Validation Report for GS Microscale Project Activity	
BASIC INFORMATION	
Title of the project activity	Fuel-Switch Project Deriving Carbon Assets from the Use of Non-Edible Raw Agriculture-Derived Oil System (NERADO System) To Replace Heavy Fuel Oil for Aluminium Dross Recycling in Malaysia.
GS Reference Number	GS11356
Scale of the project activity	☐ Large-scale ☐ Small-scale ☒ Micro-scale
Version number of the validation report	2
Completion date of the validation report	07/03/2024
The version number of the PDD to which this report applies	Version 1.6; 28/02/2024
Project participants	Climate Resources Exchange International Pte Ltd
Host Party	Malaysia
SDG Targeted	SDG 8 Decent Work and Economic Growth SDG 11 Sustainable Cities and Communities SDG 13 Climate Action
Applied methodologies and standardized baselines	AMS.III.AS: Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications, Version 02.0
Applicable Sectoral scopes	1 & 9: Energy Distribution
Estimated amount of annual average GHG emission reductions or GHG removals by sinks	1,692 tCO_2e
Name of VVB	E-0052: Carbon Check (India) Private Limited
Name, position, and signature of the approver of the validation report	Priya Suman Priya Suman, Compliance Officer

SECTION A. Executive summary

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Purpose and general description

Climate Resources Exchange International Pte Ltd (PD) has appointed /49/ the VVB, Carbon Check (India) Private Ltd. to perform an independent Joint validation and verification of the Gold Standard microscale Project activity "Fuel-Switch Project Deriving Carbon Assets from the Use of Non-Edible Raw Agriculture-Derived Oil System (NERADO System) To Replace Heavy Fuel Oil for Aluminium Dross Recycling in Malaysia" in Malaysia (hereafter referred to as "Project Activity"). This report summarises the findings of the validation of the project, performed on the basis of Gold Standard criteria Gold standard for global goals (GS4GG), as well as criteria given to provide for consistent project operations, monitoring and reporting. This report contains the findings and resolutions from the validation and a validation opinion.

Project and Baseline Scenario

The proposed micro-scale project activity involves the Fuel-Switch Project using a Non-Edible Raw Agriculture-Derived Oil System (NERADO System) by Replacing carbon-intensive energy source i.e. Heavy Fuel Oil (HFO) in an existing Aluminium Dross recycling facility of JTS Engineering Sdn Bhd in Malaysia. This is in compliance with § 2.2. of applied methodology "AMS.III.AS: Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications, Version 02.0" /B01/. Thus, the project scenario is the use of NERADO whereas the baseline is the use of HFO.

The Project Activity aims to reduce GHG emissions through the implementation of a fuel switch project in an existing facility. Emission reductions attributable to the project activity are additional to any that would occur in the absence of the project activity in accordance with the Gold standard for global goals (GS4GG) requirements for additionality.

The purpose of validation is to have a thorough and independent assessment of the proposed PA against the applicable Gold standard and GS requirements, in particular, the project's baseline, monitoring plan, and the PA compliance with relevant Gold standard criteria and host Party criteria. These are validated to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all Gold Voluntary projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of voluntary emission reductions (VERs).

Location

The project activity is located inside the facility of JTS Engineering Sdn Bhd at Jalan Tembaga, Plentong, Johore, Malaysia. Geographical Coordinates: Latitude 1° 27' 2.6028" N Longitude: 103° 53' 42.036" E.

Scope of the validation

The validation scope is defined as the independent and objective review of the Project Activity (PDD /01/). The (PDD /01/). is reviewed against the relevant criteria (see above) and decisions by the Gold standard and CDM Executive Board, including the approved baseline and monitoring methodologies. The validation team has, based on the recommendations in the GS4GG Validation and Verification Standard, Version 1.0 /B02/ employed a rule-based approach, focusing on the identification of significant risks for project implementation and the generation of VERs.

While carrying out the validation, CCIPL determines if the Project Activity complies with the requirements stipulated in Section B of the GS4GG "Validation and Verification Standard", Version 1.0 /B02/ and of paragraph 37 of the CDM Modalities & Procedures, the applicability conditions of the selected methodology /B01/, guidance issued by the Gold Standard and also assess the claims and assumptions made in the PDD /01/ without limitation on the information provided by the project participants.

Validation Process

The validation consists of the following four phases:

i. A desk review of the programme design documents
   - A review of the data and information;

- Cross checks between information provided in the PDD /01/ and information from sources with all necessary means without limitations to the information provided by the PP;
- Upload of the Validation work plan on the GS project registry

ii. Follow-up interviews with project stakeholders
- Interviews with relevant stakeholders in host country with personnel having knowledge of the project development via physical meetings, telephone, and email, etc.;
- Cross checking between information provided by interviewed personnel with all necessary means without limitations to the information provided by the project proponent;

iii. Reference to available information relating to projects or technologies similar projects under validation and review based on the approved methodology /B01/ being applied for the appropriateness of formulae and accuracy of calculations.

iv. The resolution of outstanding issues and the issuance of the final validation report and opinion.

The report is based on the assessment of the PDD /01/ undertaken through stakeholder consultations, application of standard auditing techniques including but not limited to document reviews and stakeholder interviews, review of the applicable/applied methodology /B01/ and their underlying formulae and calculations.

This report contains the findings and resolutions from the validation and a validation opinion on the proposed PDD thus confirming the programme design in the documents is sound and reasonable and meets the stated requirements and identified criteria.

Conclusion

The selected baseline and monitoring methodology AMS.III.AS: "Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications", Version 02.0/B01/ is applicable to the project and correctly applied. Therefore, Carbon Check (India) Private Ltd. recommends the project to the GS4GG for registration.

Carbon Check (India) Private Ltd. concludes the validation with a positive opinion that the GS PDD "Fuel-Switch Project Deriving Carbon Assets from the Use of Non-Edible Raw Agriculture-Derived Oil System (NERADO System) To Replace Heavy Fuel Oil for Aluminium Dross Recycling in Malaysia" in Malaysia, as described in the PDD /01/, meets all applicable CDM/GS requirements, including those specified in the GS4GG Validation and Verification Standard, Version 1.0 /B02/, relevant methodology, tools, guidelines and article 12 of the Kyoto Protocol, paragraph 37 of CDM modalities and procedures, subsequent decisions by the COP/MOP and CDM Executive Board.

SECTION B. Validation team, technical reviewer and approver

B.1. 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/document review	On-site inspection	Interviews	Validation findings
1.	Team Leader/ Technical Expert	IR	Singh	Vikash Kumar	CCIPL	X	X	X	X
2.	Team Member	IR	Sharma	Harish	CCIPL	X	X	X	X
3.	Assessor	IR	Bankar	Siddhant[1]	CCIPL	X	X	X	X

[1] Mr. Siddhant Bankar worked in the project till date 30/10/2023.

B.2. Technical reviewer and approver of the validation 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	IR	Agarwalla	Sanjay Kumar	CCIPL
2.	Approver	IR	Suman	Priya	CCIPL

SECTION C. Means of validation

C.1. Desk/document review

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The draft PDD submitted by PP, and additional background documents related to the project design and monitoring plan were reviewed. Furthermore, the validation team used additional documentation from third parties such as, technical reports related to the project design or technical data.

A list of all documents reviewed or referenced during the validation is provided in Appendix-3.

C.2. On-site inspection

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On-site inspection has been conducted for the validation of the project activity:
The on-site audit was performed by the validation team of CCIPL from 07/11/2022 to 08/11/2022 and the activities performed during the onsite audit include but not limited to the following.

1.	A review of the data and information presented to verify completeness and consistency in accordance with GS “Principles and Requirements” V 1.2/B02/
2.	A review of the project description and monitoring methodology, paying particular attention to the applicability conditions of the methodology and baseline and additionality-related requirement
3.	A review of the monitoring plan and the project’s compliance with relevant GS criteria.
4.	A review of calculations and assumptions made in determining the GHG data and emission reductions;
5.	Cross-check a sample of a project (Questionnaire, operation surveys/interviews)

Furthermore, VVB has considered the Site Visit and Remote Audit Requirements and Procedures, version 2.0/B02/ for conducting the audit. In accordance with the requirements provided in §3.1.1(b) of the Site Visit and Remote Audit Requirements and Procedures, version 2.0, VVB determined that a physical site visit is required for the given project. It was determined based on §4.1.1 of the Site Visit and Remote Audit Requirements and Procedures, version 2.0 that a physical site visit is mandatory. VVB carried out the risk assessment in accordance with Annex 1 of the Site Visit and Remote Audit Requirements and Procedures, version 2.0/B02/.

C.3. Interviews

No.	Interviewee		Date	Subject	Team member
	Last name	First name			
1.	Sim	Cherie	07/11/2022	•Discussion on Project Design and eligibility criteria •Proposed Technology to be used in the PA. •PP Management System Manual •Discussion on project funding and involvement of any ODA •Discussion on the PA PDD and ER sheet •Discussion on the GS preliminary review commence •Sustainability aspects of the PA SDG impacts	Vikash Kumar Singh, Harish Sharma, Siddhant Bankar
2.	Shian	Loh ying	07/11/2022	•Discussion on Project Design and eligibility criteria •Proposed Technology to be used in the PA. •PP Management System Manual •Discussion on project funding and involvement of any ODA •Discussion on the PA PDD and ER sheet •Discussion on the GS preliminary review commences. Sustainability aspects of the PA SDG impact	Vikash Kumar Singh, Harish Sharma, Siddhant Bankar
3.	Cheng	Jason	07/11/2022	•Brief introduction of plant working. •Information about all equipment's specifications. •EHS policy being followed by a company. •Information about NERADO oil. •Retrofitting's done for carbon project. •Production, sailes, employment procedures and log. •Quality procedures and standard being followed.	Vikash Kumar Singh, Harish Sharma, Siddhant Bankar
4.	Asoka	Ranjith	07/11/2022	•Brief introduction of plant working. •Information about all equipment's specifications.	Vikash Kumar Singh, Harish Sharma, Siddhant

				•EHS policy being followed by a company. •Information about NERADO oil. •Retrofitting's done for carbon project. •Production, sailes, employment procedures and log. •Quality procedures and standard being followed.	Bankar
5.	Pandey	Tridansh	07/11/2022	•Brief introduction of plant working. •Information about all equipment's specifications. •EHS policy being followed by a company. •Information about NERADO oil. •Retrofitting's done for carbon project. •Production, sailes, employment procedures and log. •Quality procedures and standard being followed.	Vikash Kumar Singh, Harish Sharma, Siddhant Bankar
6.	Win	Nyo	08/11/2022	Local stakeholder consultation	Vikash Kumar Singh, Harish Sharma, Siddhant Bankar
7.	Khairul	Surenoenu Appu	08/11/2022	Local stakeholder consultation	Vikash Kumar Singh, Harish Sharma, Siddhant Bankar
8.	Azacan Omar	Mohamao	08/11/2022	Local stakeholder consultation	Vikash Kumar Singh, Harish Sharma, Siddhant Bankar

C.4. Sampling approach

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No sampling approach used during the validation.

C.5. Clarification requests (CLs), corrective action requests (CARs), and forward action requests (FARs) raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Demonstration of prior consideration of the GS	-	2	-
Identification of project type	-	-	-
Description of project activity	-	12	-
Application and selection of methodologies and standardized baselines	-	3	-
- Application of methodologies and	-	5	-

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
standardized baselines			
- Deviation from methodology and/or methodological tool	-	-	-
- Clarification on applicability of methodology, tool and/or standardized baseline	-	-	-
- Project boundary, sources and GHGs	-	2	-
- Baseline scenario	-	-	-
- Demonstration of additionality	-	-	-
- Estimation of emission reductions or net anthropogenic removals	-	-	-
- Monitoring plan	-	2	-
Start date, crediting period type and duration	-	-	-
Environmental impacts	-	-	1
Local stakeholder consultation	-	2	-
Sustainable development co-benefits	-	-	-
Safeguarding principle	-	-	-
Others (Table Formatting & Editorial, latest template update)	-	5	-
Total	-	33	1

SECTION D. Validation findings

D.1. Demonstration of prior consideration of the GS

Means of validation	In line with para 4.1.49 (b), GS4GG Principle & Requirements V 1.2, "*Retroactive projects shall submit the required documents for preliminary review (time of first submission) within one year of the project start date*". As submission could not be made within the specified timeline, the PP has submitted a deviation request approved by GS, "approved deviation request form" /30/. The deviation request is approved by GS under the condition that, during the design certification process, the PD successfully demonstrates the renewability and overall suitability of the biomass (and its residue), used for making the NERADO fuel for powering the aluminium recycling process, through compliance with the four requirements stipulated in the "approved deviation request form /30/". Furthermore, the VVB has assessed the section B.5.1. of the PDD/01/ to validate the compliance with the four requirements set in the "approved deviation request form /30/".
Findings	In reference to the response from PP and the submitted "approved deviation request form /30/", VVB assessed that the PP has got exemption for the requirement of para 4.1.49 (b) of GS4GG Principle & Requirements v 1.2/B02/, however, the said exemption is subject to 4 conditions and to demonstrate the prior consideration of revenues from Gold Standard certification, VVB raised five CARs CAR 24 to CAR 28 in this respect all of which have been resolved
Conclusion	PP has got an exemption for the requirement of para 4.1.49 (b) of GS4GG Principle & Requirements V 1.2/B02/ due to COVID-19 outbreak. VVB upon thorough assessment and review of the documents received, finds that the provided evidence demonstrates acceptable proof of prior consideration of carbon credit revenue. The documentation, including Board Resolution dated 25th March 2019, and prior consideration intimation form/47/ of UNFCCC dated 29 Feb 2020, substantiates the serious consideration of revenues from carbon credits in the decision to implement the project. The comprehensive nature of these documents supports the transparency and credibility of the prior consideration process. Therefore, it is concluded that the project activity conforms to para 4.1.49 (b) GS4GG Principle & Requirements V 1.2/B02/

D.2. Identification of project type

Means of validation	CCIPL based on documentary review, on-site inspection and interviews confirms that the proposed GS activity is a non-A/R project.
Findings	NA
Conclusion	VVB confirms that the proposed GS activity is a non-A/R project. The assessment in compliance with § 6.3 (c) GS4GG Validation and Verification Standard (version 1) and GS requirement.

D.3. Description of project activity

Means of validation	The description of the project activity contained in the PDD /01/ is transparent, detailed and provides a clear overview of the project. Its content was confirmed by means of document review, interviews and onsite visit to validate the accuracy and completeness of the project description. The purpose of this Project Activity- "The Project Activity aims to reduce GHG emissions through implementation of fuel switch project in an existing facility. Emission reductions attributable to the Project activity are additional to any that would occur in the absence of the project activity in accordance with the "Gold standard for global goals" (GS4GG) requirements for additionality. The micro scale Project Activity involves the Fuel-Switch Project using Non-Edible Raw Agriculture-Derived Oil System (Nerado System) by Replacing carbon intensive energy source i.e. Heavy Fuel Oil (HFO) in an existing Aluminium Dross Recycling facility of JTS Engineering Sdn Bhd in Malaysia. This is in compliance with § 2.2. of applied methodology AMS.III.AS: "Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications", Version 02.0 /B01/ The project activity is located within the host country of Malaysia, specifically in an existing Aluminium Dross Recycling facility of JTS Engineering Sdn Bhd in Malaysia. The project location is validated by physically visiting the site. The purpose of this Project Activity: Besides reducing GHG emissions in line with the United Nations Sustainable Development Goal (SDG) number 13 'Climate Action, the project activity also seeks to increase other long-term sustainability benefits as mentioned below. **SDG 8 Decent work and economic growth** 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. **SDG 11 Sustainable Cities and Communities** Target 11: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. **SDG 13, Climate Action:** Target 13.2: Integrate climate change, measures into national policies, strategies and planning. The validation team based on review of PDD /01/, and interview confirms that the description of the proposed project in the PDD is accurate, complete, and provides an understanding of the proposed project. The PDD /01/ describes how the project contributes to sustainable development in the host country. The validation team reviewed the PDD and interview the PP and confirms that the project contributes to sustainable development in the host country. This is in conformance with §7.2.1 of GS VVS (version 1) and the requirement §4 of the "Principle and Requirements" version 1.2 /B02/ From the desk review of PDD /01/, review of ODA Declaration /51/ and interviews of the PP representatives, it is revealed that this project activity does not involve any ODA funding. Thus, the validation team considers no ODA funding from any Annex 1 country has been involved under this project activity. The review of the PDD/01/ reveals that the PP has selected crediting period of five years renewable up to one time as the technical lifetime of the project is restricted to 10 years This is in conformance with §7.6 GS4GG VVS (version 1) /B02/, §5.1.1

	(c) and §5.1.1 (f) of "Principles and Requirements", version 1.2 /B02/. The start date of the project is 27/06/2019 which is in compliance with §4.1.39 of "GS4GG Principles and Requirements", version 1.2 /B02/., , However, the crediting period start date of the project has been selected by PP as 01/04/2022 This is in conformance with the requirements contained in §10.2.1 "GHG Emissions Reductions & Sequestration Product Requirement, V 2.2" /B02/ which states "The start date of Crediting Period is the date of start of operation (start of planting for A/R Projects) or a maximum of two years (three years for A/R & AGR) prior to the date of Project Design Certification, whichever occurs later." PP has chosen start date of crediting period (01/04/2022) which is two years prior to the anticipated date of project Design Certification (31/03/2024)..
Findings	VVB has raised total five CARs, i.e., CAR 1, CAR 2, CAR 3, CAR 7 & CAR 8 for the completeness of section A.1 of the PDD which have been resolved
Conclusion	The validation team confirms the project description of the project contained in the PDD to be complete and accurate. The PDD complies with the applied methodology, GS4GG VVS (version 1), "Principles and Requirements", version 1.2 /B02/ and template guidance.

D.4. Application and selection of methodologies and standardized baselines

D.4.1. Application of methodologies and standardized baselines

Means of validation	The project activity applies single small-scale methodology: AMS.III.AS – "Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications", version 02.0/B01/ and following tools where applicable. • "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Version 3.0/B01/ • "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" Version 3.0/B01/ • "Upstream leakage emissions associated with fossil fuel use" Version 2.0/B01/ The proposed micro scale Project Activity involves the Fuel-Switch Project using Non-Edible Raw Agriculture-Derived Oil System (Nerado System) by Replacing carbon intensive energy source i.e. Heavy Fuel Oil (HFO) in an existing Aluminium Dross Recycling facility of JTS Engineering Sdn Bhd in Malaysia. Thus, the methodology and tools mentioned above are applicable to the project. Also, the project does not apply standardized baseline. The validation team checked the applicability of methodology (AMS-III.AS, version 02) as follows. Applicability Criteria §3, AMS III AS/B01/: The proposed micro scale Project Activity involves the Fuel-Switch Project using Non-Edible Raw Agriculture-Derived Oil System (NERADO System) by Replacing carbon intensive energy source i.e., Heavy Fuel Oil (HFO) in an existing Aluminium Dross Recycling facility. Applicability Criteria §4, AMS III AS/B01/: As the fuel switching activity did not result any energy efficiency therefore the primary aim of the microscale project activity is to reduce emissions through fuel switching only. Applicability Criteria §5, AMS III AS/B01/: (a) The baseline fuel i.e. HFO and the project fuel are consumed in furnaces that are used in the manufacture of products i.e. aluminium dross which is an element process for the project activity. (b) VVB assessed that the previous three years from the start date of the project only HFO was used in the elemental process, except for in 2019 where small quantities of biomass fuel were used for experimental purpose. (c) VVB through its assessment during site visit, interview and research through online secondary data sources evaluated that regulations do not restrict the use of the baseline fossil fuel or require the use of project biomass and low carbon energy sources for the given elemental process and industry.

	(d) For the elemental process where the fuel switch takes place have a distinct fuel input and distinct product output. The output of each element process is aluminium conforming to the client's quality requirement./27//19/ (e) The primary output of the microscale project activity is aluminium ingot and not energy (e.g., heat, electricity) that can be directly measured. (f) PP has confirmed that the primary output of the microscale project activity produced in the industrial facility throughout the crediting period shall be equivalent to the product(s) produced in the baseline. For the purposes of this methodology, in addition PP has further confirmed that products produced in the industrial facility throughout the crediting period shall provide the same level of service, or better, and be of the same level of quality, or better than the product(s) produced in the baseline. (g) PP confirms that the type of input materials used in the project shall be homogeneous and similar to the input material that was used in the baseline and deviation during the crediting period of input material type, composition, or amount used per unit of product output shall be within the range of ±15 per cent of the baseline characteristics and values. (h) The production capacity of the microscale project activity remains the same and shall not be beyond ±15 per cent of the baseline capacity. Applicability Criteria §6, AMS III AS/B01/: VVB through site visit observations and interviews, assessed that the project activity does not involve any chemical processes that result in the transformation of raw materials, thus precluding the possibility of claiming certified emission reductions. Consequently, this criterion holds no relevance to the project activity. Applicability Criteria §7, AMS III AS/B01/: The project activity incorporates Non-Edible Raw Agriculture-Derived Oil (NERADO) as the renewable fuel source, which is employed without undergoing the any chemical or biodiesel conversion process. The NERADO fuel undergoes no pre-combustion chemical treatment. The procedural details are outlined in Section A.3 of the PDD/01/, thus affirming compliance with the relevant criteria. Applicability Criteria §8, AMS III AS/B01/: The VVB assessment concludes that the project meets the stipulated criteria for methodology application. The existing plant, undergoing retrofitting (i.e. replacement includes the addition of a new fuelling system with filters, jacketed pipes and heaters) has been operational for a period exceeding three years preceding the initiation of the project activity. The replacement took place in the second half of 2019, the commissioning of the equipment on 27/06/2019., The fulfilment of this prerequisite guarantees the availability of sufficient baseline performance data, substantiating the suitability of the methodology. Applicability Criteria §9, AMS III AS/B01/: The specified criterion, pertaining to the cross-checking of farmer records with seed and synthetic nitrogen fertilizer suppliers, is not applicable to the current project scenario. This is due to the absence of a dedicated plantation for the fuel employed in the project, thereby rendering the comparison of records unnecessary. As such, the mentioned assessment criteria hold no relevance within the context of the project activity. Applicability Criteria §10, AMS III AS/B01/: The applicability criteria outlined in the tool "Project emissions from cultivation of biomass" are deemed relevant if the sourcing of biomass involves dedicated plantations. However, in the present project context, there is no utilization of dedicated plantations for biomass sourcing. Consequently, the criteria stipulated in the mentioned tool do not apply to the current project scenario. Applicability Criteria §11, AMS III AS/B01/: in the present project context, there is no utilization of charcoal as a project fuel. Consequently, the criteria 11(a) and 11(b) stipulated in the methodology do not apply to the current project scenario.

	Applicability Criteria §12, AMS III AS/B01/: The assessment confirms that the project solely encompasses the retrofitting of the fuel firing system, without contributing to an extension of the overall project life. Given this scope, the stipulated requirements pertaining to the demonstration of the remaining lifetime of replaced equipment, as detailed in the most recent version of the "General guidelines for SSC CDM methodologies," do not directly apply. The project's activities do not result in an increase in the remaining lifetime of the affected systems, thus ensuring alignment with the prescribed crediting period. Applicability Criteria §13, AMS III AS/B01/: The assessment affirms that the given project meets the applicability criteria, as the output produced, which includes hot/fused metal, is measurable and quantifiable. Therefore, there is no need to resort to using the input material as a proxy for determining baseline/project emissions. The project's ability to directly measure the product output ensures a robust and accurate assessment of emissions, rendering the mentioned proxy approach unnecessary in this context. Applicability Criteria §14, AMS III AS/B01/: VVB assessed that as the given project is a microscale project activity with a limit of 10,000 emission reductions annually, measures shall be limited to those that result in emission reductions of less than or equal to 60 kt CO2 equivalent annually. Applicability Criteria §3, GS4GG Principles & Requirements, version 1.2/B02/: **1. Types of projects:** VVB has assessed the criteria affirms that the given project meets the applicability criteria as the project activity is a fuel-switch project that involves the swapping from HFO to NERADO during the smelting process of aluminium. **2. Location of project:** VVB has assessed the criteria affirms that the given project meets the applicability criteria as the project activity is a fuel-switch project that involves the swapping from HFO to NERADO during the smelting process of aluminium. **3. Project Area, Project Boundary and Scale:** VVB has assessed the criteria affirms that the given project meets the applicability criteria as the project activity will be developed within the host country boundary of Malaysia as micro scale project. **4. Host Country Requirements:** VVB has assessed the criteria affirms that the given project meets the applicability criteria as the project activity is in compliance with applicable Host Country's legal, environmental, ecological and social regulations. **5. Contact Details:** VVB has assessed the criteria affirms that the given project meets the applicability criteria. **6. Legal Ownership:** VVB has assessed the criteria affirms that the given project meets the applicability criteria as the nature of project activity is independent of JTS's sale of Aluminium to its clients, therefore JTS retains Full and uncontested legal ownership of any Products that are generated under Gold Standard Certification.
Findings	CAR 4 & CAR 5 were raised and have been resolved
Conclusion	Based on document review, interviews and on-site assessment, the validation team confirmed that the application of the baseline methodology is transparent and conservative and confirms that the chosen baseline and monitoring methodology i.e. AMS.III.AS ver. 02.0/B01/ is applicable to the project activity.

D.4.2. Deviation from methodology and/or methodological tool

Means of validation	Compliance of monitoring plan with monitoring methodology has been verified by document review, review of the data and information presented, review of the monitoring plan, the monitoring methodology/B01/ including applicable tool(s),

	evaluation of data management and the quality assurance and quality control system, onsite site inspection, review of PDD/01/, Review of Monitoring methodology. The applicability of methodology was found to be fulfilled, no deviations from methodology were observed. No Deviation is requested from the applicable methodology and/or methodological tool.
Findings	No Finding was raised.
Conclusion	The validation team confirms that no deviation from the selected methodology and/or methodological tool was applied in the validation of the proposed microscale project activity

D.4.3. Clarification on applicability of methodology, tool and/or standardized baseline

Means of validation	No clarification is requested on the applicability of methodology, tool and/or standardized baseline.
Findings	NA
Conclusion	NA

D.4.4. Project boundary, sources and GHGs

Means of validation	By means of comparison of the PDD/01/ with the applied CDM methodology AMS III AS Version 02.0, the validation team has assessed the project boundary in accordance with applicable related validation requirements in the GS4GG VVS Ver 1. In accordance with § 7.3.1 & § 7.3.2 of GS VVS (version 1.0) /B02/ the validation team has assessed the geographical boundary of the project. As per applied methodology AMS III AS /B01/, the project boundary is the physical, geographical site where the switching of energy sources takes place. It includes all installations, processes or equipment affected by the switching. In cases where the renewable biomass is sourced from dedicated plantations it also includes the area of the plantations. In cases involving thermo-mechanical processing of the biomass (e.g. charcoal; briquettes; syngas) the sites where these processes are occurring shall be within the project boundary. This was as checked and confirmed by reviewing the PDD /01/, on site visit, and interviews with stakeholders and representatives of PP, the project boundary includes the project equipment, the baseline equipment has remained the same the microscale project and the source of fuel i.e., HFO supplier, however the fuel firing system of the project activity has been replaced with a new fuelling system which was commissioned on 27/06/2019. JTS will implement regular maintenance to ensure that the equipment will be able to sustain over the course of the 10-year crediting period . One CAR has been raised for including the baseline equipment and following a thorough assessment of the response provided by the Project Proponent (PP), the Validation and Verification Body (VVB) confirms that the baseline equipment, including the Furnace, Burners, jacketed pipeline, pumps, heaters, and filters, have been appropriately included within the project boundary. This aligns with the applied methodology/B01/ and supports the validity of the Fuel Switch Project. The PP's response acknowledges the replacement of pumps and the addition of filters, Jacketed pipes, and heaters as evidenced during site visit too. Furthermore, the updated version of the Project Design Document (PDD)/01/ reflects the inclusion of these equipment additions and emission from additional electricity as a result of the project activity are considered in the project boundary. Additionally,, it is noted that the replaced equipment within the Fuel Switch Project shall be subject to monitoring during each verification period. This monitoring requirement prevent any kind of leakage on account of replaced equipment in any other place.
Findings	VVB raised total four CARs i.e., CAR 6, CAR 10, CAR 12 and CAR 13. CAR 13 was raised related to boundary (Same CAR is applicable for monitoring plan also) ensuring that the baseline equipment will also be the part of the boundary, same was accepted and corrected by the PP which have been resolved.
Conclusion	This was as checked and confirmed by reviewing the PDD /01/ and interviews with representatives of PP. A review of PDD reveals the definition of the boundary for the PA in terms of a geographical area i.e., Malaysia. (Within which the microscale

	project activity is included and implemented) has been transparently defined, and in establishing the boundary of the microscale project, the PP has taken into consideration all applicable national and/or sectoral policies and regulations within that chosen boundary. This conforms to the requirement of §7.3 of GS4GG VVS (version 1) /B02/. The validation team confirms the following: 1. The physical boundary of the project is clearly defined. 2. The project boundary is defined in accordance with the applied methodology. 3. The GHG source and gas involved in the baseline & project scenario is considered appropriately. 4. The validation team did not reveal other greenhouse gas emission occurring within the proposed GS project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 10% of the overall expected average annual emission reduction, which are not addressed by the applied methodologies. Hence, the project boundary is defined in accordance with §7.3 and §9.6.3 of GS4GG VVS (version 1.0) /B02/.

D.4.5. Baseline scenario

Means of validation	The VVB has validated the baseline in line with §20 of applied methodology AMS-III. AS i.e. "*The baseline is related to the historical fossil fuel consumption associated with the element processes, affected by the project activity that would continue to occur in the absence of the project activity.*" The baseline scenario is that the Heavy Fuel Oil was used to power the furnace in the recycling of aluminium dross. In the absence of the project activity, the aluminium dross recycling plant would continue to consume fossil fuel (HFO). VVB has checked the last three-year HFO consumption data and records "2016-2022 JTS fuel consumption (NERADO vs Fossil Fuels)"/04/

Year	HFO Consumption (L)
2018	998,860
2017	1,088,610
2016	973,950

Findings	CAR 11 and CAR 16 were raised and have been resolved
Conclusion	The validation team based on the description provide above with regard to the assessment of the requirements confirms that: (a) All the assumptions and data used by the project participants are listed in the PDD/01/ and or it annexures, including their references and sources; (b) All documentation used are relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD/01/. (c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. (d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD/01/. (e) The approved baseline methodology has been correctly applied to identify the most plausible baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

D.4.6. Demonstration of additionality

Means of validation	The proposed project activity has demonstrated additionality by applying the tool 21 "Demonstration of additionality of small-scale project activities", version 13.1/B01/. PP has demonstrated the Additionality opting §10 (a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions; It has been argued that the project activity faces the implementation barrier mainly the investment barrier. In line with §5.10(a) of Tool 21 "Demonstration of additionality of small-scale project activities", version 13.1/B01/ an investment comparison analysis is used under investment barrier using levelized cost of production compared between the cost of aluminium production using the baseline fuel HFO and the renewable fuel NERADO. VVB has raised five CARs for the demonstration of additionality and PP has provided the satisfactory response/evidence to close the raised queries. VVB has reviewed the

final version of investment analysis sheet "financial Analysis"/18/, the financial parameters are supported by relevant and sufficient evidence for demonstrating the appropriateness of the chosen value for the given parameter.

Assumptions: Baseline Scenario

General Parameters	Value	Data Source
Average Annual Aluminium Production 2016-2018 (Kg)	4,498,971	JTS Product Output Data 2016 – 202
Average HFO consumed 2016 - 2018 (Litres)	1,020,473	2016 - 2022 JTS fuel consumption
2018 HFO cost (RM/l)	2.23	2016 - 2022 JTS fuel consumption NERADO vs Fossil Fuels The 2018 HFO cost was taken as the highest cost over the past thre prior to the start of the project, this allow for a more conservative inves analysis.
O&M cost (RM)	1,101,123	JTS Financial Statement 2017&2018
O&M Cost inflation	0.97%	Malaysia - Inflation rate 2028 | Statist

Assumptions: Project Scenario

General Parameters	Value	Data Source
2018 NERADO ~ CPO Price (RM/l)	2.24	Monthly Palm Oil Trade Statistics, 20 MPOC The 2018 NERADO/CPO cost was t as it was the lowest cost over the three year prior to the start of the pro this is to allow for a more conserv investment analysis.
Initial Project Investment - Equipment Cost (RM)	238,905	Purchase order and invoice of equip for the new fuelling system which cor of filters, pumps, jacketed pipes pumps.
O&M Cost (RM)	1,101,123	JTS Financial Statement 2017&2018 The same O&M cost from the bas scenario was considered for the pr scenario to account for a conservative approach to the invest analysis.

Outcome of the Investment Analysis

Fuel Type	Levelized cost of aluminium production (RM/l)	Source of information
HFO	0.725	Investment analysis spreadsheet
NERADOs	0.848	

PP transparently evaluated the sensitivity of the parameters to an extent at which the project activity become financially viable without VER revenue and presented the likelihood of such scenario. VVB acknowledges that the sensitivity analysis was conducted as part of the updated investment analysis, considering the reasonable sensitivity of applicable variables. VVB also recognizes that PP has made corrections to the calculations for the parameters. Furthermore, based on the information provided, VVB has assessed the sensitivity analysis conducted by PP which revealed

	that even with a 10% increase in HFO price and a 10% decrease in NERADO price, the project is not financially attractive in comparison to the baseline scenario. This means that the baseline scenario, which is based on the price of HFO, remains the most viable and profitable option. However, VVB further assessed the sensitivity of the parameters and found that the financial viability is breached when there is a 26% increase in HFO price or a 21% decrease in NERADO price. This indicates that the parameters is more sensitive to larger variations in fuel prices. Based on the assessment of financial analysis worksheet/18/ and other assumptions as detailed in this section of the FVR, VVB concluded that the fuel prices have a relative correlation, meaning that it is highly unlikely for only one type of fuel price to increase without an increase in the other type of fuels. This suggests that if there is a significant increase in HFO price, it is expected that other types of fuels would also experience price increases. Overall, this information implies that the financial additionality remains unaffected by moderate variations in fuel prices but becomes breached when there are larger fluctuations in the prices of HFO and NERADO which is a highly unlikely scenario.'
Findings	CAR 17, CAR 18, CAR 19 and CAR 30 were raised and have been resolved
Conclusion	The validation team confirms that all the documented evidence listed above during the validation process are found in line with §7.4 and §7.5 and is able to confirm that: a) The benefits of carbon credits were considered necessary in the decision to undertake the project as a proposed project activity. b) All the assumptions and data used by the project participants are listed in the PDD, including their references and sources; c) All parameters used in financial calculations are duly validated as detailed above in means of validation section. d) All underlying assumptions are appropriate and reasonable in context of the project activity e) Financial calculations performed for investment analysis were correct and comply with the CDM requirements of "Methodological Tool 27: Investment Analysis" Ver 13.0and the nationally accepted accounting practices. VVB further confirms that the sensitivity analysis is performed in accordance with "Methodological Tool 21 - Demonstration of additionality of small-scale project activities" Ver 13.1. The review of investment analysis did not reveal any parameter, other than those included in the sensitivity analysis that has a material impact on the investment analysis. The validation process, as described above, confirms that the range of variations for each sensitivity parameter presented in the sensitivity analysis were reasonable. In all cases the use of baseline fuel is the least cost option available with PP, therefore it is concluded that the project activity is financially additional.

D.4.7. Estimation of emission reductions or net anthropogenic removals

Means of validation	As the project activity resulting in an annual emission reduction less than 20 kt CO_2, Therefore, in line with §20, AMS III AS /B01/, PP has applied option 1 of the methodology. Option 1: For projects that involve replacing, modifying or retrofitting systems in existing facilities, the average of the immediately prior three-year historical fossil fuel consumption data, for the existing facility, shall be used to determine an average annual baseline fossil fuel consumption value. Similarly, prior three-year historical production data (excluding abnormal years) for the existing facility, shall be used to determine an average annual historical baseline output production rate. $BE_y = P_{prod,y} \times EF_{CO2,BL}$ Where:

BE_y = The baseline emissions from fossil fuels displaced by the project activity in t CO2e in year y (of the crediting period)

$EF_{CO2,BL}$ = The baseline specific emission factor in t CO2/kg or m3

$P_{prod,y}$ = The annual net production of the facility in year y, in kg or m3

$P_{prod,y}$ = 4,498.971t has been estimated using production data of year 2016-2018 as the base year for the ex-ante estimation purpose.

Year	2016	2017	2018
Production (Tonnes)	4730.44	4659.45	4107.03

The baseline specific emission factor ($EF_{CO2,BL}$) is calculated ex ante as per paragraph 23, equation 2 of applied methodology:

$$EF_{CO2,BL} = \frac{\sum_i \left(FC_{FF,BL,i} \times NCV_{FF,i} \times EF_{CO2,FF,i}\right)}{P_{prod,BL}}$$

Where:

$FC_{FF,BL,i}$ = Average annual baseline fossil fuel consumption value for fuel type i, using volume or weight units[2]

Year	2016	2017	2018
HFO Consumption (l)	973,950	1,088,610	998,860

The source of the Historical fuel consumption is the fuel purchase records and fuel purchase bills/invoices.

$NCV_{FF,i}$ = Average net calorific value of fossil fuel type i combusted GJ per unit volume or mass unit
Source: 40.4 GJ/Ton (2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1, Table 1.2, Residual Fuel Oil)

$EF_{CO2,FF,i}$ = CO2 emission factor of fossil fuel type i combusted in t CO2/GJ, (77.4 kg CO2/GJ IPCC Default value) = 0.0774 t CO2/GJ

$P_{prod,BL}$ = Average annual historical baseline production in units of weight or volume, kg or m3,
Value applied = 4498.97 t
Source: Average of last three-year annual production data

Year	2016	2017	2018
Production (Tonnes)	4730.44	4659.45	4107.03

$EF_{CO2,BL}$ = 0.0007 t CO2/t

BE_y = 4,498,971 x 0.0007 = 3,223 t CO_2

BE_y is calculated in the ER sheet and is transparently mentioned in PDD/01/. The value calculated is 3,223 tCO_2 per year.

The detailed calculations of the baseline emissions have been presented transparently in the PDD/01/ and the ER calculation sheet/02/. The same is found to be correct and hence accepted.

[2] Volume or weight units will be used depending on which best defines the fuel consumption requirements of the production process(es).

Leakage
General guidance on leakage in biomass project activities shall be followed to quantify leakages pertaining to the use of biomass residues.

VVB has assessed that no equipment will be transferred outside the project boundary, therefore, leakage can be discarded.

Project activity emissions
Project emissions are calculated as per paragraph 33, equation (9) of the applied methodology. The project emissions should be calculated as follows:

$$\mathrm{PE}_{\mathrm{y}} = PE_{elec,y} + PE_{fossilfuel,y} + PE_{transport,y} + PE_{cultivation,y} + PE_{CH4,y}$$

Where:

PE_y	=	Project emissions in year y (t CO2)
$PE_{elec,y}$	=	Project emissions due to electricity consumption in year y (t CO2)
$PE_{fossilfuel,y}$	=	Project emissions due to fossil fuel consumption in year y (t CO2)
$PE_{transport,y}$	=	Project emissions from transportation of the renewable biomass from the places of their origin to the manufacturing facility site in year y (t CO2)
$PE_{cultivation,y}$	=	Project emissions from renewable biomass cultivation in year y (t CO2e)
$PE_{CH4,y}$	=	Project emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year y (t CO2e)

In line with §5.4 of the applied methodology, VVB has assessed that as the biomass is not sourced from dedicated plantations and the transport of project fuel is less than 200 kms therefore the project emissions on account of cultivation and transportation are not considered by the PP. Furthermore, as the project activity does not involve any kind of charcoal production and also there is no increased usage of fossil fuel consumption, hence, the above equation is simplified to:

$$PE_y = PE_{elec,y}$$

Project emissions from electricity consumption

As per the methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" $PE_{elec,y}$ can be calculated as such:

$$= \sum_j EC_{PJ,j,y} \times EF_{EF,j,y} \times (1 + TDL_{j,y}) \qquad \text{Equation (1)}$$

Parameter	Value	Source of Information
$EC_{PJ,j,y}$ (qty of electricity consumed in biomass processing)	2,181.20 MWh	2018 Annual Electricity Consumption. 'Product Data Sheet_cradle-to-gate'/25/
$EF_{ef,j,y}$ (Emission factor for electricity generation for source.)	0.585 tCO2/MWh	"2017 CDM electricity baseline for Malayasia" Calculated in accordance with Tool to calculate the emission factor for an electricity system" (tCO2/MWh)./03/
$TDL_{j,y}$	20% default value from	Default Value

	meth. Tool 05 /B01/.	

The complete calculation for $EFEF_{j,y}$ is provided in section B.6 of the PDD/01/. For combined margin calculation, the BM and OM data is taken from "2017 CDM Electricity Baseline for Malaysia[3]"/03/

Emission reductions

Emission reductions in year *y* (ER_y) are calculated as follows:

$$\mathrm{ER}_y = BE_y - PE_y - LE_y$$

Where:

PE_y = Project emissions in year *y* (t CO_2/y)

LE_y = Leakage emissions in year *y* (t CO_2/y)

The detailed calculations of the project emissions have been presented transparently in the PDD and the ER calculation sheet . The same is found to be correct and hence accepted.

Data and parameters fixed ex ante:

Data/Parameter	Assessment
TDLj,y	**Description:** Average technical transmission and distribution losses for providing electricity to source j **Value Applied:** **Source:** Default value of 20% has been selected which is in line with the methodological tool, "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"/B01/. **Purpose of data:** To estimate project emissions form electricity consumption. The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
$NCV_{FF,i}$	**Description:** Average net calorific value of fossil fuel type i combusted, GJ per unit volume or mass unit. **Value Applied:** **Source:** 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1, Table 1.2, Residual Fuel Oil **Purpose of data:** To estimate Baseline CO2e Emissions The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
$EF_{CO2,FF,i,y}$	**Description:** CO_2 emission factor for the fossil fuel **Value Applied:** **Source:** 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2, Table 2.2, Residual Fuel Oil4 **Purpose of data:** The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
$EF_{EL,j}$	**Description:** Emission Factor for electricity generation for source j in year y. **Value Applied:**

[3] https://www.mgtc.gov.my/wp-content/uploads/2019/12/2017-CDM-Electricity-Baseline-Final-Report-Publication-Version.pdf

[4] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

	Source: "2017 CDM Electricity Baseline for Malaysia" study by Malaysian Green Technology Corporation **Purpose of data:** The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
$FC_{,FF,BL,i}$	**Description:** Average annual baseline fossil fuel consumption value for fuel type i, using volume or weight units **Value Applied:** **Source:** Based on average of the immediately prior three-year historical fossil fuel consumption data, as recorded from receipts/invoices for fossil fuel (Heavy fuel oil) purchases/46/ **Purpose of data:** The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
$P_{prod,BL}$	**Description:** Annual average historic baseline production in units of weight. **Value Applied:** **Source:** Based on average of the immediately prior three-year historical product output data, as recorded from receipts/invoices. /20/ **Purpose of data:** The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
Job_{BL}	**Description:** Number of jobs created in the baseline **Value Applied:** **Source:** JTS Engineering Sdn Bhd Accounts and Human Resource Department "JTS Management Staff List 2018"/17/ **Purpose of data:** Calculation of SDG 8's Baseline. The assessment team checked the details during on-site assessment, the given parameter details were found correct and in line with the applied methodology.
PPM_{BL}	**Description:** Level of particulate matter in the air of the project activity **Value Applied:** **Source:** JTS Stack Annual Monitoring Reports/52/ **Purpose of data:** Calculation of SDG 11's Baseline The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.

Data and parameters to be monitored:

Data/Parameter	Assessment
$P_{prod,y}$	**Description:** The annual net project production of the element process *i* in year *y (Tons/year)* **Source:** Invoices/receipts, inventory records. **Measurement methods and procedures:** Measurement results shall be cross-checked with records for sold production (e.g. invoices/receipts), inventory records and by performing mass measurements using annually 3rd party Calibrated weigh bridge. **Monitoring Frequency:** Monthly and Yearly **Purpose of data:** Estimation of CO2e emission reductions
$EC_{PJ,j,y}$	**Description:** Quantity of electricity consumed in year y (MWh/Y). **Source:** Electricity consumption data, as recorded from receipts/Utility Bills from Tenaga (Malaysia power provider)/15/ **Measurement methods and procedures:** **Purpose of data:**

		The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
	Job_{PJ}	**Description:** Annual average historic baseline production in units of weight. **Value Applied:** **Source:** JTS Engineering Sdn Bhd Accounts and Human Resource Department. **Measurement methods and procedures:** **Purpose of data:** The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
	Annual $Salary_{PJ,i,j}$	**Description:** Number of jobs created in the baseline **Value Applied:** **Source:** JTS Engineering Sdn Bhd Accounts and Human Resource Department "JTS Management Staff List 2018"/17/ **Measurement methods and procedures:** **Purpose of data:** Calculation of SDG 8's Baseline. The assessment team has checked the details during on site assessment, the given parameter details found correct and in line with the applied methodology.
	PPM_{PJ}	**Description:** Level of particulate matter in the air of the project activity **Value Applied:** **Source:** 3rd party accredited labs that will do mandatory quarterly stage emissions monitoring **Measurement methods and procedures:** **Purpose of data:** Calculation of SDG 11's Baseline The assessment team checked the details during on site assessment, the given parameter details were found correct and in line with the applied methodology.
Findings	CAR 12, CAR 15 & CAR 27 were raised and have been resolved.	
Conclusion	The validation team confirms, based on the description provided above, and the steps taken to assess the requirements that: (a) All assumptions and data used by the project participants are listed in the PDD /01/ and/or its annexures, including their references and sources. (b) All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD /01/. (c) All values used in the PDD /01/ including GWPs are considered reasonable in the context of the proposed microscale project activity. (d) The baseline methodology, any corresponding tool(s) have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. (e) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD and has been done in the corresponding ER sheet /02/;	

D.4.8. Monitoring plan

Means of validation	The monitoring plan in the PDD/01/ is correctly applied to the project activity. The monitoring plan has been found to be in compliance with the requirements of the applied methodology AMS- III. AS, version 02 /B01/. The assessment team confirmed that the monitoring parameters are sufficient to calculate the emission reductions in accordance with the methodology. The parameters will be calculated or measured as mentioned above section. The energy meter is installed and maintained by TENAGA Malaysia, which is a government utility provider. The sub-station conducts monthly maintenance and readings in accordance with the Malaysian government regulations. The maintenance and calibration are done by TENAGA. The procedure was confirmed during the interview with the project Participant. The monitoring parameters will be recorded for emission reduction as per the requirements. The validation team confirms that list of parameters identified by

	the PP and as mentioned in the PDD/01/ are in line with the monitoring methodology.
Findings	CAR 13, CAR 25 & CAR 27 were raised and have been resolved.
Conclusion	The validation team, on the basis of a review of all the supportive evidence for the above-mentioned parameter, concluded that the emission reduction is appropriately calculated and was reasonable and the next generation estimates used in ER calculations/02/ are correct. The validation team confirms, based on the description provided above, and the steps taken to assess the requirements that: (a) All assumptions and data used by the project participants are listed in the PDD /01/ and/or its annexures, including their references and sources. (b) All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD /01/; (c) All values used in the PDD /01/ including GWPs are considered reasonable in the context of the proposed CDM project activity.; (d) The baseline methodology, any corresponding tool(s)/B01/ have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. (e) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD and has been done in the corresponding ER sheet /02/;

D.5. Start date, crediting period type and duration.

Means of validation	The start date of project activity is 27/06/2019 which is the date of first invoice /26/ received against the works quotation/26/ dated 24/06/2019 is considered as the acceptance of the quotation as there is no formal work order raised by the PP. It was confirmed that the date is the earliest real action taken towards the implementation of the project activity and thus the first invoice is considered the earliest real action towards project implementation. The details and documentary evidence of the quotation and invoices release for the furl switch works are provided to the validation team. The operational lifetime of the project activity was validated from the declaration provided by the PP, and it is 10 years. The PP has considered a 5-year crediting period with one renewable cycle i.e. 10 years with the first 5-year crediting period from 01/04/2022 to 31/03/2027 and the second renewed 5 -year crediting period from 01/04/2027 to 31/03/2032 and the crediting period start date is considered as 01/04/2022,which is two years prior to the date of anticipated Project Design Certification (31/03/2024).The detailed description of means of validation for the start date, crediting period type and duration has also been provided detailed in the section D.3.
Findings	CAR 9, CAR 15 & CAR 20 were raised and have been resolved.
Conclusion	The validation team confirms that the start date, expected operational lifetime, type and duration of the crediting period and starting date of the crediting period described in the PDD are in compliance with the §7.6 of GS4GG Validation and Verification Standard Version 1 /B02/.

D.6. Sustainable Development co-benefits

Means of validation		Parameter	Description/Assessment
	1.	SDG 8 Decent Work and Economic Growth **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	**Mitigation Measure:** Increased employment opportunities **Implementation method:** The number of males and females employed by the project will be reported for each monitoring period based on keeping book and be cross-checked by the labor contracts and training records of employees. For ex ante estimation, 18 jobs are created including 9 males and 9 females. **Way of monitoring:** The actual average monthly salary will be determined by the record-keeping book and cross checked by the salary slips.

			equal pay for work of equal value.	**Frequency of monitoring** Annually
		2.	SDG 11 Sustainable Cities and Communities 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.	**Mitigation Measure**: Annual mean levels of fine particulate matter **Implementation method:** The project activity will reduce the amount of air pollution (Particulate Matter) being released into the atmosphere/working environment. This will be quantified by the reduction in PM levels that is released into the atmosphere from the chimney furnace. This will be the difference between PM levels in the baseline (PMbaseline) and in project scenario (PMproject) **Way of monitoring:** As per minimum requirements stated by Malaysia's Environmental Quality Act's mandate on Secondary Aluminum Total PM must equate to no more than 10mg/m3.
		3.	SDG 13 Climate Action (mandatory) **Target 13.2** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	**Mitigation Measure:** Emission reductions in tCO2e **Implementation method:** The implementation of the project activity contributes to SDG 13, by ensuring that there is sustainable management and efficient use of natural resources. This can be quantified and measured by the volume amount of HFO that is being avoided from being used in the furnace of the facility each year. This HFO fuel is replaced with NERADO oil. **Way of monitoring:** The calculation and justification of this indicator will be elaborated on in the section below. **Frequency of monitoring** Annually
Findings	No CAR is raised			
Conclusion	CCIPL confirms that the sustainability monitoring plan and indicators included in the PDD confirm the sustainable development requirements of GS4GG.			

D.7. Safeguarding principles assessment

Means of validation	PP has done the safeguarding principles assessment analysis and presented the assessment in the GS PDD /01/. The assessment has been performed in accordance with requirements prescribed in the GS4GG Principles & Requirements, Version 1.2 & Safeguarding Principles & Requirements, Version 2.1 /B02/
Findings	No Findings were raised on this portion
Conclusion	The validation team has carried out on site interviews to cross check the safeguarding principal assessment conducted by the PP. GS VVB has also reviewed the initial GS local stakeholder consultation report/29/ and GS4GG PDD /01/ and found that the PP has assessed all the required critical safeguarding principles in project activity. It has been found that the PA fulfills all the principles. In line with Safeguarding principles and assessment v2.1 and para 7.7 of GS VVS v1.0/B02/ VVB has determined whether an upfront assessment against the Safeguarding Principles had been carried out and the project has been implemented in accordance with the requirements set out in Safeguarding Principles and Requirements, v2.1/B02/. The VVB has checked the steps taken to assess the requirements mentioned under section D of PDD and confirms following points: a. assessment applies to the project scenario. b. the Project Developer(s) has provided suitable responses and their justifications to the non-exhaustive list of assessment questions set out against each Safeguarding

	Principle are in accordance with the Safeguarding Principles and Requirements v2.1/B02/. c. risk is identified, the requirements have been used to guide redesign/mitigation proposals, i.e., the response to a given outcome has been designed with the intention of achieving the stated requirements. d. The VVB has confirmed PP has conducted an environmental impact assessment, /09//31/ by the in accordance with the host country procedures. The VVB confirmed PA is fulfilling requirements in accordance with Safeguarding Principles and Requirements v2.1/B02/.

D.8. Local stakeholder consultation

Means of validation	DR, I
Findings	CAR 21, CAR 22, CAR 29 & CAR 32 were raised and have been resolved.
Conclusion	The validation team has checked the corresponding documents /29/ and found them in line with the GS4GG requirements. A feedback portal has been set up on the JTS website[5] to allow stakeholders who come in after the development of the project to give feedback throughout the crediting period of the project activity. Taking into consideration that the Local Stakeholder Consultation was conducted after the start date of the project, any continuous inputs from stakeholders can still be sent through the company's website feedback portal which would collect any feedback and input raised. Any feedback or input would be followed up within 7 working days. In the event of any feedback, input, or grievances with significant impact raised by any stakeholder, the design and implementation of the project activity allowed for the conversion back into the baseline scenario (the retrofitted equipment allows for the use of both baseline scenario fuel type and project scenario fuel type) to allow for any grievances to be addressed before resuming the project activity The validation team confirms that the project activity meets the Gold Standard requirements for stakeholder feedback/ grievance mechanism. Furthermore, on review of stakeholder consultation report/29/ VVB confirmed that PP has conducted and stakeholder consultation in accordance with GS stakeholder consultation and engagement requirement v2.1/B02/

SECTION E. Internal quality control

The final validation report has undergone a technical review and quality review before being submitted to the project participant. A technical reviewer qualified in accordance with CCIPL's qualification scheme for GS4GG validation and verification performed the technical review.

SECTION F. Validation opinion

The VVB (Carbon Check (India) Private Ltd.) hereafter referred to as CCIPL has been appointed by Climate Resources Exchange International Pte Ltd (the PP) to perform validation of their PA "Fuel-Switch Project Deriving Carbon Assets from the Use of Non-Edible Raw Agriculture-Derived Oil System (NERADO System) To Replace Heavy Fuel Oil for Aluminium Dross Recycling in Malaysia (GS11356)". The validation was performed on the basis of the GS4GG requirements. The scope of the validation is defined as an independent and objective review of the project design document (PDD) /01/, which meets all applicable GS4GG "Principles and Requirements" version 1.2/B02/ and other relevant GS4GG applicable rules for project activity. The project's baseline establishment and monitoring plan, tools /B01/, and guidelines were used in accordance with relevant methodology /B01/ The information in these documents is reviewed against GS Validation and Verification Standard for PA, Version 1.0 /B02/, GS4GG rules and requirements.

The report is based on the assessment of the PDD /01/ undertaken through stakeholder consultations, application of standard auditing techniques including but not limited to document reviews, stakeholder interviews, review of the applicable/applied methodology /B01/, and their underlying formulae and calculations.

The team assigned to the validation meets the CCIPL internal procedures including the GS4GG requirements for the team composition and competence. The validation team has conducted a thorough contract review as per GS and CCIPL's procedures and requirements.

Validation methodology and process:

[5] http://www.jts.com.my/usr/contactus.aspx?pgid=6&lang=en

The validation has been performed as per the requirements described in the Gold Standard for the Global Goals Principles & Requirements (version 1.2), and GS VVS for PA (version 1.0) /B02/ and constitutes the review and completion of the following steps:

- Desk review of the PDD /01/, and ER spreadsheet/02/
- Review of the applied monitoring methodology AMS-III.AS: Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications, Version 02.0/B01/
- On-site visit interview (07/11/2022 to 08/11/2022)
- Issuance of Draft Validation Report
- Resolution of CARs and CLs raised during validation.
- Issuance of Final Validation Report.

The PA will result in emissions reductions that are real, and measurable, and give long-term benefits to the mitigation of climate change. It is demonstrated that the PA is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the PA. The validation did not reveal any information that indicates that the PA can be seen as a diversion of ODA funding.

The PDD /01/ contains monitoring plan for the monitoring of the emission reductions from the PA. The monitoring arrangement described in the monitoring plan is feasible within the project design and its CCIPL's opinion that the project participants are able to implement the monitoring plan.

Carbon Check (India) Private Ltd. concludes the validation with a positive opinion that the GS PA "Fuel-Switch Project Deriving Carbon Assets from the Use of Non-Edible Raw Agriculture-Derived Oil System (NERADO System) To Replace Heavy Fuel Oil for Aluminium Dross Recycling in Malaysia (GS11356)", as described in the PDD /01/, meets all applicable GS4GG requirements/B02/ and , / and the requirements of the applied methodology AMS-III.AS, version 02 /B01/.

Therefore, Carbon Check (India) Private Ltd. requests the registration of the project activity as a GS PA with Gold Standard.

Appendix 1. Abbreviations

Abbreviations	Full Texts
BE	Baseline Emission
CAR	Corrective Action Request
CCIPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reduction
CL	Clarification Request
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COP/MOP	Conference of Parties/ Meeting of Parties
DNA	Designated National Authority
DR	Document Review
EB	Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas
GS	Gold Standard
GS4GG	Gold Standard for global goals
GWh	Giga Watt Hours
IPCC	Intergovernmental Panel on Climate Change
kW	Kilo Watt
kWh	Kilo Watt Hours
LE_y	Leakage
LSC	Local Stakeholder Consultation
LS	Local Stakeholder
ODA	Official Development Assistance
PE	Project Emission
PA	Project Activity
PDD	Project Design Document
PP	Project Participant
T	Tonne
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
VVB	Validation and Verification Body

Appendix 2. Competence of team members and technical reviewers

Carbon Check (India) Private Limited

Certificate of Competency

Mr. Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☒ Team Leader	☒ Technical Expert
☒ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☒ Plastic Waste Expert
☒ CCB Expert	☐ Legal Expert	☒ Financial Expert	☒ Environmental, Health and Safety financial matters
☒ SDG+	☒ Social no-harm(S+)	☒ Environment no-harm(E+)	

☒ Local Expert for India/RSA and Spanish speaking countries

in the following Technical Areas:

☒ TA 1.1	☒ TA 1.2	☐ TA 2.1	☒ TA 3.1	☒ TA 4.1
☒ TA 4. n	☐ TA 5.1	☐ TA 5.2	☒ TA 7.1	☐ TA 8.1
☐ TA 9.1	☐ TA 9.2	☐ TA 10.1	☒ TA 13.1	☒ TA 13.2
☒ TA 14.1	☒ TA 15.1	☐ TA 16.1		

Issue Date

5th December 2023

Expiry Date

31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Sanjay Agarwalla

Mr. Sanjay Kumar Agarwalla
Technical Director

Revision History of the document:

Revision date	Summary of changes
2022[1]	Annual revision
Jan 2023	Annual revision
Dec 2023	Change in the template due to revision in TA and function

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Carbon CHECK

Carbon Check (India) Private Limited

Certificate of Competency

Mr. Harish Sharma

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☒ Team Leader	☒ Technical Expert
☐ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☐ Plastic Waste Expert
☐ CCB Expert	☐ Legal Expert	☒ Financial Expert	☐ Environmental, Health and Safety financial matters
☒ SDG+	☒ Social no-harm(S+)	☒ Environment no-harm(E+)	
☒ Local Expert for India			

in the following Technical Areas:

☒ TA 1.1	☒ TA 1.2	☐ TA 2.1	☒ TA 3.1	☐ TA 4.1
☐ TA 4. n	☐ TA 5.1	☐ TA 5.2	☐ TA 7.1	☐ TA 8.1
☐ TA 9.1	☐ TA 9.2	☐ TA 10.1	☒ TA 13.1	☐ TA 13.2
☐ TA 14.1	☐ TA 15.1	☐ TA 16.1		

Issue Date

5th December 2023

Expiry Date

31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Sanjay Agarwalla

Mr. Sanjay Kumar Agarwalla
Technical Director

Revision History of the document:

Revision date	Summary of changes
2022	Initial Adoption
Jan 2023	Annual revision
Dec 2023	Change in the template due to revision in TA and function

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Carbon CHECK

Carbon Check (India) Private Limited

Certificate of Competency

Mr. Siddhant Bankar

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☐ Team Leader	☒ Technical Expert
☐ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☐ Plastic Waste Expert
☐ SDG+	☐ Social no-harm(S+)	☐ Environment no-harm(E+)	☐ CCB Expert
☐ Financial Expert	☒ Local Expert for India		

in the following Technical Areas:

☐ TA 1.1	☒ TA 1.2	☐ TA 2.1	☒ TA 3.1	☐ TA 4.1
☐ TA 4. n	☐ TA 5.1	☐ TA 5.2	☐ TA 7.1	☐ TA 8.1
☐ TA 9.1	☐ TA 9.2	☐ TA 10.1	☒ TA 13.1	☐ TA 13.2
☐ TA 14.1	☐ TA 15.1			

Issue Date

1st January 2023

Expiry Date

31st December 2023

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

CCIPL_FM 7.9 Certificate of Competency_V2.1_012023

Carbon CHECK

Carbon Check (India) Private Limited

Certificate of Competency

Mr. Sanjay Kumar Agarwalla

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☒ Team Leader	☒ Technical Expert
☒ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☐ Plastic Waste Expert
☐ CCB Expert	☐ Legal Expert	☒ Financial Expert	☐ Environmental, Health and Safety financial matters
☒ SDG+	☒ Social no-harm(S+)	☒ Environment no-harm(E+)	
☒ Local Expert for India and Bangladesh			

in the following Technical Areas:

☒ TA 1.1	☒ TA 1.2	☒ TA 2.1	☒ TA 3.1	☒ TA 4.1
☐ TA 4. n	☒ TA 5.1	☒ TA 5.2	☒ TA 7.1	☐ TA 8.1
☒ TA 9.1	☒ TA 9.2	☒ TA 10.1	☒ TA 13.1	☒ TA 13.2
☐ TA 14.1	☐ TA 15.1	☒ TA 16.1		

Issue Date

05th December 2023

Expiry Date

31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Revision History of the document:

Revision	Summary of changes
2022[1]	Annual revision
Jan 2023	Annual revision and template change
Dec 2023	Change in the template due to revision in TA and function

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Appendix 3. Documents reviewed or referenced.

No.	Documents	Provider
/01/	• GS11356 NERADO Fuel Switch PDD_v1.6_28/02/2024 • GS11356 NERADO Fuel Switch PDD_v1.5_09/02/2024 • GS11356 NERADO Fuel Switch PDD_v1.1_07/03/2022 • GS11356 GS4GG Preliminary Review_round-3 final	PP
/02/	• ER Calculations_Ex Ante_27022024_SKA commentsER • ER Calculations_Ex Ante_28082023_SKA commentsER • Calculations_Ex Ante_31012024_SKA comments	PP
/03/	2017 CDM Electricity Baseline for Malaysia Report	PP
/04/	2019 - 2022 JTS fuel consumption (NERADO vs Fossil Fuels)	PP
/05/	ACRA business registration of JTS OPTIMAX PTE LTD	PP
/06/	EHS Test paper	PP
/07/	EIMAS Certificate	PP
/08/	Engagement Document JTSNERADO_CRX	PP
/09/	Environmental Requirements_Malaysia Department of Environment	PP
/10/	Furnace Emissions analysis (Diesel Fuel) June 2020	PP
/11/	furnace Emissions analysis (NERADO FUEL) DEC 2019	PP
/12/	Furnace Emissions analysis (NERADO FUEL) FEB 2020	PP
/13/	Furnace emissions analysis (NERADO Fuel) JULY 2019	PP
/14/	JTS baseline and project equipment declaration 2022	PP
/15/	JTS Electricity Consumption 2021&2022	PP
/16/	a. JTS Financial Statement 2015&2016_audited. b. JTS Financial Statement 2017&2018_audited	PP
/17/	a. JTS Management Staff List 2022 b. JTS Monthly Salary Breakdown 2022	PP
/18/	JTS NERADO investment analysis spreadsheet	PP
/19/	JTS PRE & POST Product quality	PP
/20/	JTS product output data 2016 to June 2022	PP
/21/	JTS sale summary 2016-2018	PP
/22/	Maintenance record for Spectrometer	PP
/23/	Manufacturing License	PP
/24/	Monthly Electricity bills	PP

No.	Documents	Provider
/25/	Product Data Sheet_cradle-to-gate (05.09.2022)	PP
/26/	a. Quotation & PO b. Purchase order & invoice of equipment	PP
/27/	Quality control Policy	PP
/28/	SSM business registration of JTS Engineering Sdn Bhd	PP
/29/	Stakeholder Consultation-Report V1.1	PP
/30/	Deviation-Request-form_280920_GS decision	PP
/31/	EIA Report Approval by Department of environment Johor	PP
/32/	JTS baseline and project equipment declaration 2022	PP
/33/	JTS Furnace Maintenance (Bricklaying)	PP
/34/	JTS Furnace Maintenance (Oil Pump)	PP
/35/	Biodiesel from coconut acid oil using Candida rugosa and Candida antarctica lipases	PP
/36/	a. Improved biodiesel production from sludge palm oil catalyzed by a low-cost liquid lipase under low process input conditions b. Integrated bioconversion process for biodiesel production utilizing waste from the palm oil industry c. On trending technologies of aluminium dross recycling_A review d. Processing of Aluminium Dross_The Birth of a Closed Industrial Process e. V. Petrauskaite reference for CFAD production Physical_refining_of_coconut_oil_Effect_of_crude_o	PP
/37/	JTS baseline and project equipment declaration 2023	PP
/38/	JTS declaration for RSPO_MSPO compliance	PP
/39/	Quantitative assessment of palm oil wastes generated by mills in Southern Benin	PP
/40/	Report on JTS Renewable fuel usage	PP
/41/	Sumit Nandi_Production of Medium Chain Glycerides from coconut acid oil 53_497	PP
/42/	Sustainable Oil Palm Waste Management in Engineering Development	PP
/43/	Biograce condensed list of standard values	PP
/44/	exxonmobil marine fuel oil	PP
/45/	FINAL CFP report_JTS Engineering_9.12.2021 (Rev.1_18.2.2022)	PP
/46/	JTS Corporate Board Resolution_Fuel switch and carbon credits	PP
/47/	JTS Prior Consideration Form - NERADO-04042020-Final	PP

No.	Documents	Provider
/48/	SIRIM JTS Article	PP
/49/	CCIPL 949 Countersigned Contract,dated 2022-07-26	VVB
/50/	Fuel invoice for 2017-18	PP
/51/	Official Development Assistance Declaration Form	PP
/52/	JTS stack monitoring report 2019 to 2022 (29082022) (1)	PP

Ref no.	Reference Document
/B01/	a. AMS.III.AS: Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications, Version 02.0 https://cdm.unfccc.int/UserManagement/FileStorage/16EUKOWIVQ4P9RT0J2DCAYFL5B3S8M b. Tool 03: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion, version 3.0 c. Tool 05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, version 3.0 d. Tool 07: Tool to calculate the emission factor for an electricity system, version 7.0 e. Tool 15: Upstream leakage emissions associated with fossil fuel use , version 2.0 f. Tool 19: Demonstration of additionality of microscale project activities, Version 10.0. g. Tool 21: Demonstration of additionality of small-scale project activities, version 13.1 h. Tool 27: Methodological tools for investment analysis, version 13.0
/B02/	a. GS Principal and Requirements v1.2 https://globalgoals.goldstandard.org/101-par-principles-requirements/ b. GS Validation and Verification standard v1.0 https://globalgoals.goldstandard.org/113-par-validation-and-verification-standard/ c. GS Microscale project requirement v1.2 https://globalgoals.goldstandard.org/108-par-microscale-project-requirements/ d. Site visit and Remote audit requirement v2.0 https://globalgoals.goldstandard.org/112_par_site-visit-and-remote-audit-requirements-and-procedures/ e. Stakeholder consultation and engagement requirement https://globalgoals.goldstandard.org/102-par-stakeholder-consultation-requirements/ f. Safeguarding principles & requirements, v2.1 https://globalgoals.goldstandard.org/103-par-safeguarding-principles-requirements/ g. GHG Emissions Reductions & Sequestration Product Requirement, V 2.2 https://www.goldstandard.org/project-developers/standard-documents h. GHG Programme of Activity Requirements and Procedures, Version 2.1 https://www.goldstandard.org/project-developers/standard-documents

Appendix 4. Clarification requests, corrective action requests, and forward action requests

Table 1. CLs from this validation

>>
NA

Table 2. CARs from this validation

CAR ID	1	Section no.	N/A	Date: 23/10/2022
Description of CAR				
Two Entities are representing as project developer. PP shall submit the evidence representing both project developers as a legal entity.				
Project participant response				**Date: 14/11/2022**
Business registration certificates for both entities are submitted to the VBB.				
Documentation provided by project participant				
i) SSM business registration certificate of JTS Engineering Sdn Bhd ii) ACRA business registration certificate of JTS Optimax Pte Ltd				
GS VVB assessment				**Date: 04/01/2023**
The registration certificates of the companies have been received. CAR Is closed.				

CAR ID	2	Section no.	N/A	Date: 23/10/2022
Description of CAR				
PP shall submit the authorization letter by project developer for the focal point/project representative.				
Project participant response				**Date: 09/11/2022**
Signed proposal for Climate Resources Exchange International Pte Ltd to be appointed as the focal point/ project/project proponent (PP) is submitted to the VBB.				
Documentation provided by project participant				
Engagement Document JTSNERAO_CRX				
GS VVB assessment				**Date: 04/01/2023**
Engagement Agreement signed between Climate Resources Exchange International Pte Ltd and JTS Engineering Sdn Bhd is received. CAR is closed.				

CAR ID	3	Section no.	A.1	Date: 23/10/2022
Description of CAR				
Section A.1 is not complying with the design template and is incomplete. CME shall update section A.1 with the complete information as required by the template guideline.				
Project participant response				**Date: 09/11/2022**
Section A.1 has been amended to incorporate all necessary information.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 04/01/2023**
The section updated. CAR is closed				

CAR ID	4	Section no.	A.1.1	Date: 23/10/2022
Description of CAR				
The compliance rationale for each eligibility criteria is missing in section A.1.1 of the PDD.				
Project participant response				**Date: 10/11/2022**
Section A.1.1 has been amended to describe the compliance rationale for each eligibility criteria.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 04/01/2023**
The compliance rationale for the required eligibility criterion have been included, CAR is closed.				

CAR ID	5	Section no.	A.1.1	Date: 23/10/2022
Description of CAR				
Demonstration of how the project meets the General Eligibility criteria of the applicable Activity				

Requirements is missing in the PDD.
Project participant response **Date: 10/11/2022**
PDD has been revised to reflect compliance with the General Eligibility criteria of the Activity Requirements.
Documentation provided by project participant
Revised PDD
GS VVB assessment **Date: 04/01/2023**
The project activity is a fuel-switch project that involves the fuel switch activity. The eligibility criterion has been included in section A.1.1, of the PD. CAR closed.

CAR ID	**6**	**Section no.**	**A.1.1**	**Date: 23/10/2022**
Description of CAR				
Confirm that the project is not registered with any other voluntary or compliance schemes. Demonstrate that no potential for double counting of impacts if the Project Area overlaps with that of another Gold Standard or other voluntary or compliance standard programme of a similar nature.				
Project participant response				**Date: 10/11/2022**
Project activity is confirmed to not be registered with any other voluntary or compliance schemes.				
Documentation provided by project participant				
Revised PDD, Signed proposal between CRX and JTS				
GS VVB assessment				**Date: 04/01/2023**
The PD has been updated. PP has confirmed that the project is not registered with any other voluntary or compliance schemes with no potential for double counting of impacts as the project area doesn't overlaps with that of another Gold Standard or other voluntary or compliance standard programme of a similar nature. VV team has checked the compliance by the means of onsite visit and online database too. CAR is closed.				

CAR ID	**7**	**Section no.**	**A.1.1**	**Date: 23/10/2022**
Description of CAR				
PP has not demonstrated that how the project is following applicable Host Country's legal, environmental, ecological and social regulations.				
Project participant response				**Date:10/11/2022**
Demonstration of project activity's compliance with Host Country's legal, environmental, ecological and social regulations has been included.				
Documentation provided by project participant				
Revised PDD, Manufacturing License				
GS VVB assessment				**Date: 04/01/2023**
It has been represented that the project activity follows applicable Host Country's legal, environmental, ecological and social regulations. PP to justify that how the project activity complies with the stipulated legal, environmental, ecological and social regulations of the host country. CAR is open.				
Project participant response				**Date:10/01/2023**
Demonstration of project activity's compliance with Host Country's legal, environmental, ecological and social regulations has been included in the PDD.				
Documentation provided by project participant				
i) Revised PDD ii) DOE Licence 2022 iii) EIA Report Approval by Department of environment Johor iii) Manufacturing Licence				
GS VVB assessment				**Date: 30/01/2023**
PP has added under section A.1.1 pt.4 of PDD, project is complying with Host country's requirements, documents shared against the statement have been found in line with a requirement of host country and GS4GG and also checked during an site visit. Hence, CAR is closed.				

CAR ID	**8**	**Section no.**	**A.1.1**	**Date: 23/10/2022**
Description of CAR				
In section A.1.1, full and uncontested legal ownership of any Products that are generated under Gold Standard Certification, (for example carbon credits) have not been demonstrated.				
Project participant response				**Date: 10/11/2022**
The nature of the project activity is independent of JTS's sale of Aluminum to its clients, therefore JTS retains Full and uncontested legal ownership of any Products that are generated under Gold Standard				

Certification.
Documentation provided by project participant
Revised PDD
GS VVB assessment **Date: 04/01/2023**
It is represented that the JTS is the only owner of the products that are generated under Gold Standard Certification, however, under key project information two entities JTS Engineering Sdn Bhd and JTS Optimax Pte Ltd are represented as project developers. PP to justify the actual shareholding pattern of the credits between the companies through VER shareholding agreement.
Project participant response **Date: 10/01/2023**
The nature of the project activity is independent of JTS's sale of Aluminium to its clients, therefore JTS retains Full and uncontested legal ownership of any Products that are generated under Gold Standard Certification. Additionally, JTS Engineering Sdn Bhd is the only entity represented as the project developer, this has been reflected in the PDD.
Documentation provided by project participant
Revised PDD
GS VVB assessment **Date: 30/01/2023**
In reference to the response from PP now only JTS Engineering Sdn Bhd is mentioned as the only project developer under key project info of updated PDD, which hold 100% shareholding of credits, Hence, **CAR is closed.**

CAR ID	**9**	**Section no.**	**A.1.2**	**Date: 23/10/2022**
Description of CAR				
In line with section A.1.2, certificate of incorporation of JTS Engineering Sdn Bhd, Purchase order of equipment and agreement between CRX and JTS need to be submitted.				
Project participant response				**Date: 10/11/2022**
Requested documents are submitted to the VBB.				
Documentation provided by project participant				
i) SSM business registration certificate of JTS Engineering Sdn Bhd ii) Purchase order & invoice of equipment iii) Engagement document JTSNERADO_CRX				
GS VVB assessment				**Date: 04/01/2023**
The listed documents have been received, CAR is closed.				

CAR ID	**10**	**Section no.**	**A.2**	**Date: 23/10/2022**
Description of CAR				
In section A.2, the coordinates to be provided in WGS 84 coordinate system (deg, min, sec)				
Project participant response				**Date: 10/11/2022**
Coordinates have been amended to reflect the WGS 84 coordinate system.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 04/01/2023**
The coordinates have been updated correctly; CAR closed				

CAR ID	**11**	**Section no.**	**A.3**	**Date: 23/10/2022**
Description of CAR				
In section A.3, the PP to describe specifically whether the project activity involve replacing or modifying or retrofitting systems in existing facilities. Also, provide the purchase order supporting the replacement/ modification/ retrofitting.				
Project participant response				**Date: 10/11/2022**
The project activity involves retrofitting existing facilities. Section A.3 has been amended to reflect this.				
Documentation provided by project participant				
i) Revised PDD ii) Purchase order & invoice of equipment				
GS VVB assessment				**Date: 04/01/2023**
The project activity involves the retrofit of fuelling system of the existing furnace to condition the fuel for				

the desired temperature. The offer letter for the works along with invoices have been received. CAR Is closed.

CAR ID	12	Section no.	B.3	Date: 23/10/2022
Description of CAR				
As the net project production of the elemental process is the monitored parameter therefore can't be excluded from the project boundary.				
Project participant response				**Date: 10/11/2022**
Section B.3 has been amended to reflect the inclusion of net project production of the elemental process within the project boundary.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 04/01/2023**
The melted aluminium and aluminium ingots are included in the project boundary, CAR is closed.				

CAR ID	13	Section no.	B.3	Date: 23/10/2022
Description of CAR				
In case if the project involves any equipment replacement, the baseline equipment will also be the part of the boundary.				
Project participant response				**Date: 10/01/2023**
Section B.3 has been amended to reflect the inclusion of the baseline equipment within the project boundary.				
Documentation provided by project participant				
GS VVB assessment				**Date: 30/01/2023**
The revised PDD project boundary diagram doesn't reflect any baseline replaced equipment for monitoring. CAR is open.				
Project participant response				**Date: 22/02/2023**
Section B.3 has been amended to reflect the inclusion of the baseline equipment within the project boundary.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 17/04/2023**
The changes didn't reflect in the updated version of the PDD. The baseline equipment replaced hasn't been updated in the project boundary, **CAR is open.**				
Project participant response				**Date: 16/05/2023**
In the fuel switch project, there was the replacement of pumps and added in filters, Jacketed pipes and heaters (as per the invoices presented previously). The equipment have been added in the project boundary in the updated version of the PDP. The baseline equipment list in the MR would also be updated to include the Furnace, Burners, jacketed pipeline, pumps, heaters, filters.				
Documentation provided by project participant				
i) Updated PDD				
GS VVB assessment				**Date: 01/06/2023**
Following a thorough assessment of the response provided by the Coordinating and Managing Entity (PP), the Validation and Verification Body (VVB) confirms that the baseline equipment, including the Furnace, Burners, jacketed pipeline, pumps, heaters, and filters, have been appropriately included within the project boundary. This aligns with the applied methodology and supports the validity of the Fuel Switch Project. The PP's response acknowledges the replacement of pumps and the addition of filters, Jacketed pipes, and heaters as evidenced during site visit too. Furthermore, the updated version of the Project Design Document (PDP) reflects the inclusion of these equipment additions within the project boundary. Additionally, it is noted that the replaced equipment within the Fuel Switch Project shall be subject to monitoring during each verification period. This monitoring requirement prevent any kind of leakage on account of replaced equipment in any other place. # CAR is closed.				

CAR ID	14	Section no.	B.4	Date: 23/10/2022

Description of CAR	
In line with 6.1.2 (e) of GS4GG “Principles & Requirements”, tables in the design documents should be captioned and clearly marked with unique ID.	
Project participant response	**Date: 10/11/2022**
All tables and diagrams have been labeled with unique IDs as per GS4GG “Principles & Requirements”.	
Documentation provided by project participant	
Revised PDD	
GS VVB assessment	**Date: 04/01/2023**
There are two tables with ID “table 1”, also, the pictures/diagrams are not captioned. CAR is open	
Project participant response	**Date: 10/01/2023**
All tables and diagrams have been labeled with unique IDs as per GS4GG “Principles & Requirements”.	
Documentation provided by project participant	
Revised PDD	
GS VVB assessment	**Date: 01/02/2023**
In revised PDD, tables and diagrams captioned and clearly marked with unique ID now Hence, CAR is closed.	

CAR ID	15	Section no.	B.4	Date: 23/10/2022
Description of CAR				
The technical life of the baseline equipment and project equipment need to be transparently mentioned along with start date of operation. Furthermore, the purchase order to be submitted in support of start date. Technical lifetime document provided by OEM need to be submitted.				
Project participant response				**Date: 10/11/2022**
The technical lifetime document by the OEM is submitted to the VBB.				
Documentation provided by project participant				
i) JTS baseline and project equipment declaration 2022 ii) Purchase order & invoice of equipment				
GS VVB assessment				**Date: 04/01/2023**
None of the document confirms the remaining technical lifetime of the baseline and project equipment. **CAR is open**				
Project participant response				**Date: 10/01/2023**
The same equipment was used in the baseline and project activity which has already exceeded the expected technical life. However, JTS has consistently been maintaining and retrofitting the equipment to ensure the equipment remains operational beyond the expected lifespan. Supporting documents will be provided to demonstrate JTS’s commitment in maintaining the serviceability of the equipment.				
Documentation provided by project participant				
i) JTS baseline and project equipment declaration 2022 ii) Purchase order & invoice of equipment iii) JTS Furnace maintenance (Brick Laying & Oil Pump)				
GS VVB assessment				**Date: 30/01/2023**
VVB has reviewed the document shared, however from the declaration it is not clear what is the lifespan of the equipment’s used in the project boundary, further as per GS4GG “Principal and Requirements”, PP to share the documentary evidence against remaining technical life span of the equipment. Technical lifetime document provided by OEM need to be submitted. **Hence, CAR is open**				
Project participant response				**Date: 21/03/2023**
PP has uploaded the updated declaration with includes JTS’s commitment in maintaining the serviceability of the project equipment for the duration of the project lifespan.				
Documentation provided by project participant				
i) JTS baseline and project equipment declaration 2023				
GS VVB assessment				**Date: 17/04/2023**
The declaration related to the serviceability of the furnace till 26/06/2029 has been received. However, in section C.1.2, PP has represented an expected operational lifetime of 20 years. PP shall update the section appropriately. CAR is open.				

Project participant response	Date: 25/04/2023
Section C.1.2 has been updated accordingly.	
Documentation provided by project participant	
i) Updated PDD	
GS VVB assessment	**Date: 01/06/2023**
VVB Has assessed the updated PD and found that section C.1.2 has been updated with the expected operation life time of the project to 10 years. # CAR is closed.	

CAR ID	16	Section no.	B.4	Date: 23/10/2022
Description of CAR				
The supportive documents to be provided to validate the consumption data of baseline fuel HFO for year 2016 to 2018.				
Project participant response				**Date: 10/11/2022**
The supporting documents of baseline fuel HFO consumption data for years 2016-2018 are submitted to the VBB. The information can be found within the '2016 HFO', '2017 HFO', '2018 HFO' tab within the excel file.				
Documentation provided by project participant				
2019-2022 JTS fuel consumption (NERADO vs Fossil Fuels)				
GS VVB assessment				**Date: 04/01/2023**
The baseline data has been received, moreover, the complete database has been witnessed during the site visit. CAR Is closed.				

CAR ID	17	Section no.	B.5	Date: 23/10/2022
Description of CAR				
In line with para 12 of tool 27 - investment analysis, project participants shall supply spreadsheet versions of all investment analysis. All formulas used in this analysis shall be readable and all relevant cells shall be viewable and unprotected.				
Project participant response				**Date: 1/12/2022**
Investment analysis will be submitted to the VVB.				
Documentation provided by project participant				
JTS NERADO Investment analysis spreadsheet				
GS VVB assessment				**Date: 04/01/2023**
The spreadsheet is received; CAR is closed.				

CAR ID	18	Section no.	B.5	Date: 23/10/2022
Description of CAR				
The supporting documents for the assumptions used in investment analysis need submitted for the validation of assumptions.				
Project participant response				**Date: 10/11/2022**
Product data sheets and all relevant data has been submitted to the VVB.				
Documentation provided by project participant				
i) JTS product output data 2016 to June 2022 *ii) Product Data Sheet_cradle-to-gate (05.09.2022)*				
GS VVB assessment				**Date: 02/02/2023**
The supportive documents against all input assumptions of financial analysis haven't been shared by the PP. Hence. CAR is open.				
Project participant response				**Date: 21/03/2023**
The supporting documents against all input assumptions of financial analysis have been shared by PP.				
Documentation provided by project participant				
i) Updated investment analysis spreadsheet ii) Product Data Sheet_cradle-to-gate (05.09.2022) iii) JTS Product Output Data 2016 – 2022 iv) 2019 - 2022 JTS fuel consumption NERADO vs Fossil Fuels				
GS VVB assessment				**Date: 17/04/2023**
VVB has reviewed the financial analysis spreadsheet. PP shall 1. It is observed that the rate of income tax considered in the financial analysis corresponds to the				

year 2021. PP to demonstrate the validity of the value in accordance with para 10 of Methodological tool 27 for "Investment Analysis." Similarly, the values considered for assumptions like annual aluminum production, Fuel Cost (HFP/NERADO), and associated project cost must be conforming to para 10 of tool 27.

2. The terminology "O&M depreciation" is not clear to VVB team. PP to clarify why a depreciation on O&M is being considered?

3. Levelized cost analysis should be limited to the feasible technical life of the project.

4. It is observed that the for the annual production of Aluminum different volume of HFO and NERADO has been assumed. The basis of the same is considered as the average fuel consumption pertaining to different time-period without any consideration of relative output during that period which is not correct for the comparative fuel consumption of different fuels. Moreover, PP to demonstrate that how the input assumption "specific fuel consumption" of NERADO conform to para 10 of Methodological tool 27 for "Investment Analysis."

5. It has been observed that the Civil Works and equipment expenditure has been considered for project scenario only, PP to justify that why such expenditure are not applicable for the baseline scenario.

PP to correct the levelized cost analysis as the PP has computed the per unit cost analysis for first year of operation only.
CAR is open

Project participant response	**Date: 16/05/2023**

The investment analysis has been updated to include only the applicable variables to compute the levelized cost analysis of aluminium production between the use of HFO and NERADO across the technical life of the project.
The results from the investment analysis have also been updated accordingly in the relevant sections of the PDD under "STEP 2: Investment Analysis"

Documentation provided by project participant

i) Updated JTS NERADO Investment Analysis Spreadsheet

ii) Biograce condensed list of standard values (supporting document)

iii) exxonmobil marine fuel oil (supporting document)

iv) Updated PDD

GS VVB assessment	**Date: 01/06/2023**

Upon reviewing the response provided by the PP, the VVB notes that the collective response received does not sufficiently address the specific queries raised in CAR 18. The VVB emphasizes the importance of a pointwise response to each individual query to ensure clarity and facilitate a comprehensive evaluation. The responses received from the PP should ideally provide direct and specific answers to each query, enabling the VVB to thoroughly assess the compliance and validity of the project.
#CAR is open.

Project participant response	**Date: 06/06/2023**

1. The rate of income tax has been removed from the updated investment analysis as the parameter was not included in the levelised cost analysis. The values of parameters such as annual alumnium production, respective fuel cost and associated project cost have been adjusted to be aligned with para 10 of Methodological tool 27 where the values included in the analysis were available prior to the implementation of the project in 2019.

2. The inclusion of the O&M depreciation parameter has been corrected to O&M growth rate to account for the increase in O&M cost due to inflation. This change has been reflected in the updated investment analysis.

3. The levelised cost analysis done was limited to the feasible technical life of the project (10 years) as reflected in the updated investment analysis spreadsheet.

4. The comparative fuel consumption of different fuels for annual production of aluminium have been

adjusted to consider fuel consumption of existing HFO consumption and the associated annual production of aluminium data from the same time period which were available prior to the start of the project. This allows output of specific fuel consumption of NERADO to conform with para 10 of the Methodological tool 27 as all inputs used to derive the value were based on relevant information available at the time of the investment decision.

5. The parameter of civil works and equipment expenditure was removed from the updated investment analysis, all associated costs are represented by the O&M parameter. The O&M parameter is applied to both the project and baseline scenarios.

The PP has corrected the investment analysis to include only applicable variables to compute the levelized cost analysis of aluminum production between the use of HFO and NERADO across the technical life of the project.

Documentation provided by project participant

i) Updated JTS NERADO Investment Analysis Spreadsheet

ii) Biograce condensed list of standard values (supporting document)

iii) exxonmobil marine fuel oil (supporting document)

iv) Updated PDD

GS VVB assessment	**Date: 14/07/2023**

1. The rate of income tax has been removed from the updated investment analysis as now it is not considered within the levelised cost analysis. The values of parameters such as annual aluminum production, respective fuel cost, and associated project cost have been adjusted to align with para 10 of Methodological tool 27, which specifies the use of values available prior to the project's implementation in 2019.

2. The terminology "O&M depreciation" has been clarified and corrected to "O&M growth rate" in the updated investment analysis. This change accounts for the increase in O&M costs due to inflation. VVB acknowledges and accepts this correction.

3. VVB confirms that the levelised cost analysis performed was limited to the feasible technical life of the project, which is reflected in the updated investment analysis spreadsheet. The analysis has been appropriately adjusted to consider the 10-year technical life of the project.

4. VVB acknowledges the adjustment made in the comparative fuel consumption analysis for annual aluminum production. The fuel consumption of existing HFO and associated aluminum production data from the same time period have been taken into account. This adjustment ensures that the specific fuel consumption of NERADO aligns with actual heat value of required for the annual production using HFO as a fuel. Furthermore, the specific fuel consumption data conforms to para 10 of Methodological tool 27, as all inputs used for deriving the value are based on relevant information available at the time of the investment decision.

5. VVB has assessed that PP has updated the investment analysis by removing the O&M expense against Civil Works and equipment expenditure particularly for project scenario. Considering the comparable infrastructure for both the baseline and project scenario, the same O&M has been considered for both scenarios and is found to be appropriate.

PP acknowledges that the levelized cost analysis was initially computed for the first year of operation only. In response to this CAR, PP has made the necessary correction to ensure that the levelized cost analysis is performed accurately using suitable discount rate and covers the entire operational period of the project. #CAR 18 is closed.

CAR ID	**19**	**Section no.**	**B.6**	**Date: 23/10/2022**
Description of CAR				
It is not clear that PP has selected investment comparison analysis with the baseline comparison or benchmark analysis. As both approaches have been mentioned in section B.5.				
Project participant response				**Date: 10/11/2022**

Confirmation of selected investment analysis method has been included.	
Documentation provided by project participant	
Revised PDD	
GS VVB assessment	**Date: 04/01/2023**
PP has selected investment comparison analysis, the same has been updated in the PD; CAR is closed.	

CAR ID	**20**	**Section no.**	**C.2.2**	**Date: 23/10/2022**
Description of CAR				
In section C.2.2, the reference document to the mentioned clause/para is missing. For the mentioned clause, please refer the GS4GG "Principles and Requirements" V 1.2.				
Project participant response				**Date: 10/11/2022**
Reference to GS4GG has been included into the PDD				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 04/01/2023**
VVB team unable to find the referenced section 3.4.1, moreover it is not clear that PP is seeking 5 years of fixed or renewable crediting period. Total length of crediting period must conform to the certification & crediting period rules as defined in Principles & Requirements, GHG Emissions Reductions & Sequestration Product Requirements or Activity Requirements. **CAR is open.**				
Project participant response				**Date: 10/01/2023**
Reference to section 5.1.1 of GS4GG "Principles and Requirements" V 1.2 has been included and addressed in the PDD.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 04/01/2023**
PP have added the statement under section C.2.2 of PDD in line with section 5.1.1 of GS4GG "Principles and Requirements" V1.2,however, PP to write whole period as well (i.e- DD/MM/YYYY to DD/MM/YYYY) 10 year **with an updated statement, CAR is open.**				
Project participant response				**Date: 22/02/2023**
The section has been updated to include the period in (DD/MM/YYYY) format.				
Documentation provided by project participant				
i) Updated PDD				
GS VVB assessment				**Date: 17/04/2023**
The PD has been updated with the crediting period starting from 27/06/2019 to 26/06/2029. # CAR is closed.				

CAR ID	**21**	**Section no.**	**E.2**	**Date: 23/10/2022**
Description of CAR				
Stakeholder Consultation Report on the initial consultation and stakeholder feedback round to be submitted for the validation.				
Project participant response				**Date: 10/11/2022**
The Stakeholder Consultation Report is submitted to the VBB.				
Documentation provided by project participant				
Stakeholder Consultation Report				
GS VVB assessment				**Date: 04/01/2023**
The stakeholder consultation report is received, CAR is closed.				

CAR ID	**22**	**Section no.**	**E.2**	**Date: 23/10/2022**
Description of CAR				
The URL link of feedback portal to be provided in section E.2 of the design document.				
Project participant response				**Date: 10/11/2022**
The URL link for the feedback portal has been provided in Section E.2 of the amended PDD.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 04/01/2023**
Link updated; CAR closed.				

CAR ID	23	Section no.	N/A	Date: 23/10/2022
Description of CAR				
In reference to template guide para 14, the PDD form to be filled using the same format without modifying its font, headings, or logo, and without any other alteration to the form. The line spacing should be consistent throughout the document. Also, the headings should be in bold as per the format only.				
Project participant response				**Date: 10/11/2022**
The PDD form has been reformatted as per template.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 04/01/2023**
The format is adopted, however, in cover page of the GS PD serial number of the key project information index need to be corrected. CAR is open.				
Project participant response				**Date: 10/01/2023**
The PDD form has been reformatted as per the template and GS PD serial number of key project information index has been corrected.				
Documentation provided by project participant				
Revised PDD				
GS VVB assessment				**Date: 30/01/2023**
VVB has reviewed the revised PDD, and the indexing is now found updated, Hence **CAR is closed.**				

CAR ID	24	Section no.	N/A	Date: 06/01/2023
Description of CAR				
In line with para 4.1.49, GS4GG Principle & Requirements V 1.2, PP to demonstrate the prior consideration of revenues from Gold Standard certification. Additionally, PP to demonstrate, how project activity conforms to para 4.1.49 (b) and 4.1.50 (b).				
Project participant response				**Date: 10/01/2023**
The prior consideration has been addressed in accordance with paragraph 4.1.49 (b) and 4.1.50 (b) in the updated PDD.				
Documentation provided by project participant				
ii) Revised PDD ii) Deviation Request Form				
GS VVB assessment				**Date: 04/01/2023**
In reference to the response from VVB and the submitted deviation approval, PP has got exemption for the requirement of para 4.1.49 (b) and 4.1.50 (b) of GS4GG Principle & Requirements V 1.2, however, the said exemption is subject to 4 conditions raised in the form CARs 25 to CAR 28. Hence, in line with para 4.1.49, GS4GG Principle & Requirements V 1.2, PP still requires demonstrating the prior consideration of revenues from Gold Standard certification.				
Project participant response				**Date: 23/03/2023**
The four conditions raised have been addressed, hence the prior consideration has been addressed in accordance with paragraph 4.1.49 (b) and 4.1.50 (b) in the updated PDD.				
Documentation provided by project participant				**Date: 23/03/2023**
i) Updated PDD				
VVB Assessment				**Date: 17/04/2023**
As requested, PP still requires demonstrating the prior consideration of revenues from Gold Standard certification. **# CAR Is open.**				
Project participant response				**Date: 16/05/2023**
The relevant documents to demonstrate prior consideration has been provided and addressed in the updated PDD.				
Documentation provided by project participant				
i) Updated PDD ii) JTS Corporate Board Resolution_Fuel switch and carbon credits				

iii) JTS Prior Consideration Form – NERADO-04042020-Final

GS VVB assessment	Date: 01/05/2023

PP has got exemption for the requirement of para 4.1.49 (b) and 4.1.50 (b) of GS4GG Principle & Requirements V 1.2 due to COVID 19 outbreak. VVB has upon thorough assessment and review of the documents received, finds that the provided evidence demonstrates acceptable demonstration of prior consideration of carbon credit revenue. The documentation, including Board Resolution dated 25th March 2019, and prior consideration intimation form of UNFCCC dated 29 Feb 2020, substantiates the serious consideration of revenues from carbon credits in the decision to implement the project. The comprehensive nature of these documents supports the transparency and credibility of the prior consideration process.
#CAR is closed.

CAR ID	25	Section no.	Dev. Req	Date: 07/02/2023

Description of CAR

As an alternative to fossil fuels, the proposed project activity makes use of renewable biomass resources, in line with the definition provided in CDM's EB23 Annex 18 here. The renewability of the biomass shall be monitored along the crediting period and be included in the Monitoring Plan, where required by the applied Impact quantification methodology.

Project participant response	Date: 23/03/2023

The responses to the requirement have been addressed in section B.5.1 of the updated PDD along with the necessary supporting documents.

Documentation provided by project participant

i) Updated PDD

ii) Journal Articles:

- Biodiesel from coconut acid oil using Candida rugosa and Candida antarctica lipases
- Improved biodiesel production from sludge palm oil catalyzed by a low cost liquid lipase under low process input conditions
- Integrated bioconversion process for biodiesel production utilizing waste from the palm oil industry

GS VVB assessment	Date: 17/04/2023

VVB has assessed the response and found it in line with the requirement of para 4 of EB23 Annex 18.
CAR is closed

CAR ID	26	Section no.	Dev. Req	Date: 07/02/2023

Description of CAR

The proposed project activity does not result in the diversion of existing biomass resources. The project activity expected to make use of biomass resources already in use shall NOT be eligible for Gold Standard registration unless convincing evidence is provided to demonstrate that the current users agree with the envisioned shift of use (potential leakage associated to such a shift must be taken into account). In the absence of such an agreement, the Project Developer shall demonstrate that their project activity makes use of surplus biomass for each type of biomass resource used.

PD shall provide convincing evidence to demonstrate that the current users of the biomass (and its residue) and other stakeholders involved in the entire value chain agree with the envisioned shift of use under the proposed project.

Project participant response	Date: 23/03/2023

The responses to the requirement have been addressed in section B.5.1 of the updated PDD along with the necessary supporting documents.

Documentation provided by project participant

i) Updated PDD

ii) Literature review by JTS (Report on JTS Renewable fuel usage)

iii) Supporting journal article

- Quantitative assessment of palm oil wastes generated by mills in Southern Benin
- Production of medium chain glycerides and monolaurin from coconut acid oil by lipase-catalyzed reactions
- Physical Refining of Coconut Oil: Effect of Crude Oil Quality and Deodorization Conditions on Neutral Oil Loss
- Sustainable Oil Palm Waste Management in Engineering Development

GS VVB assessment	Date: 17/04/2023

VVB has assessed that the project activity is a micro-scale activity and NERADO Fuel is being purchased form the suppliers. Also, as per the literature review of verifiable resources submitted by the PP, it is evident that annual consumption by the PP is less than 1% of the total production of such residual oils in Malaysia making it highly unlikely to impact any existing value chain of the region.
CAR is closed.

CAR ID	27	Section no.	Dev. Req	Date: 07/02/2023

Description of CAR

Project Developer shall demonstrate that their proposed project will only make use of degraded land and shall include this criterion in the Sustainability Monitoring Plan to ensure there is no diversion of land from other essential purposes like food production. Two exceptions may be considered:

a. Convincing evidence is provided showing that the envisioned energy crop is part of a traditional rotational cropping, OR
b. An increase of the productivity is obtained, locally and to the benefit of the current users, through measures implemented in the context of the activity so as to at minimum compensate for the part of the land newly allocated to growing the energy crop.

Compliance with these criteria above must be monitored over the crediting period and thus be part of the Monitoring Plan.

Project participant response	Date: 23/03/2023

The responses to the requirement have been addressed in section B.5.1 of the updated PDD along with the necessary supporting documents.

Documentation provided by project participant

i) Updated PDD

ii) Literature review by JTS (Report on JTS Renewable fuel usage)

iii) Supporting journal article

- Quantitative assessment of palm oil wastes generated by mills in Southern Benin
- Production of medium chain glycerides and monolaurin from coconut acid oil by lipase-catalyzed reactions
- Physical Refining of Coconut Oil: Effect of Crude Oil Quality and Deodorization Conditions on Neutral Oil Loss
- Sustainable Oil Palm Waste Management in Engineering Development

GS VVB assessment	Date: 17/04/2023

VVB has assessed that the project is not using any kind of woody/non-woody biomass that is

1. Originating from land areas that are forests.
2. Croplands and/or grasslands

therefore, monitoring for diversion of land from other essential purposes like food production is not required.
CAR is closed.

CAR ID	28	Section no.	Dev. Req	Date: 07/02/2023

Description of CAR

the Project Developer shall provide a Compliance Report showing that the project is in compliance with the latest version of the Roundtable on Sustainable Palm Oil guidance document on Principles and Criteria for Sustainable Palm Oil Production (including the national interpretations). Furthermore, Project Developer must demonstrate that they have started the process for RSPO compliance at the time of preliminary review.
Project participant response **Date: 23/03/2023**
The responses to the requirement have been addressed in section B.5.1 of the updated PDD along with the necessary supporting documents.
Documentation provided by project participant
i) Updated PDD ii) JTS declaration for RSPO_MSPO compliance
GS VVB assessment **Date: 23/03/2023**
RSPO compliance will only be applicable when the project activity uses fuel derived from palm-based oil. PP has represented that they are purchasing the NERADO fuel from the suppliers/sources that are RSPO compliant and the compliance documents shall be provided as supporting documents during verification. # CAR 28 is closed.

CAR ID	**29**	**Section no.**		**Date: 07/02/2023**
Description of CAR				
As the LSC is conducted after the start date, therefore, in line with 4,1,28 of the GS4GG Principles and Requirements V 1.2, the Project Developer shall provide further explanation of how comments received during the consultation are taken into account and implement a Grievance Mechanism in line with the Stakeholder Consultation & Engagement Requirements.				
Project participant response				**Date: 15/03/2023**
Further explanation has been provided in both the Local Stakeholder Consultation Report and the PDD				
Documentation provided by project participant				
i) Updated PDD ii) Updated Local Stakeholder Consultation Report				
GS VVB assessment				**Date: 17/04/2023**
The PP has update the LSC report and PDD. PDD now represent that the ongoing and continuous grievance mechanism is in place. # CAR is closed.				

CAR ID	**30**	**Section no.**	**B-5**	**Date: 07/02/2023**
Description of CAR				
The initial objective of a sensitivity analysis is to determine in which scenarios the project activity would pass the benchmark or become more favourable than the alternative. Hence, PP to transparently evaluate the sensitivity of the parameters up to an extent at which the project activity become financially viable without VER revenue and present the likelihood of such scenario.				
Project participant response				**Date: 23/03/2023**
PP has updated the investment analysis spreadsheet and PDD to transparently evaluate the sensitivity of the parameters to illustrate the extent where the project activity would become financially viable without VER revenue and presented the likelihood of such scenario.				
Documentation provided by project participant				
i) *JTS NERADO investment analysis spreadsheet* ***ii)*** *Updated PDD*				
GS VVB assessment				**Date: 17/04/2023**
PP has subjected the sensitivity analysis up to +/-8% of the fuel cost, PP to justify why the sensitivity is restricted up to +/-8% only. Moreover, PP to transparently evaluate the sensitivity of the parameters up to an extent at which the project activity become financially viable without VER revenue and present the likelihood of such a scenario. **CAR is open**				
Project participant response				**Date: 16/05/2023**
The sensitivity analysis has been updated along with the updated investment analysis to ensure that the				

reasonable sensitivity of the applicable variables is accounted for. The sensitivity of the variables was also transparently evaluated to the extent at which the project activity become financially viable without VER revenue and addressed the likelihood of the scenario occurring.
Results from the sensitivity analysis have also been addressed under the relevant sections under “STEP 2: Investment Analysis” of the updated PDD.

Documentation provided by project participant

i) Updated PDD

ii) Updated JTS NERADO Investment Analysis Spreadsheet

GS VVB assessment	**Date: 01/06/2023**

The Verification and Validation Body (VVB) has reviewed the response provided by the Coordinating and Managing Entity (PP) regarding the sensitivity analysis and updated investment analysis. According to the PP, the sensitivity analysis has been updated, considering the reasonable sensitivity of applicable variables. This indicates that the project has been evaluated for potential variations in these variables to assess its financial viability.
VVB assessed that the parameters have been subjected to +/-10% variation. Also, the parameters have been subjected to a variation up to the extent at which the project activity become financially viable without VER revenue. However, it is represented graphically that the project becomes financially viable with increase of HFO price by 270%. PP to clarify how it is possible that by increasing the price of baseline fuel project can be financially viable. PP shall correct the calculations and contradicting statement.
CAR is open.

Project participant response	**Date: 06/06/2023**

The sensitivity analysis was conducted in the updated investment analysis to ensure that the reasonable sensitivity of the applicable variables were accounted for. The PP has also corrected the calculations for the parameters when subjected to a variation up to the extent at which the project activity becomes financially viable without VER revenue. The corrected calculation reflects that the scenario where the baseline fuel (HFO) is subjected to a 26% increase would result in the project activity becoming more financially viable without VER revenue.

The likelihood of the scenario occurring has been addressed in the PDD under subset 2d of the investment analysis (Step 2) through the following statement: While on the other hand, the scenario of having an increase in HFO price over 26% from the 2018 value is unlikely. Reasons to support this are because average historical pricing of HFO over the past 10 years have been ranging approximately 44% below the threshold level of the 26% increase from the 2018 HFO price. Furthermore, there are other external factors such as a declining demand for HFO due to regulatory factors that drive the shift from HFO to alternative fuels. In addition, the market for fuel oils has been relatively competitive as suppliers and producers face competition from various sources, including other types of fuel oils and energy sources. This competition also helps to regulate the HFO prices and prevents substantial increase in price.

Documentation provided by project participant

iii) Updated PDD

iv) Updated JTS NERADO Investment Analysis Spreadsheet

GS VVB assessment	**Date: 14/07/2023**

VVB acknowledges that the sensitivity analysis was conducted as part of the updated investment analysis, considering the reasonable sensitivity of applicable variables. VVB also recognizes that PP has made corrections to the calculations for the parameters. Furthermore, based on the information provided, VVB has assessed the sensitivity analysis conducted by PP which revealed that even with a 10% increase in HFO price and a 10% decrease in NERADO price, the benchmark is not breached. This means that the baseline scenario, which is based on the price of HFO, remains the most viable and profitable option. However, VVB further assessed the sensitivity of the parameters and found that the benchmark is breached when there is a 26% increase in HFO price or a 21% decrease in NERADO price. This indicates that the benchmark is more sensitive to larger variations in fuel prices.
Based on their assessment, VVB concluded that the fuel prices have a relative correlation, meaning that it is highly unlikely for only one type of fuel price to increase without an increase in the other type of fuels. This suggests that if there is a significant increase in HFO price, it is expected that other types of fuels would also experience price increases.
Overall, this information implies that the benchmark remains unaffected by moderate variations in fuel prices but becomes breached when there are larger fluctuations in the prices of HFO and NERADO which

is a highly unlikely scenario. Therefore, The CAR is closed.

CAR ID	31	Section no.	NA	Date: 14/07/2023
Description of CAR				
As the PDD template has been updated by GS therefore the PDD template version 1.2 is obsolete, PP shall use the latest available version 1.5 of the PDD template.				
Project participant response				**Date: 28/08/2023**
Template has been updated				
Documentation provided by project participant				
GS11356 NERADO Fuel Switch PDD_28082023				
GS VVB assessment				**Date: 01/09/2023**
PP has now updated a PDD using the GS latest format for PDD i.e v1.5 Hence, CAR is closed				

CAR ID	32	Section no.	PDD	Date: 19/09/2023
Description of CAR				
1. As per para 22 of the meth: "the average of the immediately prior three-year historical fossil fuel consumption data, for the existing facility, shall be used to determine an average annual baseline fossil fuel consumption value. Similarly, prior three-year historical production data (excluding abnormal years) for the existing facility, shall be used to determine an average annual historical baseline output production rate. "Accordingly aluminium production data have not been presented to derive the baseline specific emission factor. 2. The latest document related to this is "Methodological tool Investment analysis, version 12.0 ". But in the PDD that has not been referred. Relevant paras from the tool need to refer.				
Project participant response				**Date: 06/11/2023**
1. The immediate prior three-year historical data for aluminium production was added into the PDD in the relevant section. The appropriate supporting documents and files have also been provided. 2. The relevant tool (TOOL27 version 13.0) and guidance on the assessment of investment analysis (version 05) along with their respective relevant paragraphs have been added and updated in the PDD under the appropriate sections.				
Documentation provided by project participant				
1. Updated PDD 2. 2016-2022 JTS fuel consumption file 3. JTS Product Output Data 2016 – 2022 file				
GS VVB assessment				**Date: 01/09/2023**
1. PP has now updated three-year aluminium production data in table 5 of section B.4. Hence CAR is closed. 2. PP has now updated references in of tools in PDD version 1.5. Hence, CAR is closed.				

CAR ID	33	Section no.	Preliminary Review	Date: 19/09/2023
Description of CAR				
PD to address the following FAR from the GS4GG preliminary review round 1. PP shall provide the opinions of an expert stakeholder been provided for the following: Principle 4.1 Sites of Cultural and Historical Heritage Principle 4.2 Forced Eviction and Displacement Principle 4.3 Land Tenure and Other Rights Principle 4.4 Indigenous Peoples Principle 8.1 Impact on Natural Water Patterns/Flows Principle 8.2 - Erosion and/or Water Body Instability Principle 9.10 - High Conservation Value Areas and Critical Habitats Principle 9.11 - Endangered Species 2. The revised cover letter does not include JTS Optimax Pte Ltd as a project participant. PP shall maintain consistency between GS4GG cover letter and PDD while listing project participant and representative. GS VVB shall assess and provide its opinion on the same.				

3. PP shall insert the GS ID of the project in the ODA declaration form.
4. PD to supply supporting data for all parameters in time for validation/design review, or allocation may be delayed. This includes and is not limited to: ER spreadsheets, individual study calculations, survey results, study reports etc. GS VVB shall assess and provide its opinion on the same.
5. B.6 – The SDG targets and indicators chosen by PP does not correspond to selected SDGs. For ex: for SDG 13, PP has chosen SDG target from SDG 3 which is incorrect. PP shall take note of this and take corrective actions.
6. C.2.1 – The crediting period start of project must be the start of project operation or a maximum of two years prior to the date of Project Design Certification whichever is later. PP shall take note of this and update the start date of crediting period.
7. D.1 - PP shall complete the table stating the safeguarding principles that will be monitored.
8. PD shall refer and address the requirement cited vide deviation request form approved (dated 27/10/2020) by GS during validation stage.

Project participant response	**Date: 06/11/2023**

1. The assessment of safeguarding principles is provided in appendix 1 of the PDD, it has been found that none of the principles mentioned are applicable to the project activity. Also the EIA for the project activity has been conducted which has been shared with the VVB during the validation, therefore, the further opinion of any specific expert stakeholder in not required.

2. The PDD has been updated to reflect JTS Engineering Sdn Bhd as the only entity represented as the project developer.

3. The GS ID has been inserted in the ODA declaration form.

4. The relevant supporting data for all parameters have been supplied to the VVB during the validation stage.

5. The SGD targets and their appropriate indicators have been amended and reflected in the updated PDD.

6. The crediting period for the start of the project has been updated to the appropriate date which is two years prior to the date of Project Design Certification and reflected in the relevant sections in the PDD.

7. The safeguarding principles assessment table in the PDD has been completed and provided in appendix 1.

8. The requirements cited in the approved deviation request form (dated 21/10/2020) has been addressed accordingly in the relevant section of the PDD.

Documentation provided by project participant

1. Updated PDD

2. ODA declaration form

3. EIA report (NASUPA Sdn. Bhd)

4. NASUPA to JTS Engineering name change document

GS VVB assessment	**Date: 01/09/2023**

1. PP has now provided assessment on safeguarding Principle Assessment in Appendix 1 of the PDD version 1.5 in line with Annex 1 of GS4GG Safeguarding Principles and Requirements V2.1. Hence, CAR is closed.
2. PP has now JTS Engineering Sdn Bhd as the only entity represented as the project developer in entire PDD and cover page of the PDD version 1.5 is in line with GS4GG PDD, version 1.5 template. Hence CAR is closed.
3. PP has now inserted GS ID in the ODA declaration form. Hence, CAR is closed.
4. PP has now provide ER sheet and supporting documents. Hence CAR is closed.
5. PP has now updated SDG targets and indicators corresponds to selected SDGs in table 13 of section B.6 of the PDD, version 1.5. Hence, CAR is closed.
6. The crediting period start date has been updated by PP in C.1 & C.2 of PDD version 1.5 as per

the requirement of §10.2.1 “GHG Emissions Reductions & Sequestration Product Requirement, V 2.2 “ The start date of Crediting Period is the date of start of operation (start of planting for A/R Projects) or a maximum of two years (three years for A/R & AGR) prior to the date of Project Design Certification, whichever occurs later”. Hence, CAR is closed. 7. PP has now completed the table stating the safeguarding principles that will be monitored in Appendix 1 of the PDD, version 1.5. Hence, CAR is closed. 8. PP has been addressed the requirements cited in the approved deviation request form (dated 21/10/2020) in table 12 of the PDD, version 1.5. Hence, CAR is closed.

Table 3. FARs for the VVB undertaking subsequent verifications

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FAR	1	Section no.	Preliminary Review	Date: 02/02/2024
Description of FAR				
VVB to verify the consumption data, if PP has consumption records of palm sludge oil as per section B.5.1. of this PDD. It is mandatory for PP to produce RSPO compliance for the purchased palm sludge oil.				