7.5 MW Waste-to-Energy Power Plant by Goodwatts WTE Jamnagar Private Limited in Gujarat, India

Document Prepared by (LGAI Technological Center S.A. (Applus+ Certification)

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Summary:

The current project activity is 7.5MW Waste to Energy power plant in Navagam Ghed, Jamnagar, Gujarat state, India. The plant utilizes Refuse-Derived Fuel (RDF) as feedstock which is derived through separation and sorting of received Municipal Solid Waste (MSW) from the Jamnagar city. The waste excludes the recyclable or potentially hazardous materials from the waste stream. Project developer (PD) i. e. M/s GoodWatts WTE Jamnagar Private Limited (GWJPL) has an agreement with Jamnagar Municipal Corporation. GWJPL is a special purpose vehicle formed by Abellon CleanEnergy Ltd. which is based in Ahmedabad, Gujarat, India and Jamnagar Municipal Corporation (JMC).

The main purpose of this project activity is to reduce GHG emissions through avoidance of methane production from decay of biomass through controlled combustion of MSW and renewable energy generation ushing steam turbine/generator which is supplied to national grid of India through DISCOM.

The project activity generates electricity through waste to energy-based power generation using RDF. The project utilizes RDF of about 311 tonnes per day and has potential to generate maximum 7.5 MW electricity. The waste to energy plant has a 1 travelling grate-type boiler for treating the RDF and a combination of 1 steam turbine and 1 generator to recover heat from combustion of RDF for generating electricity. PD supplies generated electricity to Indian national grid through contractual agreement with the local distribution company (DISCOM).

The project through its 7-year renewable crediting period starting from 15-November-2021 to 14-November-2028 is expected to reduce 278,421 tCO_2e emission reductions with average emission reductions as 39,774 tCO_2e.

The objective of this validation activity is to have an independent third party for the assessment of the project design, estimated emission reductions (ER) sheet and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

The project's baseline and monitoring plan is assessed against applied methodologies – AMS III.E, version 17.0 and AMS I.D, version 18.0.

The projects compliance with the

- Host Country legislation and sustainability criteria along with VCS program guide version 4.4 and VCS standard version 4.5
- CDM Validation and Verification Standard for project activities version 03.0
- VCS Validation Verification Manual, version 3.2

Validation 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 estimated verified emission reductions (VERs).

A risk-based approach has been followed to perform this validation activity. In the course of Validation, 04 Corrective Action requests (CARs) and 05 Clarification Requests (CLs) were raised and successfully closed. 01 Forward action request (FARs) is raised for the verifying VVB.

The review of the project description and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and project owners have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

As a part of validation, VVB has checked and confirmed project details against the submitted documents and have conducted on-site visit too and no uncertainties are associated with the validation.

Our Validation approach was based on the requirements as defined by VCS board. Our approach is risk-based, drawing on an understanding of the risks associated with estimated GHG emissions data and the controls in place to mitigate these. The validation confirms that:

The projects description compliance with relevant rules, including the Host Country legislation and sustainability criteria along with VCS program guide version 4.4 and standard version 4.5.

The project's baseline and additionality are assessed against "AMS III.E, version 17.0 - Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment" and "AMS I.D, version 18.0 - Grid connected renewable electricity generation".

The project's monitoring plan is assessed against "AMS III.E, version 17.0 - Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment" and "AMS I.D, version 18.0 - Grid connected renewable electricity generation".

A risk-based approach has been followed to perform this validation activity. The review of the project description and additional documents related to baseline and monitoring methodologies; the subsequent background investigation, follow-up interviews with Project Participants have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence for positive validation opinion as per the VCS requirements.

CONTENTS

1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Hereinafter referred as Applus+ Certification) has been appointed by "Kosher Climate India Private Limited" to perform the validation of the project entitled "7.5 MW Waste-to-Energy Power Plant by Goodwatts WTE Jamnagar Private Limited in Gujarat, India" under VCS standard, version 4.5 and program guide, version 4.4.

The objective of this validation activity is to have an independent third party for the assessment of the project design, ER sheet 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 CDM approved methodology – AMS III.E, version 17.0 and AMS I.D, version 18.0.
- The project's monitoring plan is assessed against CDM approved methodology – AMS III.E, version 17.0 and AMS I.D, version 18.0.
- The projects compliance with the requirements of relevant rules and requirements, including the Host Country legislation and sustainability criteria along with VCS requirements and CDM approved methodologies and applied tools.
- CDM Validation and Verification Standard for project activities version 03.0
- VCS Validation and Verification manual version 03.2

Validation 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 estimated verified emission reductions (VERs).

1.2 Scope and Criteria

The scope of validation is independent and objective review of the submitted VCS Project Description (VCS PD) against the relevant criteria and decisions (see 1.1).

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 VCS PD. The main focus of the assessment team is to identify the significant risks for the project description, implementation and the generation of VERs. The validation activity is not meant to provide any consulting to the project participants however, stated requests for clarifications and corrective actions may have provided input for improvement of the project design.

The only purpose of the validation is its usage during the registration 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 validation opinion, which will go beyond that purpose.

1.3 Reasonableness of Assumptions

The validation have been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS.

1.4 Summary Description of the Project

The current project activity is 7.5 MW Waste to Energy power plant in Navagam Ghed, Jamnagar, Gujarat state, India. The plant utilizes Refuse-Derived Fuel (RDF) with installed capacity as 311 tonnes per day (TPD) as a feedstock which is derived through separation and sorting of received Municipal Solid Waste (MSW) from the Jamnagar city. The waste excludes the recyclable or potentially hazardous materials from the waste stream. Project developer (PD) i. e. M/s GoodWatts WTE Jamnagar Private Limited (GWJPL) has an agreement with Jamnagar Municipal Corporation. GWJPL is a special purpose vehicle formed by Abellon Clean Energy Ltd. which is based in Ahmedabad, Gujarat, India and Jamnagar Municipal Corporation (JMC).

The main purpose of this project activity is to reduce GHG emissions through avoidance of methane production from decay of biomass through controlled combustion of MSW and renewable energy generation ushing steam turbine/generator which is supplied to national grid of India through DISCOM.

The project activity generates electricity through waste to energy-based power generation using RDF. The project utilizes RDF of about 311 tonnes per day and has potential to generated maximum 7.5 MW electricity. The waste to energy plant has a 1 travelling grate-type boiler for treating the RDF and a combination of 1 steam turbine and 1 generator to recover heat from combustion of RDF for generating electricity. PD supplies generated electricity to Indian national grid through contractual agreement with the local distribution company (DISCOM).

The project through its 7 year renewable crediting period starting from 15-November-2021 to 14-November-2028 is expected to reduce 278,421 tCO_2e emission reductions with average emission reductions as 39,774 tCO_2e.

This is a greenfield project activity and prior to the implementation of the project activity, MSW in Jamnagar city was taken to the designated site to landfill in anaerobic condition without any methane recovery system for flaring or energy recovery purpose. This was confirmed during the on-site interviews. Therefore, in the absence of the project activity, methane emissions from anaerobic decay of waste would have been released into the atmosphere. For electricity component, prior to the implementation of the project activity, the equivalent amount of electricity would have generated through grid connected power plants which are dominated by fossil fuel based units[1].

[1] https://powermin.gov.in/en/content/power-sector-glance-all-india

As confirmed based on technical specifications of the project activity, relevant permissions received from local authority; the project activity will help to avoid methane emissions from open dump site in the absence of the project activity and generate renewable electricity, which displaced part of the electricity otherwise supplied by grid connected power plants.

More details about the project activity are provided below in section 3.1.

2 VALIDATION PROCESS

2.1 Method and Criteria

Validation scope: The scope is defined as an independent and objective review of project design document. The VCS PD was reviewed against the criteria stated in VCS guidance documents, approved CDM baseline and monitoring methodologies AMS III.E, version 17.0 and AMS I.D, version 18.0. The validation was based on the requirements in the VCS validation and verification manual, version 3.2, Clean Development Mechanism Validation and Verification Standard for project activities, version 03.0, VCS standard, version 4.5, VCS program guide, version 4.4.

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

Validation process: The project assessment is based on the VCS validation and verification manual, version 3.2, Clean Development Mechanism Validation and Verification Standard for project activities, version 03.0, VCS standard, version 4.5, VCS program guide, version 4.4 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:

- A desk review of the project design documentation;
- Follow-up interviews with project stakeholders;
- The resolution of outstanding issues and the issuance of the final Joint –VAL &report and opinion.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. LGAI TECHNOLOGICAL CENTER S.A. (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/verifying the identified criteria.

Appointment of the assessment team: According to the sectoral scope / technical area and experience in the sectoral or national business environment, LGAI Technological Center S.A. (Applus+ Certification)

has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of LGAI Technological Center S.A. (Applus+ Certification).

The composition of audit team shall be approved by the LGAI Technological Center S.A. (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)
- Financial Expert (FE)
- 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
Deepak Pundlik	LA / TE (1.1) / TEiT (13.1)	Yes	Yes 1.1 No 13.1	No	Yes
Dr. Atul Takarkhede	FE / TE (13.1)	Yes	Yes (for both)	Yes	Yes
Nikunj Agarwal	TR	Yes	Yes	Yes	NA

The complete list of CVs is included as Appendix 3 of this report.

Document Review: The VCS PD submitted by the PD was reviewed against the approved methodology 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 LGAI Technological Center S.A. (Applus+ Certification) who 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 in the below sections.

Resolution of Clarification and Correction Action Request: The objective of this validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for LGAI Technological Center S.A. (Applus+ Certification) positive conclusion on the project design document. The Corrective Action Requests and Clarification Requests raised by LGAI Technological Center S.A. (Applus+ Certification) were resolved during communications between the PD and Applus+

Certifications to guarantee the transparency of the validation process, the concerns raised and responses given are summarized below in the appendix 3.

The most recent version of VCS PD submitted by PD serves as the basis for the final assessment presented. Additional changes to the project during the validation process are not considered to be significant with respect to the main VCS objectives. The two VCS 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 validation of the final documentation including the final validation 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 project participants, the positive validation/verification opinion and relevant documents are submitted to the VCS secretariat through the VCS web-platform.

2.2 Document Review

The details of the document observed during validation process are listed below in appendix 1 of this report.

2.3 Interviews

An on-site visit was conducted for the project activity on 07/10/2023 and 08/10/2023.

VVB validated technical details & metering/monitoring arrangements along with project's operation name plates, technical details, monitoring records, and calibration certificates shared by PP. All the documents were cross checked to ensure conservative estimation of emission reductions has taken place.

During on-site audit, the PP representatives were questioned about the implementation of the project activity. Several topics like the waste collection, separation and then feeding to boiler, boiler operations, turbine specifications and operation, energy meters, waste weighing, waste characterization, data recording and monitoring, error accountability were discussed. To cross check the information provided by PP, various documents like technical specifications, commissioning certificates, statutory clearances, PPA, JMR records, steam generation data, waste collection and disposal data, invoices, equipment calibration records etc. were also verified. The names of the persons interviewed during the audit is given below;

Sr. No.	Name	Designation and company	Interviewed by
1	Mr. Pankaj Patel	President, GWJPL	Deepak Pundlik and Dr. Atul Takarkhede
2	Mr. Shyam Sharma	President, Corporate Communications, GWJPL	
3	Mr. Mukund Shah	Asst. Vice President, GWJPL	
4	Mr. Amit Odhani	AVP, HR, GWJPL	
5	Ms. Tharani T.	Consultant, Kosher Climate	
6	Mr. Nagaraju Bolapo	Lead, Kosher Climate	
7	Mr. Anil Kumar Dube	AVP, Operations, GWJPL	
8	Mr. Chandresh Prajapati	DGM, Operations, GWJPL	
9	Mr. Vikasbhai Vasava	Local stakeholder	
10	Mr. Aditya Vasani	Local stakeholder	
11	Ms. Meenaben Patel	Local stakeholder	

2.4 Site Visits

Duration of on-site visit: 07/10/2023 and 08/10/2023				
No.	Activity performed on-site	Site location	Date	Team member
1.	Assessment team checked the implementation of the project, Baseline emissions, Emission reduction calculation, technical description of the project and Monitoring, stakeholder grievances.	Jamnagar, Gujarat, India	07/10/2023 & 08/10/2023	Deepak Pundlik and Dr. Atul Takarkhede

2.5 Resolution of Findings

The objective of this validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for LGAI Technological Center S.A. (Applus+ Certification)'s positive conclusion on the project design document. The Corrective Action Requests and Clarification Requests raised by LGAI Technological Center S.A. (Applus+ Certification) were resolved during communications between the PP and LGAI Technological Center S.A. (Applus+ Certification) to guarantee the transparency of the validation process, the concerns raised and responses given are summarized below in the Appendix 2.

The final VCS PD version 03 dated 29-October-2023 serves as the basis for the final assessment presented. Additional changes to the project during the validation process are not considered to be significant with respect to the main VCS objectives. The two VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Following is the list of findings which were raised and successfully closed.

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Project Details	01	01	-
Safeguards	-	-	-
- No Net Harm	01	-	-
- Local Stakeholder Consultation	01	-	-
- Environmental Impact	-	-	-
- Public Comments	-	-	-
- AFOLU- Specific Safeguards	-	-	-
Application of Methodology	-	-	-
- Title and Reference	-	-	-
- Applicability	01	-	-
- Project Boundary	01	-	-
- Baseline Scenario	-	-	-
- Additionality	-	01	-
- Quantification of GHG Emission Reductions and Removals	-	01	-
- Methodology Deviations	-	-	-
- Monitoring Plan	-	-	01
Non-Performance Risk Analysis	-	-	-
Others (please specify)	-	-	-
Total	**05**	**03**	**01**

2.5.1 Forward Action Requests

A FAR is raised during this validation for the VVB carrying out 1st verification. Please refer Appendix 3 for details.

3 VALIDATION FINDINGS

3.1 Project Details

The current project activity is 7.5 MW Waste to Energy power plant in Navagam Ghed, Jamnagar, Gujarat state, India. The plant utilizes Refuse-Derived Fuel (RDF) as feedstock which is derived through separation and sorting of received Municipal Solid Waste (MSW) from the Jamnagar city. The waste excludes the recyclable or potentially hazardous materials from the waste stream. Project developer (PD) i. e. M/s GoodWatts WTE Jamnagar Private Limited (GWJPL) has an agreement with Jamnagar Municipal Corporation. GWJPL is a special purpose vehicle formed by Abellon Clean Energy Ltd. which is based in Ahmedabad, Gujarat, India and Jamnagar Municipal Corporation (JMC).

The main purpose of this project activity is to reduce GHG emissions through avoidance of methane production from decay of biomass through controlled combustion of MSW and renewable energy generation ushing steam turbine/generator which is supplied to national grid of India through DISCOM.

The project activity generates electricity through waste to energy-based power generation using RDF. The project utilizes RDF of about 311 tonnes per day and has potential to generated maximum 7.5 MW

electricity. The waste to energy plant has a 1 travelling grate-type boiler for treating the RDF and a combination of 1 steam turbine and 1 generator to recover heat from combustion of RDF for generating electricity. PD supplies generated electricity to Indian national grid through contractual agreement with the local distribution company (DISCOM).

The project through its 7 year renewable crediting period starting from 15-November-2021 to 14-November-2028 is expected to reduce 278,421 tCO_2e emission reductions with average emission reductions as 39,774 tCO_2e.

This is a greenfield project activity and was confirmed during the on-site interviews and based on concession agreement between Jamnagar Municipal Corporation and PP/[13/]. Prior to the implementation of the project activity, MSW in Jamnagar city was taken to the designated site to landfill in anaerobic condition without any methane recovery system for flaring or energy recovery purpose which was confirmed during site visit to the landfill area.. Therefore, in the absence of the project activity, methane emissions from anaerobic decay of waste would have been released into the atmosphere. For electricity component, prior to the implementation of the project activity, the equivalent amount of electricity would have generated through grid connected power plants which are dominated by fossil fuel based units.

This is a standalone project implemented by GWJPL and is not a grouped project.

The project proponent for the project is M/s GoodWatts WTE Jamnagar Private Limited (GWJPL) and other entity involved in the project is Kosher Climate India Private Limited. The details of both the entities are as below:

Goodwatts WTE Jamnagar Private Limited

Contact person: Mr. Pankaj Patel

Address: 10th floor, Sangeeta Complex, Nr. Parimal Crossing, Ellis bridge Ahmedabad – 380 006, Gujarat, India

Telephone: +91-79-66776100

Email: pankaj@abellon.com

Kosher Climate India Private Limited

Contact person: Mr. Vamsi Krishna

Address: Zee Plaza, No.1678, 27th Main Road, Sector 2, HSR Layout, Bengaluru, Karnataka 560102, India

Telephone: +91-99453 43475

Email: vamsi@kosherclimate.com

The project ownership is with Goodwatts WTE Jamnagar Private Limited which is a SPV of Abellon CleanEnergy Ltd. Abellon CleanEnergy Ltd. as confirmed based on commissioning certificate, statutory

clearances by local pollution control board and agreement with Jamnagar municipal corporation, land lease agreement etc.

The project start date is 15-November-2021 as confirmed based on commissioning certificate/11/ copy submitted. VVB through on-site visit and interviews has confirmed that on this day MSW was collected, processed to produce RDF and started generating electricity through combustion.

The lifetime of the project is considered 25 years. The boiler and turbo-generator being the main equipment which is used to burn RDF leading for electricity generation. This is found acceptable based on manufacturer's specifications submitted.

Chronology of events of the project activity is provided below which was checked and confirmed based on the evidence submitted i. e. DPR, incorporation certificate, copy of concession agreement etc.

S. No	Activity	Date of Activity
1.	Preparation of Detailed Project Report	17-March-2017
2.	Date of Incorporation of the company	27-March-2017
3.	Signing of Concession Agreement	25-April-2017
4.	Signing of EPC Contract	04-April-2018
5.	Signing of Power Purchase Agreement	30-May-2018
6.	Commissioning of the project activity	15-November-2021

The project has opted for renewable type of crediting period of 7 years. Since this is a Non AFOLU project, it has an option to choose between the above and fixed 10 year crediting period. Hence, the chosen one is found acceptable.

The project start date is 15-November-2021 since as observed during the on-site visit, the project has started generating electricity on this date and sending the same to the electricity grid thus it started emission reductions. Thus, the 1st renewable 7 year crediting period will be from 15-November-2021 to 14-November-2028. VVB also noted that the project was not fully operational from the start date and is now getting stabilized in terms of optimum operational/monitoring parameters.

Expected average annual emission reductions from the project activity are 39,774 tCO_2e. Thus, it is between 20,000 to 100,000 tCO_2e and hence the project scale qualifies as 'Project' in line with VCS requirements.

The expected emission reductions over 1st crediting period are as below:

Year	Estimated GHG emission reductions or removals (tCO_2e)
15-November-2021 to 14-November-2022	8,878
15-November-2022 to 14-November-2023	26,847
15-November-2023 to 14-November-2024	36,641
15-November-2024 to 14-November-2025	44,052

15-November-2025 to 14-November-2026	49,776
15-November-2026 to 14-November-2027	54,293
15-November-2027 to 14-November-2028	57,933
Total estimated ERs	**278,421**
Total number of crediting years	**07**
Average annual ERs	**39,774**

The Project is located in, Navagam Ghed, Jamnagar 361008, Gujarat, India. The geo-coordinate of the project are 22°29'44.83"N, 70°4'0.43"E, which were cross checked with the help of google maps and confirmed during the on-site visit.

Project description and conditions prior to project initiation:

VVB has confirmed the following project description during on-site visit and based on submitted documents such as, consent to establish / operate by local pollution control board/14/, technical specifications sheets for the equipments/24/, land possession receipt/20/, power purchase agreement/22/, IBR certificate for boiler/8/, single line diagram/23/, MSW records/36/ maintained at site, energy generation records/37/, operation and maintenance manual/38/ etc.

The project activity involves travelling grate incineration technology to incinerate RDF prepared from MSW which is collected from Jamnagar city. In baseline scenario, the collected MSW was getting disposed of at a local landfill site.

The main equipment in the project activity includes 1 incinerator, 1 boiler (40 tons per hour), 1 steam turbines and 1 generator (7.5 MW), the transformer station and electricity transmission line, exhaust gas cleaning systems and ash remove system. The complete set up is within the project boundary as confirmed based on-site visit and single line diagram.

Project operations: VVB during on-site visit confirmed the project operation and a brief description is presented here. The fresh MSW received at the unloading bay is fed to the pre-processing section. The waste is then subjected to the moving bed feeder for further process, which includes splitter, start screen, shredder. The shredded material is fed to the air density separator (ADS) and Over bend magnetic separator (OBMS) to remove the heavier particle like stone, metals etc. This treated waste is then called as Refused Derived Fuel (RDF). After pre-processing, the RDF is sent to the waste feeding section. RDF is fed to the boiler by grabber through vibro feeder at the rate of 14 TPH. RDF is incinerated on travelling grate. The unburnt components continue to move on the grates to get out of the combustion chamber and fall into the slag collector of furnace bottom in form of bottom ash. The heat recovered from the incineration process will be provided to boilers. The superheated steam generated from the boilers will be fed into the steam turbine to generate kinetic energy. Turbines are connected to generators to produce electricity. The electricity generated from the project activity will be exported to the national grid through the electricity transmission line. The flue gases from the incineration process including NOx, SOx, HCl, and dioxin or furan if any are treated by the flue gas cleaning technology. This includes combustion control, electrostatic precipitator, lime power dosing, activated carbon adsorption, bag filter. After the treated clean gas, which meets states and national Environmental Quality Standard is released to the

atmosphere from chimneys. The bottom ash is collected and sent to the brick manufactures while fly ash will be used for paver production. However, as on date it is sent to brick manufacturers.

The layout of the plant is shown in below figure:

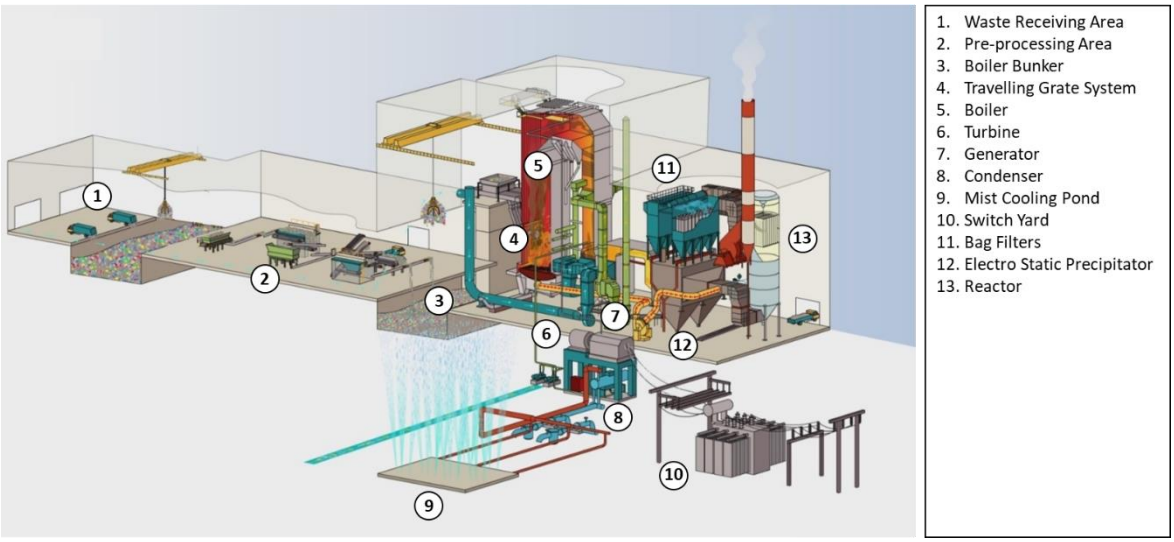

Figure 1: Plant Layout

The main technical details of Jamnagar Waste to Energy plant project are shown in table below:

Main Component	Indicator	Values
Incinerator/ Furnace	Type	Travelling Grate Type
	Manufacturer	Thermodyne Technology Pvt. Ltd. (TTPL)
	Number	1
	Unit capacity	400 ton/day
	Life time	25 years
Boiler	Number	1
	Manufacturer	Thermodyne Technology Pvt. Ltd. (TTPL)
	Unit steam output	40 ton/h
	Rated Outlet Steam Pressure	42 Kg/cm2 (G)
	Rated Steam Temperature	410˚C ± 10˚C
	Efficiency	85.9 %
	Life time	25 years
Steam turbine	Type	Condensing turbine (Bleed Cum)
	Manufacturer	Triveni Turbine Ltd.
	Number	1
	Rated capacity	7.5 MW
	Speed	7611 rpm
	Input steam	40 BAR (A) – 400°C
	Life time	25 years
Generator	Number	1
	Capacity	7.5 MW
	Manufacturer	TD Power Systems Limited.

	Frequency	50 Hz
	Rated voltage	11 kV
	Life time	25 years

Baseline scenario:
VVB noted that in the absence of project activity, the municipal solid waste generated in Jamnagar city was sent to designated landfill, where the waste was left to decay in anaerobic conditions. The greenhouse gases (GHG) generated from the solid waste were released directly into atmosphere. This establishes baseline for waste management component (CH_4 emissions).

In the absence of the project activity, the electricity which is generated through the project would have been generated from grid connected power plants, which are dominated by fossil fuel-based power plant.

The baseline scenario is the same as the scenario existing prior to the start of the implementation of the project activity.

Thus, VVB accepts, PP has established the baseline scenario as per AMS III.E., version 17.0 and AMS I.D., version 18.0 correctly and deemed reasonable.

Compliance with Laws, Statutes and Other Regulatory Frameworks:

The project activity does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment, Forest & Climate Change (MOEF&CC), Government of India (As per MOEF&CC Notification No. - S.O. 1533, dated 14-September-2006[2]).

The project has obtained Consent to Establish (CTE) and Consent to Operate (CTO) from the state Pollution Control Board under Air (Prevention and Control of Pollution Act, 1981[3] and Water (Prevention and Control of Pollution) Act 1974[4] which were checked and confirmed.

The project activity is implemented in compliance to The Factories Act, 1948[5] & The Indian Boilers Act-1923[6] as confirmed onsite based on copies of clearances submitted.

The project is in compliance with the Municipal Solid Waste (Management and Handling) Rules 2000[7], where all the municipal authorities in country are directed to manage solid waste in their respective jurisdiction and is implemented in compliance with the Gujarat Waste to Energy Policy, 2016[8].

The project activity has obtained approval from Gujarat Energy Development Agency (GEDA)/14/ to set up the Municipal Solid Waste based Power Project as confirmed based on copy of the documents/14/ checked.

[2] https://environmentclearance.nic.in/writereaddata/EIA_Notifications/1_SO1533E_14092006.pdf
[3] https://cpcb.nic.in/displaypdf.php?id=aG9tZS9haXItcG9sbHV0aW9uL0dTUi02RS5wZGY=
[4] https://maitri.mahaonline.gov.in/pdf/The_Water_Prevention_and_Control_of_Pollution_Act_1974.pdf
[5] https://environmentclearance.nic.in/report/EIA_Notifications.aspx
[6] https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/48110/114241/F-1729379182/IND48110.pdf
[7] https://cpcb.nic.in/uploads/MSW/MSW_AnnualReport_2001-02.pdf
[8] https://faolex.fao.org/docs/pdf/IND169749.pdf

Thus, VVB confirmed that the project activity is in compliance with all relevant statutory and regulatory laws applicable in the host country.

VVB has checked other carbon registries such as CDM, GS4GG, GCC and I-REC to confirm that the project activity is neither registered nor applied for registration with any of these GHG or Non GHG program(s) to obtain the certified GHG emission reductions. PP has submitted a declaration/39/ also that the emission reductions claimed under this project activity will not be double counted under any other GHG program. VVB checked and confirmed that the project activity is neither registered nor rejected by any other GHG program.

The current project does not involve any other form of credits and supply chain (scope 3) emissions.

Sustainable Development Contributions:

VVB noted that the plant operation directly covers key areas of sustainable development including renewable power generation, solid waste management, wastewater management and efficient usage, environment protection, innovative technological integrations, and partnership for sustained growth.

Among 17 SDGs, PD has claimed 09 SDGs which are directly linked with the project location operation and innovations in the project operations.

1. Clean water and sanitation (SDG-6)

Goal: Ensure availability and sustainable management of water and sanitation for all

Target: 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

Indicator: 6.3.1 Proportion of domestic and industrial wastewater flows safely treated

PP is using the treated sewage for their power operations as a part of colling water which is checked and confirmed during the on-site visit and also on the basis of the Single line diagram/23/ submitted by the PP.

Monitoring Parameter: Net Inlet Quantity of sewage treated water per day (m^3/day)

2. Affordable and clean energy (SDG-7)

Goal: Ensure access to affordable, reliable, sustainable and modern energy for all

Target: 7.2: By 2030 increase substantially the share of renewable energy in the global energy mix

Indicator: 7.2.1: Renewable energy share in the total final energy consumption

By generating 7.5 MW renewable power, PP is contributing to share of renewable energy in the global energy mix which otherwise would have been generated from the grid connected power plants.

Monitoring Parameter: Net Electricity Generation (GWh/year)

3. Decent work & economic growth (SDG-8)

Goal: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Target: 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

Indicator: 8.5.1 Average hourly earnings of employees, by sex, age, occupation and persons with disabilities

The project activity provides employment opportunities and the average salaries has been paid to employees irrespective of sex, age group, etc which leads to increased productivity, driving economic development. VVB confirmed the same based on employment records/33/.

Monitoring Parameter : No of employment (with bifurcation on number by sex, age group and where applicable, persons with disabilities), Average earnings, Policy for Non-discrimination and equal pay for the work of equal value.

4. Industry innovation and infrastructure (SDG-9)

Goal: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Target: 9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities

Indicator: 9.b.1 Proportion of medium and high-tech industry value added in total value added

PP has patented their technology used in this project activity and has obtained Indian Patent [Patent No. 201621023135]. Also, VVB confirmed that the project has been rated and pre-certified with 'Platinum Rating' as green campus by Indian Green Building council (IGBC)[9].

5. Sustainable cities and communities (SDG-11)

Goal: Make cities and human settlements inclusive, safe, resilient and sustainable

Target: 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

Indicator: 11.6.1 Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated, by cities

Since the project involves treatment of MSW which would have been left to decay in the baseline condition. This SDG is found acceptable.

Monitoring Parameter: Net Inlet Quantity of Municipal Solid Waste (Tonnes per day)

6. Responsible consumption and production (SDG-12)

Goal: Ensure sustainable consumption and production patterns

[9] https://abelloncleanenergy.com/igbc-platinum-rating-for-jamnagar-campus/

Target: 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

By adopting material conservation and waste recycling approaches in plant design and operations. Recovery of metal and non-metal waste from MSW for re-using to boost circular economy.

Monitoring Parameter: Net Inlet Quantity of Municipal Solid Waste (Tonnes per day), Quantity of scrap metal recovered (Tonnes per day)

7. Climate action (SDG-13)

Goal: Take urgent action to combat climate change and its impacts

Target: 13.2 Integrate climate change measures into national policies, strategies and planning

Indicator: 13.2.2 Total greenhouse gas emissions per year

VVB noted that the project involves reduction of annual average of 39,774 tons of CO_2e greenhouse gas emissions per year through avoiding open waste dumping and electricity generation through fossil fuels.

Project activity generates renewable energy-based electricity and mitigates the CO_2 emissions which would have been generated from the grid-connected power plants. Project has already commissioned and started reducing the emissions. Hence, complied to the SDG 13

Monitoring Parameter: GHG emission reductions (tCO_2/year)

8. Life on land (SDG-15)

Goal: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

PP has implemented a tree plantation program within the project boundary by significant efforts in enhancing biodiversity by more than 10,000 tree plantations in campus (landscaping in 48% area of total campus). The assessment team has verified the same on the basis of the community connect report/12/ submitted by the PP.

9. Partnership for the goals (SDG-17)

Goal: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Target: 17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

PP has set up a WTE plant in PPP (Public-Private Partnership) between GWJPL (Goodwatts WTE Jamnagar Pvt. Ltd) and JMC (Jamnagar Municipal Corporation) thus creating a partnership with Urban Local Bodies for sustainable development.

Since this project is non AFOLU project, leakage management is not applicable.

PP confirmed that there is no commercially sensitive information during the on-site interviews and has presented all project related information in the submitted VCS PD, ER sheet and financial analysis sheet.

VVB confirms that the project description presented in the VCS PD is accurate, complete and provides an understanding of the nature of the project as confirmed during the on-site visit and desk review of the submitted documents along with background search on different registries for the project.

Findings: CL 01 and CAR 01 were raised and are closed successfully. Refer appendix 3 for more details.

3.2 Safeguards

3.2.1 No Net Harm

The project activity involves MSW collection, treatment and use it as a fuel to generate electricity which is supplied to the Indian electricity grid. The project follows all the statutory requirements as evident from the clearances received from GEDA, Gujarat Pollution Control Board/14/ and Boiler Inspectorate/8/. VVB has checked the copies of these documents /14//8/to confirm the same.

VVB has confirmed that PP has assessed the risk of any negative environmental and socio-economic impacts as a result of project activities and this assessment has not identified any such risks. During on-site visit and based on desk review, VVB has checked and confirmed that there is no major risks or negative impacts associated with the project's operational phase with respect to stakeholders and the environment. The project is situated away from the vicinity of the local inhabitants thus there is no direct risk to them due to the project activity as confirmed during on-site interviews. PP is providing safety trainings and hands-on training are conducted for the workers, engineers, contractors etc. PP has received all the statutory clearances from the local body, pollution control board and other regulatory authorities as confirmed based on desk review during on-site visit. Thus, the project's construction and operational phase has no negative impact on the environment. Hence, VVB accepts that the project has no negative environmental and socio-economic impacts. It contributes positively through waste treatment and electricity generation leading to sustainable development of the region. Since, no negative impacts and mitigation measures are applicable, same are not required to be reported in the VCS PD and in the current report and during further verifications.

Findings: CL 02 was raised and are closed successfully. Refer appendix 3 for more details.

3.2.2 Local Stakeholder Consultation

PP had conducted Local stakeholder consultation meeting on 09-May-2023 at the project location, which is located in Navagam Ghed, Jamnagar city of Gujarat state, India. PP has submitted copies of invitation letter/40/, public notice/40/, attendance sheet/40/ and questionnaire/40/ filled up by invited stakeholders along with the LSC photographs. Same were checked and it was noted that questionnaire includes all the questions which are mentioned by PP in the VCS PD.

VVB confirmed that the local stakeholders' consultation meeting was attended by local persons including local villagers, local vendors and technology suppliers.

The stakeholders identified by the project participant were local people/ NGOs /local body members who are the major population of the particular area, local communities, technology supplier, project proponent representatives, O&M Team and other people involved in the project.

Validation team verified the list of participants who attended the stakeholder meeting on the basis of attendance sheet/40/ and feedback questionnaire/40/ and confirms the stakeholders identified are relevant. The validation team also verified the minutes of meeting /40/to note that no negative comments were received and the same was cross checked with the information obtained during follow up interviews with the stakeholders.

Moreover, assessment team during the validation site visit noted that a grievance register is put onsite for the stakeholder to comment on any grievances during the operation lifetime of the project activity, the grievances from the stakeholder if found suitable will be addressed immediately by the top management and thus the approach is found appropriate for the project activity.

VVB noted that none of the invited stakeholder has raised negative comments and stakeholders provided positive reply towards the project. VVB noted that none of the stakeholder comments needs to be addressed in a way which will result in changes to the project design. Thus, the Validation team is of the opinion that the stakeholder meeting was adequate an appropriate.

Findings: CL 03 was raised and are closed successfully. Refer appendix 3 for more details.

3.2.3 Environmental Impact

VVB noted that as per regulations by Government of India[10], environmental clearance/impact assessment is not required for waste to energy plants up to 15 MW. However, PD on its own has/is monitoring project's impact on soil, water and air from the construction phase. The same are mentioned by project participants in the VCS PD. Also, VVB noted that to establish and operationalize the waste to energy plant, PP has to apply for and get certain local government clearances. E.g. for the current project PP has received consent to establish and operate/14/ by local pollution control board, certificate on use of boiler/8/, no objection for ground water use/10/, concession agreement/13/, factory license/19/ etc. VVB has checked all these documents which list down the mitigation measures which are compulsory for PP to follow and hence VVB noted that there would not be any environmental impacts due to the project activity. PD has also mentioned monitoring/mitigation actions in the VCS PD which are line with the above mentioned different documents and hence found appropriate.

Findings: No findings were raised.

3.2.4 Public Comments

As a part of global stakeholder consultation, the project received 2 comments and responses to the same by PP are mentioned below:

1. A great project turning non-recyclable waste into off-grid electricity replacing carbon emissions. There needs to be many more of these projects.

PP response: This is a positive comment. Hence acknowledged.

[10] https://environmentclearance.nic.in/writereaddata/OMs-2004-2021/303_OM_07_11_2017.pdf

VVB assessment: Since this was a positive comment, no action required.

2. Is the project planning to opt for decarbonization, CCUS technology, also in lieu of the project getting its credit since 2021, does it want to transition the project from CDM to Article 6.4 Paris Agreement Mechanism as the credits gained through CDM shall get null and void the moment the implementation of registration of projects under transition begin after 31-December-2023.

PP response: The project activity is to generate electricity through municipal solid waste to energy plant. The auxiliary power required for the in-plant operations is utilised from the power generated by the project activity. The plant is completely carbon neutral, so further decarbonization is not required. The project activity predominantly focuses on methane avoidance from municipal solid waste through combustion and carbon dioxide avoidance from the grid. Hence, CCUS technology is inapplicable. The project is being developed under the Verified Carbon Standard (VCS) and is acquiring carbon credits through this mechanism. Hence, the transition of the project from CDM to Article 6.4 is inapplicable.

VVB assessment: PP has applied for VERs only, no decarbonisation is involved and the project is not submitted under CDM so will not involve transition to article 6.4. Hence, no further action required.

Findings: No findings were raised.

3.2.5 AFOLU-Specific Safeguards

For non-AFOLU projects, this section is not required.

3.3 Application of Methodology

3.3.1 Title and Reference

The PP has used type III and type I methodology for the current project as it involves methane avoidance from biomass decay and subsequent electricity generation.

The applied methodologies are as below and VVB confirmed that the most recent versions are referred to.

Type III, Other project activities:
AMS III.E “Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment”, Version 17.0.

Type I, Renewable Energy Projects:
AMS I.D, “Grid connected renewable electricity generation”, Version 18.0.

The applied methodologies refers to the latest approved version of the following tools which is checked and confirmed.

- Tool 03- Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, Version 03.0[11]
- Tool 04- Tool to calculate emissions from solid waste disposal sites, Version 08.1[12]
- Tool 07- Tool to calculate the emission factor for an electricity system, Version 07.0[13]
- Tool 12- Project and leakage emissions from transportation of freight, Version 01.1.0[14]
- Tool 21- Demonstration of additionality of small-scale project activities, Version 13.1[15]
- Tool 27- Investment analysis, Version 12.0[16]

Findings: No findings were raised.

3.3.2 Applicability

PP has discussed about applicability of methodology and tools in the VCS PD which was checked and confirmed as below:

CDM small scale methodology : AMS III.E, ver. 17.0 Title: Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment			
S. No	Applicability conditions	Project Eligibility	VVB conclusion
1	The project activity does not recover or combust methane unlike AMS-III.G. Nevertheless, the location and characteristics of the disposal site in the baseline condition shall be known, in such a way as to allow the estimation of its methane emissions.	The project activity involves methane avoidance through controlled combustion of municipal solid waste. There is no methane recovery involved. Before the implementation of the project activity, the municipal solid waste was disposed of at the Gulabnagar and Theba Waste Disposal sites, which is considered as anaerobically managed solid waste disposal facilities, as their characteristics is consistent with the	During on-site visit, VVB noted that the project involves methane avoidance through MSW diversion from the existing landfill site and generating the electricity through controlled combustion within the boiler. The existing landfill sites at Gulabnagar and Theba were visited. In the baseline scenario, the MSW was disposed of at these sites was confirmed by the stakeholders interviewed. The visual inspection has confirmed that they can be

[11] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf
[12] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-04-v8.1.pdf
[13] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf
[14] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-12-v1.1.0.pdf
[15] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v13.1.pdf
[16] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v12.pdf

		definition provided in tool 04, version 08.1 Hence the project activity meets the applicable condition.	considered as anaerobically managed (with low porosity and waste stored was found to be moist) with volume to surface ratio more than 1.5 thus in line with definition provided in Tool 04, version 08.1 and hence accepted. Thus, on the basis of on-site visit/interviews and consent to establish/14/, concession agreement,/13/ and the commissioning certificate/11/ VVB confirms that this criterion is fulfilled.
2	If the project activity involves combustion, gasification or mechanical/thermal treatment of partially decayed waste mined (i.e., removed) from a solid waste disposal site in addition to freshly generated waste the project participants shall demonstrate that there is adequate capacity of the combustion, gasification or mechanical/thermal treatment facility to treat the newly generated wastes in addition to the partially decayed wastes removed from the disposal site. Alternately justifications for combusting, gasifying or mechanically/thermally treating the partially decayed wastes instead of the newly generated wastes shall be provided.	The project activity uses fresh waste sourced from Jamnagar Municipal Corporation and there is sufficient capacity available for the utilisation of waste to produce electricity. Hence the project activity meets the applicability condition.	The project activity sources fresh waste from the Jamnagar city and combust the same for electricity generation as confirmed during the on-site visit and concession agreement/13/.. The project does not involve combusting, gasifying or mechanically/thermally treating the partially decayed wastes. Hence this criterion is fulfilled
3	If the combustion facility, the produced syngas, producer gas or RDF/SB is used for heat and electricity	The project activity involves utilisation of 311 TPD RDF and generation of electricity with the	During on-site, VVB confirmed that RDF produced is further combusted to produce

	generation within the project boundary, that component of the project activity may use a corresponding methodology under Type I project activities.	installed capacity of 7.5 MW. The electricity generated is supplied to the national grid. The relevant methodology AMS- I.D is applied to the project activity. Hence the condition is applicable to the project activity.	electricity and is sold to DISCOM based on contractual agreement i. e. PPA/22/. The assessment team confirmed from the PPA/22/ submitted that the electricity is sold to state electricity distribution company. The installed capacity is 7.5 MW which was confirmed from the commissioning certificate/11/. The project capacity is less than 15 MW and thus the project is a small scale project. Hence, PP has applied AMS I.D methodology/4/ which is an approved small scale methodology and hence acceptable. Hence this criterion is fulfilled.
4	In case of RDF/SB production, project proponents shall provide evidence that no GHG emissions occur, other than biogenic CO_2, due to chemical reactions during the thermal treatment process for example limiting the temperature of thermal treatment to prevent the occurrence of pyrolysis and/or the stack gas analysis.	During incineration of MSW, GHG emissions such as nitrous oxide, methane is emitted in negligible amount due to its presence in waste. However, the project activity involves processing of MSW pre-dominantly with organic content which is supported by waste characterization report. Hence, the project activity majorly involves biogenic CO_2. Hence, the project meets the applicability condition.	During on-site visit, VVB confirmed that RDF produced is combusted to produce electricity and no GHG other than biogenic CO_2 is generated during the process. This is confirmed based on waste characterisation report/36/ for RDF to be burned, operational parameters established in consent from PCB/14/ and boiler inspectorate certificate/8/ which has to be followed by PP. As per submitted consent from PCB, stack gas parameters were checked which has to be followed by PP as per regulatory requirement and the same confirmed that no other GHG is generated through the

			process. Hence this criterion is fulfilled.
5	In case of gasification, the process shall ensure that all the syngas produced, which may contain non-CO_2 GHG, will be combusted and not released unburned to the atmosphere. Measures to avoid physical leakage of the syngas between the gasification and combustion sites shall also be adopted.	The project activity does not involve gasification process. Hence this condition is not applicable.	During on-site, VVB confirmed that RDF produced is combusted to produce electricity and involves no gasification in this process as cross checked based on single line diagram/23/ also. Hence this criterion is fulfilled.
6	In case of RDF/SB processing, the produced RDF/SB should not be stored in such a manner as resulting in high moisture and low aeration favouring anaerobic decay. Project participants shall provide documentation showing that further handling and storage of the produced RDF/SB does not result in anaerobic conditions and do not lead to further absorption of moisture.	As per the plant design capacity, the project utilises about 311 ton of RDF per day and generate electricity with an installed capacity of 7.5 MW. The pre-processing section has sufficient design capacity to treat 600 TPD waste. Also, the boiler has a sufficient factory gate permissible limit to treat 311 TPD waste. As per the waste characterisation, out of 600 TPD waste, the processed RDF is 311 TPD remaining is the inert waste. The processed RDF is not stored in the bunkers except during major shutdown of the plant. However, during plant shutdown, the RDF will be stored in enclosed bunker. The RCC bunker is provided with adequate ventilation to promote aerobic conditions. Thus, the storage of RDF during plant shutdown will not be subjected to anaerobic conditions.	During on-site, VVB confirmed that RDF generated is with low moisture content which was confirmed based on visual inspection and test reports of the RDF submitted/36/. Further, it is not stored but immediately burned in the boiler on FIFO basis as evident from discussion with PP representatives, on-site observations. The storage resulting in high moisture is not possible as designated pre-processing section in RCC bunker is an enclosure and no water is added to RDF before burning in the boiler as confirmed during on-site visit. Further, as PP has confirmed in case of shutdown, RDF is stored within the designated preprocessing section in RCC bunker as no other space is available for the storage and the bunker as enough capacity as confirmed based on EPC contract/18/ and DPR/16/ ; wherein development of

			anaerobic conditions is minimal. Hence this criterion is fulfilled.
7	In case of RDF/SB processing, local regulations do not constrain the establishment of RDF/SB production plants/thermal treatment plants nor the use of RDF/SB as fuel or raw material.	There are no local regulations that constrain the production/ utilisation of RDF. However, the project proponent has obtained necessary consent from State Pollution Control Board (SPCB) for the establishment of waste to energy plant. Hence this criterion is not applicable.	VVB has checked the consent received from state pollution control board/14/ for operating the RDF processing unit. Hence this criterion is fulfilled.
8	During the mechanical/thermal treatment to produce RDF/SB no chemical or other additives shall be used.	The RDF is produced from the municipal solid waste sourced from Jamnagar city. The waste is pre-processed to remove the unwanted/inert materials. During the mechanical treatment, no chemical or additives is used to produce RDF. Hence this criterion is not applicable.	VVB during the on-site visit noted that the MSW after pre-treatment is processed through mechanical means which results in RDF production ready for burning in the boiler. This was confirmed during on-site visit and confirmed based on consent by PCB/14/ and single line diagram/23/ which does not mentioned provision for chemical/additives to produce RDF. Hence this criterion is fulfilled.
9	In case residual waste from controlled combustion, gasification or mechanical/thermal is stored under anaerobic conditions and/or delivered to a landfill, emission from the residual waste shall to be taken into account using the first order decay model (FOD) described in AMS-III.G.	The residual waste from the controlled combustion process includes bottom ash and fly ash. The bottom ash and fly ash are handed to the brick manufacturers on daily basis. The project facility has two silos for storing fly ash and shed for storing bottom ash. Therefore, it is not subjected to anaerobic storage. Hence this condition is not applicable.	During on-site visit, VVB has checked and confirmed that bottom ash and fly ash is not stored under anaerobic condition but is stored in two designated silos. VVB during on-site visit, checked the records of bottom ash and fly ash generation/41/ which is handed over to the brick manufacturers on daily basis which is confirmed based on ash transfer records.

			Thus, VVB ensured that emissions from the residual waste need not to be considered.
CDM small scale methodology : AMS I.D, ver. 18.0 Title: Grid connected renewable electricity generation			
1	This methodology is applicable to project activities that: *(a)* Install a Greenfield plant; *(b)* Involve a capacity addition in (an) existing plant(s); *(c)* Involve a retrofit of (an) existing plant(s); *(d)* Involve a rehabilitation of (an) existing plant(s)/unit(s); or *(e)* Involve a replacement of (an) existing plant(s).	The project activity is a green field, Indian grid connected renewable waste to energy plant. Therefore, it confirms to the said criteria.	This is a greenfield project established to treat MSW and generate electricity from the same. This is confirmed based on land Possession receipt/20/, consent to establish/operate from state PCB/14/ and PPA/22/. All these documents confirmed that there was no existing plant at the project site prior to the current project which treated MSW and generated electricity. Hence this criterion is fulfilled.
2	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: *(a)* The project activity is implemented in an existing reservoir with no change in the volume of reservoir; *(b)* The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is	The project activity is installation of new grid connected waste to energy plant. Therefore, the said criterion is not applicable.	The mentioned criterion is not applicable as it is a grid connected waste to energy project activity and not a hydro power project activity. The same was verified by the assessment team on the basis of the commissioning certificate/11/ submitted by the PP..

	greater than 4 W/m^2; *(c)* The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m^2.		
3	If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The project activity is the installation of a new grid connected waste to energy plant. Hence this criterion is not applicable	This is a greenfield project established to treat MSW and generate electricity from the same. The assessment team on the basis of the commissioning certificate/11/ and onsite audit confirms that the unit do not co-fires fossil fuel. Hence this criterion is not applicable.
4	Combined heat and power (co-generation) systems are not eligible under this category.	The project activity is the installation of a new grid connected waste to energy plant. Hence this criterion is not applicable	This is a greenfield project established to treat MSW and generate electricity from the same. The assessment team on the basis of the commissioning certificate/11/ and onsite audit confirms that no co-generation system is involved. . Hence this criterion is not applicable.
5	In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	The project activity is the installation of a new grid connected waste to energy plant. Hence this criterion is not applicable	This is a greenfield project established to treat MSW and generate electricity from the same. The assessment team on the basis of the commissioning certificate/11/ and onsite audit confirms that it is installation of new grid connected waste to energy plant and no capacity addition is involved.. Hence

			this criterion is not applicable.
6	In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	The project activity is the installation of a new grid connected waste to energy plant. Hence this criterion is not applicable.	This is a greenfield project established to treat MSW and generate electricity from the same. The assessment team on the basis of the commissioning certificate/11/ and onsite audit confirms that it is installation of new grid connected waste to energy plant and no retrofit, rehabilitation is involved. Hence this criterion is not applicable.
7	In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid, then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	The project activity involves treatment of municipal waste generated from Jamnagar City to produce RDF (Refused Derived Fuel). The relevant methodology AMS-III. E. is used for the methane avoidance component through controlled combustion, gasification or mechanical/thermal treatment. There is no recovery of methane from waste. Hence this criterion is not applicable.	This is a greenfield project established to treat MSW and generate electricity from the same. This is confirmed based on land Possession Receipt/20/, consent to establish/operate from state PCB/14/ and PPA/22/. The methane avoidance part is claimed under AMS III.E as confirmed earlier. VVB noted that as per concession agreement/13/, fresh waste is directly deposited at the project site by municipal corporation and no methane recovery is possible from waste as deposited waste after processing is directly burned in the boiler/14/. Hence this criterion is fulfilled.
8	In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions	The project activity involves treatment of municipal waste generated from Jamnagar	The assessment team on the basis of onsite audit, the commissioning certificate/11/ and Consent to establish by the

	from cultivation of biomass" shall apply.	City to produce RDF (Refused Derived Fuel). Hence this criterion is not applicable.	Pollution control board/14/ confirms that the project activity involves treatment of municipal waste generated from Jamnagar city to produce RDF. Thus, the project activity do not involves biomass. Hence this criterion is not applicable.
Tool 03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, version 03.0			
1.	This tool provides procedures to calculate project and/or leakage CO_2 emissions from the combustion of fossil fuels. It can be used in cases where CO_2 emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted and its properties. Methodologies using this tool should specify to which combustion process j this tool is being applied.	The project involves consumption of diesel for the operation of waste handling vehicle and loaders, and for the DG sets. Hence the project activity meets the applicable condition.	As observed during on-site visit, PP uses diesel for waste handling vehicles, waste loaders into bunker and for DG set used as a backup in case of emergency. The same was also confirmed on the basis of the approval for transformer and DG set installation/15/ and vehicles used by PP for waste handling as observed during the on-site visit. Hence this criterion is fulfilled.
Tool 04: Tool to calculate emissions from solid waste disposal sites, version 08.1			
1	The tool can be used to determine emissions for the following types of applications Application A: The CDM project activity mitigates methane emissions from a specific existing SWDS. Methane emissions are mitigated by capturing and flaring or combusting the methane (e.g., "ACM0001: Flaring or use of landfill gas"). The methane is generated from waste disposed in the past, including prior to the start of the CDM project activity. In	The project activity involves treatment of municipal waste generated from Jamnagar City to produce RDF (Refused Derived Fuel). The methane emissions from waste disposed is avoided during the crediting period through controlled combustion of RDF. Hence the condition B is applicable to the project activity.	VVB noted during the on-site visit that the project diverts fresh MSW from reaching the landfill site and it is combusted after mech. Treatment to generate electricity in line with Concession Agreement between Jamnagar Municipal Corporation and GoodWatts WTE Jamnagar Private Ltd./13/ Hence application B is appropriate scenario.

	these cases, the tool is only applied for an ex-ante estimation of emissions in the project design document (CDM-PDD). The emissions will then be monitored during the crediting period using the applicable approaches in the relevant methodologies (e.g., measuring the amount of methane captured from the SWDS); Application B: The CDM project activity avoids or involves the disposal of waste at a SWDS. An example of this application of the tool is ACM0022, in which municipal solid waste (MSW) is treated with an alternative option, such as composting or anaerobic digestion, and is then prevented from being disposed of in a SWDS. The methane is generated from waste disposed or avoided from disposal during the crediting period. In these cases, the tool can be applied for both ex-ante and ex post estimation of emissions. These project activities may apply the simplified approach detailed in 0 when calculating baseline emissions.		
Tool 07: Tool to calculate the emission factor for an electricity system, version 07.0			
1	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that	The project activity is a greenfield waste to energy generation plant and hence, according to the applied methodology, the baseline scenario is electricity delivered to the grid by the project activity that would have otherwise	This is a greenfield project established to treat MSW and generate electricity from the same which is fed into the national electricity grid. This is confirmed based on land Possession receipt/20/, consent to establish/operate from

	results in savings of electricity that would have been provided by the grid (e.g., demand-side energy efficiency projects).	been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in "TOOL07: Tool to calculate the emission factor for an electricity system".	state PCB/14/ and PPA/22/. All these documents confirmed that there was no existing plant at the project site prior to the current project which treated MSW and generated electricity.
2	Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e., option II a and option IIb. If option II a is chosen, the conditions specified in "Appendix 1: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to	Since the project activity is grid connected waste to energy project this condition is applicable. Combined margin grid emission factor has been calculated as per the CO_2 emission factor data base published by the CEA in which for the calculation of emission factor CEA have only considered grid connected plants.	This is a greenfield project established to treat MSW and generate electricity from the same which is fed into the national electricity grid. This is confirmed based on consent to establish/operate from state PCB and PPA. Hence this criterion is fulfilled. PP has used CEA database, version 18.0[17] which is the most recent version for calculation of grid emission factor which is acceptable.

[17] https://cea.nic.in/cdm-co2-baseline-database/?lang=en

	constraints in generation and not to other aspects such as transmission capacity.		
Tool 12: Project and leakage emissions from transportation of freight, version 01.1.0			
1.	This tool is applicable to project activities which involve freight transportation by road and where transportation is not the main project activity. This tool is not applicable to project activities where transportation is the main source of greenhouse gases emissions. This tool does not provide procedures to estimate baseline emissions from road transportation of freight. The tool only provides to determine CO_2 emissions. CH_4 and N_2O emissions are excluded for simplification as they are small compared to CO_2 emissions.	The project activity is a greenfield waste to energy generation plant. The project activity involves transportation of Municipal Solid Waste (MSW) from the waste collection point to the project site. The transportation of MSW is not the main project activity. Hence, this tool is applicable.	VVB during on-site visit noted that fresh MSW is transported from the city to the project site, the same is verified by the assessment team on the basis of the Concession agreement/13/ submitted by the PP and generated ash is taken to brick manufacturers. This involves freight transportation by road and hence this criterion is fulfilled.
2.	In addition, the tool is applicable for the determination of project or leakage emissions from freight transportation by rail in project activities where transportation is not the main project activity.	The project activity involves estimation of project emissions from transportation of freight by road. Hence this condition is not applicable.	VVB during on-site visit noted that fresh MSW is transported from the city to the project site and generated ash is taken to brick manufacturers. This involves freight transportation by road and not by rail as per the criteria. hence this criterion is not applicable.
Tool 21: Demonstration of additionality of small-scale project activities, version 13.1			
1	The use of the methodological tool "Demonstration of additionality of small-scale project activities" is not mandatory for project participants when proposing new methodologies. Project participants and coordinating/managing entities may propose	Since the applied technology is not a new methodology project proponent has applied this tool for the demonstration additionality in compliance with the tool. Hence this tool is applicable.	PP is using existing CDM approved methodology and hence this tool is applicable.

	alternative methods to demonstrate additionality for consideration by the Executive Board.		
2	Project participants and coordinating/managing entities may also apply "TOOL19: Demonstration of additionality of microscale project activities" as applicable.	This is a small-scale project activity hence TOOL19: "Demonstration of additionality of microscale project activities" is not applicable.	The project activity is not a micro-scale project and hence this tool is applicable and not Tool 19.
Tool 27: Investment analysis, version 12.0			
1	This methodological tool is applicable to project activities that apply the methodological tool "Tool for the demonstration and assessment of additionality", the methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality", the guidelines "Non-binding best practice examples to demonstrate additionality for SSC project activities", or baseline and monitoring methodologies that use the investment analysis for the demonstration of additionality and/or the identification of the baseline scenario.	The project activity applies "non-binding best practice examples to demonstrate additionality for SSC project activities", Hence this tool is applicable.	PP is applying "non-binding best practice examples to demonstrate additionality for SSC project activities" and hence Tool 27 is applicable as for investment analysis the same is required by PP.
2	In case the applied approved baseline and monitoring methodology contains requirements for the investment analysis that are different from those described in this methodological tool, the requirements contained in the methodology shall prevail.	The project activity is a small-scale grid connected Waste to Energy power project. It refers to the "non-binding best practice examples to demonstrate additionality for SSC project activities", Hence this tool is applicable.	PP is applying "non-binding best practice examples to demonstrate additionality for SSC project activities" and hence Tool 27 is applicable as for investment analysis the same is required by PP.

VVB noted that PP has selected appropriate CDM methodologies and tools as per these methodologies. The project follows applicability criteria of the meths and tools and same is checked and confirmed.

Findings: CL 04 was raised and are closed successfully. Refer appendix 3 for more details.

3.3.3 Project Boundary

PP has defined the project boundary in accordance with both the applied methodologies:

According to paragraph 21 of AMS-III.E, version 17.0, the project boundary are the physical, geographical sites:

(a) Where the solid waste would have been disposed or is already deposited and the avoided methane emission occurs in absence of the project activity;
(b) Where the treatment of biomass through controlled combustion, gasification or mechanical/thermal treatment takes place;
(c) Where the final residues of the combustion process will be deposited (this parcel is only relevant to controlled combustion activities);
(d) And in the itineraries between them, where the transportation of wastes and combustion residues and/or residues of gasification and mechanical/thermal treatment process occurs.

AS per applicable methodology PP shall consider existing waste disposal landfill site, the project site where combustion of waste is taking place, ash disposal location and itineraries between them.

VVB noted that , in the project boundary, PP has considered,

existing solid waste disposal site (SWDS) where the solid waste would have been disposed and the avoided methane emission occurs in absence of the project activity and the final residues of the combustion process will be deposited;

The current project activity which involves the treatment of waste through controlled combustion;

And in the itineraries between existing SWDS and project activity for the transportation of wastes and combustion residues.

VVB noted that, all these are clearly demonstrated and considered in the project boundary and hence acceptable,

This is clearly demonstrated in the below diagram by PP which is acceptable.

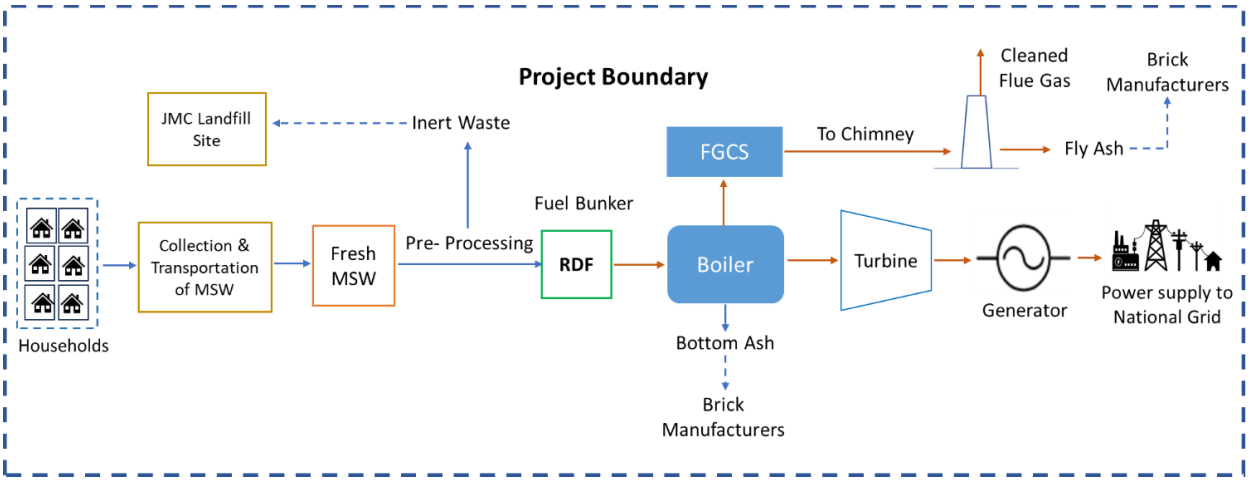

Figure 1: project boundary of the project activity

According to paragraph 18 of AMS-I. D, version 18, the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

Thus, in line with the applicable methodology PP has considered project power unit and existing national electricity grid to which this plant is connected to. The project activity involves incineration of RDF prepared from MSW and generated electricity is exported to the national grid. VVB noted that, all these are clearly demonstrated and considered in the project boundary and hence acceptable.

The project boundary as depicted by PP is as below which was checked to confirm that each GHG source, sink and reservoir is considered in accordance with the applied methodologies.

Source		Gas	Included?	Justification/Explanation
Baseline	Emissions from decomposition of waste at the SWDS	CO_2	No	CO_2 emissions from the decomposition of fresh waste are not accounted.
		CH_4	Yes	The major source of emissions in the baseline.
		N_2O	No	N_2O emissions are small compared to CH_4 emissions from landfills. Exclusion of this gas is conservative
	Emissions from electricity generation	CO_2	Yes	Major source. Electricity generation emission is included in electricity grid-based emissions.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
Project	Emissions from on-site fossil fuel	CO_2	No	CO_2 emission from fossil fuel consumption for the operation of the project activity.
		CH_4	No	Excluded for simplification. This is conservative.

Source		Gas	Included?	Justification/Explanation
	consumption due to the project activity	N_2O	No	Excluded for simplification. This is conservative.
	Emissions from on-site electricity use	CO_2	Yes	Electricity consumed for the operation of the project activity will be supplied from the Grid.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Emission from the waste treatment processes	CO_2	Yes	CO_2 emission generated from combustion of RDF.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Emissions through incremental transportation	CO_2	Yes	CO_2 emission generated from incremental transportation.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.

Findings: CL 05 was raised and are closed successfully. Refer appendix 3 for more details.

3.3.4 Baseline Scenario

As per para. 28 of AMS-III.E, the baseline scenario for the project activity is the situation where, in the absence of the project activity, organic waste matter is left to decay within the project boundary and methane is emitted to the atmosphere. The yearly baseline emissions are the amount of methane that would have been emitted from the decay of the cumulative quantity of the waste diverted or removed from the disposal site, to date, by the project activity, calculated as the methane generation potential using the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site".

VVB during on-site visit, through interviews with the local stakeholders and through document review such as concession agreement which mentions diversion of fresh MSW from existing dump site for the project confirmed that prior to the project implementation, MSW in Jamnagar city was sent to landfill and used to get decayed in anaerobic condition without any methane recovery system for flaring or energy recovery purpose. Thus, this anaerobic condition will release methane emissions into the atmosphere.

Thus, VVB accepts the baseline scenario as per AMS III.E is correctly established and deemed reasonable.

As per para. 19 of AMS-I. D, the baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.[18]

[18] https://www.irena.org/-/media/Files/IRENA/Agency/Statistics/Statistical_Profiles/Asia/India_Asia_RE_SP.pdf

As confirmed based on consent to establish/operate and PPA, the project is a greenfield project generating and feeding the same in the electricity grid. Prior to the implementation of the project activity, same amount of electricity would have been generated through fossil fuel fired grid connected energy plants.

Thus, VVB accepts the baseline scenario as per AMS I.D is correctly established and deemed reasonable.

VVB confirms that PP has submitted the required documentary evidence i,.e. concenssion agreement used in determining the baseline scenario which are relevant, are correctly quoted and interpreted in the project description.

In the VCS PD, PP has considered all the relevant national and /or sectoral policies and circumstances and have listed which were checked and confirmed.

VVB confirms that the procedures for identifying the baseline scenario have been correctly followed and the identified scenario reasonably represents what would have occurred in the absence of the project and identified baseline scenario is justified.

Findings: No findings were raised.

3.3.5 Additionality

The project applies CDM small-scale methodologies for baseline and monitoring. As per small scale requirements, the project investor shall determine the additionality based on "Methodological Tool 21-Demonstration of additionality of small-scale project activities", Version 13.1. The stepwise approach to establish additionality of the project activity has been followed by PP and details of which are provided in the following paragraphs:

Step 1: Is PA aggregate size <= SSC thresholds (15 MW, 60 GWh/y, 60 $ktCO_2e/y$)

The size of the project activity is 7.5 MW electricity generation which is less than 15MW and type III emissions are 44.91 $ktCO_2e$/year i. e. less than 60 $ktCO_2e$/year hence within the SSC thresholds and accepted.

Step 2: Is PA/CPA comprised of one or more technologies from the positive list under TOOL 32

This is a waste to energy-based grid connected power generation project. As per the latest version of the Tool 32: Positive List of Technologies" version 04, This technology is not included in the positive list.

Step 3: Is PA/CPA Aggregate size <= MSC thresholds (5 MW, 20 GWh/Y, 20 $ktCO_2e/y$) under Tool19

Installed capacity of the project is 7.5 MW and 44.91 $ktCO_2e$/year and hence doesn't come under micro activity thresholds.

And step 4 is not applicable since,

i) the project is not implemented in an LDC/SIDS or a SUZ.
ii) It does it involve technologies/measures included under para 11 (c), 12(b) and 13 (b) and end users are not Households/communities/SMEs
iii) it does not comprise of specific grid connected renewable energy technologies recommended by the host country and approved by the Board
iv) it is not implemented in an off grid area (=<12 hrs/day grid availability) supplying to households/communities

Hence, PP has used regular additionality procedure.

Hence, as per Tool 21 paragraph 10 PP has to establish that the project activity would not have occurred anyway due to at least one of the following barriers:

- **Investment barrier:** a financially more viable alternative to the project activity would have led to higher emissions;
- **Technological barrier:** a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
- **Barrier due to prevailing practice:** prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
- **Other barriers:** without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emission would have been higher

The project investor has selected the Investment barrier to demonstrate in a conservative and transparent manner that the project activity is financially unattractive. In line with the guidelines stipulated under Annex 34 of EB 358 ("Non-binding best practice examples to demonstrate additionality for SSC project activities"), a benchmark analysis has been used for the analysis and Equity IRR has been chosen as the financial indicator for the demonstration of the additionality. PP response is accepted as the project does not face any other barrier except investment barrier.

Selection of Appropriate Benchmark:

PP has considered selection of benchmark in accordance with CDM Tool 27- Investment Analysis, Version 12.0 EB 116 Annex 2 i.e. the most recent version. As per appendix of tool 27, simple default option are provided for each country.

Methodology deployed for arriving at a suitable value of Benchmark using Default Value has been described by PP as below which was checked and confirmed.

As the project activity generates power utilizing waste to energy, Group 1 as per para 5a of Appendix of EB 116 Annex 2 has been identified as a suitable category which is correct.

The investment analysis has been carried out in nominal terms. Accordingly, default value as given in table under the Appendix, EB 116 Annex 2 has been adjusted by adding suitable forecasted inflation rate taken from Reserve Bank of India (RBI).

In case of inflation data from RBI, benchmark has been calculated based on inflation rate. As per para 16 of EB 116, Annex 2, the inflation forecast should be for the duration of the crediting period. PP has computed benchmark in the following manner:

Default Value Benchmark:
The cost of equity is determined by selecting the values provided in the table of the Appendix, i.e., Default values for cost of equity (expected return on equity) in the Tool 27: Investment analysis, version 12.0.

The Required return on equity (benchmark) was computed in the following manner:

Nominal Benchmark[19] = {(1+Real Benchmark) * (1+Inflation rate)}-1

Where:
Default value for Real Benchmark = 9.77% (as per Appendix of EB 116, Annex 2)
Inflation Rate forecast by RBI[20] : The Inflation rate forecast of the host country; India is published by the Reserve bank of India. Since the investment decision was made in 2017 the RBI Inflation rate forecast has been considered. In line with investment analysis tool, the project owner has considered the next 10 years average inflation rate which is the most appropriate.

Benchmark estimation:

The Cost of Equity has been considered using the "Tool 27: Investment analysis", version 12.0 as the value is the most conservative.

Table under Appendix in EB 116, Annex 2 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India= 9.77%

Hence, benchmark value would be;

Nominal Benchmark = {(1+Real Benchmark) * (1+Inflation rate)}-1
= ((1+9.77%) * (1+4.60%)) – 1 = 14.82%

Inflation Forecast	Benchmark
10 Years	10 Years
4.60%	14.82%

Hence a benchmark of 14.82% has been selected by PP which is found acceptable.

Calculation and comparison of financial indicators:

The period considered for Post Tax Equity IRR calculations is 20 years, which corresponds to the project life as confirmed based on technical specifications submitted for boiler and turbine.

[19] https://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid15_v01.pdf

[20] Reserve Bank of India - Publications (rbi.org.in)

Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, is added back to net profits for the purpose of calculating the financial indicator. Input values considered for the IRR calculations are given below which were cross checked against the submitted document and found acceptable.

Particulars	Value	Unit	Source/Remarks	Assessment
Quantity of MSW received	600	TPD	DPR	VVB has checked the detailed project report/16/ dated 17-March-2017 which was available at the time of investment decision and found the value is in line with the actual MSW intake of the project.
Capacity of the project	7.5	MW	DPR	VVB has checked the detailed project report/16/ dated 17-March-2017 which was available at the time of investment decision and found the value is in line with the actual commissioned turbine specifications of the project.
Operating days	330	-	DPR	VVB has checked the detailed project report/16/ dated 17-March-2017 which was available at the time of investment decision and found the value is appropriate as per discussion with PP during on-site visit.
PLF First Year	65%	%	DPR	VVB has checked the detailed project report/16/ dated 17-March-2017 which was available at the time of investment decision and found the value is appropriate as per discussion with PP during on-site visit. Further VVB has to confirm whether the considered PLF is in line with ER 48 annex 11 requirements as below: PP has submitted the loan application no: G5045001, dated 02/09/2020 which references to DPR wherein the PLF for the project activity is mentioned. Thus, this fulfills the requirement of EB 48 annex 11 and hence the PLF value is acceptable.
Annual Net generation First Year	38.61	GWh	Calculated	This is calculated value in the excel sheet based on project capacity, operating dates and PLF and the calculation is found correct.
PLF from Second Year	75%	%	DPR	VVB has checked the detailed project report dated 17-March-2017 which was available at the time of investment decision and found the value is appropriate as per discussion with PP during on-site visit. Further VVB has to confirm whether the considered PLF is in line with ER 48 annex 11 requirements.

				PP has submitted the loan application no: G5045001, dated 02/09/2020 which references to DPR wherein the PLF for the project activity is mentioned. Thus, this fulfills the requirement of EB 48 annex 11 and hence the PLF value is acceptable.
Annual Net generation from second year	44.550	GWh	Calculated	This is calculated value in the excel sheet based on project capacity, PLF and days of operation and is correct.
Auxiliary Electricity Consumption	12.00 %	%	GERC Tariff Order, 2016, Pg 31	The tariff order https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf was checked to confirm the value considered and found correct. Since this is the most recent available tariff order mentioning the auxiliary ele. Consumption % same is found acceptable
Net Electricity Generation-First Year	33.98	GWh	Calculated	This is calculated value in the excel sheet based on project capacity, operating dates and PLF and % auxiliary consumption and hence the calculation is found correct.
Net Electricity Generation-from Second Year	39.20	GWh	Calculated	This is calculated value in the excel sheet based on project capacity, operating dates and PLF and % auxiliary consumption and hence the calculation is found correct.
Project cost	1226.00	INR Million	DPR	VVB has checked the detailed project report dated 17-March-2017 which was available at the time of investment decision. The actual project cost is 1262 million as confirmed based on submitted CA certificate/28/ and EPC contracts/18/ which is higher than the cost considered at the time of investment decision and hence accepted.
Debt	70%	%	DPR	VVB has checked the detailed project report dated 17-March-2017 which was available at the time of investment decision. The approved loan is for 72% of total project cost based on loan sanction letter/43/ and accepted.
Equity	30%	%	DPR	VVB has checked the detailed project report dated 17-March-2017 which was available at the time of investment decision. The approved loan is for 72% of total project cost and hence equity will remain the same and accepted.
Debt	858.20	INR Million	Calculated	This is calculated value based on total project cost and debt % as mentioned above and is correct.

Equity	367.80	INR Million	Calculated	This is calculated value based on total project cost and equity % as mentioned above and is correct.
Interest rate	11.80 %	%	GERC Tariff Order, 2016, Pg 32	The value was cross checked against tariff order https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf and found correct.
Debt Repayment tenure	15	years	DPR	VVB has checked the detailed project report dated 17-March-2017 which was available at the time of investment decision and found acceptable.
Moratorium	1	year	DPR	VVB has checked the detailed project report dated 17-March-2017 which was available at the time of investment decision and the value is found correct hence acceptable.
Operation and Maintenance	73.6	INR Million	GERC Tariff Order, 2016, Pg 18	The tariff order https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf mentions O & M cost shall be 6% of total capital cost and same is considered by PP and found correct. Since the O & M cost is based on state tariff order and hence no further breakdown in the O&M cost is available at the time of investment decision which is acceptable.
Annual Escalation for O&M	5.72	%	GERC Tariff Order, 2016, Pg 18	The value was cross checked against tariff order https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf and found correct.
Service tax on O&M services	15.00	%	As per prevailing tax rates https://www.teachoo.com/3875/320/What-is-the-Rate-of-Service-Tax--for-2015-16-and-2016-17/category/Basics/	The value considered is as per the common practice and found acceptable.
Tariff	7.07	INR/kWh	GERC Tariff Order, 2016, Pg 32	The value was cross checked against tariff order https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf and found correct. Moreover, PP has signed PPA with the same rate and hence acceptable. The PPA copy review has confirmed that JMC has awarded project at a fixed tariff of 7.07 INR/kWh with 6.31 INR/kWh is the tariff payable by GUVNL and 0.76 INR/kWh is the differential amount paid by the state government. Thus, VVB found the considered tariff value appropriate which is supported with actual PPA

				signed at fixed value for the complete crediting period at 0.07 INR/kWh
Depreciation Rate (Book) (Up to 10 years)	7.00 %	%	GERC Tariff Order, 2016, Pg 32	The value considered is as per the common practice and found acceptable.
(11 to 20 years)	2.00 %	%	GERC Tariff Order, 2016, Pg 32	The value considered is as per the common practice and found acceptable.
Project cost	1226.00	INR Million	DPR	VVB has checked the detailed project report dated 17-March-2017 which was available at the time of investment decision. The actual project cost is 1262 million as confirmed based on submitted CA certificate and EPC contracts which is higher than the cost considered at the time of investment decision and hence accepted.
Land cost	0	INR Million	DPR	VVB has checked the detailed project report dated 17-March-2017 which was available at the time of investment decision. The actual land cost is 0 million as confirmed during on-site interviews as the land is provided by Jamnagar Municipal Corporation.
Gross Depreciable Value	1226.00	INR Million	Calculated	This is calculated value in the excel sheet and is correct as it is the same as that of total project cost.
Salvage Value (@ 10%)	122.60	INR Million	Calculated	This is calculated value @ 10% of project cost and is correct.
Net Depreciable Value	1103.40	INR Million	Calculated	This is calculated value based on gross value and salvage value and is correct.
Residual value	122.60	INR Million	Calculated	This is calculated value as per the salvage value and is correct.
IT Depreciation Rate	7.69 %	%	As Per Income Tax, Depreciation rates for power generating units (http://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm)	The value considered is as per the common practice and found acceptable.
Income tax rate	34.27 %	%	Calculated	This is calculated value and is correct.
MAT rate	21.13 %	%	Calculated	This is calculated value and is correct.
Salvage Value	10%	%	GERC Tariff Order	The value is considered as per https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf and is standard practice and hence accepted.
Working capital Fuel stock for 30 days O&M expenses for one month, Receivables of one-	39,33	INR million	GERC tariff order	The value is considered as per https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf and is standard practice and hence accepted.

month charges for sale of electricity, Maintenance spares at 1% of the capital cost escalated at 5% per annum.				
Interest on working capital	11.80	%	GERC tariff order	The value is considered as per https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf and is standard practice and hence accepted.

Based on the assumption, PP has calculated post tax equity IRR which is less than the benchmark value and hence VVB accepts that it is evident that the project is not financially attractive as the equity IRR is below the benchmark value.

Post tax Equity IRR	
Project Activity	3.88%
Benchmark Value	14.82%

Sensitivity Analysis:
As required by Annex 02 of EB 116, only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation.
PP has identified the total revenue from the project activity is dependent on the Tariff, Plant Load Factor, Project Cost, Fuel cost and O&M Costs constitute more than 20% of the project costs. These factors have been subjected to a 10% variation on either side and the results of the sensitivity analysis indicate that even after applying such variation the IRR does not cross the benchmark as checked and confirmed by VVB.

Variation %	-10%	Normal	10%	Variation required to reach benchmark	Value required to reach benchmark
Tariff	NA	3.88%	12.51%	13.21%	8.004 INR/kWh
PLF	NA	3.88%	11.56%	15.40%	87%
Project Cost	13.34%	3.88%	NA	-11.68%	1082.80 INR (Mn)
O&M Cost	8.77%	3.88%	NA	-28.55%	52.56 INR (Mn)

a) **Tariff:** The Tariff rate of electricity used for investment analysis i.e., 7.07 INR/kWh is sourced from the GERC Tariff order applicable at the time of investment decision. Furthermore, the project will breach the benchmark value at a tariff variation of 13.21%. However, the actual tariff based on the PPAs signed is same to the estimated tariff and much below the tariff value required benchmarking value. Hence, increase in tariff is unlikely and accepted by VVB.

b) **PLF:** The PLF value considered is based on DPR i.e., 75% during second year and the IRR breach the benchmark value at a PLF variation of 15.40%. The submitted data has confirmed that PLF achieved till date is not even 50% thus, achieving more than 75% PLF is not found likely.

c) **Project Cost:** The project cost considered for investment analysis i.e., 1,226.0 million INR. The cost is sourced from DPR which is based on the negotiations with supplier. A variation of -11.68% is required for IRR to breach benchmark which is not possible as the project is already commissioned. The actual cost incurred by the PP is 1,262 million INR which is higher than the value required to breach the benchmark which is within the sensitivity applied.

d) **O&M Costs:** The sensitivity analysis reveals that O&M will breach the benchmark at negative values and is hypothetical case. Since the O&M cost is subject to escalation and subject to inflationary pressure, any reduction in the O&M costs is highly unlikely. VVB has noted that since the value breaching is an hypothetical case, same is accepted.

VVB, based on sensitivity analysis concluded that the project activity is additional with reasonable variation in values and is not likely to reach the benchmark value. The occurrence of these events is unlikely.

Conclusion:
As described above, the project fulfils all necessary requirements of additionality specified in the Tool 21- Demonstration of Additionality of Small-scale Project Activities, version 13.1. Hence, the project is deemed additional.

Findings: CAR 02 was raised and are closed successfully. Refer appendix 3 for more details.

3.3.6 Quantification of GHG Emission Reductions and Removals

PP has demonstrated quantification of GHG emission reductions and removals in section 4 of VCS PD which was checked and the VVB assessment is presented below. The calculations provided for emission reductions below were checked based on sourced documents i. e. ER sheet[/2/], detailed project report[/16/], commissioning certificate[/11/], weblink for CEA database (https://cea.nic.in/cdm-co2-baseline-database/?lang=en) and other documents submitted by PP.

Baseline emissions:

Baseline Emissions from Solid Waste Disposal Sites:
As per para 17, equation (1) of tool 04, version 08.1, the baseline emissions for a year is calculated using the following formula:

$$\left.\begin{matrix} BE_{CH4,SWDS,y} \\ PE_{CH4,SWDS,y} \\ LE_{CH4,SWDS,y} \end{matrix}\right\} = \varphi_y \times (1 - f_y) \times GWP_{CH4} \times (1 - OX) \times \frac{16}{12} \times F \times DOC_{f,y}$$

$$\times MCF_y \times \sum_{x=1}^{y} \sum_{j} \left(W_{j,x} \times DOC_j \times e^{-k_j \times (y-x)} \times \left(1 - e^{-k_j}\right) \right)$$

Where,

$BE_{CH4,SWDS,y}$ / $PE_{CH4,SWDS,y}$ / $LE_{CH4,SWDS,y}$ = Baseline, project or leakage methane emissions occurring in year y generated from waste disposal at a SWDS during a time period ending in year y (t CO_2e/yr)

x = Years in the time period in which waste is disposed at the SWDS, extending from the first year in the time period (x = 1) to year y (x = y)

y = Year of the crediting period for which methane emissions are calculated (y is a consecutive period of 12 months)
$DOC_{f,y}$ = Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in the SWDS for year y (weight fraction)
$W_{j,x}$ = Amount of solid waste type j disposed or prevented from disposal in the SWDS in the year x (t)
φ_y = Model correction factor to account for model uncertainties for year y
f_y = Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y
GWP_{CH4} = Global Warming Potential of methane
OX = Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
F = Fraction of methane in the SWDS gas (volume fraction)
MCF_y = Methane correction factor for year y
DOC_j = Fraction of degradable organic carbon in the waste type j (weight fraction)
k = Decay rate for the waste type j (1 / yr)
j = Type of residual waste or types of waste in the MSW

The VCS PD was checked and it is confirmed that PP has corrected applied the relevant para and equations/parameters are correctly mentioned and hence acceptable.

Baseline Emissions from Electricity Generation:
As per para 22 of AMS- I.D, version 18.0, the baseline emissions include only CO_2 emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The baseline emissions are to be calculated using equation (1) of AMS-I. D, version 18.0 as follows:

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

Where,
BE_y = Baseline emissions in year y (t CO_2)
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

The VCS PD was checked and it is confirmed that PP has corrected applied the relevant para and equations/parameters are correctly mentioned and hence acceptable.

To calculate Combined margin emissions factor i. e. $EF_{grid,CM,y}$, PP has used the altest version of tool 07 and same is found correct and assment is presented below.

As per para 14 of Tool 7, version 07.0 the following steps have been followed by PP.

(a) **Step 1:** Identify the relevant electricity systems;

(b) **Step 2:** Choose whether to include off-grid power plants in the project electricity system (optional);
(c) **Step 3:** Select a method to determine the operating margin (OM);
(d) **Step 4:** Calculate the operating margin emission factor according to the selected method;
(e) **Step 5:** Calculate the build margin (BM) emission factor;
(f) **Step 6:** Calculate the combined margin (CM) emission factor.

Step 1: Identify the relevant electricity systems
As described in tool "For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems". It also states that "If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used". Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern.

However, since August 2006, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e., at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO_2 Baseline Database. As of 31-December-2013, the Southern grid has also been synchronized with the NEWNE grid; hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations serves as the baseline for this project.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)
As per the tool, project owners may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation.

The project owner has chosen only grid power plants in the calculation which is found acceptable.

Step 3: Select a method to determine the operating margin (OM)
The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4:

(a) Simple OM; or
(b) Simple adjusted OM; or
(c) Dispatch data analysis OM; or
(d) Average OM.

The data required to calculate Simple adjusted OM and Dispatch data analysis OM is not possible due to lack of availability of data to project developers. The choice of other two options for calculating operating margin emission factor depends on generation of electricity from low-cost/must-run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, Solar, low-cost biomass, nuclear and solar generation.

Share of Must Run (Hydro/Nuclear) (% of Net generation)							
India	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
	14.6%	14.3%	14.5%	17.0%	16.5%	15.81%	15.33%

Source: Central Electricity Authority (CEA) Database Version 19, 2023[21]

The above data clearly shows that the percentage of total grid generation by low-cost/ must-run plants (on the basis of average of five most recent years) for the Indian grid is less than 50 % of the total generation. Thus, the Average OM method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

(a) **Ex-ante option:** if the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required.

OR

(b) **Ex-post option:** if the ex-post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

PP has chosen ex-ante option for calculation of Simple OM emission factor using a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PD to the VCS verifier for verification. OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the crediting period.

Step 4: Calculate the operating margin emission factor ($EF_{grid,OM\ Simple,y}$) according to the selected method:
The operating margin emission factor has been calculated using a 3-year data vintage:

Net Generation in Operating Margin (GWh) (incl. Imports)			
INDIAN Grid	2020-2021	2021-2022	2022-2023
	958,218	1,035,672	1,117,846
Simple Operating Margin (tCO_2/MWh) (incl. Imports)			
INDIAN Grid	2020-2021	2021-2022	2022-2023
	0.9402	0.9605	0.9710

Weighted Generation Operating Margin	
INDIAN Grid	0.9580

[21] https://cea.nic.in/cdm-co2-baseline-database/?lang=en

STEP 5: Calculate the build margin emission factor ($EF_{BM,y}$):
Option 1 as described above is chosen to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available from CEA Database version 18.0 at the time of submission of PDD and is fixed for the entire crediting period.

Build Margin (tCO_2/MWh) (not adjusted for imports)	
INDIAN Grid	2022-2023
	0.8670

STEP 6: Calculate the combined margin (CM) emissions factor:

Combined Margin – The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for intermittent and non-dispatch able generation types such as wind and solar photovoltaic, Tool 07- tool to calculate the emission factor for an electricity system, Version 07.0.0, EB 100, Annex 100, Annex 4, allows to weigh the operating margin and Build margin at 75% and 25%, respectively for wind and solar projects and 50% and 50%, respectively for hydro and biomass projects.

As per para 85, equation (16) of Tool 07, version 07.0, the combined margin emissions factor is calculated as follows:

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

Where,

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (t CO_2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (t CO_2/MWh)
w_{OM} = Weighting of operating margin emissions factor (percent)
w_{BM} = Weighting of build margin emissions factor (percent)

Hence, Combined Margin Emission Factor ($\boldsymbol{EF_{grid,CM,y}}$) = 0.50*0.9580 + 0.50*0.8670 = 0.9125 tCO_2/MWh

VVB has checked and confirmed that the calculation of emission factor is appropriately described and found correct.

The plant power generation details as mention and confirmed are as below:

Power generation capacity	MW	7.5
Plant Load Factor (First Year)	%	65%
Plant Load Factor (From Second Year)	%	75%
Operating days	days	330
Total power generation (first year)	MWh/yr	38,610
Total power generation (from second year)	MWh/yr	44,550
Auxiliary Electricity Consumption	%	12%

Hence, the total baseline emissions would be;

Total power generation (from first year) = 7.5*65%*330*24
= 38,610 MWh/year
Total power generation (from second year) = 7.5*75%*330*24
= 44,550 MWh/year
Auxiliary Power Consumption = 12%
Net Power Generation (first year) = 38,610*(1-0.12)
= 33,977 MWh/year

Net Power Generation (from second year) = 44,550 *(1-0.12)
= 39,204 MWh/year
Total Baseline Emission reductions (first year) = 33,977 * 0.9125
= 31,003 tCO_2e/year
Total Baseline Emission reductions (first year) = 31,003 tCO_2e/year
Total Baseline Emission reduction (first year) = 39,204 * 0.9125
= 35,773 tCO_2e/year
Total Baseline Emission reductions (from second year) = 35,773 tCO_2e/year

The above calculation presented in the ER sheet was checked and confirmed.

Baseline Emissions from Solid Waste Disposal Sites:

$$\left.\begin{matrix} BE_{CH4,SWDS,y} \\ PE_{CH4,SWDS,y} \\ LE_{CH4,SWDS,y} \end{matrix}\right\} = \varphi_y \times (1 - f_y) \times GWP_{CH4} \times (1 - OX) \times \frac{16}{12} \times F \times DOC_{f,y}$$

$$\times MCF_y \times \sum_{x=1}^{y} \sum_{j} \left(W_{j,x} \times DOC_j \times e^{-k_j \times (y-x)} \times \left(1 - e^{-k_j}\right) \right)$$

As per para 27, equation (5) of tool 04, version 08.1, the amount of solid waste type j disposed or prevented from disposal in the SWDS in the year x is calculated as follows:

$W_{j,x} = W_x \times p_{j,x}$

Where,

$W_{j,x}$ = Amount of solid waste type j disposed or prevented from disposal in the SWDS in the year x (t)
W_x = Total amount of solid waste disposed or prevented from disposal in the SWDS in year x (t)
$p_{j,x}$ = Average fraction of the waste type j in the waste in year x (weight fraction)
j = Type of residual waste or types of waste in the MSW
x = Years in the time period for which waste is disposed at the SWDS, extending from the first year in the time period (x = 1) to year y (x = y)

As per para 28, equation (7) of tool 04, version 08.1, the fraction of the waste type j in the waste for the year x or month i are calculated as follows:

$$p_{j,x} = \frac{\sum_{n=1}^{z_x} p_{n,j,x}}{Z_x}$$

Where,

$p_{j,x}$ = Average fraction of the waste type j in the waste in year x (weight fraction)
Z_x = Number of samples collected during the year x
$p_{n,j,x}$ = Fraction of the waste type j in the sample n collected during the year x (weight fraction)
n = Samples collected in year x

The estimation of baseline emissions from solid waste disposal site presented in the ER sheet is as follows:

φ_y	Model Correction Factor	0.85
1-fy	Fraction of methane captured	1.0
GWP_{CH4}	Global Warming Potential of CH_4	28
1-OX	Oxidation factor	0.9
F	Fraction of CH_4	0.5
$DOC_{f,y}$	Fraction of DOC decomposed	0.5
MCF_y	Methane Correction Factor	1

Quantity of RDF processed per day = 311 TPD
Operating days in year x = 330 days
Operating hours in day = 24 hours
Quantity of RDF processed per year (Wx) = 102,630 Tonnes/year

$\boldsymbol{W_{j,x} = W_x \times p_{j,x}}$

All the above values are ex-ante fixed and their assessment is presented below in section 3.3.8.

Composition	$\boldsymbol{p_{j,x}}$ (%)	$\boldsymbol{W_{j,x}}$ (MT)	DOC_j (%)	K_j (1/y)
Food	35.99%	36,937	15	0.400
Paper	1.15%	1,182	40	0.070
Coconut	0.00%	0	43	0.035
Green/Mix	13.42%	13,777	20	0.170
Wood	2.52%	2,590	43	0.035
Plastic	11.82%	12,134	0	-
Cloth	12.49%	12,822	24	0.070
Rubber	0.82%	842	0	0.070
Metal	0.04%	45	0	-
Glass	0.13%	133	0	-
Inert	21.60%	22,168	0	-

In the submitted ER sheet, PP has presented calculation based on total quantity of RDF processed as per DPR and total waste per year (dry basis) based on waste analysis report for the value of Wj,x and same is found correct.

The baseline emissions which are calculated in the ER sheet are checked and tabulated in the following table:

Emission from Food	Emission from paper	Emission from coconut	Emission from green mix	Emission from wood	Emission from cloth	Emission from rubber	$BE_{CH4,SWDS,y}$ (tCO_2e/ year)
13,041.8	228.3	0	3,075.7	273.5	1,485.4	0	18,105
21784	441.1	0	5,670.5	537.7	2,870.3	0	31,304
27,644.1	639.6	0	7,859.7	792.7	4,161.7	0	41,098
31,572.2	824.6	0	9,706.6	1039	5,365.7	0	48,508
34,205.3	997.2	0	11,264.8	1,276.8	6,488.3	0	54,232
35,970.3	1158	0	12,579.4	1,506.4	7,535	0	58,749
37,153.4	1308	0	13,688.5	1,728.1	8,511	0	62,389
Total Baseline Emissions from Solid waste Disposal Site							314,385

Project emissions:

As per para 22, equation (1) of AMS- III. E, version 17.0, the project emissions consist of

$$\mathrm{PE}_{\mathrm{y}} = \mathrm{PE}_{\mathrm{y,comb}} + \mathrm{PE}_{\mathrm{y,transp}} + \mathrm{PE}_{\mathrm{y,power}}$$

Where,

PE_y = Project activity direct emissions in the year y (t CO_2e)

$PE_{y,comb}$ = Emissions through combustion and gasification of non-biomass carbon of waste and RDF/SB in the year y (t CO_2e)

$PE_{y,transp}$ = Emissions through incremental transportation in the year y (t CO_2e)

$PE_{y,power}$ = Emissions through electricity or diesel consumption in the year y (t CO_2e)

As per para 24, equation (2) of AMS- III. E, version 17.0, the project emissions from combustion of the non-biomass (i.e., fossil) carbon content of the wastes and RDF/SB and from the auxiliary fossil fuel consumed will be estimated as follows:

$$PE_{y,comb} = Q_{y,non-biomass} \times 44/12 + Q_{y,fuel} \times EF_{y,fuel}$$

Where,

$Q_{y,non-biomass}$ = Non-biomass carbon of the waste and RDF/SB combusted/gasified in the year y (tonnes of carbon)

$Q_{y,fuel}$ = Quantity of auxiliary fossil fuel used in the year y (tonnes)

$EF_{y,fuel}$ = CO_2 emission factor for the combustion of the auxiliary fossil fuel (tonnes CO_2 per tonne fuel, according to latest IPCC Guidelines)

As per para 20, equation (1) of tool 12, version 01.1.0, the project or leakage emissions are determined as follows:

$$PE_{TR,m} = \sum_{f} D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6}$$

Where,

$PE_{TR,m}$ = Project emissions from transportation of freight monitoring period m (t CO_2)
$D_{f,m}$ = Return trip distance between the origin and destination of freight transportation activity f in monitoring period m (km)
$FR_{f,m}$ = Total mass of freight transported in freight transportation activity f in monitoring period m (t)
$EF_{CO2,f}$ = Default CO_2 emission factor for freight transportation activity f (g CO_2/t km)
f = Freight transportation activities conducted in the project activity in monitoring period m

As per para 6, equation (1) of tool 03, version 03.0, the project emissions through diesel consumption are determined as follows:

$$PE_{FC,j,y} = \sum_{i} FC_{i,j,y} \times COEF_{i,y}$$

Where,
$PE_{FC,j,y}$ = CO_2 emissions from fossil fuel combustion in process j during the year y (tCO_2/yr)
$FC_{i,j,y}$ = Quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr)
$COEF_{i,y}$ = CO_2 emission coefficient of fuel type i in year y (tCO_2/mass or volume unit)

As per para 7 (b), equation (4) of tool 03, version 03.0, the CO_2 emission coefficient $COEF_{i,y}$ is calculated based on net calorific value and CO_2 emission factor of the fuel type i, as follows:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$$

Where,
$NCV_{i,y}$ = Weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$ = Weighted average CO_2 emission factor of fuel type i in year y (tCO_2/GJ)

As per AMS I.D, paragraph 39, for most renewable energy project activities, PE_y = 0. Hence for the current project, project emissions due to electricity generation will be zero as the project is not a geothermal project or does not involve water reservoir.

Project emissions from combustion process of RDF:

As per para 24, equation (2) of AMS- III. E, version 17.0, the project emissions from combustion of the non-biomass (i.e., fossil) carbon content of the wastes and RDF/SB and from the auxiliary fossil fuel consumed will be estimated as follows:

$$PE_{y,comb} = Q_{y,non-biomass} \times 44/12 + Q_{y,fuel} + EF_{y,fuel}$$

The estimation of project emission from combustion of RDF is as follows:

$$Q_{non-biomass} = Q_y \times Default\ dry\ matter\ content\ (\%)) \times FCC_{j,y} \times FFC_{j,y}$$

Where,
Q_y = Amount of waste combusted, gasified or mechanically/thermally treated by the project activity in each year
$FCC_{j,y}$ = Fraction of total carbon content in waste type j in year x

$FFC_{j,y}$ = Fraction of fossil carbon in total carbon content of waste type j in year x (weight fraction)

Waste Type	$p_{j,x}$	Q_y		Q_y	$FCC_{j,y}$	$FFC_{j,y}$	$Q_{y,non\text{-}biomass}$
j	%	TPY (Wet)	Default dry matter content (%)	TPY (Dry)	Total Carbon (%)	Fossil carbon in total carbon (%)	Non-biomass carbon of the RDF (TPY)
Food	35.99%	36,937	40%	14,775	38%	0%	0
Paper	1.15%	1,182	90%	1,064	46%	1%	5
Coconut	0.00%	0	85%	0	50%	0%	0
Green/Mix	13.42%	13,777	40%	5,511	49%	0%	0
Wood	2.52%	2,590	85%	2,202	50%	0%	0
Plastic	11.82%	12,134	100%	12,134	75%	100%	9,100
Cloth	12.49%	12,822	80%	10,257	50%	20%	1,026
Rubber	0.82%	842	84%	707	67%	20%	95
Metal	0.04%	45	100%	45	0%	0%	0
Glass	0.13%	133	100%	133	0%	0%	0
Inert	21.60%	22,168	90%	19,951	3%	100%	599
Total	**100.0%**	**102,630**		**66,779**			**10,824**

$Q_{y,\ fuel}$	1,155	litres
$p_{i.\ y}$	0.88	Kg/litre
$Q_{y,\ fuel}$	1.0164	tonnes
$EF_{y,\ fuel}$	74,800	kg/TJ
$NCV_{i,\ y}$	43.3	TJ/Gg
$EF_{y,\ fuel}$	3.239	tCO_2e/year

For determining value of $Q_{y,fuel}$, PP has used following parameters and its assessment is presented in section 3.3.8 below;

$Q_{y,\ fuel}$	1,155	litres
$p_{i.\ y}$	0.88	Kg/litre
$Q_{y,\ fuel}$	1.0164	tonnes

$EF_{y, fuel}$	74,800	kg/TJ
$NCV_{i, y}$	43.3	TJ/Gg
$EF_{y, fuel}$	3.239	tCO_2e/year

Thus, total project emissions from combustion of RDF and from the auxiliary fossil fuel consumed ($PE_{y,comb}$) = *(10,824 * 44/12)* + (1.0164*3.239)
= 39,692 tCO_2e/year

Project Emissions from fossil fuel combustion:

In line with Tool 03 requirements for project emissions due to fossil fuel combustion, PP has used equation 1 as per para 6 of the applied tool.

Where, $PE_{FC,,y} = \Sigma FC_{i,j,y} \times COEF_{i,y}$

PP has calculated COEFi,y i. e. CO@ emission coefficient in line with option 2 equation 4 of para 7 of the applied tool which is acceptable.

Hence, $COEF_{i,} = NCV_{i,y} \times EF_{CO2,i,y}$

PP has calculated the project emissions based on data in the below table. The assessment of the parameters is provided in section 3.3.8 below.

$FC_{i, j, y}$	77,358	Litres
$p_{i,y}$	0.88	kg/litre
$FC_{i,j, y}$	68.1	tonnes
$NCV_{i,y}$	43.3	TJ / Gg
$EF_{CO2,i,y}$	74,800	Kg /TJ

Fuel consumption on site per year = 77,358 * 0.88
= 68.1 tonnes
CO_2 emissions from fossil fuel combustion = (68.1 *43.3* 74,800)/1,000,000
Project Emissions from fossil fuel combustion = *220* tCO_2e/year

Project Emissions from Incremental Transportation:

The tool 12 Project and leakage emissions from transportation of freight is applicable for the project activity and as per para 20 equation 1, project emission shall be calculated as below.

$$PE_{TR,m} = \sum_{f} D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6}$$

As observed during on-site visit, as on date, the average distance between the project site and collection point in equal to the distance between waste collection and the landfill site in the baseline. However, PP

has confirmed that during monitoring period if, there are any emissions from incremental transportation, the same will be measured and accounted under project emissions.

The collection and transportation of MSW is under the scope of Jamnagar Municipal Corporation. The average distance between the project site and waste collection point is in same range of distance between the waste collection point and the landfill site in the baseline scenario. Hence the project emissions from freight transportation for collection of MSW is considered as zero.

However, PP has considered project emissions for the incremental distance between project plant and disposal of inert waste/ash disposal site which is in line with the applied methodological/tool requirements and demonstrated below. The round trip distance considered for the project emission calculations has been validated through interviewed/plant records during the on-site visit.

Parameter	Description	Unit	Value	Remark
$D_{MSW,m}$	Return trip distance between the origin and destination of freight transportation for collection of MSW	km	0	-
$FR_{MSW,m}$	Total mass of freight transported in freight transportation for collection of MSW	t	600	
N	No of Operating days	days	330	
$D_{inert,m}$	Return trip distance between the origin and destination of freight transportation for disposal of inert waste	km	10	Plant Record
$FR_{inert,m}$	Total mass of freight transported in freight transportation for disposal of inert waste	TPD	289	Plant Record
$D_{ash,m}$	Return trip distance between the origin and destination of freight transportation for disposal of combustion residue	km	22	Plant Record
$F_{ash,m}$	Total mass of freight transported in freight transportation for disposal of combustion residue	TPD	47	Plant Record
$EF_{CO2,f}$	Default CO2 emission factor for freight transportation activity f	g CO2/t km	245	As per table 1 of tool 12, version 01.1.0 (For light Vehicles)
$PE_{y,transp}$	**Project Emissions from Incremental Transportation**	**tCO_2/ year**	**317**	

Leakage emissions:

According to the applied methodology of AMS- III.E, version 17.0, para 37, the RDF produced is not subjected to anaerobic conditions before its combustion. Hence, no leakage emission is accounted in the project activity. As per AMS I.D, renewable energy project does not involve leakage emissions.

Net emission reductions:

As per paragraph 38 of AMS III.E, version 17.0, The emission reduction achieved by the project activity will be measured as the difference between the baseline emission and the sum of the project emission and leakage.

$ER_y = BE_y - (PE_y - LE_y)$ – equation (7)

Where,
ER_y = Emission reductions in year y (t CO_2)
BE_y = Baseline Emissions in year y (t CO_2)
PE_y = Project emissions in year y (t CO_2)
LE_y = Leakage emissions in year y (t CO_2)

As per paragraph 43 of AMS I.D version 18.0, the emission reductions are calculated as follows:

$ERy = BEy - PEy - LE_y$ – equation (9)

Where:
ER_y = Emission reductions in year y (t CO_2)
BE_y = Baseline Emissions in year y (t CO_2)
PE_y = Project emissions in year y (t CO_2)
LE_y = Leakage emissions in year y (t CO_2)

VVB confirms that the methodology and the referenced tools are applied correctly to calculate baseline emissions, project emissions, leakage and net GHG emission reductions and removals.

PP has provided excel datasheet which provides complete calculation for baseline, project and leakage emissions. Same was checked to confirm that the values considered are correct and equations are used in line with the applied methodology and tools. Based on the submitted excel datasheet, VVB checked and confirmed that the values presented for emissions is correct in the below table for the complete 1st crediting period.

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
15-November-2021 to 14-November-2022	49,108	40,229	0	8,878

15-November-2022 to 14-November-2023	67,077	40,229	0	33,831
15-November-2023 to 14-November-2024	76,871	40,229	0	36,641
15-November-2024 to 14-November-2025	84,281	40,229	0	44,052
15-November-2025 to 14-November-2026	90,005	40,229	0	49,776
15-November-2026 to 14-November-2027	94,522	40,229	0	54,293
15-November-2027 to 14-November-2028	98,162	40,229	0	57,933
Total (7 years)	560,026	281,605	0	**278,421**
Average annual emission reductions (tCO_2e)				**39,774**

Findings: CAR 03 was raised and are closed successfully. Refer appendix 3 for more details.

3.3.7 Methodology Deviations

For the current validation, PP has not identified any methodology deviations applied to the project.

3.3.8 Monitoring Plan

To calculate the emission reductions, the following parameters are fixed ex-ante as per the approved CDM baseline and monitoring methodology AMS III. E, version 17.0 and AMS. I.D, version 18.0 and other tools used.

Parameters determined ex-ante: -

a. $GWPCH_4$ – The ex-ante value of 28 tCO_2e/tCH_4 for the parameter 'Global Warming Potential for methane' is based on 2019 refinements to 2006 IPCC Guidelines for National Greenhouse Gas Inventories, 5th assessment report which is the most recent one and found acceptable.

b. $EF_{grid,OM,y}$ – The ex-ante value of 0.9580 tCO_2e/MWh for the parameter 'Operating Margin CO_2 emission factor in year y' is based on CO_2 emission database, version 19.0, November, 2023 published by Central Electricity Authority (CEA), Government of India. The value is based on most recent 3 year data from CEA database i. e. (2020-2021, 2021-2022, 2022-2023) and found acceptable.

c. $EF_{grid,BM,y}$ – The ex-ante value of 0.8670 tCO_2e/MWh for the parameter 'Build Margin CO_2 emission factor in year y' is based on CO_2 emission database, version 19.0, November, 2023 published by Central Electricity Authority (CEA), Government of India. The value is based on most recent year data (2022-2023) from CEA database and found acceptable.

d. $EF_{grid,CM,y}$ – The ex-ante value of 0.9125 tCO_2e/MWh for the parameter 'Combined Margin CO_2 emission factor in year y' is based on CO_2 emission database, version 19.0, November, 2023 published by Central Electricity Authority (CEA), Government of India. The value calculated based on operating and build margin value calculated from CEA database and found acceptable.

e. $\emptyset_y$ – The ex-ante value of 0.85 for the parameter 'Default value for the model correction factor to account for model uncertainties' is for tropical humid/wet climate conditions as per the Tool "Emissions from solid waste disposal site" for Application B. VVB has confirmed humidity and wet climate condition at the project location on the basis of the data available from the local database such as https://www.indianclimate.com/show-data.php?request=JNNOVS4OEQ which confirms that average temperature is above 25^0C and https://jamnagar.nic.in/district-at-a-glance/ which confirms that average annual rainfall is 1,100 mm thus satisfying the requirements of table 1 of tool 04, version 08.1 and hence found acceptable.

f. F – The ex-ante value of 0.5 for the parameter 'Fraction of methane in the SWDS gas (volume fraction)' is as per IPCC 2006 Guidelines for National Greenhouse Gas Inventories and is a default value and found acceptable.

g. OX – The ex-ante value of 0.1 for the parameter 'Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)' is as per the Tool "Emissions from solid waste disposal site" and found acceptable.

h. $DOC_{f,y}$ – The ex-ante value of 0.5 for the parameter 'Default value for the fraction of degradable organic carbon (DOC) in MSW that decomposes in the SWDS' is as per IPCC 2006 Guidelines for National Greenhouse Gas Inventories and fond acceptable.

i. MCF_y – The ex-ante value of 1.0 for the parameter 'methane correction factor' is used as per IPCC 2006 Guidelines for National Greenhouse Gas Inventories for anaerobic managed solid waste disposal sites. VVB noted that the SWDS is above the water table and is managed solid waste disposal sites, includes controlled placement of waste and mechanical compacting and levelling, as per the Tool "Emissions from solid waste disposal sites". Hence found acceptable.

j. DOC_j – The ex-ante value of the parameter 'Fraction of degradable organic carbon in the waste type j (weight fraction)' are adapted from Volume 5, Tables 2.4 and 2.5 of IPCC 2006 Guidelines for National Greenhouse Gas Inventories as per the Tool "Emissions from solid waste disposal sites". Hence found acceptable.

k. Kj – The ex-ante value of the parameter 'Decay rate for the waste type j' for different waste types are adapted from Volume 5, Tables 3.3 of IPCC 2006 Guidelines for National Greenhouse Gas Inventories as per the Tool "Emissions from solid waste disposal sites". Hence found acceptable.

l. FCC_j - The ex-ante value of the parameter 'Fraction of total carbon in total carbon content of waste type j' for different waste types are adapted from Volume 5, chapter 2, Table 2.4 of IPCC 2006 Guidelines for National Greenhouse Gas Inventories as per the Tool "Emissions from solid waste disposal sites". Hence found acceptable.

m. Dry matter content in % of wet weight - The ex-ante values of the parameter are adapted from Volume 5, chapter 2, Table 2.4 of IPCC 2006 Guidelines for National Greenhouse Gas Inventories as per the Tool "Emissions from solid waste disposal sites". Hence found acceptable.

n. $NCV_{i,y}$ – The ex-ante value of 43.3 TJ/Gg for the parameter 'Weighted average net calorific value of fuel type i in year y' for the fuel – diesel is sourced from Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories and found acceptable.

o. $EF_{CO2,i,y}$ – The ex-ante value of 74,800 Kg/TJ for the parameter 'Weighted average CO_2 emission factor of fuel type i in year y' for the fuel – diesel is sourced from Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories and found acceptable.

p. $\rho_{i,y}$ - The ex-ante value of 880 kg/m^3 for the parameter 'Weighted average density of fuel type i in year y' is based on data published by Indian Oil Corporation Limited (IOCL) as a local value usage is permitted and same is checked and found acceptable.

q. Z_x – This parameter 'Number of samples collected during the year x' is used for calculation of baseline and project emissions with Minimum of three samples every three months from truck load, pre-processing, boiler feed, star-screen reject which is confirmed based on plant records and found acceptable.

r. $EFCO_{2,f}$ – The ex-ante values for the parameter are based on default CO_2 emission factors take into account emissions generated by loaded outbound trips and empty return trips as per the applied tool and hence fond acceptable.

Parameters determined ex-post: -

a. $EG_{Pj,y}$ - Quantity of net electricity generation supplied by the project (Waste to Energy) plant/unit to the grid in year y: This parameter is monitored continuously and calculated based on export by project and import energy by the project to arrive at the net electricity supply to the grid in MWh/year based on joint meter readings (JMR) by PP and DISCOM officials. PP has installed bi-directional energy meters with accuracy class of 0.2s. There are 02 meters – Main and Check so in event of failure of any one meter, the other can be considered to get the values of energy exported/imported. The energy meter details are as below:

	Main Meter	Check Meter
Type of meter	Bi-directional	
Location of meter	GETCO 66kv Substation Navagam Ghed	
Accuracy class of meter	0.2s	0.2s
Serial number of meters	GJ4651A	GJ4919A

VVB noted that both the energy meters are calibrated as on date based on the calibration certificates. As per local government guidelines in India, calibration of energy meter is to be conducted at least once in the 5 years[22]. The generated energy based on JMR can be cross checked against invoices raised by PP to the DISCOM in line with agreement signed with them.

b. Electricity Consumed by the project activity - Quantity of net electricity consumed by the project activity from the grid in year y : This parameter is measured based on energy imported by the project recorded at energy meter installed at Substation in MWh/year and monitored continuously. PP has installed bi-directional energy meters with accuracy class of 0.2s. There are 02 meters – Main and Check so in event of failure of any one meter, the other can be considered to get the values of energy imported. The energy meter details are as below:

	Main Meter	Check Meter
Type of meter	Bi-directional	
Location of meter	GETCO 66kv Substation Navagam Ghed	
Accuracy class of meter	0.2s	0.2s
Serial number of meters	GJ4651A	GJ4919A

[22] https://cea.nic.in/wp-content/uploads/2020/02/meter_reg.pdf

VVB noted that both the energy meters are calibrated as on date based on the calibration certificates. As per copy of GERC tariff order submitted, the import energy shall be 12% of gross electricity generation and same acts as a cross checking measure for the parameter monitored.

c. Wx - Total amount of waste disposed in a SWDS in year x: Monitoring frequency: Continuously, aggregated at least annually for year x. The measured value is multiplied by dry matter as per the methodology requirements. The weighbridge used for weighing is regularly calibrated in accordance with the manufacturer's specification i.. e. annual as confirmed during the on-site visit. As confirmed during site visit and calibration records, calibration of electronic weighbridge will be done annually. Plant record for total solid waste reached at site maintained at site electronically as well as manually and are measured on daily basis. The weighbridge calibration details cross checked during on-site visit are as below:

Serial No.	1) H-941-F-19 2) H-938-F-19
Calibration frequency	12 months
Date of Calibration/ validity	15-December-2022/15-December-2023
Certificate No.	2484718/JAM/2022/01

d. $P_{n,j,x}$ - Weight fraction of the waste type j in the sample n collected during the year x. This parameter is monitored to know the waste composition in line with applied methodology and measured on sampled basis quarterly. As discussed during the on-site visit, random samples will be collected after the pre-processing section i.e. from the vibro feeder, out of which representative sample of 25 kg will be taken for analysis. The waste composition based on the waste types j will be segregated and weighed for each waste fraction (measured on wet basis). The sampling records for 03 samples conducted on quarterly basis will be maintained by PP. The weighbridge details for the sample weighing is as below as confirmed during the on-stie visit.

Serial No.	1) H-941-F-19 2) H-938-F-19
Calibration frequency	12 months
Date of Calibration/ validity	15-December-2022/15-December-2023
Certificate No.	2484718/JAM/2022/01

e. Z_x - Number of samples collected during the year x: In line with requirement of the methodology, PP will sample minimum 03 nos. from each of the - truck load, pre-processing area, boiler feed, star-screen rejects once in three months. This is found acceptable.

f. $Q_{,y}$ - Amount of waste combusted, gasified or mechanically/thermally treated by the project activity in each year y: The parameter measured continuously in tonnes per day (TPD) is the quantity of RDF fed to the boiler and recorded on daily basis. As of now, the installed load cells to measure the amount of waste are not operating as per the requirements and PP is consulting with OEMs to develop customised load cells and same would be installed and operational before or during 1st verification, technical details and calibration records will be submitted. A FAR is

raised for the same. Until then, the amount of RDF combusted in the boiler will be determined from weighbridge records, by excluding the quantity of inert waste after pre-processing, the total amount of waste received for combustion which is found acceptable.

g. $Q_{,y,ash}$ - Quantity of combustion residues generated by the project activity in each year y: As a part of combustion of processed MSW i. e. RDF, the residual waste is generated which contains bottom ash and fly ash. As observed during on-site visit, the ash generated is weighed at the weighbridge and then dispatched to brick manufacturers on daily basis and recorded in plant records. The weight bridge used is calibrated and is in continual operation.

h. $Q_{y,non\text{-}biomass}$ - Quantity of non-biomass carbon content of the RDF combusted in each year y: This parameter is monitored to understand non-biomass content of the waste combusted in line with applied methodology and measured on sampled basis quarterly. As discussed during the on-site visit, random samples will be collected after the pre-processing section i.e. from the vibro feeder, out of which representative sample of 25 kg will be taken for analysis. The sampling records for 03 samples conducted on quarterly basis will be maintained by PP. The quantity of non-biomass carbon content of the RDF will be calculated based on the IPCC default values of total carbon content (FCC) and fossil carbon content (FFC).

i. CT_y - Average truck capacity for transportation: This parameter values in tonnes/truck are monitored via the recordings of the net capacity of the trucks at weighbridge readings and cross-checked with the vehicle licenses. Plant records are maintained for each truck at site electronically as well as manually and are measured on daily basis. The weighbridge calibration details cross checked during on-site visit are as below:

Serial No.	1) H-941-F-19 2) H-938-F-19
Calibration frequency	12 months
Date of Calibration/ validity	15-December-2022/15-December-2023
Certificate No.	2484718/JAM/2022/01

j. $Q_{y,fuel}$ - Quantity of auxiliary fossil fuel used in the year y: As discussed during on-site visit, PP uses Diesel as a start-up fuel for boiler. Same is measured in tonnes/year. The plant records of diesel consumption will be cross checked against purchase bills.

k. $FC_{i,j,y}$ - Quantity of fuel type i combusted in process j during the year y: As noted during the on-site visit, PP uses vehicles within the project boundary for waste transfer from trucks to bunker from bunker to vibro feeder. PP has also installed 01 Diesel Generation set. Amount of fuel (Diesel) used will be measured in tonnes/year. The plant records of diesel consumption will be cross checked against purchase bills.

l. $D_{inert,m}$ - Return trip distance between the origin and destination of freight transportation activity for disposal of inert waste in monitoring period m: PP will measure and record average distance travelled by the truck through the odometer readings of trucks. The plant records will have the data in km on daily basis for this parameter.

m. $D_{ash,m}$ - Return trip distance between the origin and destination of freight transportation activity for disposal of ash in monitoring period m: PP will measure and record average distance travelled by the truck through the odometer readings of trucks. The plant records will have the data in km on daily basis for this parameter.

n. $FR_{inert,m}$ - Total mass of freight transported in freight transportation activity for disposal of inert waste in monitoring period m: The parameter will be monitored in daily basis via the recordings of the net capacity of the trucks at weighbridge readings and cross-checked with the vehicle licenses. The weighbridge calibration details cross checked during on-site visit are as below:

Serial No.	1) H-941-F-19 2) H-938-F-19
Calibration frequency	12 months
Date of Calibration/ validity	15-December-2022/15-December-2023
Certificate No.	2484718/JAM/2022/01

o. $FR_{ash,m}$ - Total mass of freight transported in freight transportation activity for disposal of ash in monitoring period m: The parameter will be monitored in daily basis via the recordings of the net capacity of the trucks at weighbridge readings and cross-checked with the vehicle licenses. The weighbridge calibration details cross checked during on-site visit are as below:

Serial No.	1) H-941-F-19 2) H-938-F-19
Calibration frequency	12 months
Date of Calibration/ validity	15-December-2022/15-December-2023
Certificate No.	2484718/JAM/2022/01

Monitoring plan:
PP has detailed out monitoring plan in section 5.3 of VCS PD which was checked and found acceptable. The details of the monitoring plan are as below:

PP has developed monitoring plan to establish suitable data collection method for measurement & collection of data and maintenance of records according to the monitoring methodology of AMS.III. E. Version 17.0 and AMS.I.D. Version 18.0. The same was checked and found acceptable.

The monitoring plan is project specific for which, the project performance with all relevant criteria will be monitored. PP will ensure that trainings will be provided to concerned personnel for operation purpose.

The monitoring plan implemented by the project participant describes about the following aspects:

- Overall project management
- Monitoring Plan
- Emergency Preparedness
- Training on Monitoring & Archiving of Data and Internal Audit Procedures
- Quality Assurance and Quality Control (QA/QC) procedures

Overall Project Management and Team:
The project owner organizes a separate team to be responsible for data collection, supervision and witness the whole process of data measuring and recording. A senior manager will be appointed to take full responsibility for the overall monitoring of the project. The monitoring and measurement will be carried out by designated monitoring officers. The site in-charge will be responsible for carrying out internal auditing and QA/QC. All the values from generation record will be checked with the invoices for consistency. During the on-site visit, VVB interviewed PP representatives and checked the O & M manual/38/ submitted by the PPto confirm the same.

Monitoring Plan
The monitoring procedures will be carried out as mentioned in section 5.2 of VCS PD.. The data will be recorded on a continuous basis or as indicated in section 5.2 of PD and backup of the same will be maintained. The data to be monitored include MSW composition and quantity, electricity exported and imported, auxiliary fuel consumption, quantity of combustion residues. In addition to this, PP will monitor the SDG parameters stated in section 1.17 of VCS PD.

Personal Training:
The project employs qualified and experienced persons for plant operation. PP will provide safety training to ensure that all employees understand and follow safety protocols and procedures, including emergency response plans. The training includes handling hazardous materials, operating equipment safely, and preventing accidents.

Emergency preparedness:
In case of any unforeseen event that is not covered under this monitoring plan, staff of the operation division will immediately inform the chief of the operation division. The chief of the operation division is then responsible to ensure that the cause for the unforeseen event is detected, the event is remedied and for the period of time in which the unforeseen event has occurred uncertainty in data gathered is limited as much as possible. The same was checked from the O & M manual/38/ submitted by the PP and found acceptable by the assessment team.

Internal auditing
The internal auditing process involves a systematic and objective evaluation of the plant's operations, processes, and controls to ensure compliance with regulations, identify operational efficiencies, mitigate risks, and improve overall performance. The project owner will have a team of internal expertise in waste-to-energy technology, environmental regulations, health and safety, and financial management. Project owner will conduct the internal auditing by cross checking the data from the invoices and data logbooks for ensuring the quality and consistency of data measured and monitored for the purpose of emission reduction calculations.

Quality Assurance and Quality Control (QA/QC) procedures
PP will ensure that all the meters are regularly calibrated as per the frequency specified by the manufacturer. PP will preserve the calibration records, along with the data files of project monitoring. Error check routines will be established on site and at the point of data storage to detect data measuring / transmission failures as well as malfunctions. In the case of malfunction of the meters, the meter supplier will provide technical support to engage the problem promptly and emission reductions during the corresponding period will be calculated conservatively. The installation of the electricity metering equipment will fulfil the requirements of the relevant national standard.

VVB concludes that the monitoring plan adheres to the requirements of the applied methodology and referenced tool and found correct.

Findings: FAR 01 was raised. Refer appendix 3 for more details.

3.4 Non-Permanence Risk Analysis

Not applicable for the present project activity.

4 VALIDATION OPINION

Applus+ Certification has been engaged by "Kosher Climate India Private Limited" to perform validation of the project "7.5 MW Waste-to-Energy Power Plant by Goodwatts WTE Jamnagar Private Limited in Gujarat, India".

The management of the project participant/owner is responsible for the preparation of the GHG emissions data and the reported/estimated GHG emissions reductions on the basis set out within the project's Monitoring Plan in the VCS PD and the applied approved CDM small scale methodologies; AMS III.E, version 17.0 and AMS I.D, version 18.0 and referenced tools.

Our Validation approach was based on the requirements as defined under the Kyoto Protocol, VCS board. Our approach is risk-based, drawing on an understanding of the risks associated with estimated GHG emissions data and the controls in place to mitigate these. As a part of validation 03 CARs, 05 CLs and 01 FAR was raised.

As a result of the validation, the validation team confirms that:

- The project fulfils criteria of VCS Standard Version 4.5.
- The project is in line with all relevant VCS requirements.
- The selected baseline and monitoring methodologies AMS III.E, version 17.0 and AMS I.D, version 18.0 are applicable to the project and correctly applied
- The project baseline is sufficiently justified in the PD.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated average annual emission reductions of 39,774 tCO_2e and total 278,421 tCO_2e is most likely to be achieved within the 7 years (twice renewable) of crediting period.
- No restrictions or uncertainties were identified related to the validation.

Applus+ Certification declares that the validation of the GHG statement was conducted in accordance with ISO 14064-3, 2019.

Applus+ Certification therefore requests the registration of the project as a VCS project activity.

Validated GHG emission reductions and removals in the above period:

Year	Estimated GHG emission reductions or removals (tCO_2e)
15-November-2021 to 14-November-2022	8,878
15-November-2022 to 14-November-2023	26,847
15-November-2023 to 14-November-2024	36,641
15-November-2024 to 14-November-2025	44,052
15-November-2025 to 14-November-2026	49,776
15-November-2026 to 14-November-2027	54,293
15-November-2027 to 14-November-2028	57,933
Total estimated ERs	**278,421**
Total number of crediting years	07
Average annual ERs	39,774

APPENDIX 1: DOCUMENT REFERENCES

No.	Author	Title	References to the	Provider
1.	Project Developer	Initial VCS PD Final VCS PD	Version 01 dated 15-September-2023 Version 05 dated 02-August-2024	Project Developer
2.	Project Developer	Initial ER Sheet Final ER Sheet	Version 01 dated 15-September-2023 Version 04 dated 02-August-2024	Project Developer
3.	Project Developer	Initial IRR Sheet Final IRR Sheet	Version 01 dated 15-September-2023 Version 03 dated 02-August-2024	Project Developer
4.	CDM UNFCCC	AMS III.E.: Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment AMS I.D.: Grid Connected renewable electricity generation	Version 17.0 Version 18.0	Project Developer

5.	CDM UNFCCC	CDM Tools: Tool 03- Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, Version 03.0 Tool 04- Tool to calculate emissions from solid waste disposal sites, Version 08.1 Tool 07- Tool to calculate the emission factor for an electricity system, Version 07.0 Tool 12- Project and leakage emissions from transportation of freight, Version 01.1.0 Tool 21- Demonstration of additionality of small-scale project activities, Version 13.1 Tool 27- Investment analysis, Version 12.0	Version 03.0 Version 08.1 Version 07.0 Version 01.1.0 Version 13.1 Version 12.0	Project Developer
6.	VERRA	VCS Requirements: - Verified Carbon Standard Program Guide - Verified Carbon Standard - VCS Program Definitions, - VCS Registration and Issuance Process -VCS Validation and Verification Manual - VCS Project Description template - VCS Validation Report Template	Version 4.4 Version 4.5 Version 4.4 Version 4.4 Version 3.2 Version 4.2 Version 4.2	VERRA
7.	CDM UNFCCC	CDM Validation and Verification Standard for Project Activities	Version 3.0	UNFCCC
8.	Gujarat Boiler Inspection Department	Certificate for use of a Boiler dated 03-November-2022	-	Project Developer
9.	Project Developer	Building plan Approvals	-	Project Developer

10.	Government of India Ministry of Jal Shakti Department of Water Resources, River Developmen t & Ganga Rejuvenation Central Ground Water	NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION	Dated 14-September-2022	Project Developer
11.	Gujarat Energy Development Agency	Commissioning Certificate	Dated 06-December-2021	Project Developer
12.	Project Developer	Community Connect document	-	Project Developer
13.	Project Developer	Concession Agreement between Jamnagar Municipal Corporation and GoodWatts WTE Jamnagar Private Ltd.	Dated 25-April-2017	Project Developer
14.	Gujarat Pollution Control Board	Consent To Establish	Dated 28-July-2020	Project Developer
15.	OFFICE OF THE CHIEF ELECTRICAL INSPECTOR	Approval for Transformer and DG set Installation	Dated 04-February-2021	Project Developer
16	Project Developer	Detailed Project Report	Dated 17-March-2017	Project Developer
17.	Project Developer	Meter Test Reports	Dated 02-June -2021	Project Developer
18.	Project Developer	EPC Contracts	-	Project Developer

19	Directorate Industrial Safety & Health Gujarat State	License To work a Factory	Dated 22-March-2021	Project Developer
20	Jamnagar Municipal Seva Sedan	Land Possession Receipt	Dated 24-November-2021	Project Developer
21	Project Developer	List Of Major Equipment such as, 1. Incinerator/furnace 2. Boiler 3. Steam turbine 4. Generator 5. Balance of plant	-	Project Developer
22	Project Developer	Power Purchase Agreement between GoodWatts WTE Jamnagar Pvt. Ltd. And Gujarat Urja Vikas Nigam Limited	Dated 30-May-2018	Project Developer
23	Project Developer	Single Line Diagram	-	Project Developer
24	Project Developer	Technical Specifications of 1. Incinerator/furnace 2. Boiler 3. Steam turbine 4. Generator	-	Project Developer
25	Abellon CleanEnergy Ltd	Borewell Water test Report	Dated 24-November-2018	Project Developer
26	Project Developer	Weighbridge Technical Specifications	-	Project Developer
27	Legal Metrology, Gujarat State	Weighbridge Certification of verification	Dated 15-November-2022	Project Developer
28	Shah and Shah Associates	C.A. Certificate	Dated 30-June-2023	Project Developer
29	CDM	CDM Website https://cdm.unfccc.int/Projects/projsearch.html last assessed on 09-November-2023	-	Publicly available

30	VERRA	Verra Registry https://registry.verra.org/app/search/VCS/All%20Projects last assessed on 09-November-2023	-	Publicly available
31	Gold Standard	GS4GG Website: https://registry.goldstandard.org/projects?q=&page=1 last assessed on 09-November-2023		Publicly available
32	I-REC Standard	International REC Standard (I-REC) https://www.irecstandard.org/registries/ last assessed on 09-November-2023	-	Publicly available
33	Project Developer	Employment Records	--	Project Developer
34	Project Developer	GERC Tariff Order, 2016	https://gercin.org/wp-content/uploads/2019/09/Order-No.-4-of-2016.pdf	Project Developer
35	Project Developer	Rates of Depreciation for income Tax	http://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm	Project Developer
36	Project Developer	MSW / RDF Records maintained at the site with respect to its usage Physical / chemical analysis conducted on sampling basis for MSW received and RPD produced	-	Project Developer
37	Project Developer	Energy generation Records	-	Project Developer
38	Project Developer	O & M Manual	-	Project Developer

39	Project Developer	No Double Counting declaration		Project Developer
40	Project Developer	Local Stakeholder Consultation documents including, Invitation Letter, Public Notice, Attendance sheet, Feedback Form, Minute of meetings		Project Developer
41	Project Developer	Records of Bottom ash and Fly ash		Project Developer
42	Project Developer	Diesel Consumption Records		Project Developer
43	Project Developer	Loan sanction letter from IERDA		Project Developer
44	Project Developer	Waste analysis reports		Project Developer

APPENDIX 2: ABBREVIATIONS

Abbreviations	Full texts
ADS	Air Density Separator
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CERC	Central Electricity Regularity Commission
CL	Clarification request
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CTE	Consent to establish
CTO	Consent to operate
DNA	Designated National Authority
DPR	Detailed Project Report
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
EPC	Equipment procurement Contract
ER	Emission Reductions
FAR	Forward Action Request
FAR	Forward Action Request
GEDA	Gujarat Energy Development Agency
GHG	Greenhouse gas(es)
GWJPL	GoodWatts WTE Jamnagar Private Limited
GS4GG	Gold Standard for Global Goals
GWP	Global Warming potential
IGBC	Indian Green Building council
JMC	Jamnagar Municipal Corporation
JMR	Joint Metering reading
LSC	Local Stakeholder Consultation
MOEF&CC	Ministry of Environment, Forest & Climate Change
MSW	Municipal Solid Waste
MW	Mega Watt
OBMS	Over bend magnetic Separator
OM	Operating Margin
PCB	Pollution Control Board
PD	Project Developer
PPP	Public-Private Partnership
RBI	Reserve Bank Of India
RDF	Refuse-Derived Fuel

SDG	Sustainable Development Goals
SEB	State Electricity Board
SERC	State Electricity Regularity Commission
TPD	Tonnes per Day
TTPL	Thermodyne Technology Pvt. Ltd.
VCS	Verified Carbon Standard
VER	Verified Emission Reduction
VVB	Validating and verifying Body
WTE	Waste to Energy

APPENDIX 3: FINDINGS OVERVIEW

Table 1. Clarifications (CL) from this validation

CL ID	01	**Section no.**	3.1	**Date:** 09-October-2023
Description of CL				
1. PP shall clarify how it will ensure that collected waste is treated for generation of electricity on FIFO basis. 2. PP to clarify that leachate is not generated at the project site and if generated, how it is handled. 3. In the submitted PD version 01 dated 15-September-2023, in section 1.11, under the mentioned technical specifications, PP has mentioned the manufacturer as '*Thermodyne Technology Pvt. Ltd. (TTPL)'* for Incinerator/Furnace. PP to clarify whether the manufacturer is same for all the components, if not, PP to provide the manufacturer of all the components.				
Project participant response				**Date:** 23-October-2023
1. The entire waste received in a day will be processed and treated on the same day. Since the plant is in continuous operation, the waste coming in will be transferred immediately from the receiving area to the Moving Bed Feeder through fixed crane operation, where the waste received first is directed to the pre-processing section first. However, it is to further confirm that the plant operational capacity of 600 TPD of fresh waste is adequate to process the entire waste received on daily basis. This ensures that the waste received in the plant is treated on a FIFO basis. *1)* 2. The leachate released from the MSW is collected in the collection tank, provided in the bunker. The leachate is then treated and re-used for plantation within the campus and/or used in the cooling tower. 3. The manufacturers of all the components are different. The technical specification described under section 1.11 has been made consistent in PD.				
Documentation provided by project participant				
Updated PD.				
VVB assessment				**Date:** 25-October-2023
1. During the on-site visit, VVB noted that the collected waste is stored in the bunker and segregated to separate out inert waste. The segregated waste (called as RDF by PP) is then used as a fuel in boiler. The boiler operator and bunker personnel had confirmed that the daily waste which is incoming is totally fed to the feeder within 24 hours and hence PP response is accepted and this part of CL is closed. 2. VVB noted that the leachate generated i. e. wastewater generated during waste storage at bunker is collected and treated in wastewater treatment plant, further used for plantation as confirmed during the on-site visit. Hence this part of CL is closed. 3. Revised PD was checked and table in section 1.11 was found to be corrected. Hence this part of CL is closed. **CL 01 is closed.**				

CL ID	02	**Section no.**	3.2.1	**Date:** 09-October-2023
Description of CL				

In the submitted PD version 01 dated 15-September-2023, in section 1.14, PP to clarify about compliance of project activity with Municipal Solid Waste act 2000, Solid Waste act 2016, Plastic Waste Act.
Project participant response **Date:** 23-October-2023
The section 1.14- Compliance with Laws, Statutes, and Other Regulatory Frameworks has been updated in the PD.
Documentation provided by project participant
Updated PD.
VVB assessment **Date:** 25-October-2023
PP has revised section 1.14 of the PD which now details compliance with all the applicable laws and regulations. **CL 02 is closed.**

CL ID	03	**Section no.**	3.2.2	**Date:** 09-October-2023
Description of CL				
1. In the submitted PD version 01 dated 15-September-2023, in section 2.2, PP to clarify whether the risk related to the project activity is explained to Local stakeholders. 2. PP to provide supporting documents for the Local stakeholder Consultation conducted for the project activity.				
Project participant response				**Date:** 23-October-2023
1. There is no major risks or negative impacts associated with the operation of the project activity. Since the project is situated away from the vicinity of the inhabitants, there is no direct risk involving the inhabitants due to the project activity. However, safety training and hands-on training were conducted for the workers, engineers, contractors etc, involved in the project on-site daily. In addition, during the local stakeholder's consultation meeting the project representative explained and discussed the possible socio-economic impacts due to the project activity and taken the feedback from all the stakeholders participated during the LSC meeting. There is no major concerns or adverse impacts raised by the participants. Further project participant is maintaining the grievance addressal register which is made available to the local stakeholders all the time to register their grievances or complains if any due to the operation of the project activity. 2. The LSC photographs, attendance sheet, feedback form, public notice is submitted as supporting documents for the Local stakeholder Consultation meeting.				
Documentation provided by project participant				
Updated PD				
VVB assessment				**Date:** 25-October-2023
1. PP response is found acceptable as during on-site visit, it was noted that the project is situated in remote area and is following all the rules/guidelines towards health and safety of the persons associated/not associated with the project. Hence this part of CL is closed. 2. PP has submitted LSC documents which confirm the information provided in section 2.2 of the PD and hence acceptable. This part of CL is closed. **CL 03 is closed.**				

CL ID	04	**Section no.**	3.3.2	**Date:** 09-October-2023
Description of CL				
1. It is not clear how PP will ensure that handling and storage of the collected waste near bunker does not result in anaerobic conditions and do not lead to further absorption of moisture. 2. PP shall clarify in the VCS PD version 01 dated 15-September-2023, how project activity adheres to para 39 and 40 of the applicable methodology AMS-III.E.				
Project participant response				**Date:** 23-October-2023

1. As per the plant design capacity, the project utilizes about 311 ton of RDF per day and generate electricity with an installed capacity of 7.5 MW. The pre-processing section has sufficient design capacity to treat 600 TPD waste. Also, the boiler has a sufficient factory gate permissible limit to treat 311 TPD waste. As per the waste characterization out of 600 TPD waste, the processed RDF is 311 TPD remaining is the inert waste. The processed RDF is not stored in the bunkers except during major shutdown of the plant. However, during plant shutdown, the RDF will be stored in enclosed bunker. The RCC bunker is provided with adequate ventilation to promote aerobic conditions. Thus, the storage of RDF during plant shutdown will not be subjected to anaerobic conditions. *2)* 2. As per para 39 and 40 of AMS- III.E, the monitoring plan for the parameters has been updated in section 5.2 of the PD.
Documentation provided by project participant
Updated PD
VVB assessment **Date:** 25-October-2023
1. PP response is accepted. During the on-site visit, VVB observed that RCC bunker used for waste storage is with adequate ventilation and it ensures aerobic conditions. Hence acceptable and CL is closed. 2. PP response is accepted and revised PD section 5.2 was checked to confirm the same. However, following parameters were not found as a part of monitoring plan in section 5.2 A. Non-biomass carbon content of the waste or RDF/SB combusted to be measured by sampling (Q,non-biomass) B. Electricity consumption C. Distance for transporting the waste in the baseline and the project scenario Hence this part of CL is open. CL 04 is open.
Project participant response **Date:** 29-October-2023
2. As per the applied methodology AMS-III.E, the monitoring plan of the parameter non-biomass carbon content of the RDF ($Q_{non\text{-}biomass}$), Electricity consumption by the project activity and the distance for transporting the waste in the baseline and the project scenario has been updated.
Documentation provided by project participant
Updated PD.
VVB assessment **Date:** 29-October-2023
2. Revised PD version 03 was checked to confirm the parameters are now part of monitoring plan under section 5.2. CL 04 is closed.

CL ID	05	**Section no.**	3.3.3	**Date:** 09-October-2023
Description of CL				
1. As observed during the on-site visit, PP is using bucket loader to deposit waste into waste bunker from the waste collection area and a DG set is part of project activity. PP to clarify why the same are not considered in the project emissions in section 3.3 and 4.2 of the submitted VCS PD version 01 dated 15-September-2023. 2. As a part of project activity, three types of end products are generated - inert waste, bottom ash and fly ash. As per the submitted VCS PD version 01 dated 15-September-2023, bottom ash will be used for brick manufacturing. However, brick manufacturing plant within the project premises is yet to be commissioned. In view of the same, PP to clarify: • how these three streams of end products are being taken care of? • According to Methodology AMS-III.E Para 21(C) Project boundary also includes the area where final residues of combustion will be disposed. PO to clarify with respect to project boundary also.				
Project participant response				**Date:** 23-October-2023

1. The project emission from fossil fuel usage for the loader, DG set etc., has been calculated using tool 03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion. The same has been updated in the ER sheet and PD.

3)

2. **Inert Waste:** The raw MSW received at the project site is subjected to the pre-processing section, where the MSW is processed to enhance the calorific value and moisture content of waste fuel (RDF). Here the waste less than 20 mm which contains residual inert matter is removed. The inert waste is sent to the landfill site designed with protective measures against pollution of groundwater, surface water, air fugitive dust, windblown litter, and slope instability etc., As per the concession agreement, the Jamnagar Municipal Corporation will be responsible for the development, Operation & Maintenance of the landfill disposal site. The quantity of inert waste is measured through weighbridge records.

   Bottom Ash: Bottom ash is the combustion residues collected at the furnace outlet. The ash extractor is installed at the outlet of the travelling grate boiler. Bottom ash is cooled down below 60°C. Cooled bottom ash after the ash extractor will pass through a vibrating table and magnetic metal separator to separate out ferrous material from bottom ash. The collected bottom ash is handed over to the brick manufacturers. The quantity of bottom ash is measured through weigh bridge records.

   Fly Ash: The ash generated during the combustion process in the form of carry-over ash, is collected in the flue gas collection system (FGCS). The flue gas treatment process consists of electrostatic precipitator (ESP), bag filters, dry sorbent injection (DSI) system and acid reactor tower. The treated fly ash received from the project activity is utilized in the brick manufacturing units. The fly ash is handed over to the brick manufactures. The quantity of fly ash is measured through weigh bridge records.

   As per 21 (c) of AMS- III.E, the final residues of the combustion process i.e., the bottom ash and fly ash will be handed to the brick manufactures. The inert waste is sent to the landfill site. The project boundary has been revised in line to para 21 of applied methodology AMS- III.E.

Documentation provided by project participant

Updated ER Sheet & PD.

VVB assessment	**Date:** 25-October-2023

1. PP has revised section 3.2 and 4.2 to update the requirements as per Tool 03 for calculation of project emissions. However, section 5 of PD does not provide parameters required as a part of ex-ante or ex-post monitoring due to Tool 03 and same shall be revised. Hence this part of CL is open.
2. PP has revised project boundary in line with para 21 (c) which is checked and confirmed. PP has also included parameter $Q_{,y,ash}$ as a part of monitoring parameter in section 5.2 of PD which is confirmed. As responded by PP, the generated bottom ash and fly ash will be handed over to brick manufacturers and a quantity of the disposed ash will be recorded. Project emissions for incremental distance for waste disposal will be monitored which is found acceptable. For inert waste, the same will be disposed of in the landfill which was confirmed during on-site interviews. The amount of inert waste and incremental distance will be monitored as mentioned in the revised PD which is checked and confirmed. Hence this part of CL is closed.

CL 05 is open.

Project participant response	**Date:** 29-October-2023

1. The monitoring plan for all the parameters as per the Tool 03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion has been incorporated in section 5.1 and section 5.2 of the PD.

Documentation provided by project participant

Updated PD

VVB assessment	**Date:** 29-October-2023

1. Revised PD version 03 section 5 now provided both ex-ante and ex-post parameters required to be monitored as per tool 03.

CL 05 is closed.

Table 2. Corrective Action Request (CAR) from this validation

CAR ID	01	**Section no.**	3.1	**Date:** 09-October-2023
Description of CAR				
1. In the submitted PD version 01 dated 15-September-2023, in the section 1.1, audit history table is missing as per the Project description template 4.2. Also, as per the template instruction, '*For the project validation, state the validation date in the Period column '*. Correction is sought. 2. In the submitted PD version 01 dated 15-September-2023, PP to use international number format throughout. Correction is sought. 3. In the submitted PD version 01 dated 15-September-2023, PP to revise the date format as per the DD-Month-YYYY format as per the Project description template version 4.2. Correction is sought. 4. In the submitted PD version 01 dated 15-September-2023, in section 1.1, PP has not mentioned the estimated annual average GHG emission reductions. Correction is sought. 5. In the submitted PD version 01 dated 15-September-2023, PP has applied VCS standard 4.4. However, on the VCS portal, latest version of VCS standard is 4.5. PP to revise it. Correction is sought. 6. In the submitted PD version 01 dated 15-September-2023, in section 1.11, PP has provided plant layout. However, PP to provide the names of all the component in the process. Correction is sought. 7. In the submitted PD version 01 dated 15-September-2023, section 1.16.1 and section 1.16.2 should be made in line with the project description template 4.2. Correction is sought. 8. In the submitted PD version 01 dated 15-September-2023, in section 1.17, PP to mention the indicators for the claimed SDGs. Also, PP to elaborate the description of the SDG achieved. Correction is sought.				
Project participant response				**Date:** 23-October-2023
1. The audit table has been included in section 1.1- Summary description of the project. *4)* 2. The international number format has been updated in the PD. 3. The date format has been modified in the PD as per the Project description template version 4.2. 4. The estimated annual average GHG emission reduction has been incorporated in the section 1.1 of the PD. 5. The project description has been updated in line to the VCS Standard Version 4.5. *5)* 6. The major components of the project activity have been updated in the plant layout illustration in section 1.11 of the PD. *6)* 7. As per section 1.16.1 and section 1.16.2, the project is not included in any emissions trading program or any other mechanism that includes GHG allowance trading. The GHG emission reductions and removals generated by the project will not be used for compliance under such programs or mechanisms. The project has not sought or received another form of GHG-related environmental credit. The section 1.16.1 and section 1.16.2 has been checked "no" as per the project description filling guidance. 8. The relevant target and indicator for the claimed SDG has been updated in section 1.17 of the PD.				
Documentation provided by project participant				
Updated PD				
VVB assessment				**Date:** 25-October-2023
1. PP has not mentioned correct details in section 1.1 which is checked and confirmed. This part of CAR is closed. 2. PP has revised PD to use international number format which is checked and confirmed. This part of CAR is closed. 3. In the revised PD submitted, PP has now used DD-Month-YYYY format as per the Project description template version 4.2. This part of CAR is closed.				

4. In the revised PD estimated annual emission reductions are now mentioned in section 1.1. DD-Month-YYYY format as per the Project description template version 4.2. This part of CAR is closed. 5. PP has now used VCS standard 4.5 consistently throughout PD. This part of CAR is closed. 6. Section 1.1 diagram depicting project layout now provides names of all the components. This part of CAR is closed. 7. PP has revised section 1.16.1 and 1.16.2 and VVB confirms that project is not part of any carbon registry and/or environmental registry. This part of CAR is closed. 8. PP has revised section 1.17 of PD which was checked and found appropriate. This part of CAR is closed. **CAR 01 is closed.**

CAR ID	02	**Section no.**	3.3.5	**Date:** 09-October-2023
Description of CAR				
In the submitted PD version 01 dated 15-September-2023, in section 3.5, PP to mention the Chronology of events for the project activity. Correction is sought.				
Project participant response				**Date:** 23-October-2023
The chronology of the events of the project activity has been included in section 3.5 of the PD.				
Documentation provided by project participant				
Updated PD.				
VVB assessment				**Date:** 25-October-2023
PP has revised section 3.5 of PD to include major milestones achieved as a part of chronology table which is checked and confirmed. **CAR 02 is closed.**				

CAR ID	03	**Section no.**	3.3.6	**Date:** 09-October-2023
Description of CAR				
In the submitted PD version 01 dated 15-September-2023, in section 4, PP to mention the equation numbers as per the applied methodology. Correction is sought.				
Project participant response				**Date:** 23-October-2023
The relevant equation numbers as per the applied methodology and tools has been provided in section 4 of the PD.				
Documentation provided by project participant				
Updated PD.				
VVB assessment				**Date:** 25-October-2023
Section 4 of revised PD is now corrected to include equations no. as per the applied methodologies which is checked and confirmed. **CAR 03 is closed.**				

CAR ID	04	**Section no.**	3.4.5	**Date:** 16-October-2023
Description of CAR				
1. In the Expenses Tab, an inconsistency is observed in the calculation of total O&M (Operations and Maintenance) expenses. The report suggests that, starting from the third year, fuel cost escalation is being adjusted in place of the escalation of O&M expenses. 2. In benchmark Tab, source link is not provided for the verification of Return on Equity. 3. Information related to Date of Incorporation of the Company is not provided.				
Project participant response				**Date:** 23-October-2023
1. The inconsistency observed in the calculation of total O&M (Operations and Maintenance) expenses has been rectified. The updated IRR sheet has been submitted. 2. The source link for the return on equity and inflation forecast has been provided in IRR sheet and the same has been consistent in the PD. 3. The date of incorporation of Goodwatts WTE Jamnagar Private Limited is 27-March-2017. The same has been updated in section 3.5 of PD.				

Documentation provided by project participant	
Updated IRR Sheet	
VVB assessment	**Date:** 25-October-2023
1. Revised IRR sheet, expenses tab was checked to confirm that necessary correction has been made. This part of CAR is closed. 2. The source link of return of equity is now updated and is line with in with the one in the VCS PD. This part of CAR is closed. 3. PP has submitted deed of incorporation which confirms the date of incorporation. This part of CAR is closed. **CAR 04 is closed.**	

Table 3: Forward Action Requests (FAR) from this validation

FAR ID	01	**Section no.**	3.3.8	**Date:** 16-October-2023
Description of CAR				
During the on-site visit, VVB noted that the vibro feeder which picks up MSW for combustion in boiler is not fitted with load cells. The verifying VVB to check and confirm that load cells are installed and are calibrated.				
Project participant response				**Date:**
Documentation provided by project participant				
VVB assessment				**Date:**

APPENDIX 4: COMPETENCY STATEMENTS

Validation 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 (1.2)	OR	Pundlik	Deepak	TQC-Outsourced entity	Yes	Yes	Yes	Yes
2	Financial Expert / Technical Expert (13.1)	OR	Takarkhede	Atul	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	Agarwal	Nikunj	LGAI Technological Center S.A. (Applus+ Certification)
2.	Approver	IR	Calle de Miguel	Agustin	LGAI Technological Center S.A. (Applus+ Certification)

Shorts CV of the Team: -

Name	SHORT CV. BACKGROUND INFORMATION
Deepak Pundlik	Mr. Deepak Pundlik has an experience in climate change, waste management and environmental management. After completing Masters in Environment Sciences from Pune university, He has worked in waste management field. As a GHG consultant, He handled projects under renewable energy, waste management sectors during his stint with companies - MITCON and Thermax. Post Thermax, Deepak was involved in organic farming research project with Tata Institute of Social Sciences. As a GHG auditor, He has validated/verified projects under CDM/VCS/GS and GCC mechanisms from renewable energy, energy demand, waste management sectors. He is based in Pune and is

	participating as a Lead auditor and Technical expert (1.1) and Technical expert in trainee for (13.1) in the project team.
Dr. Atul Takarkhede	Dr. Atul Takarkhede is Ph.D. (Environmental Sciences) from Institute of Science, RTM Nagpur University, Nagpur, and he has already published different technical papers related to environmental sciences. He counts with more than 11 years of experience in field of Environmental Auditing, consulting and accreditation. He is an expert in ISO 9001-14001, CO2/GHG Reporting, Carbon Foot Print, Energy, Water and Waste Management reporting for organizations' environmental performance. His professional portfolio is mainly related with carrying out EIA, conducting QA/QC of EIA Reports; conducting environmental/water audits; NABET requirements appliance, functional area expert in Water Pollution & Solid & Hazardous Waste management among others. Furthermore, he counts with solid experience on CDMVCS-GS consultancy and auditing. Currently he is associated with True Quality Certifications Private Limited and empaneled with Applus+ Certification to carry out GHG audits in the aforementioned schemes. Dr. Atul Takarkhede is based in Nagpur, India. Dr. Atul Takarkhede participates as part of the Audit Team as the Financial expert and Technical Expert (13.1) for the assessment.
Nikunj Agarwal	Mr. Nikunj Agarwal has very extensive experience (17 years) in the field of carbon market. He had been working with the different Europeans DoE's (Verification Bodies) accredited by UNFCCC for the Carbon Credits Certification. He had also worked as consultant for Energy Efficiency projects. Apparently, he had worked as Monitoring and Verification Experts in Energy Efficiency Projects. He had worked more than 300 Carbon projects under CDM/VCS/GS) in South Asia and others Region such as: India, Philippines, Malaysia, Fiji, Indonesia, China, Israel, Pakistan, Chile, Peru, Columbia, South Africa, Singapore, Nepal & Thailand. He is the Certified Energy Manager by the Bureau of Energy Efficiency, Government of India. He is in the Pool of Methodology Expert by the UNFCCC. He was part of the Gold Standard Advisory Panel for the CLIMATE SMART AGRICULTURE (CSA). Mr. Nikunj Agarwal is based in Kronberg, Germany. Mr. Nikunj Agarwal participates in the project's technical review team.