OK	
Data Unit	(GJ)	(GJ)	(GJ)	Consistent	OK	
Monitoring	Calculation based on	Calculation based on	Calculation based on	Consistent	OK	

frequency - Reading / Recording	continuously monitored data an aggregated as appropriate.	continuously monitored data an aggregated as appropriate.	continuously monitored data an aggregated as appropriate.		
Calibration requirements	No requirements	No requirements	See the Table 5.2 below for calibration and accuracy of monitoring equipment defined according to supplier recommendation.	Project participants completed and clarified every calibration and accuracy requirements of all monitoring equipment /5.10/5.12/5.13/.	OK
Uncertainty level	No requirements	No requirements			
Measurement Principle (if applicable)	This parameter should be determined as the difference of the enthalpy of the process heat supplied to process heat loads in the project minus the enthalpy of the feed-water, the boiler blow-down and any condensate return to the heat generators. The respective enthalpies should be determined based on the mass flows, the temperatures, and the pressure. Steam tables or thermodynamic equations may be used to calculate the enthalpy as a function of temperature and pressure	This parameter was determined as the difference of the enthalpy of the process heat loads in the project activity minus the enthalpy of the feed-water, the boiler blow-down and any condensate return to the heat generators. The respective enthalpies were determined based on the mass flows, the temperatures and, in the case of superheated steam, the pressure. Appropriate thermodynamic equations may be used to calculate the enthalpy as a function of temperature and pressure	This parameter was determined as the difference of the enthalpy of the process heat loads in the project activity minus the enthalpy of the feed-water, the boiler blow-down and any condensate return to the heat generators. The respective enthalpies were determined based on the mass flows, the temperatures and, in the case of superheated steam, the pressure. Appropriate thermodynamic equations may be used to calculate the enthalpy as a function of temperature and pressure	Consistent	OK

	Technical aspects	Conclusion and IRL																							
Instrument Type:	<p>According to the final equipment arrangements, the Verification team can confirm the following characteristics:</p> <p>The following table refers to the final arrangements of monitoring equipment.</p> <p>Table 5.1 Monitoring Equipment identification for every superheated line process</p> <table border="1" data-bbox="517 571 1771 1390"> <thead> <tr> <th>Line Steam</th> <th>Working Conditions</th> <th>Flow Meter Transmitter</th> <th>Pressure Gauge</th> <th>Thermocouple</th> </tr> </thead> <tbody> <tr> <td rowspan="2">High Pressure 85 Bar – Turbine</td> <td rowspan="2">84.9 Barg 481°C 183 ton/hr</td> <td>Endress + Hauser S# D501F50109D TAG663-FT-0156</td> <td>Endress + Hauser S# D500C90109 C TAG663-PT-0155</td> <td>Endress + Hauser S# 266161 663-TE-0157</td> </tr> <tr> <td>Rosemount 2051CD S# 33712 TAG 665-FT-9030</td> <td>Rosemount 2051TG S# 32601(A)-32602(B) TAG665-PT-9040-A/B</td> <td>Rosemount 644 S# 32561(A)- 32562(B) TAG 665-TT-9043-A- B</td> </tr> <tr> <td>Medium pressure 6.5 Bar</td> <td>6.5 Barg 197°C 13 ton/hr</td> <td>Rosemount 2051CD S# 33711 TAG 665-FT-9025  Rosemount 2051CD S# 107763 TAG 665-FT-9051</td> <td>Rosemount 2051TG S# 32561(A)- 32562(B) TAG 665-PT-9001-A-B</td> <td>Rosemount 644 S# 0271897 665-TT-9026</td> </tr> <tr> <td>Low pressure 5 Bar</td> <td>5.4 Barg 159 °C 52 ton/hr</td> <td>Rosemount 2051CD S# 33709 0033709 TAG 665-FT-9019  Rosemount 2051CD S# 33710 TAG 665-FT-9023</td> <td>Rosemount 2051TG S# 32598(A)-32599(B)- 32600(C) TAG 665-PIC-9002-A-B-C</td> <td>Rosemount 644 S# 0271896 TAG 665-TT-9024</td> </tr> </tbody> </table>	Line Steam	Working Conditions	Flow Meter Transmitter	Pressure Gauge	Thermocouple	High Pressure 85 Bar – Turbine	84.9 Barg 481°C 183 ton/hr	Endress + Hauser S# D501F50109D TAG663-FT-0156	Endress + Hauser S# D500C90109 C TAG663-PT-0155	Endress + Hauser S# 266161 663-TE-0157	Rosemount 2051CD S# 33712 TAG 665-FT-9030	Rosemount 2051TG S# 32601(A)-32602(B) TAG665-PT-9040-A/B	Rosemount 644 S# 32561(A)- 32562(B) TAG 665-TT-9043-A- B	Medium pressure 6.5 Bar	6.5 Barg 197°C 13 ton/hr	Rosemount 2051CD S# 33711 TAG 665-FT-9025  Rosemount 2051CD S# 107763 TAG 665-FT-9051	Rosemount 2051TG S# 32561(A)- 32562(B) TAG 665-PT-9001-A-B	Rosemount 644 S# 0271897 665-TT-9026	Low pressure 5 Bar	5.4 Barg 159 °C 52 ton/hr	Rosemount 2051CD S# 33709 0033709 TAG 665-FT-9019  Rosemount 2051CD S# 33710 TAG 665-FT-9023	Rosemount 2051TG S# 32598(A)-32599(B)- 32600(C) TAG 665-PIC-9002-A-B-C	Rosemount 644 S# 0271896 TAG 665-TT-9024	OK
Line Steam	Working Conditions	Flow Meter Transmitter	Pressure Gauge	Thermocouple																					
High Pressure 85 Bar – Turbine	84.9 Barg 481°C 183 ton/hr	Endress + Hauser S# D501F50109D TAG663-FT-0156	Endress + Hauser S# D500C90109 C TAG663-PT-0155	Endress + Hauser S# 266161 663-TE-0157																					
		Rosemount 2051CD S# 33712 TAG 665-FT-9030	Rosemount 2051TG S# 32601(A)-32602(B) TAG665-PT-9040-A/B	Rosemount 644 S# 32561(A)- 32562(B) TAG 665-TT-9043-A- B																					
Medium pressure 6.5 Bar	6.5 Barg 197°C 13 ton/hr	Rosemount 2051CD S# 33711 TAG 665-FT-9025  Rosemount 2051CD S# 107763 TAG 665-FT-9051	Rosemount 2051TG S# 32561(A)- 32562(B) TAG 665-PT-9001-A-B	Rosemount 644 S# 0271897 665-TT-9026																					
Low pressure 5 Bar	5.4 Barg 159 °C 52 ton/hr	Rosemount 2051CD S# 33709 0033709 TAG 665-FT-9019  Rosemount 2051CD S# 33710 TAG 665-FT-9023	Rosemount 2051TG S# 32598(A)-32599(B)- 32600(C) TAG 665-PIC-9002-A-B-C	Rosemount 644 S# 0271896 TAG 665-TT-9024																					

	Feed water line	90,2 Bar 250 °C		Endress + Hauser S# D500BE0109C TAG 663-PT-0106	Rosemount 644 S# 265913 TAG 663-TT-0111		
Serial Number:	According to the final equipment arrangements, the Verification team can confirm the following characteristics:						OK
	Table 5.2 Calibration Assessment						
Manufacturer Model Nr.:	<b>Monitored Equipment(1)</b>	Pressure Gauge	Steam Flow Meter	Thermocouple transmitter	Pressure gauge	Steam Flow Meter	Thermocouple transmitter
	<b>Manufacture Model ID</b>	Endress + Hauser Cerabar PMP75	Endress+ Hauser Cerabar PMP75	Endress + Hauser TH53	Rosemount 2051TG	Rosemount 2051CD	Rosemount 644
	<b>TAG ID</b>	663-FT-0155	663-FT-0156	663-TE-0157	665-PT-9040-A/B	665-FT-9030	665-TT-9043-A-B
	<b>Unique Serial</b>	D500C90109C	D501F50109D	266161	32601(A)-32602(B)	33712	0271902(A)-0219846(B)
	<b>Accuracy level</b>	±0.075% /5.2/	±0.075% /5.2/	±0 075%	±0.05% /5.4/5.5/	±0.05% /5.4/5.5/	±0.03% /5.4/5.5/
Specific Location:	<b>Calibration Frequency (2)</b>	18 months	18 months	No required	18 months	18 months	24 months
	<b>Date of Calibration</b>	21.10.2013	24.10.2013	No required	24.10.2013	21.10.2013	19.11.2014
		17.11.2014	18.11.2014		19.11.2014	19.11.2014	14.11.2015
		14.11.2015	13.11.2015		14.11.2015	14.11.2015	08.11.2016
		19.11.2016	12.11.2106		08.11.2016	08.11.2016	
Measurement Range:	<b>Valid of</b>	19.05.2018	12.05.2018	No required	08.05.2018	08.05.2018	08.11.2018
							NOK PP shall

<b>Calibration (3)</b>						
<b>Entity</b>	INECO	INECO	No required	INECO	INECO	INECO

Table 5.2

<b>Monitored Equipment(1)</b>	Pressure Gauge	Steam Flow Meter	Steam Flow Meter	Thermocouple transmitter	Pressure Gauge
<b>Manufacture Model ID</b>	Rosemount 2051TG	Rosemount 2051CD	Rosemount 2051CD	Rosemount 644	Rosemount 2051TG
<b>TAG ID</b>	665-PT-9001-A-B	665-FT-9025	665-FT-9051	665-TT-9026	665-PIC-9002-A-B-C
<b>Unique Serial</b>	32561(A)-32562(B)	33711	107763	0271897	32598(A)-32599(B)-32600(C)
<b>Accuracy level</b>	±0.05% /5.5/	±0.05% /5.5/	±0.05%	±0.03%	±0.05%
<b>Calibration Frequency (2)</b>	18 months	18 months	18 months	24 months	18 months
<b>Date of Calibration</b>	24.10.2013 19.11.2014 14.11.2015 08.11.2016	22.10.2013 19.11.2014 13.11.2015 09.11.2016	21.10.2013 19.11.2014 14.11.2015 11.11.2016	03.01.2013 08.11.2016	24.10.2013 19.11.2014 14.11.2015 19.11.2016
<b>Valid of Calibration (3)</b>	08.11.2015	12.05.2018	11.05.2018	08.11.2018	18.05.2018
<b>Entity</b>	INECO	INECO	INECO	INECO	INECO

Table 5.2

<b>Monitored Equipment(1)</b>	Steam Flow Meter	Steam Flow Meter Deareator	Pressure Gauge	Thermocouple transmitter
<b>Manufacture Model ID</b>	Rosemount 2051CD	Rosemount 2051CD	Rosemount 2051TG	Rosemount 644HANA
<b>TAG ID</b>	665-FT-9019	665-FT-9023	665-PT-9040-B	665-TT-9024
<b>Unique Serial</b>	33709	33710	32602(B)	0271896

clarify cases for Thermocouple transmitter (665-TT-9026 and CL 1 IS OPEN

	<b>Accuracy level</b>	±0.05%	±0.05% /5.5/	±0.05% /5.5/	±0.03% /5.5/	
	<b>Calibration Frequency</b> (2)	18 months	18 months	18 months	24 months	
	<b>Date of Calibration</b>	22.10.2013	21.10.2013	24.10.2013	03.01.2013	
		19.11.2014	19.11.2014	19.11.2014	08.11.2016	
		13.11.2015	11.11.2015	14.11.2015		
		12.11.2016	17.11.2016	08.11.2016		
<b>Valid of Calibration</b> (3)	12.05.2018	11.05.2018	08.05.2018	08.11.2018		
<b>Entity</b>	INECO	INECO	INECO	MCI LTDA		
Gaps in operating time of instrument:	Period: No gaps during monitoring period for heat energy generation for this monitoring period. /4.9/					SEE CL1
	Default value used: No required					-
	Justification: No required					-
	QA/QC aspects					Conclusion and IRL
Source of data	Source: On-site measurements and calculations.					OK
	Procedures: The heat generation is determined as the difference of the enthalpy between the process heat loads in the project activity minus the enthalpy of the feed-water. The enthalpies were determined based on the steam flows, the temperatures and the pressure. Appropriate thermodynamic formulae were used and Verification team confirmed that the criteria applied for energy calculations are consistent with operative conditions and the calculation have been done under conservative assumptions.					OK
	Implementation of procedure: The verification team confirms that the all monitored data is continuously measured and					OK

	<p>automatically storage in the Data Control System (DCS). The data centre system and plant records/4.9/ are reliable and safely. The plant records /4.9/ are consistent with the MR and ER spreadsheet calculation.</p>	
	<p><b>Responsibility:</b> The monitoring data information is processed and stored on-site, and monthly is send to Arauco Bioenergía S.A. for Emission Report and final processing.</p>	OK
Archiving of raw data and protection measures	<p>The data centre system and plant records/4.9/ are reliable. The plant records /4.9/ are consistent with the MR and ER spreadsheet calculation. The verification teams confirmed on the site that anyone could not modify the original data, and the data belongs to the normal operation records of the project activity</p>	OK
Data transfer and protection of input data for calculations	<p>The Project Participants provided all monitored records for this monitoring period.</p>	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	<p>The Verification Team confirmed that all monitored data for heat energy generation calculation were provided/4.9/. The data is credible and traceable and consistent with the MR and ER Calculations</p>	OK
Data verification	<p><b>Consistency of raw data with calculation tool:</b> The monitored data are consistent with the ER spread sheet/1.2/ calculation</p>	OK
	<p><b>Consistency of calculation tool with monitoring report:</b> The monitored data are consistent with the ER spread sheet/1.2/ calculation</p>	OK
Crosscheck (if available)	<p>No applicable</p>	-

**Table 6**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y.	Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y.	Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y.	Consistent	OK
Parameter ID (if available)	EL <sub>PJ, gross, y</sub>	EL <sub>PJ, gross, y</sub>	EL <sub>PJ, gross, y</sub>	Consistent	OK
Data Unit	MWh	MWh	MWh	Consistent	OK
Monitoring frequency - Reading / Recording	Continuously and aggregated as appropriate, to calculate emission reductions.	Continuously and aggregated as appropriate, to calculate emission reductions.	Continuously and aggregated as appropriate, to calculate emission reductions.	Consistent	OK
Calibration requirements	No requirements	7 years	7 years	Calibration and accuracy requirements are consistent with the manufacture specification of the laboratory instruments/5.9/	OK
Uncertainty level	No requirements	+/- 0.2%	+/- 0.2%		OK
Measurement Principle (if applicable)	Use calibrated electricity meters	Use calibrated electricity meters	Use calibrated electricity meters	Consistent	OK
	Technical aspects				Conclusion and IRL
Instrument Type:	Bi-directional Electricity meter				8

Serial Number:	TAG8600-10	OK
Manufacturer Model Nr.:	Schneider Electric ION 8600 Model	OK
Specific Location:	Electrical Sub-station, Turbo generator 41 MW SE-EI-0003/0004	
Gaps in operating time of instrument:	Period: No gaps for gross power generation has been found/4.12/	OK
	Default value used: No applicable	-
	Justification: No applicable	-
	QA/QC aspects	Conclusion and IRL
Source of data	Source: On-site measurement.	
	Procedures: Monitored continuously and aggregated as appropriate using proper electric meters, calibrated and maintained according to manufacturer specification. The verification team confirmed that the data is storage automatically in the Data Control System (DCS).	OK
	Implementation of procedure: The Verification team confirmed that the dedicated electricity meter measured the total power generation, and the data is recorded automatically in the (DCS). The Verification team also confirmed that the data in the DCS is consistent the Plant Power Generation records/4.12/ and the power plant availability records/3.1/.  . The data records/4.12/ and electricity meters layout are consistent with the technical issues observed during the site inspection.	OK
	Responsibility: The responsible for the monitoring procedure is the Power Plant Engineer in Charge, event which was confirmed during the site inspection.	OK
Archiving of raw data and protection measures	The verification team confirmed that the monitored data is automated recorded and storage in an electronic way in the Data Control System (DCS). The verification teams confirmed on the site that anyone could not modify the original data, which belongs to the operational data to support the plant operation performance. Finally, the data report is recorded into the virtual Arauco FTP site (FileZilla) designated to the Viñales project activity, which has restricted access protected with passport and username.	OK

Data transfer and protection of input data for calculations	<p>During the site inspection and revision of the Data Control System (DCS), verification team confirmed that the Plant Power Generation records/4.2/ is consistent operation data and the power plant availability records/3.1/.</p> <p>The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergia S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/</p>	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The Verification team checks that all data from the monitoring period are complete and consistent	OK
Data verification	The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.	OK
	Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/	OK
Crosscheck (if available)	<p>The consistency of metered electricity shall check with receipts from electricity sales and the quantity of fuels fired (e.g. check whether the electricity generation divided by the quantity of fuels fired results in a reasonable efficiency that is comparable to previous years).</p> <p>Project Participants demonstrated the cross-checking process according to the methodology guideline/2.4/. Although, there are no electricity invoices for the total power generation, the Project Participants made a reliable comparison between the calculation of the surplus of electricity supplied (i.e. balance of power input vs. output and consumption) and the sales electricity to the grid (i.e. electricity invoices). Meanwhile, the Project participants compared the index between electricity generation divided by the quantity of combusted biomass in Power boiler results in a reasonable efficiency comparable to yearly statistic range, and the percentage difference between Measured energy displacement using dedicated equipment and calculated energy displacement according methodology. The comparison results reflected that the Gross quantity of electricity generated is reasonable. Also the Verification team confirmed that the analysis of the index of power generator with the combusted biomass was done with the data available and shows consistency with the normal operation period. The Power Plant defined an operation range of 0.83-1.34 (MWh/BDt) for this indicator, which defined according to the turbo generator performance and Arauco experience, which seems credible and consistent with the plant operation conditions.</p>	OK

**Table 7**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Project electricity imports from the grid in year y	Project electricity imports from the grid in year y	Project electricity imports from the grid in year y	Consistent	OK
Parameter ID (if available)	EL <sub>PJ,imp,y</sub>	EL <sub>PJ,imp,y</sub>	EL <sub>PJ,imp,y</sub>	Consistent	OK
Data Unit	MWh	MWh	MWh	Consistent	OK
Monitoring frequency - Reading / Recording	Continuously and aggregated as appropriate, to calculate emission reductions.	Continuously and aggregated as appropriate, to calculate emission reductions.	Continuously and aggregated as appropriate, to calculate emission reductions.	Consistent	OK
Calibration requirements	No requirements	7 years	7 years	Calibration and accuracy requirements are consistent with the manufacture specification of the laboratory instruments/5.9/	OK
Uncertainty level	No requirements	+/- 0.2%	+/- 0.2%		OK
Measurement Principle (if applicable)	Use calibrated electricity meters	Use calibrated electricity meters	Use calibrated electricity meters	Consistent	OK
	Technical aspects				Conclusion and IRL
Instrument Type:	Bi-directional Electricity meters				-
Serial Number:	PT-1012A934-01 & 8600-2_3				-
Manufacturer Model Nr.:	Schneider Electric ION 8600 Model				OK
Specific Location:	Electrical Sub-station, Turbo generator 41 MW SE-EI-0003/0004				-

Gaps in operating time of instrument:	Period: No gaps for gross power generation has been found/4.12/	OK
	Default value used: No applicable	--
	Justification: No applicable	
	QA/QC aspects	Conclusion and IRL
Source of data	Source: On-site measurement.	-
	Procedures: Monitored continuously and aggregated as appropriate using proper electric meters, calibrated and maintained according to manufacturer specification.	OK
	Implementation of procedure: The Verification team confirmed that the dedicated electricity meter measured the total power generation, and the data is recorded automatically in the (DCS). The Verification team also confirmed that the data in the DCS is consistent the Plant Power Generation records/4.12/ and the power plant availability records/3.1/.  Project participants clarified and explained sufficiently the final arrangement of the meters to monitor the electricity imported from the grid. The Verification team confirmed that the imported electricity is monitored by two meters Schneider Electric Model ION 8600.  The differences between the measured data correspond to the electricity consumed by the Power Generation during the no generation period. The electricity consumed by the Saw Mill complex corresponds to the electricity consumed during the baseline. The data records/4.12/ and electricity meters layout are consistent with the technical issues observed during the site inspection.	OK
	Responsibility: The responsible for the monitoring procedure is the Power Plant Engineer in Charge, which was confirmed during the site inspection.	OK
Archiving of raw data and protection measures	The verification team confirmed that the monitored data is automated recorded and recorded in an electronic way in the Data Control System (DCS). The verification teams confirmed on the site that anyone could not	OK

	modify the original data, which belongs to the operational data to support the plant operation performance. Finally, the data report is recorded into the virtual Arauco FTP site (FileZilla) designated to Viñales project activity, which has restricted access protected with passport and username.	
Data transfer and protection of input data for calculations	During the site inspection and revision of the Data Control System (DCS), verification team confirmed that the Plant Power Generation records/4.2/ is consistent operation data and the power plant availability records/3.1/. The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergía S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The Verification team checks that all data from the monitoring period are complete and consistent.	OK
Data verification	The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.	OK
	Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/	OK
Crosscheck (if available)	The consistency of metered electricity shall check with receipts from electricity purchases. The Verification team confirmed that Project Participants provided relevant evidences/3.3/ of electricity purchases, and the differences are below of 1%.	OK

**Table 8**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Total auxiliary electricity consumption required for	Total auxiliary electricity consumption required for	Total auxiliary electricity consumption required for	It is clear the meter localization and	OK

	the operation of the power plants at the project site in year y.	the operation of the power plants at the project site in year y.	the operation of the power plants at the project site in year y.	monitoring procedure. The data records /4.12/are consistent with the MR and PD.			
Parameter ID (if available)	EL <sub>PJ,aux,y</sub>	EL <sub>PJ,aux,y</sub>	EL <sub>PJ,aux,y</sub>	Consistent.	OK		
Data Unit	MWh	MWh	MWh	Consistent.	OK		
Monitoring frequency - Reading / Recording	Continuously and aggregated as appropriate, to calculate emission reductions.	Continuously and aggregated as appropriate, to calculate emission reductions.	Continuously and aggregated as appropriate, to calculate emission reductions.	Consistent.	OK		
Calibration requirements	No requirements.	According to the manufacturer specification.	According to the manufacturer specification.	Calibration and accuracy requirements are consistent with the manufacture specification of the laboratory instruments/5.9/	OK		
Uncertainty level	No requirements.	According to the manufacturer specification.	According to the manufacturer specification.		OK		
Measurement Principle (if applicable)	Use calibrated electricity meters and conservative calculations.	Use calibrated electricity meters and conservative calculations.	Use calibrated electricity meters and conservative calculations.	Consistent	OK		
	Technical aspects				Conclusion and IRL		
Instrument Type:	The verification team can confirm that the monitoring equipment and meter localization of the total auxiliary electricity consumption required for the operation of the power plants are the following:				OK		
Serial Number:							
Manufacturer Model Nr.:							
Specific Location:							
Measurement Range:						<table border="1"> <tr> <td><b>Monitored Equipment(1)</b></td> <td>Energy meter Biomass conditioning</td> <td>Power Boiler consumption (1)</td> <td>Power Boiler consumption (2)</td> <td>Power energy consumption</td> <td>Administrative areas</td> </tr> </table>	<b>Monitored Equipment(1)</b>
<b>Monitored Equipment(1)</b>	Energy meter Biomass conditioning	Power Boiler consumption (1)	Power Boiler consumption (2)	Power energy consumption	Administrative areas		

				(3)		
	<b>Manufacture Model ID</b>	Schneider Electric ION 8600 Model				
	<b>TAG ID</b>	669-EI-1603/1604 (1-6)	669-EI-1703/1704 (1-7)	669-EI-1803/1804 (1-8)	669-EI-1903/1904 (1-9)	669-EI-1703/1804 (1-11)
	<b>Unique Serial</b>	LI-1010A261-02	LI-1010A263-02	LI-1010A264-02	LI-1010A262-02	LI-1010A265-02
	<b>Accuracy level</b>	+/- 0.2% /5.3/	+/- 0.2% /5.3/	+/- 0.2% /5.3/	+/- 0.2% /5.3/	+/- 0.2% /5.3/
	<b>Calibration Frequency</b>	7 years	7 years	7 years	7 years	7 years
	<b>Date of Calibration</b>	12.10.2010	12.10.2010	12.10.2010	14.10.2010	12.10.2010
	<b>Valid of Calibration</b>	11.10.2017	11.10.2017	11.10.2017	11.10.2017	11.10.2017
	<b>Entity</b>	-	--	-	-	-
The Verification team confirmed the validity of calibration certifications for all electricity meters/5.41/.						
Gaps in operating time of instrument:	Period: No gaps for gross power generation has been found/4.12/					OK
	Default value used: No applicable.					-
	Justification: No applicable.					-
	QA/QC aspects					Conclusion and IRL
Source of data	Source: On-site measurement.					
	Procedures: Monitored continuously and aggregated as appropriate using proper electric meters, calibrated and maintained according to manufacturer specification. The verification team confirmed that the data is storage automatically in the Data Control System (DCS).					OK
	Implementation of procedure: The Verification team confirmed that the dedicated electricity meter measured the total power generation, and the data is storage automatically in the (DCS). The Verification team also					OK

	<p>confirmed that the data in the DCS is consistent the Plant Power Generation records/4.12/ and the power plant availability records/3.1/.</p> <p>The data records/4.12/ and electricity meters layout are consistent with the technical issues observed during the site inspection..</p>	
	<p><b>Responsibility:</b> The responsible for the monitoring procedure is the Power Plant Engineer in Charge, which is confirmed during the site inspection.</p>	OK
Archiving of raw data and protection measures	<p>The verification team confirmed that the monitored data is automated recorded and stored in the electronic way in the Data Control System (DCS). The verification teams confirmed on the site that anyone could not modify the original data, which belongs to the operational data to support the plant operation performance. Finally, the data report is recorded into the virtual Arauco FTP site (FileZilla) designated to the Viñales project activity, which has restricted access protected with passport and username.</p>	OK
Data transfer and protection of input data for calculations	<p>During the site inspection and revision of the Data Control System (DCS), verification team confirmed that the Plant Power Generation records/4.2/ is consistent operation data and the power plant availability records/3.1/.</p> <p>The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergia S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/.</p>	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The Verification team checks that all data from the monitoring period are complete and consistent.	OK
Data verification	<p>The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.</p>	OK
	<p><b>Consistency of calculation tool with monitoring report:</b> The monitored data are consistent with the MR/1.1/</p>	OK
Crosscheck (if available)	<p>The consistency of metered electricity shall be checked with receipts from electricity if available and the quantity of fuels fired (e.g. check whether the electricity generation divided by the quantity of fuels fired results in a reasonable efficiency that is comparable to previous years).</p>	OK

	<p>Project Participants corrected and improved the cross-checking process according to methodology guideline/2.4/. Although, there are no electricity invoices for auxiliary power consumption, the Project Participants made comparison between the calculation of the surplus of electricity supplied (i.e. balance of power input vs. output and consumption) and the sales electricity to the grid (i.e. electricity invoices). The differences are less than 2% in the all monitoring period, which is reasonable and credible.</p> <p>Also, the Verification team confirmed that the analysis of the index of power generator with the combusted biomass was done with the data available and shows consistency with the normal operation period (July to Oct 2014) and below to the expectation during the instability period a consequence of general maintenance period (Nov &amp; Dec 2014). The Power Plant defined an operation range of 0.830-1.340 (MWh/BDt) for this indicator, which was defined according to the turbo generator performance and Arauco experience, which seems credible and consistent with the plant operation conditions.</p>	
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**Table 9**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Moisture content of the biomass waste	Moisture of each biomass waste type k	Moisture of each biomass waste type k K1 Sawdust and bark from industrial operations on-site. B4 K2 Sawdust and bark from industrial operations on-site. B1/B3 K3 Sawdust and bark from industrial	Consistent  However, the monitored data are not consistent with the biomass waste type k.	OK

			operations off-site B1/B3 K4 Biomass from forestry operations B1/B3.		
Parameter ID (if available)	N/A	N/A	N/A	Consistent.	OK
Data Unit	% Water content in mass basis in wet biomass.	% Water content in mass basis in wet biomass.	% Water content in mass basis in wet biomass.	Consistent.	OK
Monitoring frequency - Reading / Recording	The moisture content should be monitored for each batch of the biomass of homogeneous quality. The weighted average should be calculated for each monitoring period and used in the calculations.	Continuously. Daily samples of biomass waste from industrial and forest operations were taken for moisture content measurement.	Continuously. Daily samples of biomass waste from industrial and forest operations were taken for moisture content measurement.	Consistent.	OK
Calibration requirements	No requirements.	According to the manufacturer specification.	According to the manufacturer specification. See the Table 9.1 below.	Calibration and accuracy requirements are consistent with the manufacture specification of the laboratory instruments/5.8/ Calibration Certifications were not provided.	OK
Uncertainty level	No requirements.	According to the manufacturer specification.	According to the manufacturer specification. See the Table 9.1 below.	Project Participants provided the manufacturer specification/5.13/ of	OK

				laboratory equipment																					
Measurement Principle (if applicable)	The moisture content should be monitored for each batch of biomass of homogeneous quality.	The biomass waste moisture content will be monitored and registered by taking periodic samples from each biomass type flow to the power boiler. Humidity content will be calculated by evaporating the water of the samples and measuring the weight before and after the water has been evaporated. This process will be carried out in dedicated scales.	The biomass waste moisture content was monitored and registered by periodic samples from each biomass type burned in the power boiler. Humidity content was obtained evaporating the water of the samples and measuring the weight before and after the water has been evaporated. This process was carried out in dedicated equipment.	Verification team confirmed that Project Participants did a deep revision of the moisture data records/4.3/.	OK																				
	Technical aspects				Conclusion and IRL																				
Instrument Type:	Table 9.1 Laboratory Monitored Instruments: <table border="1"> <tr> <td><b>Monitored Equipment</b></td> <td>Electronic moisture analyser</td> <td>Laboratory Oven</td> <td>Laboratory Digital Scale</td> </tr> <tr> <td><b>Manufacture Model ID</b></td> <td>Sartorius MA150C</td> <td>Memmert UFE 600</td> <td>Sartorius TE1502S</td> </tr> <tr> <td><b>Unique Serial</b></td> <td>27402265</td> <td>G611.0831</td> <td>27008246</td> </tr> <tr> <td><b>Accuracy level</b></td> <td>±0.001 gr</td> <td>+/- 0.5%</td> <td>±0.001 gr</td> </tr> <tr> <td><b>Calibration Frequency</b></td> <td>Once a year</td> <td>Once a year</td> <td>Once a year</td> </tr> </table>				<b>Monitored Equipment</b>	Electronic moisture analyser	Laboratory Oven	Laboratory Digital Scale	<b>Manufacture Model ID</b>	Sartorius MA150C	Memmert UFE 600	Sartorius TE1502S	<b>Unique Serial</b>	27402265	G611.0831	27008246	<b>Accuracy level</b>	±0.001 gr	+/- 0.5%	±0.001 gr	<b>Calibration Frequency</b>	Once a year	Once a year	Once a year	OK
<b>Monitored Equipment</b>					Electronic moisture analyser	Laboratory Oven	Laboratory Digital Scale																		
<b>Manufacture Model ID</b>					Sartorius MA150C	Memmert UFE 600	Sartorius TE1502S																		
<b>Unique Serial</b>					27402265	G611.0831	27008246																		
<b>Accuracy level</b>					±0.001 gr	+/- 0.5%	±0.001 gr																		
<b>Calibration Frequency</b>	Once a year	Once a year	Once a year																						
Serial Number:																									
Manufacturer Model Nr.:																									

Specific Location:	<table border="1"> <tr> <td><b>Date of Calibration</b></td> <td>02/10/2014 29/12/2015 26/10/2016</td> <td>28/08/2014 08/10/2015 26/10/2016</td> <td>02/10/2014 29/12/2015 26/10/2016</td> </tr> </table>	<b>Date of Calibration</b>	02/10/2014 29/12/2015 26/10/2016	28/08/2014 08/10/2015 26/10/2016	02/10/2014 29/12/2015 26/10/2016					
<b>Date of Calibration</b>	02/10/2014 29/12/2015 26/10/2016	28/08/2014 08/10/2015 26/10/2016	02/10/2014 29/12/2015 26/10/2016							
Measurement Range:	<table border="1"> <tr> <td><b>Valid Calibration</b></td> <td>25.10.2017</td> <td>27.10.2017</td> <td>25.10.2017</td> </tr> <tr> <td><b>Entity</b></td> <td>Cientec</td> <td>Cientec</td> <td>Cientec</td> </tr> </table> <p>The Verification team confirmed that the Project Participants provided the relevant evidence to demonstrate that the laboratory equipment are calibrated/5.15/5.11/ by reputable and authorised body (i.e. CIENTEC). Also, the Verification team confirmed that the calibration equipment was the first calibrated. Additionally, it has been crosschecked that monitoring frequency is made in accordance with registered monitoring plan. Therefore the calibration from the manufacturer covers the most of the monitored period.</p>	<b>Valid Calibration</b>	25.10.2017	27.10.2017	25.10.2017	<b>Entity</b>	Cientec	Cientec	Cientec	
<b>Valid Calibration</b>	25.10.2017	27.10.2017	25.10.2017							
<b>Entity</b>	Cientec	Cientec	Cientec							
Gaps in operating time of instrument:	<p><b>Period:</b> No gaps for monitoring equipment were found. The Verification team confirmed that the calibration procedures for monitoring equipment were the first time. Therefore there are no gaps in monitoring equipment.</p> <p><b>Default value used:</b> No applicable.</p> <p><b>Justification:</b> No applicable.</p>	OK								
	QA/QC aspects	Conclusion and IRL								
Source of data	<p><b>Source:</b> On-site measurement.</p> <p><b>Procedures:</b> The biomass moisture waste was monitored and registered with periodic samples from each biomass type flow to the power boiler. The moisture content should be monitored for each batch of the biomass of homogeneous quality. The Verification team confirmed that periodic samples recorded by type of biomass and supplier of biomass. Lab operator takes at least one sample for each batch of biomass.</p> <p><b>Implementation of procedure:</b> The verification team observed during site inspection that the laboratory operator manages the samples and take the weights before and after of water evaporated. The operator shall registry all data moisture content results into the system according to the samples were taken every</p>	OK								
		OK								

	<p>day.</p> <p>The Verification Team confirmed that the moisture content data records are correct. The Verification team confirmed that the data obtained after revision/4.3/ is conservative, consistent with the category projects and the moisture content expected.</p>	
	<p><b>Responsibility:</b> The responsible for the monitoring procedure is the laboratory responsible which was confirmed during the site inspection.</p>	OK
Archiving of raw data and protection measures	<p>The verification team confirmed that the monitored data is recorded and digitalized in the Data Control System (DCS). The verification teams confirmed on the site that anyone could not modify the original data, which belongs to the operational data to support the plant operation performance.</p> <p>The Verification team confirmed that the moisture content data records/4.3/ are correct. The 14% of the records did not have proper lab support; as a result, a conservative assumption was applied according to the range of accuracy of balance. The Verification team found the procedure consistent with the conservative assumption.</p>	OK
Data transfer and protection of input data for calculations	<p>The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergía S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/.</p>	OK
	Quality of evidence	Conclusion and IRL
Completeness of data		
Data verification	<p>The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.</p>	OK
	<p>Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/.</p>	OK

Crosscheck (if available)	The Verification team checked the results of moisture content for this monitoring period with reputable and credible sources/7.3/. Values and assumption are consistent and conservative.	
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**Table 10**

Parameter and instrumentation Information					
	Meth/Tool	PD	MR	Verified	Conclusion and IRL
Parameter title	Quantity of fuel type i combusted in process j during the year y.	Quantity of fuel type i combusted in process j during the year y.	Quantity of fuel type i combusted in process j during the year y.	Consistent.	OK
Parameter ID (if available)	FC <sub>i,j,y</sub>	FC <sub>i,j,y</sub>	FC <sub>i,j,y</sub>	Consistent.	OK
Data Unit	ton/y or m <sup>3</sup> /y	ton/y or m <sup>3</sup> /y	ton/y or m <sup>3</sup> /y	Consistent.	OK
Monitoring frequency - Reading / Recording	Continuously.	Continuously.	Continuously.	Consistent.	OK
Calibration requirements	No requirements.	No requirements.	According to the manufacturer specification of flow meters. See the Table 10.1 below/5.10/	Project Participants included the consistent description of a monitoring system for fossil fuel consumption.	OK
Uncertainty level	No requirements	No requirements	According to the manufacturer specification. See the Table 10.1 below/5.10/		OK
Measurement Principle (if applicable)	Use either mass or volume meters. In cases	<u>Diesel consumption in the power boiler:</u> The	<u>Fossil fuel in the power boiler:</u> The consumption	Project Participants	OK

	<p>where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift).</p> <p>Accessories such as transducers, sonar, and piezoelectric devices are accepted if they are properly calibrated with the ruler gauge and receiving a reasonable maintenance.</p>	<p>consumption will be determined by recording the purchases of diesel and the stock differences in the diesel tank level. The information will be crossed-checked with the information recorded in the SAP system.</p> <p><u>Transportation of biomass waste from the gate to the power plant:</u> The Project Proponent will obtain the specific diesel consumption (km/lt of diesel) for all the trucks transporting the biomass waste on-site. Also, the Project Proponent will also determine the distances travelled by the trucks on-site. The total amount of diesel consumed by each truck will be determined by dividing the total distance traveled on-site by the corresponding specific consumption. The total</p>	<p>will be determined by recording the purchases of fossil fuel and the stock differences in the diesel tank level.</p> <p><u>Fossil fuel consumption due to on-site biomass transportation:</u> This could be the transportation of biomass waste from the conveyor belts and the consumption of the front loaders. The project participant obtained specific diesel consumption for all the vehicles involved biomass transporting. The total amount of diesel consumed due to on-site biomass transportation was the sum of all the vehicles used for on-site biomass transportation.</p>	<p>corrected and justified the monitoring procedure sufficiently. The procedure is as follows:</p> <p>Diesel consumption in the power boiler: The consumption is determined by dedicated fuel flow meters.</p> <p>663FT-508 Endress+Hausser 83F40 D606EA16000</p> <p>663FT-522 Endress+Hausser 33F25- D606E916000</p>	
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		<p>amount of diesel consumed due to on-site biomass transportation will be the sum of all the diesel amounts consumed by all the trucks used for on-site biomass transportation.</p> <p><u>Diesel consumption of the front loaders:</u> The Project Proponent will use the diesel performance index expressed in liters of diesel consumption per hour of operation of the front loader. The Project Proponent will choose a conservative diesel performance index for the emission reduction calculation for the period. The total diesel consumption will be determined by multiplying the diesel consumption index of the front loader by the total amount of hours of operation of the front</p>			
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	loader.																											
	Technical aspects			Conclusion and IRL																								
Instrument Type:	The Verification team checked the calibration certification provided by the Project Participants/5.16/. The certifications are consistent with the equipment observed during the site inspections, and the calibration body (Salfamontajes) has the respective authorization of equipment manufacturer.			OK																								
Serial Number:				OK																								
Manufacturer Model Nr.:				OK																								
Specific Location:				OK																								
Measurement Range:				OK																								
	Table 10.1 Laboratory Monitored Instruments: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Monitored Equipment</th> <th>Fossil fuel flow transmitter</th> <th>Fossil fuel flow transmitter</th> </tr> </thead> <tbody> <tr> <td><b>Manufacture Model ID</b></td> <td>Endress+Hausser 83F40</td> <td>Endress+Hausser 83F25</td> </tr> <tr> <td><b>Unique Serial</b></td> <td>D606EA16000</td> <td>D606E916000</td> </tr> <tr> <td><b>Accuracy level</b></td> <td>0,1%</td> <td>0,1%</td> </tr> <tr> <td><b>Calibration Frequency</b></td> <td>5 years</td> <td>5 years</td> </tr> <tr> <td><b>Date of Calibration</b></td> <td>02/11/2011 12/11/2015 10/11/2016</td> <td>02/08/2011- 12/11/2015- 10/11/2016</td> </tr> <tr> <td><b>Valid Calibration of</b></td> <td>09/11/2021</td> <td>09/11/2021</td> </tr> <tr> <td><b>Entity</b></td> <td colspan="2">Salfamontajes</td> </tr> </tbody> </table>			Monitored Equipment	Fossil fuel flow transmitter	Fossil fuel flow transmitter	<b>Manufacture Model ID</b>	Endress+Hausser 83F40	Endress+Hausser 83F25	<b>Unique Serial</b>	D606EA16000	D606E916000	<b>Accuracy level</b>	0,1%	0,1%	<b>Calibration Frequency</b>	5 years	5 years	<b>Date of Calibration</b>	02/11/2011 12/11/2015 10/11/2016	02/08/2011- 12/11/2015- 10/11/2016	<b>Valid Calibration of</b>	09/11/2021	09/11/2021	<b>Entity</b>	Salfamontajes		
Monitored Equipment	Fossil fuel flow transmitter	Fossil fuel flow transmitter																										
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<b>Date of Calibration</b>	02/11/2011 12/11/2015 10/11/2016	02/08/2011- 12/11/2015- 10/11/2016																										
<b>Valid Calibration of</b>	09/11/2021	09/11/2021																										
<b>Entity</b>	Salfamontajes																											
Gaps in operating time of instrument:	Period: No gaps for monitoring equipment found. Default value used: No applicable. Justification: No applicable.			OK																								
	QA/QC aspects			Conclusion and IRL																								

Source of data	Source: On-site measurement.	
	<p><b>Procedures:</b></p> <p>The consistency of metered fuel consumption quantities should cross-check by an annual energy balance based on purchased quantities and stock changes. Where the purchased fuel invoices can be identified specifically with the emission reduction project, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial record.</p>	OK
	<p><b>Implementation of procedure:</b> The Verification team confirmed that the dedicated flow meter measured the total power generation, and the data is storage automatically in the (DCS).</p> <p>The Verification team confirmed that the updated procedures are consistent with the flow meters installed in the power plant and checked during the site inspection. The plan records/4.2/ is consistent with the ER calculation/1.2/ and MR/1.1/</p>	OK
	<p><b>Responsibility:</b> The responsible for the monitoring procedure is the Power Plant Engineer in Charge, which was confirmed during the site inspection.</p>	OK
Archiving of raw data and protection measures	The verification team confirmed that the monitored data is recorded electronically in the Data Control System (DCS). The verification teams confirmed on the site that anyone could not modify the original data, which belongs to the operational data to support the plant operation performance.	OK
Data transfer and protection of input data for calculations	The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergía S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/.	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The Verification team confirmed that monitored data are complete/4.3/ and consistent with the MR and ER	OK

Data verification	Consistency of raw data with calculation tool: the monitored data are consistent with the ER spread sheet/1.2/ calculation.	OK
	Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/	OK
Crosscheck (if available)	The Verification team can confirm that the Project Participants cross-checked the fossil fuel consumption in the project activity with the Energy Balance/4.9/ and the invoices of fossil fuels purchases/3.11/	OK

### 2.3. Parameters measured through laboratory test

**Table 1**

Sampling information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	Net calorific value of biomass waste of category n in year y.	Net calorific value of biomass waste of category n in year y.	Net calorific value of biomass waste of category n in year y.	Consistent	OK
Parameter ID (if available)	NCV <sub>BR,n,y</sub>	NCV <sub>BR,n,y</sub>	NCV <sub>BR,n,y</sub>	Consistent	OK
Data Unit	(GJ/tonnes of dry matter)	(GJ/tonnes of dry matter)	(GJ/tonnes of dry matter)	Consistent	OK
Testing frequency	At least every six months, taking, at least, three samples for each measurement.	At least every six months, taking, at least, three samples for each measurement.	At least every six months, taking, at least, three samples for each measurement.	Consistent	OK
Implementation point	Reputed 3 <sup>rd</sup> Party	Reputed 3 <sup>rd</sup> Party	Reputed 3 <sup>rd</sup> Party	Consistent	OK

	Laboratory.	Laboratory.	Laboratory.		
Uncertainty level	At least three samples.	At least three samples.	At least three samples.	Consistent	OK
	Technical aspects				Conclusion and IRL
Testing Principle:	Solid biofuels Determination of calorific value Standard				OK
Methodology of Sampling:	Standard CEN/TS 14918:2009. The Verification team confirmed that the Project Participants avoid the first test camping results, which do not offer confidence with NCV results. Also, the Verification team that the second campaign carries out with the Monitoring Plant requirement. The results are reliable and confident.				OK
Laboratory Analysis Equipments & Analyser	CESMEC developed the two testing campaigns. Verification team confirmed that the second campaign carries out with requirements.				OK
Certification of Analyser/Laboratory:	Project participants provide evidence, and it is possible to check the CESMEC accreditation.				OK
Methodology of Laboratory Analysis (if applicable)	Low heating Value for Biomass.				OK
Measurement Range:	Dry basis.				
Gaps in sampling frequency	Period: The Verification team confirmed that the testing campaign cover the monitoring period,				OK
	Default value used: Project Participants shall justify the conservative assumption Project participants avoid the the wrong test.				OK
	Justification: No applied.				
	QA/QC aspects				Conclusion and IRL
Source of data	Source: On-site measurements.				
	Procedures: The consistency of this measurements were compared with values of others projects and relevant data				OK

	source.	
	Verification team confirmed that CESMEC, NCVs test developer, is reputed 3party Laboratory..	
	Implementation of procedure: Consistent	OK
	Project Participants compare with other CDM projects, which is allowed according to the Monitoring Plan, and the results are consistent.	
	Responsibility: The responsible for the monitoring procedure is the Power Plant Engineer in Charge. A sample of biomass was submitted to the Laboratory.	OK
	Resubmittedativeness: consistent	OK
	Reproducibility: Yes the test is reproducibility by other entities, and the values shall be similar.	OK
Archiving of raw data and protection measures	The data supplied by the Laboratory/3.5/ is recorded by the responsible and introduced into the virtual Arauco FTP site (FileZilla) designated to Viñales project activity. The verification teams confirmed that the FTP site had restricted access protected with passport and username.	OK
Data transfer and protection of input data for calculations	The Power Plant Engineer in charge is the responsible of the information into the FTP site and complete the project data base/1.2/ to the Arauco Bioenergia S.A. processes for further Emission calculation/1.2/ and Monitoring Report/1.1/.	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The second campaign is resubmittedative and consistent with MP's demand.	OK
Data verification	The consistency of raw data with calculation tool: The monitored data are consistent with the ER spread sheet/1.2/ calculation.	OK
	Consistency of calculation tool with monitoring report: The monitored data are consistent with the MR/1.1/	OK
Crosscheck (if available)	The Verification team confirmed that the cross-checking process developed by the Project Participants are correct /3.9/and checked the values with the default IPCC and they are consistent.	OK

## 2.4. Parameters obtained from external sources and accounting data

**Table 1**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	For biomass waste categories for which scenarios B1:, B2: or B3: is deemed a plausible baseline alternative, project participants shall demonstrate that this is a realistic and credible alternative scenario.	For biomass waste categories for which scenarios B1:, B2: or B3: is deemed a plausible baseline alternative, project participants shall demonstrate that is a realistic and credible alternative scenario.	For biomass waste categories for which scenarios B1:, B2: or B3: is deemed a plausible baseline alternative, project participants shall demonstrate that is a realistic and credible alternative scenario.	Consistent	OK
Parameter ID (if available)	N/A	N/A	N/A	Consistent	OK
Data Unit	tonnes	tonnes	tonnes	Consistent	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	- Quantity of available biomass waste of type n in the region. - Quantity of biomass waste of type n that are utilised (e.g. for energy generation or as feedstock) in the defined geographical region. - Availability of a surplus of biomass waste types n (which cannot be sold or utilised) at the ultimate supplier to the project and a resubmitted sample of other suppliers in the defined geographical region.  At the validation stage for biomass waste categories identified ex-ante, and always that new biomass waste categories are included during the crediting period.				OK

	The parameter description in the MR/1.1/ is with MP and Methodology requirements.  Verification team confirmed that there is no new biomass waste type during the monitoring period.	
Date of Data:	At validation stage.	OK
Gaps in data	Period: N/A	OK
	Default value used: N/A	OK
	Justification: N/A	OK
	QA/QC aspects	Conclusion and IRL
Source of data	Source: Official national surveys and statistics.	OK
	Responsibility: Arauco Bioenergia according to the MP responsibilities.	OK
	Resubmittedativeness: Baseline scenario B1/B3 at validation stage.	OK
Reliability of Data Source:	N/A	OK
Is the Data up-to-date?	N/A	OK
Archiving of raw data and protection measures	N/A	OK
Data transfer and protection of input data for calculations	N/A	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	N/A	OK
Data verification	Consistency of raw data with calculation tool: N/A	OK
	Consistency of calculation tool with monitoring report: N/A	OK
Crosscheck (if available)	N/A	OK

Table 2

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	CO <sub>2</sub> emission factor for fossil fuel type f in year y.	CO <sub>2</sub> emission factor for fossil fuel type f in year y.	CO <sub>2</sub> emission factor for fossil fuel type f in year y.	Consistent.	OK
Parameter ID (if available)	EF <sub>ff,y,f</sub>	EF <sub>ff,y,f</sub>	EF <sub>ff,y,f</sub>	Consistent.	OK
Data Unit	tCO <sub>2</sub> /GJ	tCO <sub>2</sub> /GJ	tCO <sub>2</sub> /GJ	Consistent.	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	CO <sub>2</sub> emission factor for fossil fuel type. Either conduct measurements or use accurate and reliable local or national data where available. Where such data is not available, use IPCC default emission factors if they are deemed to represent local circumstances reasonably. Choose the value in a conservative manner and justify the choice. The verification teams confirmed with relevant public evidence/8.6/that there are not available the CO <sub>2</sub> emission factor for Chilean fossil fuels market and the conservative assumption taken.				OK
Date of Data:	According to the latest version of IPCC default emission factor/8.7/ 2006				OK
Gaps in data	Period: N/A				
	Default value used: N/A				
	Justification: N/A				
	QA/QC aspects				Conclusion and IRL
Source of data	Source: 2006 IPCC Guidelines on National GHG Inventories. Table 1.4 Chapter 1 of Vol.2 /8.7/				OK
	Responsibility: Arauco Bioenergia				OK
	Represubmittedateness: No regional or national CO <sub>2</sub> values according to the public information/8.6/				OK
Reliability of Data Source:	Last version of IPCC default values. OK.				OK

Is the Data up-to-date?	Yes.	OK
Archiving of raw data and protection measures	N/A	
Data transfer and protection of input data for calculations	N/A	
	Quality of evidence	Conclusion and IRL
Completeness of data	According to the Monitoring Plan.	OK
Data verification	Consistency of raw data with calculation tool: <i>yes</i> .	-
	Consistency of calculation tool with monitoring report: <i>yes</i> .	-
Crosscheck (if available)	The verification teams confirmed with relevant public evidence/8.6/that there are not available the CO <sub>2</sub> emission factor for Chilean fossil fuels market and the conservative assumption taken.	OK

Table 3

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	CH <sub>4</sub> emission factor for the combustion of biomass waste in the project plant	CH <sub>4</sub> emission factor for the combustion of biomass waste in the project plant.	CH <sub>4</sub> emission factor for the combustion of biomass waste in the project plant.	Consistent.	OK
Parameter ID (if available)	EF <sub>CH<sub>4</sub>,BR</sub>	EF <sub>CH<sub>4</sub>,BR</sub>	EF <sub>CH<sub>4</sub>,BR</sub>	Consistent.	OK
Data Unit	tCH <sub>4</sub> /GJ	tCH <sub>4</sub> /GJ	tCH <sub>4</sub> /GJ	Consistent.	OK

	Technical aspects	Conclusion and IRL
Description of Data / Data Refers to:	<p>CO<sub>2</sub> default values, as provided in Table 4 and 5 of the ACM0006 (Version 12.1.1).</p> <p>The verification teams confirmed that project participants applied the maximum conservative values for CH<sub>4</sub> emission from default values defined by the Methodology/2.4/.</p>	OK
Date of Data:	Consistent with the Methodology ACM0006 V 12.1.1	OK
Gaps in data	Period: N/A	-
	Default value used: N/A	-
	Justification: N/A	-
	QA/QC aspects	Conclusion and IRL
Source of data	Source: ACM0006 (Version 12.1.1) Table 4 and 5 CH <sub>4</sub> default values/2.4/	OK
	Responsibility: Arauco Bioenergia.	OK
	Resubmittedateness: Assumption Conservative consistent with the MP requeriment/1.3/	OK
Reliability of Data Source:	Maximum conservativeness.	OK
Is the Data up-to-date?	Yes.	OK
Archiving of raw data and protection measures	N/A	-
Data transfer and protection of input data for calculations	N/A	-
	Quality of evidence	Conclusion

		and IRL
Completeness of data	According to the Monitoring Plan.	OK
Data verification	Consistency of raw data with calculation tool: <i>N/A</i>	-
	Consistency of calculation tool with monitoring report: <i>N/A</i>	-
Crosscheck (if available)	The verification teams confirmed that the assumption is the maximum uncertainty 300%	OK

**Table 4**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	CO2 emission factor of the most carbon intensive fossil fuel used in the country.	CO2 emission factor of the most carbon intensive fossil fuel used in the country.	CO2 emission factor of the most carbon intensive fossil fuel used in the country.	Consistent.	OK
Parameter ID (if available)	EF <sub>CO2,LE</sub>	EF <sub>CO2,LE</sub>	EF <sub>CO2,LE</sub>	Consistent.	OK
Data Unit	tCO <sub>2</sub> /GJ	tCO <sub>2</sub> /GJ	tCO <sub>2</sub> /GJ	Consistent.	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	Identify the most carbon intensive fuel type from the National communication, other literature sources (e.g. IEA). Possibly consult with the national agency responsible for the national communication / GHG inventory. If available, use national default values for the CO <sub>2</sub> emission factor. Otherwise, IPCC default values may be used. Project participants did monitor the parameter according to the MP/1.3/.  The Verification team confirmed that the CO <sub>2</sub> emission factor of the most carbon-intensive fossil fuel used in				OK

	the country was monitored and included into the MR. It also confirmed that Chile does not have national CO <sub>2</sub> factors. Therefore, the IPCC default values are consistent.	
Date of Data:	IPCC is correct.	OK
Gaps in data	Period: N/A	-
	Default value used: N/A	-
	Justification: N/A	-
	QA/QC aspects	Conclusion and IRL
Source of data	Source: Pending. Project Participants proved that 2006 IPCC Guidelines on National GHG Inventories. Table 1.4 Chapter 1 of Vol.2 /8.7/ is de relevant sources.	OK
	Responsibility: Arauco Bioenergia.	OK
	Resubmittedativeness: Pending No regional or national CO <sub>2</sub> values according to the public information/8.6/	OK
Reliability of Data Source:	Pending. Last version of IPCC default values. OK.	OK
Is the Data up-to-date?	Yes.	OK
Archiving of raw data and protection measures	N/A	-
Data transfer and protection of input data for calculations	N/A	-
	Quality of evidence	Conclusion and IRL
Completeness of data	According to the Monitoring Plan, the most national intensive fuel is Gas Coke and lignite Coke $EF_{CO_2,LE} = 0.119 \text{ tCO}_2/\text{GJ}$ Not used in this case, since leakage is assumed to be 0 for the present monitoring period.	OK

Data verification	Consistency of raw data with calculation tool: <i>N/A</i>	
	Consistency of calculation tool with monitoring report: <i>N/A</i>	
Crosscheck (if available)	The verification teams confirmed with relevant public evidence/8.6/ that there are not available the CO <sub>2</sub> emission factor for Chilean fossil fuels market and the conservative assumption taken.	OK

**Table 5**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	Length of the operational campaign in year y.	Length of the operational campaign in year y.	Length of the operational campaign in year y.	Consistent.	OK
Parameter ID (if available)	LOC <sub>y</sub>	LOC <sub>y</sub>	LOC <sub>y</sub>	Consistent.	OK
Data Unit	tonnes	tonnes	tonnes	Consistent.	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	Records and sum of the hours of operation of the project activity facilities during year y.  The Verification team confirmed that the records of power plant availability were correct and consistent with the ER /1.2/ and plant records /4.1/4.6/4.9/.				OK
Date of Data:	July to December 2015-2016.				OK
Gaps in data	Period: No gaps.				OK
	Default value used: <i>N/A</i>				-
	Justification: <i>N/A</i>				-
	QA/QC aspects				Conclusion and IRL
Source of data	Source: On-site measurements.				OK

	Responsibility: Arauco Bioenergia according to the MP responsibilities.	OK
	Representativeness: Data records.	OK
Reliability of Data Source:	Yes.	OK
Is the Data up-to-date?	The data is updated.	OK
Archiving of raw data and protection measures	All recorded monitored data is archived in electronic into the SAP Commercial System and the Data Control System (DCS)/4.1/.	OK
Data transfer and protection of input data for calculations	The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergia S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/.	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The monitored data is correct.	OK
Data verification	Consistency of raw data with calculation tool: Yes.	OK
	Consistency of calculation tool with monitoring report: Yes.	OK
Crosscheck (if available)	N/A	OK

**Table 6**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	Quantity of the main product of the production process (e.g. sugar cane, rice) produced in year y from plants operated at the project site.	Quantity of the main product of the production process (e.g. sugar cane, rice) produced in year y from plants operated at the project site.	Quantity of the main product of the production process produced in year y from plants operated at the project site.	Consistent.	OK
Parameter ID (if available)	P <sub>y</sub>	P <sub>y</sub>	P <sub>y</sub>	Consistent.	OK

Data Unit	tonnes	tonnes	tonnes	Consistent.	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	<p>The data correspond to the production levels in Viñales Industrial Complex.</p> <p>Although the parameter does not have any implication on ER calculation; Project participants did not provide monitored evidence for annual production level.</p> <p>PPs provided the Plant Records production regarding saw timber process/4.10/ and remanufacturing section /4.11/. The Verification team checked that the production is consistent with the PD information/1.3/ and the data observed during the site inspection. The version of MR/1.1/ is consistent and clearly supported.</p>				OK
Date of Data:	Project Participants provided monitored data. /4.10/4.11/.				OK
Gaps in data	Period: No gaps.				OK
	Default value used: N/A				-
	Justification: N/A				-
	QA/QC aspects				Conclusion and IRL
Source of data	Source: On-site measurements.				-
	Responsibility: The responsible for the monitoring procedure is the Power Plant Engineer in Charge. The monitoring data information is processed and stored on-site from the SAP system. Monthly the data is submitted to Arauco Bioenergía S.A. for further processing.				-
	Resubmittedativeness: The data is consistent with the Viñales Industrial Complex operation.				OK
Reliability of Data Source:	The data provided is reliability with wood operation..				OK
Is the Data up-to-date?	Yes.				OK
Archiving of raw data and protection measures	<p>.</p> <p>The data supplied by Project Participants/4.10/4.11/ is recorded by the responsible and introduced into the virtual Arauco FTP site (FileZilla) designated to Viñales project activity. The verification teams confirmed that</p>				OK

	the FTP site has restricted access protected with passport and username.	
Data transfer and protection of input data for calculations	The Power Plant Engineer in charge is the responsible of the information into the FTP site and complete the project data base/1.2/ in order to the Arauco Bioenergía S.A. processes for further Emission calculation/1.2/ and Monitoring Report/1.1/.	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The data is resubmittedative of operation conditions.	OK
Data verification	Consistency of raw data with calculation tool: <i>yes</i> .	OK
	Consistency of calculation tool with monitoring report: <i>yes</i> .	OK
Crosscheck (if available)	The Verification team was able to check that Saw Mill Viñales process /4.10/4.11/ is consistent with public information/7.4/.	OK

**Table 7**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	<i>Weighted average net calorific value of fuel type i in year y.</i>	<i>Weighted average net calorific value of fuel type i in year y.</i>	<i>Weighted average net calorific value of fuel type i in year y.</i>	Consistent.	OK
Parameter ID (if available)	$NCV_{i,y}$	$NCV_{i,y}$	$NCV_{i,y}$	Consistent.	OK
Data Unit	<i>GJ/ton</i>	<i>GJ/ton</i>	<i>GJ/ton</i>	Consistent.	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	Either conduct measurements or use of accurate and reliable local or national data where available. Where such data is not available, use IPCC default net calorific values (country-specific, if available) if they are deemed to reasonably resubmitted local circumstances. Choose the values in a conservative manner and				OK

	<p>justify the choice.</p> <p>The Verification team found that the applicable method for fossil fuel net calorific value is nconsistent with the Monitoring Plan/1.3/ and the Methodology/2.4/ requirements. The team confirmed that there are reliable regional data available.</p> <p>They provided relevant evidences/4.13/ demonstrating that fuel supplier data is available. The data are:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th><i>Fossil fuels</i></th> <th><i>Units</i></th> <th><i>IPCC</i></th> <th><i>2014</i></th> <th><i>2015</i></th> <th><i>2016</i></th> </tr> </thead> <tbody> <tr> <td rowspan="2"><i>Diesel</i></td> <td><i>(GJ/ton)</i></td> <td><i>43.3</i></td> <td><i>42.87</i></td> <td><i>42.87</i></td> <td><i>42.87</i></td> </tr> <tr> <td><i>Kcal/Kg</i></td> <td></td> <td><i>10,247</i></td> <td><i>10,247</i></td> <td><i>10,247</i></td> </tr> <tr> <td rowspan="2"><i>Fuel Oil</i></td> <td><i>(GJ/ton)</i></td> <td><i>41.7</i></td> <td><i>46.31</i></td> <td><i>46.31</i></td> <td><i>46.31</i></td> </tr> <tr> <td><i>Kcal/Kg</i></td> <td></td> <td><i>11,068</i></td> <td><i>11,068</i></td> <td><i>11,068</i></td> </tr> </tbody> </table>	<i>Fossil fuels</i>	<i>Units</i>	<i>IPCC</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>Diesel</i>	<i>(GJ/ton)</i>	<i>43.3</i>	<i>42.87</i>	<i>42.87</i>	<i>42.87</i>	<i>Kcal/Kg</i>		<i>10,247</i>	<i>10,247</i>	<i>10,247</i>	<i>Fuel Oil</i>	<i>(GJ/ton)</i>	<i>41.7</i>	<i>46.31</i>	<i>46.31</i>	<i>46.31</i>	<i>Kcal/Kg</i>		<i>11,068</i>	<i>11,068</i>	<i>11,068</i>	
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Date of Data:	<p>Reliable for the monitoring period.</p> <p>Reliable data for this monitoring period was provided.</p>	OK																												
Gaps in data	<p>Period: According to the evidences provided, no gaps have been found.</p> <p>Default value used: N/A</p> <p>Justification: N/A</p>	OK																												
	<p>QA/QC aspects</p>	-																												
	<p>QA/QC aspects</p>	-																												
Source of data	<p>Source:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th><b>Data source Conditions for using</b></th> <th><b>Data source Conditions for using</b></th> </tr> </thead> <tbody> <tr> <td>a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source if the carbon fraction of the fuel is not provided (Option A)</td> </tr> </tbody> </table>	<b>Data source Conditions for using</b>	<b>Data source Conditions for using</b>	a) Values provided by the fuel supplier in invoices	This is the preferred source if the carbon fraction of the fuel is not provided (Option A)	Conclusion and IRL																								
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	b) Measurements by the project participants.	If a) is not available		
	c) Regional or national default values.	If a) is not available. These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).		
	d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.	If a) is not available		
	<p>The team confirmed that there are reliable regional data available.</p> <p>The option "a) Values provided by the fuel supplier in invoices" is consistent.</p>			
Responsibility: Arauco Bioenergia according to the MP responsibilities.			OK	
Resubmittedativeness: Verification team checked that the vales are consistent with Methodology requirements.			OK	
Reliability of Data Source:	. Yes, the evidences provided are copy of fuel suppliers' invoices./4.13/.			OK
Is the Data up-to-date?	Yes.			OK
Archiving of raw data and protection measures	N/A			-
Data transfer and protection of input data for	N/A			-

calculations		
	Quality of evidence	Conclusion and IRL
Completeness of data	The fuels values selected are consistent with the MP.	OK
Data verification	Consistency of raw data with calculation tool: Yes.	OK
	Consistency of calculation tool with monitoring report Yes.	OK
Crosscheck (if available)	The fuel supplier values were compared with the IPCC. The selected values are consistent and conservatives.	OK

**Table 8**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	CO <sub>2</sub> emission factor for fossil fuel type f in year y.	Weighted average CO <sub>2</sub> emission factor of fuel type I in year y.	Weighted average CO <sub>2</sub> emission factor of fuel type I in year y.	Consistent.	OK
Parameter ID (if available)	EF <sub>CO<sub>2</sub>,i</sub>	EF <sub>CO<sub>2</sub>,i</sub>	EF <sub>CO<sub>2</sub>,i</sub>	Consistent.	OK
Data Unit	tCO <sub>2</sub> /GJ	tCO <sub>2</sub> /GJ	tCO <sub>2</sub> /GJ	Consistent.	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	CO <sub>2</sub> emission factor for fossil fuel type. Either conduct measurements or use of accurate and reliable local or national data where available. Where such data is not available, use IPCC default emission factors if they are deemed to reasonably resubmitted local circumstances. Choose the value in a conservative manner and justify the choice. The verification teams confirmed with relevant public evidence/8.6/that there are not available the CO <sub>2</sub> emission factor for Chilean fossil fuels market and the conservative assumption taken.				OK

Date of Data:	According to the latest version of IPCC default emission factor/8.7/ 2006.	OK
Gaps in data	Period: N/A	-
	Default value used: N/A	-
	Justification: N/A	-
	QA/QC aspects	Conclusion and IRL
Source of data	Source: 2006 IPCC Guidelines on National GHG Inventories. Table 1.4 Chapter 1 of Vol.2 /8.7/	OK
	Responsibility: Arauco Bioenergia.	OK
	Resubmittedativeness: No regional or national CO2 values according to the public information/8.6/	OK
Reliability of Data Source:	Last version of IPCC default values. OK.	OK
Is the Data up-to-date?	Yes.	OK
Archiving of raw data and protection measures	N/A	-
Data transfer and protection of input data for calculations	N/A	-
	Quality of evidence	Conclusion and IRL
Completeness of data	According to the Monitoring Plan.	OK
Data verification	Consistency of raw data with calculation tool: N/A	-
	Consistency of calculation tool with monitoring report: N/A	-
Crosscheck (if available)	The verification teams confirmed with relevant public evidence/8.6/that there are not available the CO <sub>2</sub> emission factor for Chilean fossil fuels market and the conservative assumption taken.	OK

**Table 9**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m.	Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m.	Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m.	Consistent.	OK
Parameter ID (if available)	$D_{f,m}$	$D_{f,m}$	$D_{f,m}$	Consistent.	OK
Data Unit	Km	Km	Km	Consistent.	OK
Technical aspects					Conclusion and IRL
Description of Data / Data Refers to:	Trips undertook under the project activity and transporting freight between the origin and destination in a round trip. Determined once for each freight transportation activity for a reference trip using the vehicle odometer or any other appropriate sources.				OK
Date of Data:	<p>2<sup>ND</sup> MP (01-January-2015 to 31-December-2016)</p> <p>The monitored records are consistent with the DCS database in terms of provider, origin and biomass type. However, the total distance per supplier is slightly different in around 1%.</p> <p>The Verification team confirmed that the distance of round trip were revised and improved by the Project Participants.</p> <p>Distances Plant Records/4.4/4.14/ are consistent with the MR and ER Calculation.</p>				OK
Gaps in data	Period: No gaps. The data cover the only the monitoring period.				OK
	Default value used: N/A				OK
	Justification: N/A				OK
QA/QC aspects					Conclusion

		and IRL
Source of data	Source: Records of vehicle operator and/or records by project participant.	
	Responsibility: The responsible for the monitoring procedure is the Power Plant Engineer in Charge. The monitoring data information is processed and recorded on-site from the SAP system. Monthly the data is submitted to Arauco Bioenergía S.A. for further processing.	OK
	Representativeness: The team confirmed that the data is representative of the biomass operation and the freight transportation. The verification teams confirmed that the SAP commercial data is reliable and consistent with the current operations and the database/4.4/4.14/ and the applied distances has been checked on-line with Google Maps application. The sources of biomass waste transported to the Power Plant correspond to the project activity area of influence defined in the Monitoring Plan/4.4/	OK
Reliability of Data Source:	Yes. The data is consistent.	OK
Is the Data up-to-date?	Yes. The data is consistent	OK
Archiving of raw data and protection measures	All recorded monitored data is archived in electronic into the SAP commercial System and the Data Control System (DCS)/4.1/.	OK
Data transfer and protection of input data for calculations	The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergía S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	Yes. The data provided meets the monitoring system and it is available and traceable.	OK
Data verification	Consistency of raw data with calculation tool: Yes. The data is consistent	OK
	Consistency of calculation tool with monitoring report: Yes. The data is consistent	OK
Crosscheck (if available)	The verification team cross-checked the monitored data during the site inspection and confirmed that the round trip distances are consistent with data from independent source (Google Maps).	OK

**Table 10**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	Total mass of freight transported in freight transportation activity f in monitoring period m.	Total mass of freight transported in freight transportation activity f in monitoring period m.	Total mass of freight transported in freight transportation activity f in monitoring period m.	Consistent.	OK
Parameter ID (if available)	FR <sub>f,m</sub>	FR <sub>f,m</sub>	FR <sub>f,m</sub>	Consistent.	OK
Data Unit	tonne	tonne	tonne	Consistent.	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	Total mass transported from external resources to the Power Plant.				OK
Date of Data:	2 <sup>ND</sup> MP (01-January-2015 to 31-December-2016) The data is consistent and with the total biomass consumed in the Power Plant/4.1/.				OK
Gaps in data	Period: No gaps. The data cover the only the monitoring period.				OK
	Default value used: N/A				OK
	Justification: N/A				OK
	QA/QC aspects				Conclusion and IRL
Source of data	Source: Records by project participant.				OK
	Responsibility: The responsible for the monitoring procedure is the Power Plant Engineer in Charge. The monitoring data information is processed and stored on-site from the SAP system. Monthly the data is submitted to Arauco Bioenergia S.A. for further processing.				OK
	Represubmittedativeness: The team found that the data is not consistent with the biomass operation and plant records.  The monitored data was reviewed and corrected. The data bases for transport/4.14/ are consistent with				OK

	Biomass data/4.1/, the MR and ER calculation.	
Reliability of Data Source:	Yes the data is consistent with the biomass transported to the power plant and consistent with the SAP system.	OK
Is the Data up-to-date?	Yes, the data now is updated.	OK
Archiving of raw data and protection measures	All recorded monitored data is archived in electronic into the SAP commercial System and the Data Control System (DCS)/4.1/.	OK
Data transfer and protection of input data for calculations	The monitoring data information is consulted, processed and stored on-site by the Power Plant Engineer in Charge, and monthly is send to Arauco Bioenergia S.A. for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	the data meets the monitoring system and it is available and traceable.	OK
Data verification	Consistency of raw data with calculation tool: YES	OK
	Consistency of calculation tool with monitoring report: Yes.	OK
Crosscheck (if available)	The Verification team is consistent with the SAP commercial teams and waste biomass for power generation.	OK

**Table 11**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	Amount of fossil fuel type i consumed by power plant/unit m, k or n (or in the project	Amount of fossil fuel type i consumed by power plant/unit m, k or n.	Amount of fossil fuel type i consumed by power plant/unit m, k or n.	Consistent.	OK

	electricity system) in year y or hour h.				
Parameter ID (if available)	$FC_{i,m,i,y}$ , $FC_{i,k,y}$	$FC_{i,m,i,y}$ , $FC_{i,k,y}$	$FC_{i,m,i,y}$ , $FC_{i,k,y}$	Consistent.	OK
Data Unit	<i>Mass or volume unit</i>	<i>Mass or volume unit</i>	<i>Mass or volume unit</i>	Consistent.	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	Amount of fossil fuel consumed by the power plant or unit m or k connected to relevant electricity system according to the "Tool to calculate the emission factor for an electricity system".				OK
Date of Data:	Year 2014. However, the Project Participants should make the difference the electricity system fuels consumption with the project fuels consumptions. Also, they have to clarify the source of data in the MR/1.1/  Project Participants reviewed and identified clearly all sub index and parameters definitions. The Monitoring Report/1.1/, the PD version 3/1.3/, ER Calculation version 2/1.2/ and relevant tools /2.5/2.6/2.7/ are consistent and traceable.				OK
Gaps in data	Period: No gaps. The 2015-2016 data is relevant and consistent with Monitoring Plan requirements.				OK
	Default value used: N/A				OK
	Justification: N/A				OK
	QA/QC aspects				Conclusion and IRL
Source of data	Source: CDEC-SIC public information.				OK
	Responsibility: The responsible for the monitoring procedure is Arauco Bioenergía S.A, which could be checked during the site inspection.				OK
	Represubmittedativeness: The 2015-1016 data is relevant and consistent with Monitoring Plan requirements.				OK
Reliability of Data Source:	Yes. The Verification team cross-checked the data with the public data/6.1/6.2/6.3/				OK
Is the Data up-to-date?	Yes and consistent with the Monitoring Plan requirements.				OK
Archiving of raw data and protection measures	The SIC electricity system data/3.6/3.7/ is recorded and storage into the virtual Arauco FTP site (FileZilla) designated to the Viñales project activity, which has restricted access protected with passport and username.				OK
Data transfer and	The monitoring data information is consulted, processed and stored by Arauco Bioenergía S.A, which is the				OK

protection of input data for calculations	responsible for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/	
	Quality of evidence	Conclusion and IRL
Completeness of data	The Verification team confirmed that the fuels consumption data of power units connected to the SIC/3.8/ are consistent with the public data/6.1/6.2/6.3/and the data reported and used by the PPs for emission factor calculation/4.5/.	OK
Data verification	Consistency of raw data with calculation tool: yes.	OK
	Consistency of calculation tool with monitoring report: yes.	OK
Crosscheck (if available)	Verification team cross-checked the data with the public data available/3.5/3.6/. All data found traceable and credible.	OK

**Table 12**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	Net calorific value (energy content) of fossil fuel type i in year y $NCV_{i,y}$ .	Net calorific value (energy content) of fossil fuel type i in year y $NCV_{i,y}$ .	Net calorific value (energy content) of fossil fuel type i in year y $NCV_{i,y}$ .	No difference with calorific values of fossil fuels project activity was established. The data and parameters has been clearly identified in the documents.	OK
Parameter ID (if available)	$NCV_{i,y}$	$NCV_{i,y}$	$NCV_{i,y}$	Consistent.	OK
Data Unit	<i>GJ/mass or volume</i>	<i>GJ/mass or volume</i>	<i>GJ/mass or volume</i>	Consistent.	OK
	Technical aspects				Conclusion

		and IRL								
Description of Data / Data Refers to:	The net calorific value of fossil fuels used in the SIC according to "Tool to calculate the emission factor for an electricity system".	OK								
Date of Data:	<p>Energy Balance /6.4/                      Verification team that the Energy Balance is reliable sources for Regional data of NCV. However, the Project Participants should make the difference the electricity system fuels consumption with the project fuels consumptions. Also, they have to clarify the source of data in the MR/1.1/</p> <p>Project Participants reviewed and identified clearly al sub index and parameters definitions. The Monitoring Report/1.1/, the PD version 3/1.3/, ER Calculation version 2/1.2/ and relevant tools /2.5/2.6/2.7/ are consistent and traceable.</p>	OK								
Gaps in data	Period: No gaps. The Energy Balance/6.4/ is relevant and consistent with Monitoring Plan requirements.	OK								
	Default value used: N/A	OK								
	Justification: N/A	OK								
	QA/QC aspects	Conclusion and IRL								
Source of data	<p>Source:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Data source Conditions for using</th> <th style="width: 50%;">Data source Conditions for using</th> </tr> </thead> <tbody> <tr> <td>a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source if the carbon fraction of the fuel is not provided (Option A)</td> </tr> <tr> <td>b) Measurements by the project participants.</td> <td>If a) is not available</td> </tr> <tr> <td>c) Regional or national default values.</td> <td>If a) is not available. These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).</td> </tr> </tbody> </table>	Data source Conditions for using	Data source Conditions for using	a) Values provided by the fuel supplier in invoices	This is the preferred source if the carbon fraction of the fuel is not provided (Option A)	b) Measurements by the project participants.	If a) is not available	c) Regional or national default values.	If a) is not available. These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).	OK
Data source Conditions for using	Data source Conditions for using									
a) Values provided by the fuel supplier in invoices	This is the preferred source if the carbon fraction of the fuel is not provided (Option A)									
b) Measurements by the project participants.	If a) is not available									
c) Regional or national default values.	If a) is not available. These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).									

	d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.	If a) is not available	
	The Project Participants chose the energy balance from National Energy commission.		
	Responsibility: The responsible for the monitoring procedure is Arauco Bioenergía S.A, which could be checked during the site inspection.		
Resubmittedateness: The data is relevant and consistent with Monitoring Plan requirements.			OK
Reliability of Data Source:	Yes. The Verification team cross-checked the data with the public data/6.4/		OK
Is the Data up-to-date?	Yes and consistent with the Monitoring Plan requirements.		OK
Archiving of raw data and protection measures	The SIC electricity system data/3.6/3.7/ is recorded and storage into the virtual Arauco FTP site (FileZilla) designated to the Viñales project activity, which has restricted access protected with passport and username.		OK
Data transfer and protection of input data for calculations	The monitoring data information is consulted, processed and stored by Arauco Bioenergía S.A, which is the responsible for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/		OK
	Quality of evidence		Conclusion and IRL
Completeness of data	The Verification team confirmed that the NCV are consistent with the public data/6.4/and the data reported and used by the PPs for emission factor calculation/4.5/.		OK
Data verification	Consistency of raw data with calculation tool: yes		OK
	Consistency of calculation tool with monitoring report: yes		OK
Crosscheck (if available)	Verification team cross-checked the data with the public data available/6.4/ with the IPCC default data seems credible and conservative.		OK

**Table 13**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	CO2 emission factor of fossil fuel type i used in power unit m in year y.	CO2 emission factor of fossil fuel type i used in power unit m in year y.	CO2 emission factor of fossil fuel type i used in power unit m in year y.	Consistent	OK
Parameter ID (if available)	EF <sub>CO2,i,y</sub> , EF <sub>CO2,m,i,y</sub>	EF <sub>CO2,i,y</sub> , EF <sub>CO2,m,i,y</sub>	EF <sub>CO2,i,y</sub> , EF <sub>CO2,m,i,y</sub>	Consistent	OK
Data Unit	tCO2/GJ	tCO2/GJ	tCO2/GJ	Consistent	OK
	Technical aspects				Conclusion and IRL
Description of Data / Data Refers to:	CO2 emission factor of fossil fuel type use in the SIC according to the "Tool to calculate the emission factor for an electricity system".				OK
Date of Data:	2006 IPCC guideline. Table 1.2, chapter 1 of vol.2. /6.5/  The Monitoring Report/1.1/, the PD version 3/1.3/, ER Calculation version 2/1.2/ and relevant tools /2.5/2.6/2.7/ are consistent and traceable.				OK
Gaps in data	Period: No gaps. The IPCC data is relevant and consistent with Monitoring Plan requirements. No relevant of regional data for CO2 emission factor.				OK
	Default value used: N/A				-
	Justification: N/A				-
	QA/QC aspects				Conclusion and IRL
Source of data	Source: 2006 IPCC guideline. Table 1.2, chapter 1 of vol.2				OK
	Responsibility: The responsible for the monitoring procedure is Arauco Bioenergia S.A, which could be checked during the site inspection.				OK
	Represubmittedativeness: The IPCC data is relevant and consistent with Monitoring Plan requirements. No				OK

	relevant of regional data for CO2 emission factor.	
Reliability of Data Source:	Yes. The Verification team cross-checked the data with the IPCC data.	OK
Is the Data up-to-date?	Yes and consistent with the Monitoring Plan requirements.	OK
Archiving of raw data and protection measures	The IPCC data is recorded and storage into the virtual Arauco FTP site (FileZilla) designated to the Viñales project activity, which has restricted access protected with passport and username.	OK
Data transfer and protection of input data for calculations	The monitoring data information is consulted, processed and stored by Arauco Bioenergía S.A, which is the responsible for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The Verification team confirmed that the CO2 emission factor from the IPCC/6.5/and the data reported and used by the PPs for emission factor calculation/4.5/	OK
Data verification	Consistency of raw data with calculation tool: yes.	OK
	Consistency of calculation tool with monitoring report: yes.	OK
Crosscheck (if available)	Verification team cross-checked the data with the public data available/6.5/. All data found traceable and credible.	OK

**Table 14**

External sources and accounting information					
	PD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	Net electricity generated by power plant/unit m, k in year y.	Net electricity generated by power plant/unit m, k in year y.	Net electricity generated by power plant/unit m, k in year y.	Consistent.	OK
Parameter ID (if available)	EG <sub>m,y</sub> , EG <sub>k,y</sub>	EG <sub>m,y</sub> , EG <sub>k,y</sub>	EG <sub>m,y</sub> , EG <sub>k,y</sub>	Consistent.	OK
Data Unit	MWh	MWh	MWh	Consistent.	OK
	Technical aspects				Conclusion

		and IRL
Description of Data / Data Refers to:	Amount of electricity by power plant m or k connected to relevant electricity system according to the "Tool to calculate the emission factor for an electricity system". The Monitoring Report/1.1/, the PD version 3/1.3/, ER Calculation version 2/1.2/ and relevant tools /2.5/2.6/2.7/ are consistent and traceable.	OK
Date of Data:	Year 2015-2016. The Monitoring Report/1.1/, the PD version 3/1.3/, ER Calculation version 2/1.2/ and relevant tools /2.5/2.6/2.7/ are consistent and traceable.	OK
Gaps in data	Period: No gaps. The 2014 data is relevant and consistent with Monitoring Plan requirements.	OK
	Default value used: N/A	OK
	Justification: N/A	OK
	QA/QC aspects	Conclusion and IRL
Source of data	Source: CDEC-SIC public information.	OK
	Responsibility: The responsible for the monitoring procedure is Arauco Bioenergía S.A, which could be checked during the site inspection.	OK
	Represubmittedativeness: The 2014 data is relevant and consistent with Monitoring Plan requirements.	OK
Reliability of Data Source:	Yes. The Verification team cross-checked the data with the public data/6.1/6.2/6.3/	OK
Is the Data up-to-date?	Yes and consistent with the Monitoring Plan requirements.	OK
Archiving of raw data and protection measures	The SIC electricity system data/3.6/3.7/ is recorded and storage into the virtual Arauco FTP site (FileZilla) designated to the Viñales project activity, which has restricted access protected with passport and username.	OK
Data transfer and protection of input data for calculations	The monitoring data information is consulted, processed and stored by Arauco Bioenergía S.A, which is the responsible for further processing to Emission calculation/1.2/ and Monitoring Report/1.1/	OK
	Quality of evidence	Conclusion and IRL
Completeness of data	The Verification team confirmed that the fuels consumption data of power units connected to the SIC/3.8/ are consistent with the public data/6.1/6.2/6.3/and the data reported and used by the PPs for emission factor calculation/4.5/.	OK
Data verification	Consistency of raw data with calculation tool: yes.	OK

	Consistency of calculation tool with monitoring report: yes.	OK
Crosscheck (if available)	Verification team cross-checked the data with the public data available/3.5/3.6/. All data found traceable and credible.	OK

### 3. Data Processing and ER calculation

Description of data processing from transferred data to final results in the calculation tool		
Step	Description	Conclusion and IRL
Consistency	Evidences, spread-sheets and monitoring procedures are consistent with the Monitoring Plan and the Methodology ACM0006 Ver 12.1.1. All monitored data is traceable, reliable and no material errors have been found.	OK
Calculation Tool description	MR reports and calculation are full consistent with the methodology /2.4/	OK
Elimination of not plausible data (if applicable)	N/A	-
Transformation from useable data to input data for further calculation (if applicable)	The Verification Team can confirm that Section 3.3 in the MR/1.1/ is in line with Management Manual/4.7/ consistently including relevant instructions for monitoring procedures and the QA/QC emergency procedures.	OK
Ex-ante data	All ex-ante data and parameters available at validation are consistent with the Monitoring Plan and Methodological option for emission reductions calculations.	OK
Default parameter		
Formulae check	OK	OK
Rounding functions	The total emission reductions during the monitoring period have been rounded down to an integer.	OK

Calculation tool changes and protection measures	An unprotected ER calculation spreadsheet has been provided to the assessment team. /1.2/.	OK
Reported data	All reported data is clear, consistent and reliable.	OK

#### 4. Additional assessment

##### 8.1

##### 4.1. Internal Review

Description and performance of internal review		
	Description	Conclusion and IRL
Procedure	The Verification Team can confirm that Section 3.3 in the MR/1.1/ is in line with the Quality Management Manual/4.7/ consistently including relevant instructions for monitoring procedures and the QA/QC emergency procedures. The PPs also provided the training personal records/4.8/. The verification team confirmed that the MR/1.1/ and Calculation ER Spreadsheet/1.2/ are consistent with the monitoring system.	OK
Documentation	Quality Management Manual/4.7/ Training personal records/4.8/	OK
Responsibilities	See Section 1.2 of this Appendix.	OK

##### 4.2. Peculiarities

Description of Peculiarities and unexpected Daily Events during the verification period		
	Description	Conclusion and IRL
Performance	There were no peculiarities and unexpected events during the monitoring period.	OK
Documentation	Power Generation availability report /3.1/. The stop-down, maintenance or no generations periods are consistent with the Power Plant operation.	OK
Measures	No peculiarities.	OK

### 4.3. Further additional requirements

Description of additional requirements to be checked		
	Description	Conclusion and IRL
Compliance Environmental requirements	No applied.	

### 4.4. Data Reporting

Description of the Monitoring Report		
	Comments and Results	Conclusion and IRL
Compliance with VCS regulations	The Verification team confirmed that the Monitoring Report is consistent with the rules and guidelines of VCS states in the VCS Standard Version 3.5/2.3/ and Program Guide Version 3.5/2.2/	OK
Completeness and Transparency	The Verification team can confirm that the PD/1.3/, MR / and ER Calculation model/1.2/ are full consistent with the methodology/2.4/ and all data is traceable, supported by relevance evidence and consistent with the Project Activity implementation.	OK
Correctness	The Verification team checked that all Emission Reduction Calculations are consistent with the methodological choices in the Monitoring Plan/1.3/ and Methodology/2.4/. The assumption and calculation is supported with relevance data records, monitoring data or credible sources.	OK

## 5. Compilation and Resolutions of CARs, CRs and FARs

### Findings Overview Summary

Type	CAR	CL	FAR
<b>Total Number raised</b>	2	1	0

### Clarification Request

CL ID	CL 01	Section no.	Table 5. Monitoring Paramaters	Date:	16/05/2017
<b>Description of CL</b>					
<p><i>PP shall clarify why the following equipment has not been monitored as per defined frequency of each 24 months which is stated as per QA/QC procedures.</i></p> <p>Thermocouple transmitter Rosemount 644 (665-TT-9026) and Thermocouple transmitter Rosemount 644 HANA (665-TT-9024);</p> <p>In addition, assumptions and justifications of gap may be in line with latest VVS and ensure by clearly explaining how the conservativeness of assumptions are made.</p>					
<b>Project participant response</b>					<b>Date:</b> 12/06/2017

Thermocouple transmitters Rosemount 644 installed in TAG's 665-TT-9026 and 665-TT-9024 were included as critical equipment during the CP1-MP1 Monitoring report, nevertheless, only 665-TT-9026 was defined as critical equipment in current PD. These instruments were defined as critical because their measurements constantly check set point temperature in low and medium pressure line, but they are not directly involved in emission reduction calculation. As was mentioned in the current MR, Set points Pressure and temperature of steam lines to calculate enthalpies involved in  $HC_{BL,y}$  were properly defined in PD, justified and presented during Viñales validation process.

The calibration frequency recommended by provider was received after the first monitoring period. Before that, Power plant applied their experience and criteria to verified and maintain equipment related with temperature measurements.

However, the result of the last calibration carried on during this current monitoring period presented the following results:

TAG's	Calibration and verification				
	Calibration points (Spam %)	Instrument value (A) °C	Standard instrument (B) °C	Difference (A-B) °C	Error (%)
665-TT-9026	0%	0.04	0	0.04	0.008
	100%	450.03	450	0.03	0.006
665-TT-9024	0%	0.02	0	0.02	0.008
	100%	250	250	0	0

The error in the instruments are less than the tolerable error of  $\pm 1\%$ . Even if PP applied a correction of  $\pm 1\%$  (as is possible to observe in the table below) is possible to observe that the difference is not material with the final result.

	Set point temperature - 1%		Set point temperature		Set point temperature +1%	
	2015	2016	2016	2016	2016	2016
Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues.	28,091	34,532	28,120	34,557	28,151	34,584

In addition, as highlight the provider responsible of the equipment calibration, both equipment fulfill the verification condition defines by provider and are in optimal operating condition.

Due to the answer of the present CL, PP check the emission reduction spreadsheet and found a mistake in the applied enthalpies of medium and low pressure. A correction was applied. New calculation is presented to audit team "Viñales monit CP1MP2 ver1 170615.xlsx" and included in a

Documentation provided by project participant	
665-TT-9024 161108.pdf 665-TT-9026 161108.pdf Rosemount 644.pdf Viñales monit CP1MP2 ver1 170615.xlsx Viñales monrep CP1MP2 ver1 170615.pdf	
DOE assessment	Date: 26/07/2017
As clarified by PP and verified by the assessment team, it found that both thermocouple transmitters (665-TT-9026 and 665-TT-9024) are identified as critical equipment for constantly checking set point temperature in low and medium pressure line, however they are not directly involved in emission reduction calculation. The latest calibration of both equipments shows that they are work under good condition. Considering the final calculation result of baseline emissions are not materially influenced, the assessment team accepted the clarification of CL 1.	

### Corrective Action Request

CL ID	CAR 1	Section no.	5 Safeguards No Net Harm & Stakeholder consultation	Date: 16/05/2017
<b>Description of CAR</b>				
PP is requested to demonstrate the compliance of “no net harm” and “local stakeholder process”. Regarding “no net harm” scope, PP shall demonstrate the on-going environmental monitoring criteria related to air pollutants, wastewater, solid wastes and noise, in order to confirm whether the monitoring frequency and monitoring data are complying with standards. For “local stakeholder process”, PP shall clarify the established on-going communication channel with stakeholders, and whether comments are received, and whether the comments are considered, if any.				
<b>Project participant response</b>				<b>Date: 16/06/2017</b>

*The Project Participant, Celulosa Arauco y Constitución, formally embraced the UN Global Compact during a signing ceremony held May 30, 2011 at the UN Global Compact office in Santiago, Chile. The UN Global Compact asks companies to embrace, support and enact, within their spheres of influence, a set of ten core values in the areas of human rights, labor standards, the environment and anti-corruption:*

- Support and respect the protection of internationally proclaimed human rights;*
- Ensure they are not complicit in human rights abuses;*
- Uphold the freedom of association and the effective recognition of the right to collective bargaining;*
- Eliminate all forms of forced and compulsory labor;*
- Abolish child labor;*
- Eliminate discrimination in respect of employment and occupation;*
- Support a precautionary approach to environmental challenges;*
- Undertake initiatives to promote greater environmental responsibility;*
- Encourage the development and diffusion of environmentally friendly technologies; and*
- Work against corruption in all its forms, including extortion and bribery.*

*Yearly, PP published their Sustainability Report, where the ten core are content and described the on-going actions during the monitoring period.*

### **Environmental monitoring**

*At ARAUCO the concept of environmental responsibility leads to the development of initiatives under an efficient management strategy incorporating values, commitments and standards, together with the application of the best practices and technologies available in the industry. The environmental policy is applied to all areas of the company, from plantation management and maintenance of parks to operations developed in industries and offices. The purpose is to continually improve performance in this field. All of ARAUCO's production units are certified to environmental management standard systems and have a minimal environmental impact, additionally ensuring the traceability of raw materials. Raw material is exclusively sourced from sustainably managed forest plantations. Arauco strive to develop products and renewable energy from biomass and forest resources, generating enough energy to meet own industrial needs and contribute an energy surplus to the Chilean grid.*

Item	Impact			Monitoring
	Low	Medium	High	
Air Pollutants	x			<p>Viñales Bioenergy Plant has two monitoring stations, both located in Constitución city. Monthly reports from a 3rd partie laboratory, Air quality certificated, are received by plant. This certification cover the following items; MP-10,MP-2.5, NO<sub>2</sub>, SO<sub>2</sub> and CO.</p> <p>Additionally, once a year the plant must perform an isocinetic study. From 2018 onwards, plant shall perform 3 isocinetic studies per year.</p> <p>No environmental violations were raised during 2015-2016.</p>
Solid Waste	x			<p>According to Chilean law DS 594, Ministry of Public Health, solid waste is transported accordingly their characteristics and deposited in legally authorized landfills. Solid waste is composed by ash, sand, tree branches and sludge. Currently solid waste is deposited in "Ecobío" landfill, located in Chillán.</p> <p>No environmental violations raised during 2015-2016.</p>
Liquid Waste	x			<p>Currently liquid waste is discharged to "quebrada sin nombre" located on the side of the plant. Liquid waste are monitored monthly by a third partie laboratory. Acording to Chilean law DS 90 of General Secretariat of the Republic, monitored parameters are: PH, temperature, oil and grease, aluminum, chloride, mercury, nickel, lead, total suspended solids, sulfates, zinc and flow.</p> <p>No environmental violations raised during 2015-2016.</p>
Noise	x			<p>According to the analysis carried out during the Environmental impact Declaration there would not be an increase of noise emission levels that could exceed the standard at the nearest potential receptors for any of the project stages (construction and operation). On the other hand, in the project influence area there are no places with concentrations of native fauna associated to relevant habitats to their nesting, reproduction or feeding. No continuous monitoring are needed.</p> <p>No environmental violations raised during 2015-2016.</p>

### **Communication with Stakeholders**

**Community:** *The purpose of the Company's Local Development Strategy is to contribute to the development of local communities, developing initiatives that generate mutual benefit through a model based on dialogue and participation. In Chile, areas of work for contributing to local development have been defined that cover a wide range of programs:*

- *Education and Training: Arauco firmly believe that education is a key factor in the development of a nation. In Chile, ARAUCO provides management and financial support for schools Arauco, Constitución and Cholguan, three educational institutions known at the national level for their excellent academic results. In addition, the company supports Fundación Belén Educa, an organization providing subsidized education for more than 8,000 students in their seven schools. Arauco also make a significant contribution through Arauco Educational Foundation, which for over 20 years has helped provide quality education to 94,700 students in public schools.*
- *Infrastructure and Improving the quality of life: At Arauco we are convinced that the home is where the family puts down roots and plans their future. Therefore, the Company has decided to promote access to housing for its employees, the collaborators who works for our service providers, and families in the Company's area of influence. This is achieved through technical support in the process of applying for public subsidies, financial support for hiring expert third parties to develop projects, locating and technically evaluating land for housing purposes, and cooperation and partnerships with diverse public and private bodies for the generation of quality housing solutions.*

*Through the program of improving life's quality the Company seeks to bring practical knowledge to the neighbouring communities around Arauco-managed forest areas that will allow them to improve their daily life.*

- *Participation and dialogue: Ongoing dialogue is required for Company-community relations over the long term. In Chile, an example of how these principles are reflected is the Participation and Community Consultation Guide, which discusses how to carry out participatory processes of recording and controlling the impact of our operations to forests. To maintain fluid communication with the Company's different public interest groups, facilitating the dissemination of information of interest and the timely receipt of queries and concerns, Arauco has actively developed and managed diverse channels, platforms and tools. Hotlines, websites, e-mail addresses and social media accounts on Facebook, YouTube, Flickr and Twitter are all available to the public.*
- *Corporate Policy on Mapuche Community Relations: Through this policy, Arauco is committed to learning about and respecting the Mapuche culture, establishing a complete program of training, recognition, dialogue and collaboration. The Mapuche culture is recognized*

*as an ancient culture living in the present: relationship between the Mapuche people and land is a culture of nature. The Company has embraced the commitments of promoting mutual knowledge, maintaining channels of participation, identifying and preserving sites of cultural interest, and opening a dialogue with respect to land requirements.*

***Occupational Health and Safety:*** *At ARAUCO, the safety of our people always comes first. This commitment includes anticipating any and all actions that may be detrimental to the safety of our workers, in order to minimize the risk of accidents. Leadership means putting safety first in all decisions, thus mitigating risks from the start, incorporating lessons learned, simplifying and improving processes, and always giving recognition to people who show outstanding behavior in terms of safety. A Culture of Prevention means that our workers understand that a safe job is a job well done, and that their compliance with safety procedures and key rules is non-negotiable. Based on this solid foundation, ARAUCO is committed to providing its workers with a safe workplace environment, as well as all the tools, equipment and training necessary to perform their activities in a healthy and safe manner.*

***Corporate Commitments with Outside Initiatives:*** *Arauco recognizes the value of working in partnership with other actors, particularly when it comes to complex challenges with multiple points of view. The Company has a permanent relationship with academic institutions, NGO's and trade unions with which it seeks to expand its efforts in various networks and multi-sectoral cooperation, as:*

- *Santiago Climate Exchange*
- *Forest Footprint Disclosure (of the Global Canopy Project)*
- *Center for Business Sustainability (CBS) of Universidad Adolfo Ibañez*
- *UN Global Compact*
- *Prohumana*
- *AccionRSE*
- *Shared Value Initiative*
- *Unidos por la Primera Infancia*

#### **Documentation provided by project participant**

*062\_Anexo\_C Estudio Acustico.pdf*

*DIA\_PLANTA\_TERMICA\_COGENERACION\_VINALES.pdf*

*file\_50\_reporte\_sostenibilidad\_2016.pdf*

<i>file_7299_reporte_sostenibilidad_2015_ingles.pdf</i> <i>file_3135_codigo_etica_espanol.pdf</i> <i>file_5388_13525_i&amp;a_pacto_global_eng.pf</i> <i>OIT forestal.pdf</i> <i>No Net Harm list.xlsx</i>	
<b>DOE assessment</b>	<b>Date:</b> 21/06/2017
By means of documentary review and interviews conducted within site inspection period and the evaluation of the provided documents, DOE concludes that the scope of section 5 is covered. Within this section verification team has evaluated and crosschecked all provided information in order to issue a positive opinion. Please refer to that section for a complete description. As a result, CAR 1 is closed.	

<b>CL ID</b>	CAR 2	<b>Section no.</b>	Section 4.1.1	<b>Date:</b> 03/08/2017
<b>Description of CAR</b>				
As the monitoring period falls into the second commitment period, the GWP of CH <sub>4</sub> used for calculating emission reductions should be updated to 25 as per IPCC's Fourth Assessment Report. Please kindly revise the calculation input figure of GWP <sub>CH<sub>4</sub></sub> as well as the calculation process.				
<b>Project participant response</b>				<b>Date:</b> 03/08/2017
<i>PP corrected GWP<sub>CH<sub>4</sub></sub> value in MR and Emission Reduction spreadsheet according the update presented in IPCC's Fourth Assessment Report.</i> <i>Due to this correction the claimed emissions reduction increase from 481,358 to 506,775 VCU's.</i>				
<b>Documentation provided by project participant</b>				
<i>Viñales monrep CP1MP2 ver3 170803.docx</i> <i>Viñales monit CP1MP2 Ver2 170803.xlsx</i>				

DOE assessment	Date: 05/08/2017
<p>The assessment team verified the updated ER calculation process in the MR report and ER calculation spreadsheet, and found that the GWP of CH<sub>4</sub> has been corrected to 25. The calculation result has been changed from 481,358 to 506,775 VCU's. The assessment team confirmed the revision is correct thereby closed the CAR.</p>	