



**Verified Carbon
Standard**

4 MW BIOMASS BASED COGENERATION PLANT BY GODREJ AGROVET LTD.



Document Prepared By

LGAI Technological Center S.A. (Applus+ Certification)

Project Title	4 MW Biomass based cogeneration plant by Godrej Agrovet Ltd.
Version	02
Report ID	A+ Internal project ID: 15120, VCS project ID: 1744

Report Title	4 MW Biomass based cogeneration plant by Godrej Agrovet Ltd.
Client	Godrej Agrovet Limited
Pages	51
Date of Issue	02/10/2020
Prepared By	LGAI Technological Center, S.A. (Applus+ Certification)
Contact	Campus UAB – Ronda de la Font del Carme, s/n 08193 Bellaterra – Barcelona (Spain)

	Tel: +34 93 567 20 08 Fax: +34 93 567 20 01 www.appluscertification.com agustin.calle@applus.com carla.debat@applus.com
Approved By	LGAI Technological Center S.A. (Applus+ Certification) B.U. Managing Director: Juan Sendín Caballero
Work Carried Out By	Lead Auditor / Technical Expert: Sukanta Das

Summary:

LGAI Technological Center S.A.(Applus+ Certification) (Hereafter referred as Applus+ Certification) has been appointed by “Godrej Agrovet Limited (GAVL) to perform the 1st periodic verification of the project “4 MW Biomass based cogeneration plant by Godrej Agrovet Ltd.” for the period from 01/10/2018 to 30/06/2020. The main purpose of this verification activity is to have an independent third party for the assessment of the project design, monitoring report to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements.

The project activity is a greenfield cogeneration project in palm oil production plant which utilizes in-house generated renewable biomass Palm fibre, shell and empty fruit bunches (EFB) in the cogeneration plant (50 TPH and 4MW) in a 50 TPH palm fruit processing facility. Start date of the project activity is 01/10/2018 which is also commissioning date of project. This is as per the registered VCS PD version 03 dated: 28/07/2018 and Final Validation report version 02 dated: 28/07/2018. The commissioning report for the project activity is checked by the assessment team and found correct.

The scope of the verification is the independent and objective review of the monitoring report (MR). The MR is reviewed against the relevant criteria (see above) 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 for the project activities, version 02.0, review against registered PD and Final Validation report, CDM Project Standard for project activities, version 02.0; CDM Project Cycle Procedure for project activities, version 02.0 and VCS program guideline and standard version 4.0.

Monitoring report covers period from 01/10/2018 to 30/06/2020(both days included). The total emission reductions achieved for the project activity during the monitoring period has been 72,971 tCO_{2e}. The crediting period for VCS began on 01/10/2018 and will end on 30/09/2028. An undertaking from the project participant confirms that project will not claim any other scheme benefits for the concerned monitoring period.

A risk-based approach has been followed to perform this verification activity. In the course of verification, 09 Corrective Action requests (CAR), 00 Clarification Requests (CLs) and 00

Forward Action Requests (FARs) 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 DOE with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

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. (Applus+ Certification) 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.

The verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for site visit or document verifications. The entire documents checked/power plant verification conducted to arrive at positive verification conclusions.

1	Introduction	6
1.1	Objective.....	6
1.2	Scope and Criteria	6
1.3	Level of Assurance.....	7
1.4	Summary Description of the Project	7
2	Verification Process.....	8
2.1	Method and Criteria.....	8
2.2	Document Review	11
2.3	Interviews.....	11
2.4	Site Inspections.....	12
2.5	Resolution of Findings	12
2.5.1	Forward Action Requests.....	13
2.6	Eligibility for Validation Activities	13
3	Validation Findings.....	13
3.1	Participation under Other GHG Programs	13
3.2	Methodology Deviations.....	13
3.3	Project Description Deviations.....	14
3.4	Grouped Project	15
4	Validation Findings.....	15
4.1	Project Implementation Status	15
4.2	Safeguards	18
4.2.1	No Net Harm	18
4.2.2	Local Stakeholder Consultation.....	19
4.3	AFOLU-Specific Safeguards	19
4.4	Accuracy of GHG Emission Reduction and Removal Calculations	19
4.5	Quality of Evidence to Determine GHG Emission Reductions and Removals.....	29
4.6	Non-Permanence Risk Analysis.....	32
	APPENDIX 1: Documents Reviewed or Referenced (Verification)	34
	APPENDIX 2: CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS (CAR/CL/FAR)	36
	APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS.....	47

APPENDIX 4: ABBREVIATIONS	49
APPENDIX 5: CALIBRATION DETAILS OF THE METERS.....	50

1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Applus+ Certification) (Hereafter referred as Applus+ Certification) has been appointed by “Godrej Agrovet Ltd” to perform the 1st periodic verification of the “4 MW Biomass based cogeneration plant by Godrej Agrovet Ltd.” under VCS standard and guideline v4.0. The objective of this verification activity is to have an independent third party for the assessment of the project design, monitoring report and final validation report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against “AMS-I.C, Version 20.0”
- the project's monitoring plan is assessed against “AMS-I.C Version 20.0”
- 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 4.0
- CDM Validation and Verification Standard for the project activities, version 02.0
- CDM Project Standard for the project activities, version 02.0
- CDM Project Cycle Procedure for the project activities, version 02.0
- VCS standard v4.0
- VCS program guideline v4.0

Verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of verified emission reductions (VERs).

1.2 Scope and Criteria

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 AMS-I.C version 20.0 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 4.0,

including the approved baseline and monitoring methodology AMS.I.C version 20.0. The verification was based on the requirements in the CDM Validation and Verification Standard for the project activities version 02.0; CDM project standard for the project activities, version 02.0; CDM project cycle procedure for the project activities, version 02.0 and VCS program guideline and standard version 4.0

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. 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. Its invoices follow the paper trail back to the raw data such as meter reading records and logbook data sheet. There are no material errors, overestimation of ER, omission or misstatement. No sampling is used as the verification team has visited Co-gen power plant site. The verification team has reviewed all the documents like commissioning certificates, Logbook data sheet etc.

1.3 Level of Assurance

The verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for site visit or document verifications. The entire documents checked/Power plant verification conducted to arrive at positive verification conclusions.

1.4 Summary Description of the Project

The purpose of the project activity is to generate power using in-house generated renewable biomass fibre, shell and empty fruit bunches (EFB) in the palm fruit processing facility. The project activity involves 50 TPH boiler and 4 MW turbine generator located at Seethanagaram village, District – West Godavari, Andhra Pradesh, India. The project aims to reduce GHG emission and promoted sustainable development by use of renewable energy for generation of steam and electricity in the cogeneration plant. Assessment team checked the commissioning Certificates and found that project activity was commissioned on 01/10/2018. The project is implemented as per the description in the registered VCS PD. No event observed during the current monitoring period which can alter or deviate from the methodology requirement.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification Process: The project assessment is based on the “Clean Development Mechanism Validation and Verification Standard” for the project activities version 02.0 and “VCS standard and program guideline version 4.0” 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+ Certification 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.

Appointment of the assessment team

According to the sectoral scope / technical area and experience in the sectoral or national

business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of Applus+ Certification.

The composition of audit team shall be approved by the Applus+ Certification ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT).
- Technical Expert (TE).
- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Mr. Sukanta Das	LA/TE	YES	YES	NA	YES
Mr. Denny Xue	TR	YES	YES	NA	NA

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

Document review

The Monitoring report version 01 submitted by the PP 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 below in Appendix 1.

Follow-up interviews

A site visit is conducted by Applus+ Certification. Audit team 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+ Certification positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification 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 submitted by PP 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

The details of the document observed during the verification process are listed below in Appendix 1 of this report

2.3 Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kumar	MSMS	PP Representative	07/09/2020 - 08/09/2020	Implementation of the project and monitoring. Baseline emission calculation, achieved emission reduction for the monitoring period, monitoring process followed onsite	Mr. Sukanta Das
2	Kaki-	Ravikumar	PP Representative	07/09/2020- 08/09/2020	Baseline emission calculation, achieved emission reduction for the monitoring period, monitoring process followed onsite	
3	Sah	Jimmy	Carbon Consultant- Infinite Solutions	07/09/2020- 08/09/2020	Monitoring Report, Emissions Reductions	
4	Prakash	Shiva	Local villager	08/09/2020	Local Stakeholder	
5	Ranjit	Sai	Local villager	08/09/2020	Local Stakeholder	
6	-	Ajmeer	Local villager	08/09/2020	Local Stakeholder	
7	-	Sarath	Local villager	08/09/2020	Local Stakeholder	
8	-	Sateesh	Local villager	08/09/2020	Local Stakeholder	

2.4 Site Inspections

Duration of on-site inspection: 07/09/2020 -08/09/2020				
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 VCS PD is actually practised onsite. Also assessment team checked any change in host country criteria which may affect the baseline of the project activity. Assessment team also had a discussion with Technical staff, monitoring team and checked grievance register placed onsite as per the continuous improvement measure of PP for the Local villagers.</p>	<p>The project is located in below address: Village: Chintampalli, West Godavari district, Andhra Pradesh, India</p>	07/09/2020-08-09-2020	Sukanta Das

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+ Certification's positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification 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 submitted by PP 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.

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	01	00
Description of project activity	00	03	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	02	00
Calibration details	00	01	
Monitoring plan	00	00	00
No Net harm assessment	00	01	00
Local stakeholder consultation	00	01	00
Others (please specify)	00	00	00
Total	00	09	00

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

2.5.1 Forward Action Requests

This is 1st periodic verification of the project activity and no FAR was raised from validation.

2.6 Eligibility for Validation Activities

This section is not applicable for present verification.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project activity has not participated in any other GHG programs.

3.2 Methodology Deviations

There is no methodology deviation in present verification.

3.3 Project Description Deviations

PP has applied following project description deviations during this monitoring period of the project activity:

1. In Monitoring Parameter: $EG_{PJ,thermal,y}$ - Net quantity of thermal energy supplied by project, the “accuracy class” of the monitoring equipment has been corrected in line with the calibration certificate of respective equipment. The accuracy class of Steam flow meter/Transmitter was mentioned as $\pm 0.5\%$ in the VCS PD, which is corrected to $\pm 0.1\%$ of range. Further, the accuracy class of Pressure gauges/ Transmitter was stated as $\pm 1\%$ in the VCS PD, which is corrected as per the equipment calibration certificate i.e. $\pm 0.1\%$ of range. As the instruments are of better accuracies hence acceptable.

2. Monitoring Parameter: $B_{biomass,y}$ - Quantity of biomass residues of type k consumed in the boiler in year y (tones on dry-basis). The accuracy class of (weigh bridge) was mentioned in VCS PD was $\pm 1\%$ the same is corrected to $\pm 0.01\%$ (i.e. 5 kg) in line with the installed equipment details and calibration certificate.

3. Monitoring Parameter: Pressure - Pressure of flowing exhaust steam at the outlet of steam turbine. The accuracy class of monitoring instrument “Pressure gauges/ Transmitter” accuracy class mentioned in VCS PD was $\pm 1\%$ the same is corrected to ± 0.1 of range as per the equipment calibration certificate.

As the instruments are of better accuracies hence assessment team accepted the changes.

4. Monitoring Parameter: M (Moisture content of the biomass residues) - Moisture content of each biomass residues type k. PP has changed the “Frequency of monitoring/recording” of the parameter to once in the first year of crediting period. This parameter is not used directly for the emission reduction calculation. Emission reduction are calculated based on the para 38 of the applied methodology AMS-I.C, version 20 which is directly requires, “Net quantity of thermal energy supplied by the project activity during the year y (TJ)” & Amount of electricity supplied by the project activity during the year y; (GWh). These two parameters are calculated based on the direct measurement of steam pressure, temperature & flow and the net electricity supplied.

As per the applied methodology, “The parameter “Moisture content of the biomass residues” applies in the case where emission reductions are calculated based on biomass energy input. For all cases, ex ante estimates should be provided in the PDD and used during the crediting period.” Thus, assessment team accepted the changes.”

4. Monitoring Parameter: T - Temperature of steam generated

PP has made correction of typographical error under “Description” as “Temperature of steam extracted”.

The above deviations do not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology,

3.4 Grouped Project

This is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

During the verification site visit it was concluded that the project is implemented as per the requirement of the registered VCD PD. During the current monitoring period, it was observed that no unforeseen incident/event evolved which can impact the operation of the project activity. The project undergone continuous operation and only scheduled maintenance is observed as per the manufactures specification which is acceptable to the assessment team.

Project location is confirmed by the assessment team during the site visit. Assessment team also checked with the GPS meter regarding the latitude and longitude of the project site and confirm that the details as mentioned in the registered PD are correct. The detail is as below:

District	State	Latitude	Longitude
West Godavari	Andhra Pradesh	17° 10' 38" N	81° 41' 35" E

Assessment team also checked the technical details of the biomass-based cogeneration plant installed onsite. The technical specifications are given below:

Specification of Boiler

Sr. No.	Specification	Value	Unit
1	Type – Pulsating grate bi-drum air cooled boiler	-	-

2	Design steam generation capacity at MCR	50	tph
3	Steam pressure at MCR	34.65	Kg/cm ² (g)
4	Steam temperature	380±5	°C
5	Make and Model -	Thermax / Powermax - 500/1	-
6	Fuel requirement: Fuel 1: 55% Shredded Empty bunch Fiber Fuel 2: 30% palm fibre Fuel 3: 15% palm shell	9.35 Shredded EFB, 5.1 Palm Fiber, 2.55 Palm Shell	tph
7	Efficiency of boiler	66.8±5	%
8	Feed water temperature to economiser	126	°C

Specification of Generator

Sr. No.	Specification	Value	Unit
1	Type – multistage, impulse, nozzle governed back pressure	-	-
2	Design capacity	4	MW
3	Inlet steam pressure	33.38	kg/cm ²
4	Inlet steam temperature	370	°C
5	Specific steam consumption	11125	kg/kWh
6	Make and Model – Triveni Turbine Limited	Triveni Turbine Limited / TST-2030	-
7	Outlet steam pressure at TG	3.5	kg/cm ²
8	Electrical output at AC generator terminal (3 phase, 4 wire system, 0.8 PF)	2500 kW (415 V, 50 Hz)	-

The electricity generated by project activity is being used to meet the captive consumption. Imports of electricity from grid is only for start-ups of plant which is measured with the help of separate meter tri-vector meter. Thus, there was no feeder as electricity is not being exported to grid.

Assessment team checked the commissioning certificate and confirmed that Project Activity was commissioned on 01/10/2018 is correct.

The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period. The project design as mentioned in the registered PD is implemented and thus the same is acceptable to the assessment team. All required monitoring equipment's and procedures as mentioned in the registered VCS PD are available and implemented in an appropriate manner.

The organisational role and responsibility as mentioned in the registered VCD PD is followed onsite. All the monitoring equipment was calibrated as per the specified interval in the registered VCS PD. All the emergency preparedness as mentioned in the registered PD is followed onsite and no discrepancies were found regarding the same.

The assessment team observed that the project is in line with the registered VCS PD, FVR and approved methodology and thus no clarification/deviation is sought. CAR 09 and CL00 were raised during the verification process and closed successfully. Please refer Appendix 2 for the detail closure of the CAR.

Assessment team confirms following during the verification site visit:

1. Start date of the project is 01/10/2018 which is the date of commissioning of the Project.
2. Assessment team confirms that project has not received or sought any other form of environmental credit". An undertaking letter dated 19/09/2020 has been submitted by PP for double counting with any other GHG program. PP also has given a written declaration that project has not claimed other form of GHG credit for the concerned monitoring. Further, assessment team confirms that project activity provided contribution in sustainable development to the host country
3. Assessment team confirms that this is the 1st monitoring under VCS and covers the activity from 01/10/2018 to 30/06/2020 (inclusive of both dates). Thus, VCS crediting period should be maximum of 10 years and renewed twice till end date of CDM crediting period. 01/10/2018 is the start date and 30/09/2028 will be the end date of the crediting period.

The GHG credits from 01/10/2018 to 30/06/2020 to will be claimed under VCS only. At any point of time during the crediting period, the project proponent will abide by the "Double Counting".

4. Assessment team checked and found that the Project proponent of the project activity is same as per the registered PD. There is no change in details of the PP and the same is mentioned below:

Organization name	Godrej Agrovet Limited
Contact person	Mr. MSMS Kumar
Title	Associate Vice President (Production & Projects)

Address	Ch. Potheepalli, Dwaraka Tirumala Mandal, Andhra Pradesh
Telephone	+91 8829211128
Email	msms.kumar@godrejagrovet.com

5. Assessment team also checked the details of other entity and found that the detail as mentioned in the MR is correct.

Organization name	Infinite Solutions
Role in the project	Carbon Consultant
Contact person	Mr. Jimmy Sah
Title	Head Sustainability
Address	611, Chetak Centre Main, RNT Marg, Indore - 452001, India
Telephone	+91-9644130430
Email	jimmy@infisolutions.org

6. The quantified emission reduction calculation for the monitoring period is correct and conservative. Assessment team also compared actual VER with the estimated VER and found that the actual VER (72,9714 tCO_{2e}) is 57.32% lower than the estimated emission reduction 170,991 tCO_{2e} (97,671 tCO_{2e} *639 days/365 days=170,991 tCO_{2e}) for 639 days which is due to low PLF attained by the co-generation plant due to less requirement of process steam. Also, the operation of plant was shut down for maintenance in March 2020 and April 2020.

4.2 Safeguards

4.2.1 No Net Harm

No potential environment or socio-economic matter was found during the site visit. The project is renewable energy project and thus no negative impact observed onsite.

The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation.

The report on “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013. This report

clearly mentioned that biomass power project activity operations do not result in direct air pollution, noise pollution. Please refer below web link for the same.¹

Thus, there are no any significant impacts due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

4.2.2 Local Stakeholder Consultation

The local stake holder consultation was done during the registration of the project activity. There was no change in technical project description form the registered VCS PD. Assessment team confirmed the same during the verification site visit. Also, as best practice method PP also placed a grievance register onsite to record any grievance from the stakeholders as a part of continuous feedback from stakeholders. Assessment team checked the grievance register maintained onsite and no comments were observed for the project activity. Local people are happy as the project generated employment opportunities and thus the living standards in and around the vicinity of the project is increased and thus assessment team confirms that local stakeholders have no issue with this project activity after implementation and continuous operation.

4.3 AFOLU-Specific Safeguards

This section is not applicable as this project activity is a non-AFOLU project activity.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the VCS PD. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the VCS PD.
Findings	CAR 07 and CAR 08 were raised during the verification process and closed successfully. Please refer Appendix 2 of this report for the detail closure of the CAR.
Conclusion	The baseline Emissions for a given year is calculated in accordance with the para 38 of the applied methodology i.e. "For electricity and thermal energy (steam/heat) produced in a baseline cogeneration unit, using fossil fuel (case 28(d)). Formula used: Baseline emission:

¹ <http://164.100.94.214/sites/default/files/uploads/report-on-developmental-impacts-of-RE.pdf>

	$BE_{cogen/trigen,CO_2,y} = \left[\left(\frac{EG_{PJ,thermal,y} + EG_{PJ,electrical,y} \times 3.6}{\eta_{BL,cogen/trigen}} \right) \right] \times EF_{FF,CO_2}$ <p>Where:</p> <p>BE_{cogen/trigen,CO₂,y} - Baseline emissions from electricity and thermal energy displaced by the project activity during the year y (tCO₂)</p> <p>EG_{PJ,thermal,y} - Net quantity of thermal energy supplied by project</p> <p>EG_{PJ,electrical,y} - Net electricity supplied by the project activity</p> <p>3.6-Conversion factor (TJ/GWh)</p> <p>η_{BL,cogen/trigen} - total annual average efficiency of the cogeneration plant using fossil fuel.</p> <p>EF_{FF,CO₂} -CO₂ emission factor of the fossil fuel that would have been used in the baseline cogeneration plant obtained from reliable local or national data if available, alternatively , IPCC default emission factors can be used (t CO₂/TJ)</p> <p>Ex-ante Parameter:</p> <ol style="list-style-type: none"> 1. The total annual average efficiency(η_{BL,cogen/trigen}) of the cogeneration plant using fossil fuel i.e. 85% (default value as per SSC methodology guidance) is taken ex-ante in line with the registered VCS PD. Default efficiency of new coal fired boiler as per Appendix of the applied methodology and taking steam turbine efficiency of 100% as per Para 40(b). 2. EF_{grid,OM,y}: The parameter is fixed ex-ante and the value 0.9843 tCO₂/MWh is used as emission factor which is as per the registered VCS PD and CEA “CO₂ Baseline database for the Indian Power Sector, Version 12, May 2017”. 3. EF_{grid,BM,y}: The parameter is fixed ex-ante and the value 0.9083 tCO₂/MWh is used as emission factor which is as per the registered VCS PD and CEA “CO₂ Baseline database for the Indian Power Sector, Version 12, May 2017”. 4. EF_{grid,CM,y} : The parameter is fixed ex-ante and the value 0.9462 tCO₂/MWh is used as emission factor which is as per the registered VCS PD and CEA “CO₂ Baseline database for the Indian Power Sector, Version 12, May 2017”. <p>Ex-post parameter:</p> <p>As per the registered VCS PD and requirement of the applied methodology following parameters have been monitored by PP:</p> <p>CO₂ emission factor of fossil fuels: Coal and diesel (EF_{CO₂,i,y}) – As per VCD PD, the monitoring frequency of EF_{CO₂,i,y} is once in a monitoring period and will be taken from the latest “CO₂ baseline database for the</p>
--	--

	<p>India Power Sector, published by Central Electricity Authority (CEA) . PP has considered 95.80 tCO₂ /TJ and 72.6 tCO₂/TJ emission factor of coal and diesel respectively which is sourced from the latest CO₂ baseline database for the Indian power sector, Version 15² published by Central Electricity Authority, Govt. India. The verification team has checked the CO₂ Baseline database, Version 15 and found correct. Coal is not used in this monitoring period; hence emission factor of coal is not used in ER calculation. The verification team confirms the same through verifying the plant log book. Further, the fuel emission factor data for coal and diesel in “CO₂ baseline database” is sourced from the IPCC 2006, hence considered authentic source.</p> <p>Net quantity of thermal energy supplied by project (EG_{PJ,thermal,y})- As per VCS PD, parameter EG_{PJ,thermal,y} for project activity boiler is calculated from net steam output and its net enthalpy. Source for net steam output is steam production data log and corresponding enthalpy (at operating temperature) is inferred from steam table with respect to operating pressure and temperature.</p> <p>The monthly average value of steam flow meter and pressure gauge is used for calculation of enthalpy of the steam supplied using steam table in tonnes/TJ. This value will be multiplied with the monthly average of steam generated by project activity boiler Q_{steam}, to calculate enthalpy of steam supplied in a month. The enthalpy of feed water calculated using the measured values of flow meter (1 number) and its temperature (using meter:1 number) will be subtracted to get EG_{PJ,thermal,y}. The sum of EG_{PJ,thermal} of all the months will provide a yearly value.</p> <p>Net quantity of thermal energy supplied by project is calculated as:</p> <p>EG_{PJ,thermal,y} =steam generated in a year (ton) X average enthalpy of steam (kJ/kg/10⁶)-Enthalpy of feed water).</p> <p>The frequency of monitoring is continuous measurement for steam flow and pressure and monthly calculation. This is in line with the registered VCD PD. The value of “net quantity of thermal energy supplied by the project” (EG_{PJ,thermal,y}) during the monitoring period is calculated 599.22 TJ. The details of monitoring equipment and accuracy of is given below:</p> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td>Boiler main steam flow transmitter- 1 (TAG.NO:11-FT-211A)</td> </tr> </table>	Boiler main steam flow transmitter- 1 (TAG.NO:11-FT-211A)
Boiler main steam flow transmitter- 1 (TAG.NO:11-FT-211A)		

² http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf

	Serial Number	Y1TA17589								
	Accuracy	±0.1% of range								
	Calibration frequency	Once in 3 years								
	Boiler main steam flow transmitter - 2 (TAG.NO:11-FT-211B)									
	Serial Number	Y1TA17590								
	Accuracy	±0.1% of range								
	Calibration Frequency	Once in 3 years								
	<p>As per registered VCS PD, accuracy of steam flow meter is ±0.5, however, the actual accuracy of the steam flow meter is ± 0.1 which is better than ±0.5. PP has also applied permanent deviation in accuracy of steam flow meter. The accuracy of steam flow/transmitter is verified through the calibration certificate, thus acceptable. The verification team has checked the log sheet and confirms that the value as correctly applied for emission reduction calculation.</p> <p>Net electricity supplied by the project activity (EG_{PJ,electrical,y})-The net electricity supplied by the project activity during the monitoring period is 15,569.298 MWh. It is calculated as follows: The total generation of from the project activity - auxiliary consumption-import from the grid. The import of electricity from grid is considered for project emission. The details of meters are given below and calibration compliance are provided in Appendix 5.</p>									
	<table border="1"> <thead> <tr> <th>Equipment Name</th> <th>Gross Gen Meter</th> </tr> </thead> <tbody> <tr> <td>Serial Number</td> <td>X0465806</td> </tr> <tr> <td>Accuracy</td> <td>0.2s</td> </tr> <tr> <td>Calibration frequency</td> <td>Once in 5 years</td> </tr> </tbody> </table>		Equipment Name	Gross Gen Meter	Serial Number	X0465806	Accuracy	0.2s	Calibration frequency	Once in 5 years
	Equipment Name	Gross Gen Meter								
	Serial Number	X0465806								
	Accuracy	0.2s								
Calibration frequency	Once in 5 years									
<table border="1"> <thead> <tr> <th>Equipment Name</th> <th>Cogen Auxiliary Meter</th> </tr> </thead> <tbody> <tr> <td>Serial number</td> <td>1712057761</td> </tr> <tr> <td>Accuracy</td> <td>0.2s</td> </tr> <tr> <td>Calibration Frequency</td> <td>Once in 5 years</td> </tr> </tbody> </table>		Equipment Name	Cogen Auxiliary Meter	Serial number	1712057761	Accuracy	0.2s	Calibration Frequency	Once in 5 years	
Equipment Name	Cogen Auxiliary Meter									
Serial number	1712057761									
Accuracy	0.2s									
Calibration Frequency	Once in 5 years									
<p>Quantity of biomass residue type k consumed in the boiler in year y (B_{biomass,y}): The inhouse generated renewable biomass i.e. Palm Fibre, Nut Shell and Shredded fibre within the palm fruit processing facility as a fuels have been used. The total quantity of biomass consumed 99,836.91 tons in the boiler during the current monitoring period. Verification team checked the biomass logbook and confirms that all three parameters i.e. Palm Fibre, Palm Shell and Shredded Fibre consumed in boiler are monitored in accordance with the monitoring plan mentioned in the registered VCS PD. The same is crosschecked with the energy mass</p>										

balance as only Palm Fibre, Palm Shell, Shredded Fibre are used in the boiler. These parameters are measured using weigh bridge. The details of monitoring equipment are given below:

Monitoring equipment	Weigh Bridge
Make	Metler
Serial Number	2717131579
Calibration frequency	Annually
Accuracy class	±0.01% (i.e. 5 kg)

Delay in Weigh bridge calibration has been identified in October 2019 for 20 day. Therefore, maximum permissible error (0.1%) due to delay in calibration has been applied for the whole month of October 2019 and November 2019 (as a conservative approach) on the quantity of biomass consumed by the boiler. The calibration details are provided in Appendix-5.

Net Calorific Value of biomass type k ($NCV_{k,biomass}$)- NCV of Palm Fibre is to be measured once in the first year of the crediting period (3 samples in each quarter) by third party laboratory/inhouse as per national/international standard. The tested GCV values of biomass by third-party Lab for Palm oil fibre, Shell and Shredded fibre are 3450 kCal/kg, 4320 kCal/kg and 2540 kCal/kg, respectively. Using this value, PP has obtained NCV value for Palm oil fibre, Shell and Shredded fibre 2085 kCal/kg, 3346 kCal/kg and 891 kCal/kg respectively using web site <https://www.eecabusiness.govt.nz/tools/wood-energy-calculators/biomass-calorific-value-calculator/> and <https://www.unitjuggler.com/convert-energy-from-MJ-to-kcal.html?val=14.03> .

The average NCV of biomass fuel mix (43% SEFB+43% fibre+14% Shell) i.e. 2107 kCal/kg has been used. The details calculation of NCV values are as follows

Unit	Palm fibre kCal/kg	Shell kCal/kg	Shredded fibre kCal/kg	Average (Kcal/kg)
GCV of Biomass Dry Basis	3450	4320	2540	3436
1kCal=4.1868kJ				
GCV (MJ/kg)	14.44	18.09	10.63	
Water Content	30.00%	15.00%	50.00%	
Hydrogen	4.20%	5.20%	3.30%	
NCV (MJ/kg)	8.73	14.01	3.73	
NCV (kCal/kg)	2085	3346	891	2107

The GCV values is tested by third part accredited laboratory i.e. Sinivasa Scientific Labs hence acceptable.

Extracted Steam Enthalpy(kJ/kg)- Enthalpy of steam from turbine is calculated from steam tables based on the corresponding values of quantity of steam and pressure. The monthly average net enthalpy is calculated as enthalpy of steam at end of TG – enthalpy of feed water (529.37 KJ/kg). The Enthalpy of feed water is sourced from the VCD PD (page 13). It is assumed that feed water temperature is 126 deg C which directly gives the value of enthalpy of feed water. The Steam Enthalpy is calculated as 1997 kJ/kg. Pressure of steam is measured by pressure gauge and temperature by temperature transducer. The same was observed by verification team at the onsite. The details of monitoring equipment's are given below:

Turbine Extraction Steam Temperature Transmitter (TAG.NO:TT-141)		
Make	YOKOGAWA	
Serial No	C2T502618	
Accuracy Class	+/- 0.1 of Range	
Calibration frequency	Once in 3 years	
Date of Calibration	01/1-/2018	27/02/2020
Due Date	30/09/2021	26/02/2023

PP has used <https://www.tlv.com/global/TL/calculator/steam-table-temperature.html> website for determining enthalpy with reference to pressure and temperature which is authentic.

Pressure – It is measured continuously and recorded every month. The average value of pressure of flowing exhaust steam at the outlet of steam turbine is 2.66kg/cm² is used for emission reductions. It is recorded in boiler log sheet. It is measured by pressure gauge. Assessment team has reviewed the boiler log sheet and confirms that value is correctly applied. The plant was shut down in March 2020 and April 2020 for schedule maintenance. The verification team has accepted as it resulted in conservative baseline emissions. The details of monitoring equipment are as follow:

Turbine Extraction Steam Pressure Transmitter/Pressure gauge (TAG.NO:TI-140)	
Make	YOKOGAWA
Serial No	Y1TA16783
Calibration frequency	Once in a year
Accuracy Class	+/- 0.1 of Range

Delayed calibration Exhaust Steam Pressure has been found in Oct 19 (Delay period Oct-19 to Feb 20). Hence, maximum permissible error factor has been applied for the whole month of Oct 19 to Feb 20, to the exhaust

pressure meter reading.

Further, PP has applied deviation in accuracy and calibration frequency of pressure transmitter. The accuracy class of pressure gauge/transmitter mentioned in VCS PD is $\pm 1\%$ which is not correct. PP has corrected the same to $\pm 0.1\%$ in line with the accuracy mentioned in calibration certificate. Also, accuracy $\pm 0.1\%$ is better than $\pm 1\%$. Thus acceptable.

Monitoring equipment's are calibrated by accredited Lab. Verification team reviewed the calibration certificates and confirms that calibration has been done as per calibration frequency. The calibration detail of monitoring equipment's is provided in Appendix 5.

Quantity of fossil fuel combusted in the project in year y ($FC_{i,j,y}$). Only Diesel was used during the monitoring period. Assessment team has reviewed the electrical log sheet and diesel purchase and consumption stock during the site visit and confirmed that only diesel has been used. The quantity of diesel available in the storage tank is recorded as initial and final reading on the basis of level gauge. Diesel consumption is measured using a level gauge attached to the storage tank. As level gauge is based on a fixed scale, it does not lose measurement accuracy overtime and hence not required calibration. The reading of scale is converted into the litre with the help of standard tank dip chart which is fixed since installation of tank and does not required calibration. Diesel is consumed in DG set only in emergencies. The actual consumption of diesel during the monitoring period was 73,129 litres. The assessment team has confirmed the same by through DG set operation log book. The metered fuel (diesel) consumption has been cross checked through annual energy balance i.e. based on purchased quantity (Purchase invoices) and stock changes. PP has considered this as project emissions and deducted from the baseline emissions.

M (Moisture content of the biomass residue): The biomass residue moisture content has been monitored and registered by taking periodic sample from each biomass type flow to the boiler. This parameter is measured once in the first year of crediting period (3 samples on each quarter by third party laboratory. The weighted average of moisture content for this monitoring period is calculated. The same is provided below:

Palm Fiber (MT)	Shell (MT)	Shredded fiber (MT)
30.00%	15.00%	50.00%

Verification team has checked the third-party test report and confirms that

	<p>moisture content values are correct,</p> <p>PP has requested deviation in monitoring frequency of the moisture content of the biomass residue to once in in the first crediting period as this parameter is not used directly for the emission reduction calculation. The emission reduction is calculated in accordance with the para 38 of applied methodology AMS-I.C, version 20. “Net quantity of thermal energy supplied by the project activity during the year y (TJ)” & amount of electricity supplied by the project activity during the year y; (GWh). These two parameters are calculated based on the direct measurement of steam pressure, temperature & flow and the net electricity supplied, As per applied methodology the parameter “Moisture content of the biomass residues” applies in the case where emission reductions are calculated based on biomass energy input. For all cases, ex ante estimates should be provided in the PDD and used during the crediting period. The deviations don’t impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology, thus, acceptable.</p> <p>Temperature of Steam extracted (T): Temperature of steam extracted has been measured using temperature gauge meter on hourly basis and recorded monthly. It is recorded in boiler log sheet. The monthly average values have been used to calculate the enthalpy. The average temperature of flowing exhaust steam at the outlet of steam turbine is estimated as 174.29°C the same is used for emission reductions. The details of equipment used for monitoring of temperature is as follows:</p> <table border="1" data-bbox="550 1332 1401 1624"> <thead> <tr> <th colspan="2" style="text-align: center;">Turbine Extraction Steam Temperature Transmitter (TAG.NO:TT-141)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Make</td> <td style="text-align: center;">YOKOGAWA</td> </tr> <tr> <td style="text-align: center;">Serial No</td> <td style="text-align: center;">C2T502618</td> </tr> <tr> <td style="text-align: center;">Calibration frequency</td> <td style="text-align: center;">Once in 3 years</td> </tr> <tr> <td style="text-align: center;">Accuracy Class</td> <td style="text-align: center;">+/- 0.1 of Range</td> </tr> </tbody> </table> <p>Assessment team has reviewed the boiler log sheet and confirms that value is correctly applied. The plant was shut down in March 2020 and April 2020 for schedule maintenance.</p> <p>PP has applied deviation in monitoring parameter “Temperature of steam generated” under ‘Description” which is a typo error. The same is corrected to “Temperature of steam extracted”. The deviations don’t impact the applicability of the methodology, additionality or the</p>	Turbine Extraction Steam Temperature Transmitter (TAG.NO:TT-141)		Make	YOKOGAWA	Serial No	C2T502618	Calibration frequency	Once in 3 years	Accuracy Class	+/- 0.1 of Range
Turbine Extraction Steam Temperature Transmitter (TAG.NO:TT-141)											
Make	YOKOGAWA										
Serial No	C2T502618										
Calibration frequency	Once in 3 years										
Accuracy Class	+/- 0.1 of Range										

appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology, thus acceptable,

Net Calorific Value of fossil fuels (NCV_{fossil fuels})- The NCV of fossil fuel type if used, measured once in the year by third party laboratory/ in-house as per national/ international standard. Monitoring frequency is once in first crediting period. Since no coal is used, this parameter is not monitored.

Electricity taken from grid for the cogeneration plant startup /emergency operation (EC_{PJ,y}): The electricity taken from the grid during the current monitoring period is 733.03 MWh. It is continuously monitored and monthly recorded. It is monitored by a tri vector electricity meter installed in the control room of the plant. The meter details are provided below:

Equipment Name	Import Meter
Serial Number	17230314
Make	L & T
Calibration frequency	Once in 5 year
Accuracy Class	0.2s

The calibration of the meter is done as per calibration frequency i.e. once in 5 years. The verification team has verified the same with the plant electricity log sheet and found correct. The details of calibration of meters are provided in Appendix 5.

Baseline Emissions Calculation

Baseline is calculated using the equation

$$BE_{cogen/trigen,CO_2,y} = \left[\frac{(EG_{PJ,thermal,y} + EG_{PJ,electrical,y} \times 3.6)}{\eta_{BL,cogen/trigen}} \right] \times EF_{FF,CO_2}$$

Where:

BE_{cogen/trigen,CO₂,y} = Baseline emissions from electricity and thermal energy displaced by the project activity during the year y (t CO₂)

EG_{PJ,electrical,y} = Amount of electricity supplied by the project activity during the year y; (GWh)

3.6 = Conversion factor (TJ/GWh)

EG_{PJ,thermal,y} = Net quantity of thermal energy supplied by the project

	<p>activity during the year y (TJ)</p> <p>EF_{FF,CO_2} = CO₂ emission factor of the fossil fuel that would have been used in the baseline cogeneration plant obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used (t CO₂/TJ)</p> <p>$\eta_{BL,cogen/trigen}$ = Total annual average efficiency of the cogeneration or trigeneration plant using fossil fuel determined as per paragraph 39 or 40</p> <p>$\eta_{BL,Cogen/trigen,y}$ = 85% (using default efficiency of new coal fired boiler as per 'Tool to determine the baseline efficiency of thermal or electric energy generation systems', Ver. 01, EB 48, Annex 12)</p> <p>EF_{FF,CO_2} = $EF_{CO_2,i,y}$ = 95.80 tCO₂/TJ for coal and 72.60 tCO₂/TJ for diesel (as per Central Electricity Authority (CEA) CO₂ Baseline Database for the Indian Power Sector; Ver.15)</p> <p>During this monitoring period,</p> <p>$EG_{PJ,thermal,y}$ = 599.22 TJ</p> <p>$EG_{PJ,electrical,y}$ = 15.569 GWh</p> <p>Thus,</p> <p>$BE_{cogen,CO_2,y}$ = 73,851 tCO₂ (Round down)</p> <p>Project Emission:</p> <p>As per registered VCS PD, there are two sources for project emissions:</p> <ol style="list-style-type: none"> 1. Coal consumption in boiler 2. Diesel consumption in DG <p>Verification team found through review of log sheet that there was no coal consumption during current monitoring period, thus project emission from coal consumption is not considered.</p> <p>Project emission due to diesel consumption is calculated as:</p> <p>$PE_{diesel,y}$ = Quantity of diesel consumed (Lit) X Density of diesel X NCV of diesel X EF of diesel</p> <p>= 73,129 (L) X 0.83 (kg/L) X 9975 (kJ/kg) X 72.6 (tCO₂/TJ) / 10⁹</p> <p>= 45 tCO_{2e} (Rounded Up Value)</p> <p>Emission due to import of electricity is calculated as:</p> <p>$PE_{grid,import,y}$ = $EC_{PJ,i,y}$ = Total Electricity Import (MWh) X (1+TDL) X GEF (tCO₂/MWh)</p>
--	--

	<p> $= 733.03 \times (1+20.33\%) \times 0.9462$ $= 835 \text{ tCO}_2\text{e}$ </p> <p> As per VCS PD, the transmission & distribution losses (TDL) are to be calculated using the recent, accurate and reliable data available within the host country. The value of transmission and distribution losses for the year 2018-19 is sourced from the Executive Summary on Power Sector-June 2020 published by Central Electricity Authority³ and for the year 2019-20 is sourced from the Electricity (Amendment bill)- 2020⁴. The average value of 2 years (2018-19 and 2019-20) i.e.20.33% is considered for calculation of project emission due to import of electricity. Thus, TDL value chosen is conservative and hence DOE has accepted the same. </p> <p> Total Project Emission: $PE_y = PE_{\text{fossil fuel},y} + PE_{\text{diesel},y} + PE_{\text{grid,import},y}$ $= 0 + 45 + 835$ $= 880 \text{ tCO}_2\text{e}$ (Roundup value) </p> <p> Total project emission by the project activity is 879 tCO₂e. </p> <p> Further, biomass used in the project boiler is sourced from the in-house process plant. Hence, leakage is considered zero as per applied methodology AMS-I.C Version 20 (para 77). </p> <p> Therefore; $ER_y = 73,851 - 880 \text{ tCO}_2\text{e}$ $= 72,971 \text{ tCO}_2\text{e}$. </p> <p> Total emission reductions by the project activity during the monitoring period are 72,971 tCO₂e. </p> <p> VVB confirms that GHG emission reductions and removals have been quantified correctly in accordance with the project description and applied methodology.” </p>
--	---

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the Calibration details of the monitoring meters with the calibration certificates.
Findings	CAR 09 was raised during the verification process. The description of the CAR and its closure is described below in Appendix 2 of this report

³ http://www.cea.nic.in/reports/monthly/executivesummary/2020/exe_summary-06.pdf

⁴ <https://www.manifestias.com/2020/05/15/electricity-amendment-bill-2020/#:~:text=India's%20T%26D%20losses%20are%20almost,each%20of%20the%20large%20states.>

Conclusion	The metering facilities are installed within the plant premises. The Calibration frequency for some of the metering equipment is not followed for the current monitoring period. Meters were pre-calibrated installed at the time of commissioning of the plant. The calibration details of meters are as follows:		
	Boiler Main Steam Flow Transmitter- 1 (TAG.NO:11-FT-211A)		
	Equipment Name	Steam Flow Transmitter	
	Make	YOKOGAWA	
	Serial No	Y1TA17589	
	Accuracy Class	+/- 0.1 of Range	
	Calibration Frequency	Once in 3 years	
	Date of Calibration	01/10/2018	25/02/2020
	Due Date	30/09/2021	24/02/2023
	Boiler Main Steam Flow Transmitter -2 (TAG.NO:11-FT-211B)		
	Equipment Name	Steam Flow Transmitter	
	Make	YOKOGAWA	
	Serial No	Y1TA17590	
	Accuracy Class	+/- 0.1 of Range	
	Calibration frequency	Once in 3 years	
Date of Calibration	01/10/2018	25/02/2020	
Due Date	30/09/2021	24/02/2023	
(Generation) kWh Meter			
Equipment Name	Tri vector Meter MWh		
S.No	X0465806		
Make	SECURE		
Accuracy Class	0.2s		
Calibration frequency	Once in 5 year		
Date of Calibration/Date of Installation	01/10/2018	29/002/2020	
Due Date	30/09/2023	28/02/2025	
Turbine Extraction Steam Temperature Transmitter (TAG.NO:TT-141)			
Make	YOKOGAWA		
Serial No	C2T502618		
Accuracy Class	+/- 0.1 of Range		
Calibration frequency	Once in 3 years		
Date of Calibration	01/10/2018	27/02/2020	
Due Date	30/09/2021	26/02/2023	
Turbine Extraction Steam Pressure Transmitter (TAG.NO: PT-140)			

Equipment Name	Flow Transmitter	
Make	YOKOGAWA	
Serial No	Y1TA16783	
Accuracy Class	+/- 0.1 of Range	
Calibration Frequency	Once in a year	
Date of Calibration	01/10/2018	27/02/2020
Due Date	30/09/2021	26/02/2023

Calibration delayed in Exhaust Steam Pressure has been found in October 2019 (Delay period October 2019 to February 2020). Hence, maximum permissible error factor has been applied for the whole month of October 2019 to February 2020, to the exhaust pressure meter reading.

Auxiliary Meter Details		
Equipment Name	Cogen Auxiliary Meter	
Serial Number	1712057761	
Make	Rishabh	
Accuracy Class	0.2s	
Calibration Frequency	Once in 5 years	
Date of Calibration	01/10/2018	29/02/2020
Due Date	30/09/2023	28/02/2025

Import meter Details	
Equipment Name	Import Meter
S.No	17230314
Make	L & T
Accuracy Class	0.2s
Calibration frequency	Once in 5 years
Date of Calibration	25/11/2017
Due Date	24/11/2022

Monitoring equipment	Weigh Bridge
Make	Metler
Serial Number	2717131579
Calibration frequency	Annually
Accuracy class	5 kg ($\pm 0.01\%$) (5 kg*100/50,000 kg =0.01%)

Delay in Weigh bridge calibration has been identified in October 2019 for 20 day. Therefore, maximum permissible error (0.01%) due to delay in calibration has been applied for the whole month of October 2019 and November 2019 (as a conservative approach) on the quantity of biomass consumed by the boiler. The calibration details are provided in Appendix-

	5. Assessment team has checked the calibration certificates of all meters and confirms that meters are calibrated by NABL accredited laboratories. The calibration details of monitoring equipment are provided in Appendix 5 of this report. Verification team confirms the sufficiency of quantity, and appropriateness of quality, of the evidences used to determine the GHG reductions and removals.”
--	--

4.6 Non-Permanence Risk Analysis

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
NA	NA	NA	NA	NA

5 VERIFICATION CONCLUSION

Applus+ Certification has been engaged by Godrej Agrovet Limited to perform the 1st periodical verification of the “4 MW Biomass based cogeneration plant by Godrej Agrovet Ltd”.

The management of Godrej Agrovet Limited is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project’s Monitoring Plan in the registered VCS PD and the applied methodology AMS-I.C version 20.

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. Further, the verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for site visit or document verifications. The entire documents checked/Power plant verification conducted to arrive at positive verification conclusions. The verification team 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.
- A Reasonable Level of assurance was achieved as planned during verification process.

Verification period: 01/10/2018 to 30/06/2020 (inclusive of both days)

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

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2018(01/10/2018 to 31/12/2018)	9,285	129	0	9,156
2019(01/01/2019 to 31/12/2019)	52,172	431	0	51,741
2020(01/01/2020 to 30/06/2020)	12,394	320	0	12,074
Total	73,851	880	0	72,971

Vintage emission reduction is as below:

Vintage wise VER Breakup	tCO ₂ e
For the period from 01/10/2018 to 31/12/2018	9,156
For the period from 01/01/2019 to 31/12/2019	51,741
For the period from 01/01/2020 to 30/06/2020	12,074
Total	72,971

APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED (VERIFICATION)

No.	Author	Title	References to the document	Provider
1	NA	Commissioning certificates of the boiler and turbine	Commissioning certificate	Project participant
2	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
3	NA	Calibration Certificates	Calibration Certificates	Project participant
4	NA	Registered PD https://registry.verra.org/app/projectDetail/VCS/1744	NA	Project participant
5	NA	Validation report https://registry.verra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=25207&IDKEY=j98klasmf8jflkasf8098afnaskfj98f0a9sfsakjflsakjf8da34760453	NA	Project participant
6	NA	Emission reduction sheet version 01 Emission reduction sheet version 02 Emission reduction sheet version 03	ER sheet version 01 dated 24/08/2020 ER sheet version 02 dated 22/09/2020 ER sheet version 03 dated 29/09/2020	Project participant
7	NA	No Double Counting declaration	No Double Counting declaration- 09/11/2019	Project participant
8	NA	Fuel Analysis	Fuel Analysis	Independent Search
09	NA	Tools/ guidelines used in the project activity <ul style="list-style-type: none"> • Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50 • Tool for the demonstration and assessment of additionality (Version 04.0.0) 	UNFCCC CDM/VCS web site	UNFCCC

		<ul style="list-style-type: none"> Glossary of CDM terms version 07 VCS verification report template version 4.0 		
10	NA	Log Sheets	Share reports/Monthly statement for the complete monitoring period	PP
11	NA	MR version 01 MR version 02 MR version 03	25/08/2020 22/09/2020 29/09/2020	PP
12	NA	Invoices for the complete monitoring period	Invoice	PP
13	NA	Break down details of the complete monitoring period	Log sheet	PP
14	NA	Technical Specification of Boiler and Turbine	NA	PP
15	CEA	Executive Summary on Power Sector, - Executive Summary June 2020 published by Central Electricity Authority http://www.cea.nic.in/reports/monthly/executivesummary/2020/exe_summary-06.pdf	NA	PP
16	NA	ELECTRICITY (AMENDMENT) BILL, 2020 https://www.manifestias.com/2020/05/15/electricity-amendment-bill-2020/#:~:text=India's%20T%26D%20losses%20are%20almost,each%20of%20the%20large%20states	NA	PP

APPENDIX 2: CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS (CAR/CL/FAR)

Monitoring Template

CAR ID	01	Section no.	-	Date: 08/09/2020
Description of CAR				
<i>Font size of MR is not in line with the guidance provided in MR template. Corrective action sought.</i>				
Project participant response				Date: 22/09/2020
<i>Font size of MR is now consistent with the guidance provided in the MR template.</i>				
Documentation provided by project participant				
<i>MR version 02</i>				
DOE assessment				Date: 25/09/2020
PP has corrected the font size in MR. Hence CAR closed.				

Project Implementation Status

CAR ID	02	Section no.	4.1	Date: 08/09/2020
Description of CAR				
<i>Following inconsistencies observed during review of the MR:</i>				
<ol style="list-style-type: none"> <i>1. Net electricity generated by the project activity during this monitoring period is missing in in Sec 1.1 of MR</i> <i>2. PP is requested to provide the Commissioning Certificate of the project activity for verification</i> <i>3. PP is requested to provide the technical specifications of project activity</i> 				
Project participant response				Date: 22/09/2020

<ol style="list-style-type: none"> 1. MR has been revised to provide the value of Net electricity generated by the project activity during this monitoring period in Sec 1.1 of MR. 2. PP is hereby Submitting the Commissioning Certificate of the project activity for verification. 3. PP is hereby Submitting the technical specifications of project activity i.e Boiler & Turbine equipment's Name plate rating photos. 	
Documentation provided by project participant	
MR version 2 & ER Version 02 Commissioning Certificate Boiler & Turbine Name Plate Photos & Specification	
DOE assessment	Date: 25/09/2020
<ol style="list-style-type: none"> 1. Net electricity generated by the project activity during this monitoring period is now provided in Sec 1.1 of revised MR. 2. PP has provided the commissioning certificate of plant and verification team confirms that the plant was commissioned on 01/10/2018. 3. PP has provided the photographs of plates of boiler and turbine in which technical specifications of plant is mentioned. Hence acceptable. 	
CAR closed.	

CAR ID	03	Section no.	4.1	Date: 08/09/2020
Description of CAR				
<p><i>The breakdown details of the power plant are missing in the MR. Moreover, the supporting document regarding the breakdown details are not provided to the assessment team. Corrective action is sought.</i></p>				
Project participant response				Date: 14/09/2020
<p>PP has revised the MR to provide the breakdown details under section 3.1 of MR and also submitting the plant log books to confirm the same.</p>				
Documentation provided by project participant				
MR Version 02 Plant log books				
DOE assessment				Date: 25/09/2020

PP has now included the breakdown details in Section 3.1 of revised MR. There were two majors shut downs taken during the current monitoring period as given below:

Months	Reason
March-2020	Shutdown for routine annual maintenance.
April-2020	Shutdown for routine annual maintenance.

The verification team has checked the boiler log book/energy generation data and confirms that there are no generation recorded during these two months. Hence Ok.

CAR Closed.

CAR ID	04	Section no.	4.1	Date:	08/09/2020
Description of CAR					
<i>PP is requested to submit an undertaking for no any double accounting for current monitoring period and project activity is not participated any other GHG program other than VCS.</i>					
Project participant response					Date: 22/09/2020
<i>PP is hereby submitting the undertaking for no any double accounting for current monitoring period and project activity is not participated any other GHG program other than VCS.</i>					
Documentation provided by project participant					
<i>Undertaking No double accounting</i>					
DOE assessment					Date: 25/09/2020
PP has provided the undertaking dated 19/09/2020 for no any double accounting for the current monitoring period.					
CAR closed.					

No Net Harm

CAR ID	05	Section no.	4.2.1	Date:	08/09/2020
Description of CAR					
<i>During the document review it is observed that "No net Harm" is not described in details in the MR. Moreover, supporting documents is not shared with DOE. Corrective action is sought in this regard in the respective section of the MR.</i>					
Project participant response					Date: 22/09/2020

<i>MR has been revised to describe the “No net harm” in detail. Also, providing the supporting documents & the link in the MR itself for ready reference.</i>	
Documentation provided by project participant	
http://164.100.94.214/sites/default/files/uploads/report-on-developmental-impacts-of-RE.pdf	
DOE assessment	Date: 25/09/2020
<p>PP has updated the “No net Harm” in Section 2.1 of revised MR and also provided supporting document “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” published by Ministry of New and Renewable Energy (MNRE), 2013. Project activity has been installed in a Palm Oil Production Plant which involves the utilization of in-house generated renewable biomass fibre, shell and empty fruit bunches (EFB) in the palm fruit processing facility as a fuel for generating steam. The project activity does not require to source any type of biomass from outside of the plant. Hence, there is no outside transportation for fuel is involved. The project activity not only helps in reducing the GHG emissions but has positive Socio-economic impact as well on the project surrounding area. There are no negative environmental and socio-economic impacts associated with the project activity. Hence, no mitigation action is occupied. Further, the project activity has generated job for the local people for operation & maintenance of biomass-based power generation project. The Section 2.1 of the monitoring report has been revised by PP accordingly. Hence, acceptable to verification team.</p> <p>CAR closed.</p>	

CAR ID	06	Section no.	4.2.2	Date: 08/09/2020
Description of CAR				
<i>PP is requested to provide the evidence of on-going stakeholder consultation during this monitoring period.</i>				
Project participant response				Date: 22/09/2020
<i>PP would like to confirm that there is no grievance recived from the stakeholders during this monitoring period and hereby submitting the evidence copies of grievance register to confirm the same.</i>				
Documentation provided by project participant				
<i>Copy of Grievance/Feedback Register</i>				
DOE assessment				Date: 25/09/2020

PP has provided the copy of grievance/feedback register for the monitoring period. PP has placed a feedback/complaint register onsite a part of continuous feedback from stakeholders, in which the stakeholder can put down his/her complain and the same if found genuine will be addressed immediately. Verification team reviewed the same and confirms that there is no grievance received from the stakeholders during this monitoring period.

CAR closed.

Accuracy of GHG Emission Reduction and Removal Calculations

CAR ID	07	Section no.	4.4	Date: 08/09/2020
Description of CAR				
<p><i>Following inconsistencies observed during review of the MR:</i></p> <ol style="list-style-type: none"> <i>Net electricity generation data for the month of March 2020 and April 2020 is showing zero in ER sheet.</i> <i>The details information of installed meters such as Serial number of meters, make, calibration date, due date of calibration etc. are missing in Section.4.2 of MR. Corrective action is requested.</i> <i>The Monitoring Report does not provide the actual vs estimated comparison of the VERs for the monitoring period. Moreover, the log sheets records of the monitored parameters are not submitted to the assessment team. PP is requested to submit the supporting documents.</i> 				
Project participant response				Date: 22/09/2020
<ol style="list-style-type: none"> <i>Please be clarified that the "Net electricity generation data for the month of March 2020 and April 2020 is showing zero in ER sheet" because there were no generation occurred as the plant was under maintenance shutdown in these two months. PP has submitted the plant log book to confirm the same.</i> <i>MR & ER has been revised to provide the information of installed meters such as Serial number of meters, make, calibration date, due date of calibration etc. under the Appendix 1 of the MR</i> <i>MR has been revised to provide the actual vs estimated comparison of the VERs for the current monitoring period. Also, submitting the supporting documents to the assessment team.</i> 				
Documentation provided by project participant				
MR & ER version 02				
Meter Details & Calibration Certificate				
DOE assessment				Date: 25/09/2020

1. PP confirmed that the “Net electricity generation data for the month of March 2020 and April 2020 is showing zero in ER sheet” as there were no generation occurred during these two months due to shut down of plant for maintenance. Verification team has checked the plant log book and confirms that plant was shut down in March 2020 and April 2020. Hence Ok.
2. PP has provided the details of installed meters such as Serial number of meters, make, calibration date, due date of calibration etc. under the Appendix 1 of the MR.
3. PP has revised the MR to include the actual vs estimated comparison of the VERs for the current monitoring period. The same is provided in Section 5.4 of MR. Hence Ok.

CAR closed.

CAR ID	08	Section no.	4.4	Date:	08/09/2020
Description of CAR					
<p><i>Following are the observation of the assessment team regarding Monitoring parameter:</i></p> <ol style="list-style-type: none"> 1. <i>The notation of monitoring parameter “The total annual average efficiency of the cogeneration plant using coal” is not consistent with VCS PD.</i> 2. <i>The value of monitoring parameter $EG_{PJ,thermal,y}$ in MR is not consistent with the value calculated in ER sheet.</i> 3. <i>For Parameter $EG_{PJ,thermal,y}$, The log sheets records of Steam production is not submitted to the assessment team for the monitoring period</i> 4. <i>For Parameter $EG_{PJ,electrical}$, Co-gen Plant log book data (Auxiliary consumption-import from the grid-electricity from grid is not submitted to the assessment team for the monitoring period.</i> 5. <i>For parameter $B_{biomass,y}$, weigh bridge Log sheets records for the concerned biomass is not submitted to the assessment team for the complete monitoring period. Further, it not clear which type of biomass is used during this monitoring period in Section 4.2 of MR</i> 6. <i>For the parameter $NCV_{k,biomass}$ (net calorific value of biomass type k), Lab analysis report for the NCV is not submitted to the assessment team. PP is requested to provide the same for each type of biomass used.</i> 7. <i>For the Parameter Extracted steam Enthalpy, Plant log books for the parameter for the complete monitoring period is not submitted to the assessment team</i> 8. <i>For the Parameter Pressure (pressure of flowing exhaust steam at the outlet of steam turbine), Pressure gauge log sheet data is not submitted to the assessment team.</i> 9. <i>For the Parameter $FC_{i,j,y}$, weigh bridge log books including Log sheet record of DG set for the complete monitoring period is not submitted to the assessment team. Moreover, the consistency of metered fuel consumption quantities will be cross-checked by an annual energy balance that is based on purchased quantities and stock changes. Supporting not submitted for the same.</i> 10. <i>For the parameter $NCV_{fossil\ fuel}$ Lab analysis report for the NCV is not submitted to the</i> 					

<p><i>assessment team.</i></p> <p><i>11. For the parameter $EC_{P,j,y}$, Co-gen Plant log book data is not submitted to the assessment team.</i></p>	
Project participant response	Date: 22/09/2020
<p>PP has revised MR & ER to incorporate the above correction:</p> <ol style="list-style-type: none"> 1. The notation of monitoring parameter “The total annual average efficiency of the cogeneration plant using coal” is corrected and consistent with VCS PD. 2. The value of monitoring parameter $EG_{P,j,thermal,y}$ in MR is now consistent with the value calculated in ER sheet. 3. For Parameter $EG_{P,j,thermal,y}$, The log sheets records of Steam production is being submitted to the assessment team for the monitoring period with the other supporting documents. 4. For Parameter $EG_{P,j,electrical}$, Co-gen Plant log book data is now submitted to the assessment team for the monitoring period. 5. For parameter $B_{biomass,y}$, weigh bridge Log sheets records for the biomass is now submitted to the assessment team for the complete monitoring period. PP would like to clarify that the Project activity is utilizing the inhouse-generated renewable biomass: Palm fibre, Nut shell and shredded fibre within the palm fruit processing facility as a fuel, during this monitoring period. PP has revised Section 4.2 of MR to mention the same within the parameter tabel $B_{biomass,y}$. 6. For the parameter $NCV_{k,biomass}$ (net calorific value of biomass type k), Lab analysis report for the NCV for each type of biomass used is now submitted to the assessment team. 7. For the Parameter Extracted steam Enthalpy, Plant log books for the complete monitoring period is now submitted to the assessment team. 8. For the Parameter Pressure (pressure of flowing exhaust steam at the outlet of steam turbine), Pressure gauge log sheet data is now submitted to the assessment team. 9. For the Parameter $FC_{i,j,y}$, weigh bridge log books including Log sheet record of DG set for the complete monitoring period is now submitted to the assessment team. Also, submitting the purchased/received quantities and stock changes details along with Supporting documents to the assessment team. 10. For the parameter $NCV_{fossil\ fuel}$ it is transparently mentioned in the MR & ER that no coal (fossil fuel) has been used in the boiler during the current monitoring period. Hence, no lab análisis has been furnished for fossil fuel “coal”. 11. For the parameter $EC_{P,j,y}$, Co-gen Plant log book data is now submitted to the assessment team. 	
Documentation provided by project participant	

Co-gen Plant log book for all the monitoring parameter

For the parameter $EC_{PJ,j,y}$,

For the Parameter $FC_{i,j,y}$,

Pressure gauge log sheet data

Parameter Extracted steam Enthalpy

For the parameter $NCV_{k,biomass}$

For parameter $B_{biomass,y}$,

For Parameter $EG_{PJ,electrical}$,

For Parameter $EG_{PJ,thermal,y}$,

DOE assessment	Date: 25/09/2020
-----------------------	-------------------------

1. PP has corrected the notation of monitoring parameter “The total annual average efficiency of the cogeneration plant using coal” and now it is consistent consistent with VCS PD. Hence OK.

2. The value of monitoring parameter $EG_{PJ,thermal,y}$ has been corrected now in MR is not consistent with the value calculated in ER sheet. Hence OK.

3. PP has provided the Boiler Log sheets containing the steam production data for the monitoring parameter $EG_{PJ,thermal,y}$. However, average values used in ER sheet is missing in log sheet. PP is requested to provide the same.

4. PP has submitted the Co-gen Plant log book data (Auxiliary consumption-import from the grid-electricity from DG) pertaining to current monitoring period for the monitoring parameter $EG_{PJ,electrical}$. Assessment team has checked the data of auxiliary consumption-import from the grid and electricity generation from grid and found correct. Hence OK.

5 PP has submitted the steam generation and biomass consumption log sheet for the monitoring parameter $B_{biomass,y}$ for the complete period. The same has been reviewed by the verification team and found that project activity has utilized inhouse-generated renewable biomass: Palm fibre, Nut shell and shredded fibre within the palm fruit processing facility as a fuel, during this monitoring period. Section 4.2 of MR has been revised accordingly, however, it was observed that the biomass consumption data is not consistent in ER sheet. PP is requested to correct the data as per log sheet.

6. PP has submitted the third party labanalysis report of $NCV_{k,biomass}$ (net calorific value of biomass type k) for each type of biomass used. As per registered VCS PD, the NCV of palm fibre has been measured once in the first year of the crediting period by third party laboratory/ inhouse as per national/ international standard. Verification team has reviewed the same and found in line with the registered PD. Hence Ok.

7. PP has submitted the Turbine log sheets which contains the steam generated data and pressure data of extracted steam. Based on this parameter, extracted steam Enthalpy was derived from steam table. This is in line with the requirement of VCD-PD. Hence accepted. Hence OK.
8. PP has submitted the turbine log sheet which contains the pressure gauge data for the monitoring period. Assessment team has verified the pressure gauge data with the turbine log-sheet data and confirmed the same. Hence OK.
9. PP has submitted the weigh bridge log books including Log sheet record of DG set for the complete monitoring period including purchased/received quantities and stock changes details along with Supporting documents. The same was cross checked with the annual energy balance that is based on purchased quantities and stock changes. PP has included the details in revised MR and ER sheet. However, PP needs to provide the diesel consumption data in ER sheet only for current monitoring period accordingly revise the calculation of project emission.
10. PP has confirmed that that no coal (fossil fuel) has been used in the boiler during the current monitoring period. The same was verified with the plant log book. Hence Ok.
11. PP has submitted the Plant log book data for the parameter electricity taken from grid for the cogen plant start-up/ emergency operations ($EC_{PJ,j,y}$). A total of 733.036 MWh of electricity was taken from grid during the monitoring period. Assessment team has reviewed the Electrical log sheet data and confirms the same.

CAR remains open due to point 3,5 and 9.

Project participant response	Date: 29/09/2020
<p>3. PP is now submitting the month first and the last day boiler log sheet wherein average values used in ER sheet has been mentioned explicitly.</p> <p>5. PP has revised MR & ER in line with the biomass consumption log sheet data to maintain the consistency in reporting the data.</p> <p>9. PP has revised ER sheet to provide the diesel consumption data pertaining to the current monitoring period only i.e from Oct 2018 to Jun2020.</p>	
Documentation provided by project participant	
MR & ER sheet Version 03 Boiler log sheet showing Avg pressure & Temp Biomass log sheet	
DOE assessment	Date: 30/09/2020

3. PP has submitted the Boiler log sheet containing the monthly average value of steam production data's. Verification team has checked the data's and found correct.

5. Biomass consumption data's have been corrected in ER sheet and MR. Hence OK.

9. PP has updated the ER sheet to provide the diesel consumption data pertaining to the current monitoring period only i.e from Oct 2018 to Jun2020. Hence OK.

CAR closed.

Quality of Evidence to Determine GHG Emission Reductions and Removals

CAR ID	09	Section no.	4.5	Date: 08/09/2020
Description of CAR				
<p>1. <i>The calibration details like Meter Serial number, make, date of Calibration and Due date of the Calibration for the meters are missing in the MR. Further, PP has not provided the calibration supporting documents of the monitoring equipment's for the complete monitoring period. The details are as below:</i></p> <p>2. <i>Steam flow meter and pressure gauge used to monitor $EG_{PJ,thermal,y}$</i></p> <p>3. <i>Electric meter used to monitor $EG_{PJ,electrical}$</i></p> <p>4. <i>Weighbridge used to monitor $B_{biomass,y}$ and Quantity of fossil fuel combusted</i></p> <p>5. <i>Pressure gauge and temperature meter used to monitor Steam enthalpy</i></p> <p>6. <i>Pressure gauge (Steam output of the turbine) and temperature meter</i></p> <p>7. <i>Level Gauge for Diesel</i></p> <p>8. <i>Electric meter used to monitor $EC_{PJ,j,y}$</i></p>				
Project participant response				Date: 22/09/2020
<p>PP has revised MR & ER to provide the calibration details like Meter Serial number, make, date of Calibration and Due date of the Calibration for all the monitoring equipment's.</p> <p>PP is also submitting the calibration supporting documents of the monitoring equipment's for the complete monitoring period.</p> <p>1. Steam flow meter and pressure gauge used to monitor $EG_{PJ,thermal,y}$</p> <p>2. Electric meter used to monitor $EG_{PJ,electrical}$</p> <p>3. Weighbridge used to monitor $B_{biomass,y}$ and Quantity of fossil fuel combusted</p> <p>4. Pressure gauge and temperature meter used to monitor Steam enthalpy</p> <p>5. Pressure gauge (Steam output of the turbine) and temperature meter</p> <p>6. Level Gauge for Diesel</p> <p>7. Electric meter used to monitor $EC_{PJ,j,y}$</p>				

Documentation provided by project participant	
<i>Calibration certificates for all the monitoring equipment's</i>	
DOE assessment	Date: 25/09/2020
<p>PP has included the calibration details like meter serial number, make, date of calibration and due date of the Calibration for all the monitoring equipment's in Appendix 1 of revised monitoring report.</p> <p>PP is also provided the calibration supporting documents of the monitoring equipment's given below:</p> <ol style="list-style-type: none"> 1. Steam flow meter and pressure gauge used to monitor $EG_{PJ,thermal,y}$ 2. Electric meter used to monitor $EG_{PJ,electrical}$ 3. Weighbridge used to monitor $B_{biomass,y}$ and Quantity of fossil fuel combusted 4. Pressure gauge and temperature meter used to monitor Steam enthalpy 5. Pressure gauge (Steam output of the turbine) and temperature meter 6. Level Gauge for Diesel 7. Electric meter used to monitor $EC_{PJ,j,yi}$ <p>Thus, CAR closed.</p>	

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Lead Auditor/Technical Expert	OR	DAS	Sukanta	TQC-Outsourced entity	Yes	Yes	Yes	Yes

Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR)	EI	Xue	Denny	Applus+ Certification
2.	Approver	IR	Sendin	Juan	Applus+ Certification B.U. Managing Director

Short CVs of the Team:

1. **Mr. Sukanta DAS**, has done M. SC in (Electronics and Photonics) and M. Tech in (Energy technology) from Tezpur Central University/ Indian Institute of technology Bombay in India. He is a certified lead auditor for ISO 14001 EMS LA and ISO 9001 QMS LA from International registry for Certified Auditors (IRCA) and Certified Lean Management practitioner from Quality Council of India (QCI). He has more than Nine (9) years of working

experience at TUV NoRD/ Re-consult/CRA/APPLUS certifications under various categories of projects stating from Renewable to waste to supercritical projects. He was JI/ CDM Lead Assessor in TUV NoRD and was involved in more than 100 CDM validation and verifications activities in Gold Standard, VCS, CDM projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1, 13 technical areas 1.2/1.1/13.1. Currently he is associated with True Quality Certifications Private Limited and is empanelled with APPLUS certification to carry out GHG audit.

2. **Mr. Denny Xue** (Master Degree in Environmental Engineering, Bachelor Degree in Thermal Engineering) is an 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, he has been worked for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CM	Combined Margin
CMS	Central Monitoring system
CO ₂	Carbon dioxide
CO _{2e}	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming potential
RBI	Reserve Bank Of India
PP	Project Participant

APPENDIX 5: CALIBRATION DETAILS OF THE METERS

Boiler Main Steam Flow Transmitter- 1 (TAG.NO:11-FT-211A)		
Equipment Name	Steam Flow Transmitter	
Make	YOKOGAWA	
Serial Number	Y1TA17589	
Accuracy Class	+/- 0.1 of Range	
Calibration Frequency	Once in 3 year	
Date of Calibration	1-Oct-2018	25-Feb-2020
Due Date	30-Sept-2021	24-Feb-2023
Boiler Main Steam Flow Transmitter -2 (TAG.NO:11-FT-211B)		
Equipment Name	Steam Flow Transmitter	
Make	YOKOGAWA	
Serial Number	Y1TA17590	
Accuracy Class	+/- 0.1 of Range	
Calibration frequency	Once in three year	
Date of Calibration	1-Oct-2018	25-Feb-2020
Due Date	31-Sept-2021	24-Feb-2023
(Generation) kWh Meter		
Equipment Name	Tri vector Meter MWh	
Serial Number	X0465806	
Make	SECURE	
Accuracy Class	0.2s	
Calibration frequency	Once in 5 year	
Date of Calibration/Date of Installation	01-Oct-2018	29-Feb-2020
Due Date	30- Sept.2023	28-Feb-2025
Turbine Extraction Steam Temperature Transmitter (TAG.NO:TT-141)		
Make	YOKOGAWA	
Serial Number	C2T502618	
Accuracy Class	+/- 0.1 of Range	
Calibration frequency	Once in 3 years	
Date of Calibration	1-Oct-18	27-Feb-20

Due Date	30-Sep-21	26-Feb-21
----------	-----------	-----------

Turbine Extraction Steam Pressure Transmitter (TAG.NO: PT-140)		
Equipment Name	Flow Transmitter	
Make	YOKOGAWA	
Serial Number	Y1TA16783	
Accuracy Class	+/- 0.1 of Range	
Calibration Frequency	Once in a year	
Date of Calibration	1-Oct-2018	27-Feb-2020
Due Date	30-Sep-2019	26-Feb-2021

Calibration delayed in Exhaust Steam Pressure has been found in October 2019 (Delay period October 2019 to February 2020). Hence, maximum permissible error factor has been applied for the whole month of October 2019 to February 2020, to the exhaust pressure meter reading.

Auxiliary Meter Details		
Equipment Name	Cogen Auxiliary Meter	
Serial Number	1712057761	
Make	Rishabh	
Accuracy Class	0.2s	
Calibration Frequency	Once in 5 year	
Date of Calibration	01-Oct-2018	29-Feb-2020
Due Date	30-Sept-2023	28-Feb2025

Import meter Details	
Equipment Name	Import Meter
Serial number	17230314
Make	L & T
Accuracy Class	0.2s
Calibration frequency	Once in 5 year
Date of Calibration	25-Nov-2017
Due Date	24-Nov-2022

Monitoring equipment	Weigh Bridge
Make	Metler
Serial Number	2717131579
Calibration frequency	Annually
Accuracy class	±0.01% (i.e. 5 kg)